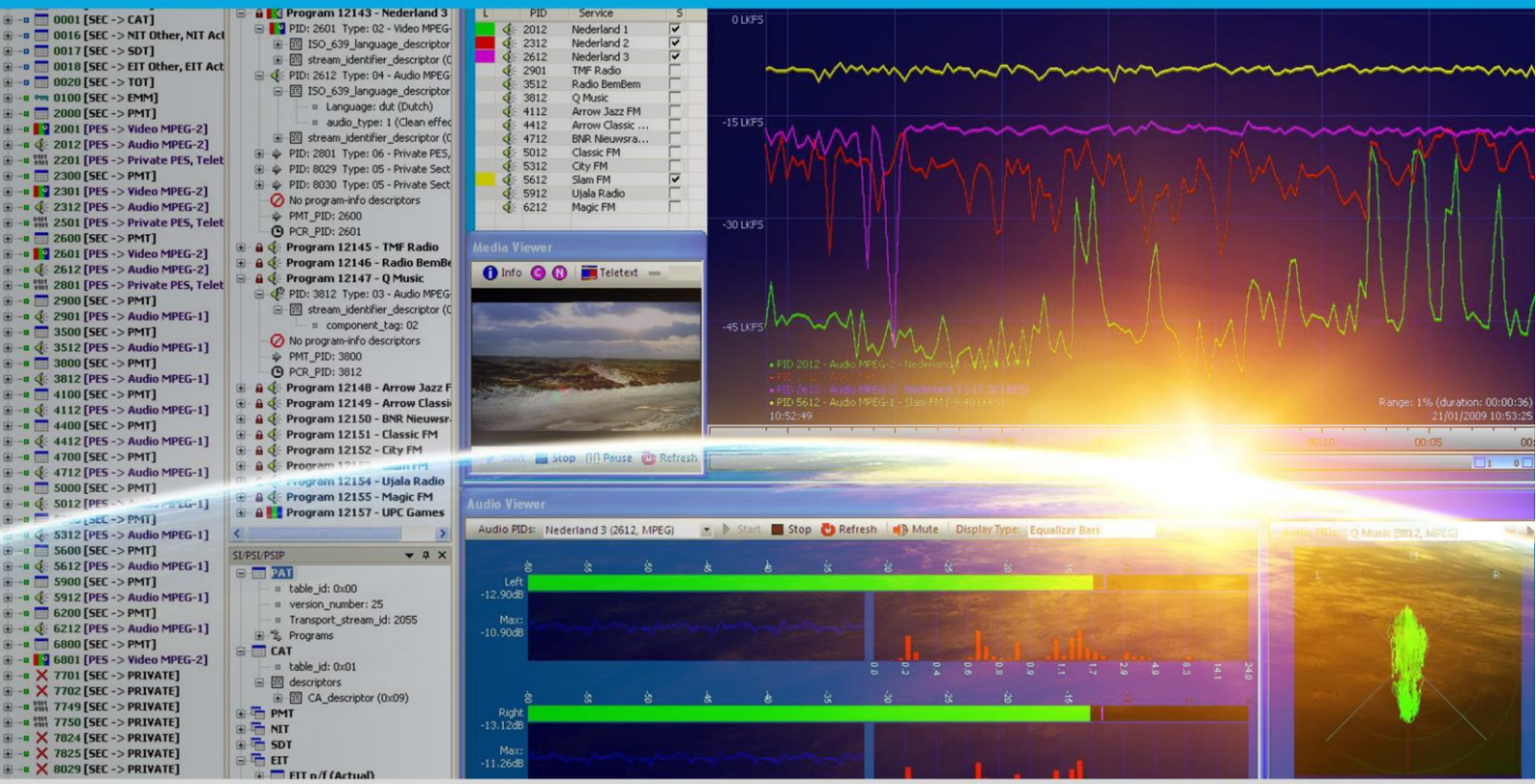
DVBControl

DVBAnalyzer



User Manual

May 2020

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General

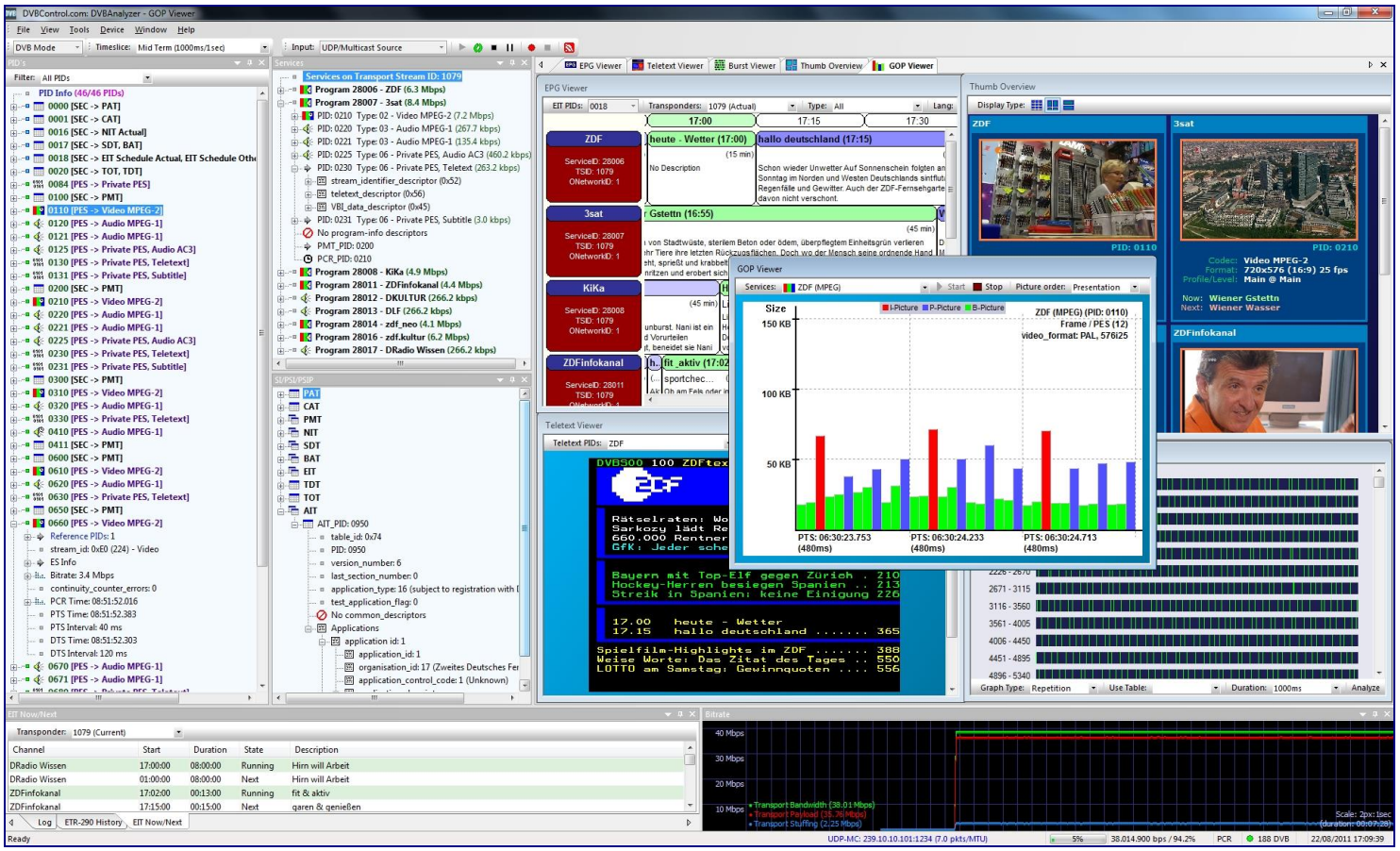
- DVBAnalyzer
- User Interface

1 DVBAnalyzer

1.1 Introduction

DVBAnalyzer is part of the DVBControl software toolset which enables powerful monitoring and analyzing of all aspects of DVB Transport Streams. This can be done from high level summary overviews, down to bit interpretation compliance.

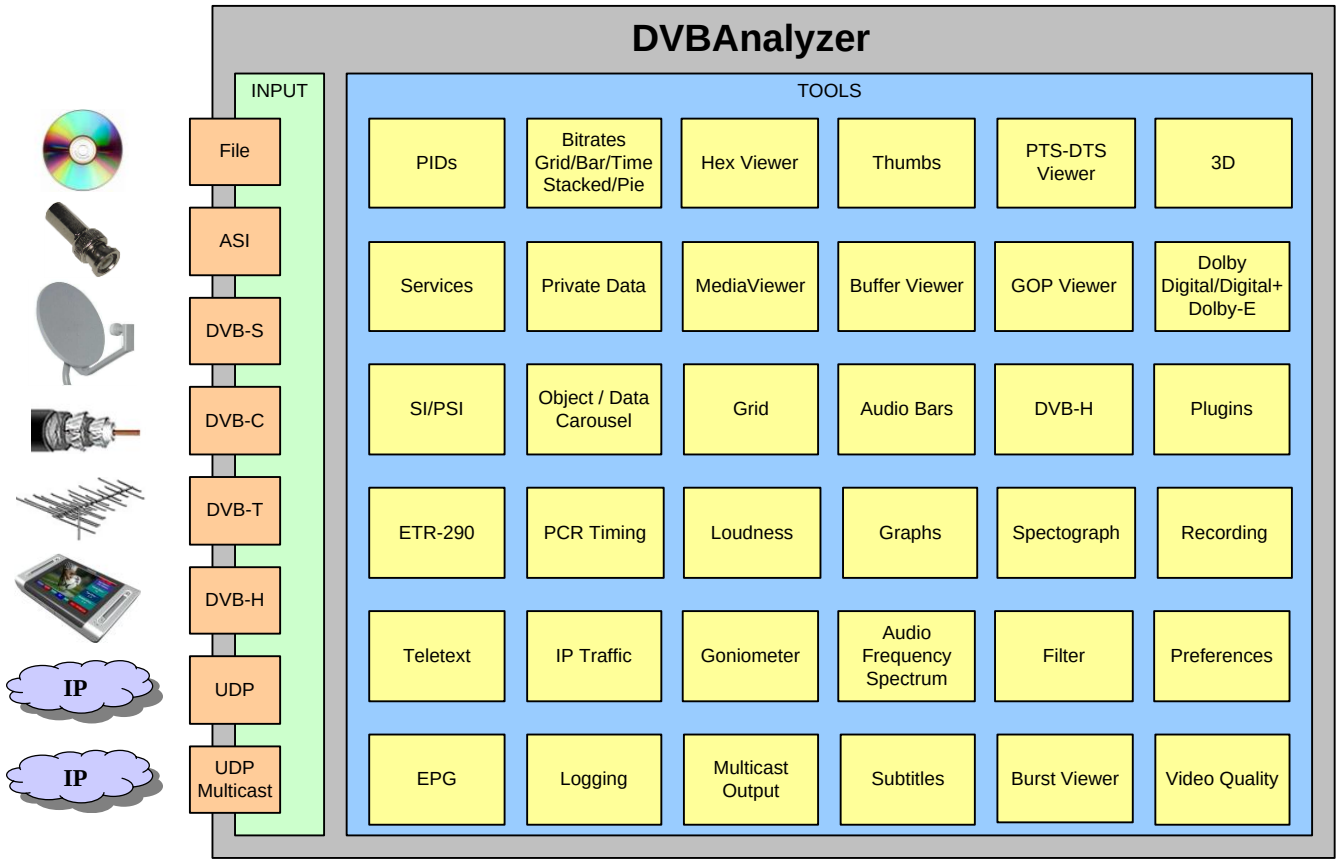
By quickly identifying different fields of interests, DVBAnalyzer helps developers, broadcasters, system integrators, and field operators during maintenance, development and testing of DVB equipment, networks and services.



1.2 Overview

Via easy User Interface interaction, DVBAnalyzer enables you to quickly analyze:

- PID structures
- Service structures
- SI/PSI/PSIP structures
- ETR 290 compliancy
- Timing
- Bitrates
- Teletext
- Subtitling
- EPG
- Private Data
- Object/Data Carousels
- GOP structures
- Video Quality
- PTS-DTS timing
- Buffer behavior
- Audio and Loudness behavior
- Dolby® Digital audio
- Dolby®-E audio
- DVB-H structures



Different views can be chosen to get maximum information:

- PID Overview
- Service Overview
- Grid Overview
- Bitrate Overview
- Thumb Overview
- Table Overview
- Descriptor Overview
- Media Viewer
- PCR Timing Viewer
- EPG Viewer
- Teletext Viewer
- Subtitle Viewer
- Hex Viewer
- Burst Viewer
- DSMCC Viewer
- IP Traffic Viewer
- VBI-Cue Viewer
- SCTE-35 Viewer
- PTS-DTS Viewer
- GOP Viewer
- Buffer Viewer
- Video Quality Viewer
- Audio Viewer (Samples, Equalizer Bars, Frequency, Spectrograph and Goniometer)
- Loudness Viewer
- Audio Metadata Viewer
- DVB-H Bootstrap Viewer
- DVB-H Time-slice Viewer
- DVB-H MPE-FEC Viewer
- DVB-H Services Overview
- DVB-H Time-slices Overview

Most views can be opened more than once and supports Unicode character sets.

Both pre-recorded and live broadcasted DVB Transport Streams (TS) can be analyzed when provided as:

- File
- DVB-ASI (input via ASI input board)
- DVB-S (input via Satellite receiver board)
- DVB-T (input via Terrestrial receiver board)
- DVB-C (input via Cable receiver board)
- UDP Unicast
- UDP Multicast
- OTT Streaming (RTSP/RTMP/RTP/HLS)

See appendix ‘Input Adapters’ for all Input possibilities.

DVBAnalyzer can be launched more than once as long as the different applications are not trying to use the same hardware receiver device.

1.3 Licensing

DVBAnalyzer is available in different software configurations.
On Top of the DA-Base software, different options can be used.

Options can be ordered separately.

Features	Base software DA-Base	Option TP	Option OD	Option AV	Option VQ	Option 3D	Option AA	Option DD	Option DE	Option DH
PID structures	X									
Service structures	X									
SI/PSI/PSIP structures	X									
PID Overview	X									
Service Overview	X									
Grid Overview	X									
Bitrate Overview	X									
Thumb Overview	X									
Table Overview	X									
Descriptor Overview	X									
MIP Overview	X									
AIT Overview	X									
Logical Channel Overview	X									
ETR290 Viewer	X									
Media Viewer	X									
PCR Viewer	X									
EPG Viewer	X									
Teletext Viewer		X								
Subtitle Viewer		X								
Hex Viewer		X								
Burst Viewer			X							
DSMCC Viewer			X							
IP Traffic Viewer			X							
VBI-Cue Viewer			X							
SCTE-35 Viewer			X							
DVB-T2 Viewer			X							
Multi-/Unicast Output			X							
PTS-DTS Viewer				X						
GOP Viewer				X						
Buffer Viewer				X						
Video Quality - Waveform - Vector scope - Blocking - Blurring - Ringing - Histograms					X X X X X					
3D Media Support						X				

Features	Base software DA-Base	Option TP	Option OD	Option AV	Option VQ	Option 3D	Option AA	Option DD	Option DE	Option DH
Audio Viewer - Samples - Equalizer Bars - Frequency - Spectrum - Spectrograph - Goniometer							X X X X X			
Loudness Viewer							X			
Audio Metadata Viewer							X			
RDS Viewer							X			
Dolby® Digital Plus								X		
Dolby®-E									X	
DVB-H Viewer										X
DVB-T2 Viewer										X
Logs	X	X	X	X	X	X	X	X	X	X

Software Maintenance Support (SMS)

When purchasing the DVBAnalyzer base license, 1 year SMS (Software Maintenance Support) is included.

1.4 Requirements

DVBAnalyzer runs under the Microsoft Windows operating systems and has been verified on:

- Windows 10 (Professional and Ultimate)
- Windows Server 2016 or 2019.

All Windows updates needs to be installed, including platform updates.

Best performance can be guaranteed by working on modern PC systems such as:

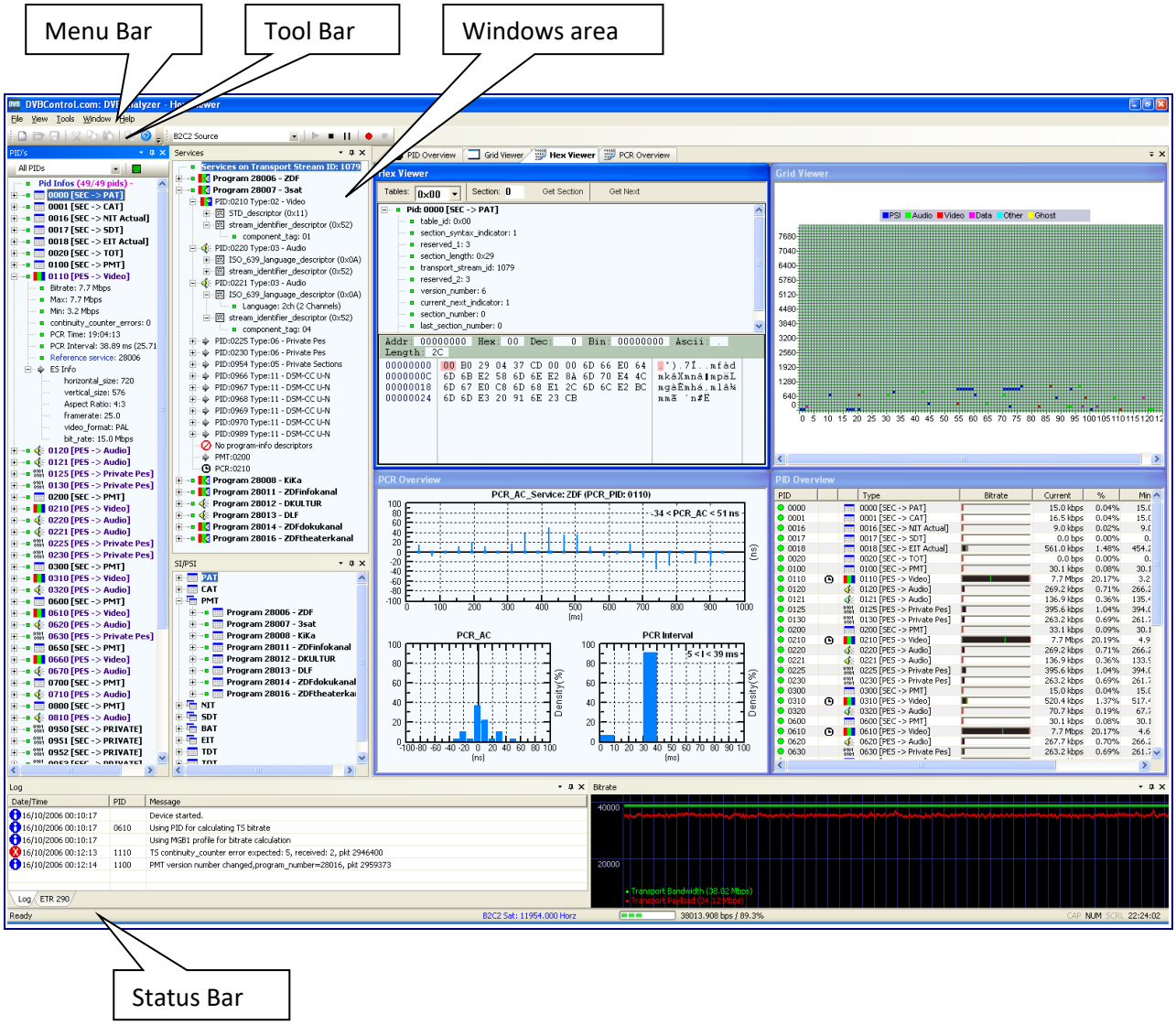
- Processor: Intel Quad Core or better
- Processor speed > 1,8 GHz*
- Memory at least 1 GB RAM
- Screen resolution at least 1600x1200 (**recommended 1920x1080 or higher**)

* **Option 'Video Quality' and HEVC decoding requires a higher CPU.**

2 User Interface

To provide maximum useful information, DVBAnalyzer uses different windows with different context sensitive views.

Window elements

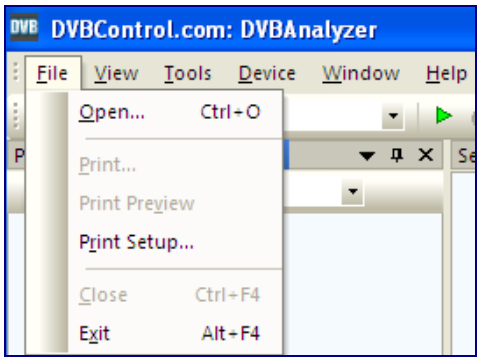


2.1 Menu Bar

The sub-menu options available in the Menu Bar selection, such as File, View, Tools, Windows and Help, are described in detail in their respective sections. A summary of each main menu item is given here:

Main menu item	Hot key	Principal functions/sub-options
File	Alt + F	Close, Exit
View	Alt + V	Toolbars, Status Bar, Application Look, Fullscreen Mode
Tools	Alt + T	DVBAnalyzer Tools, Properties
Device	Alt + D	Control input Device
Windows	Alt + W	Cascade, Tile, Close Windows
Help	Alt + H	License Manager, Updates, Manual, About DVBAnalyzer

File



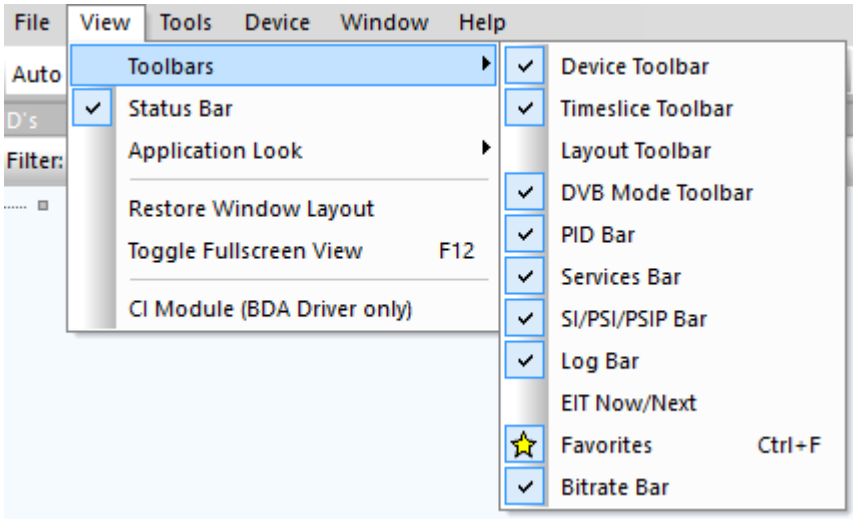
File menu	Hot key	Principal functions
Open	Ctrl + O	Open File input
Close	Ctrl + F4	This option closes the focused windows Tool
Quit	Alt + F4	This option exits DVBAnalyzer

View

The View submenu has 3 sub-options:

- Toolbars
- Status Bar
- Application Look
- Restore Windows Layout
- Toggle Full Screen Mode (F12)
- BDA Common Interface Menu

Toolbars

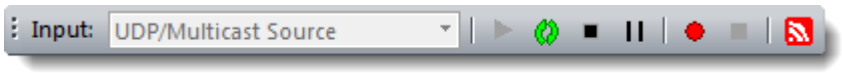


Toolbars allows the possibility to enable/disable different Bars:

- Device Toolbar
- Timeslice Toolbar
- Layout Toolbar
- DVB Mode Toolbar
- PID Bar
- Services Bar
- SI/PSI/PSIP Bar
- Log Bar
- EIT Now/Next
- Favorites
- Bitrate Bar

Different handy Toolbars enable quick usage of basic features of DVBAnalyzer.

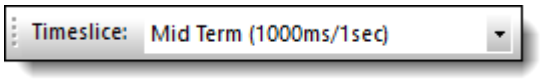
Device Toolbar



The 'Device Toolbar' gives the possibility to quickly start, stop, pause and record a stream.
When the OD option is enabled, also the Start/Stop Multicast Output button is enabled.

When using file input, it is also possible to see the current position/total time and jump to positions.

Timeslice Toolbar



The 'Timeslice Toolbar' gives the possibility to quickly change the timeslice interval which is used for the bitrate calculation.

Layout Toolbar

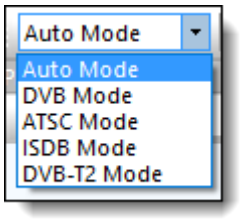
With the 'Layout Toolbar' it is possible to manage multiple layouts:

- Load Layout
- Save/Update Layout
- Add new Layout
- Remove Layout

DVB Mode Toolbar

The 'DVB Mode Toolbar' gives the possibility to choose between the different modes:

- Auto
- DVB
- ATSC
- ISDB
- DVB-T2 (used for DVB-T2 Viewer)

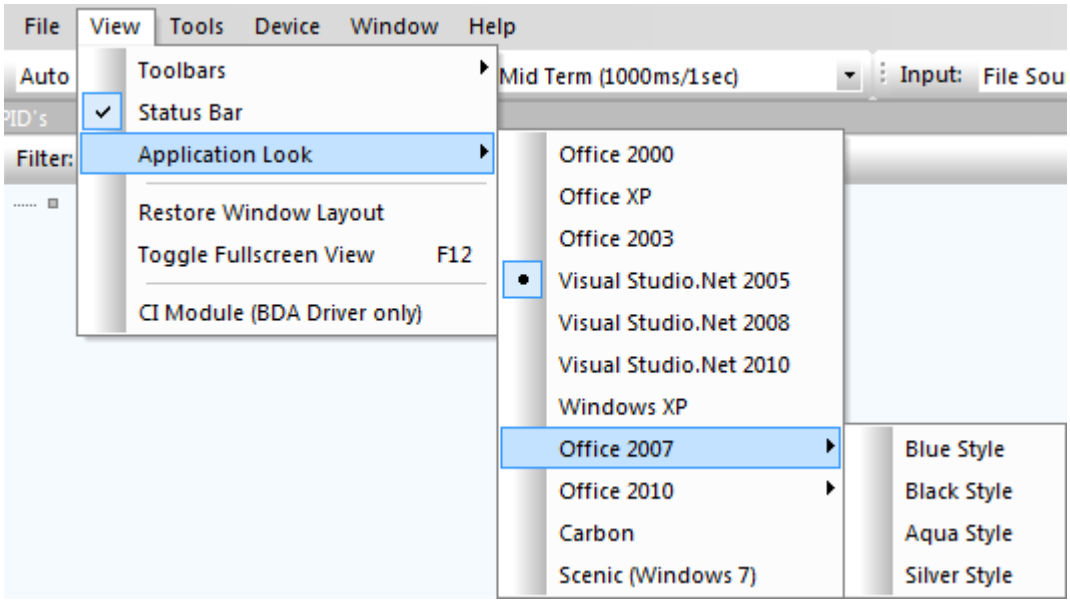


The functionality of the other (PID, Service, SI/PSI/PSIP, Log, EIT Now/Next, Favorites and Bitrate) Bars are described in detail in their respective chapters.

Status Bar

Enable/Disable the Status Bar.

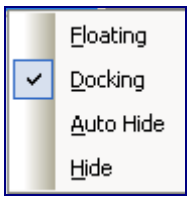
Application Look



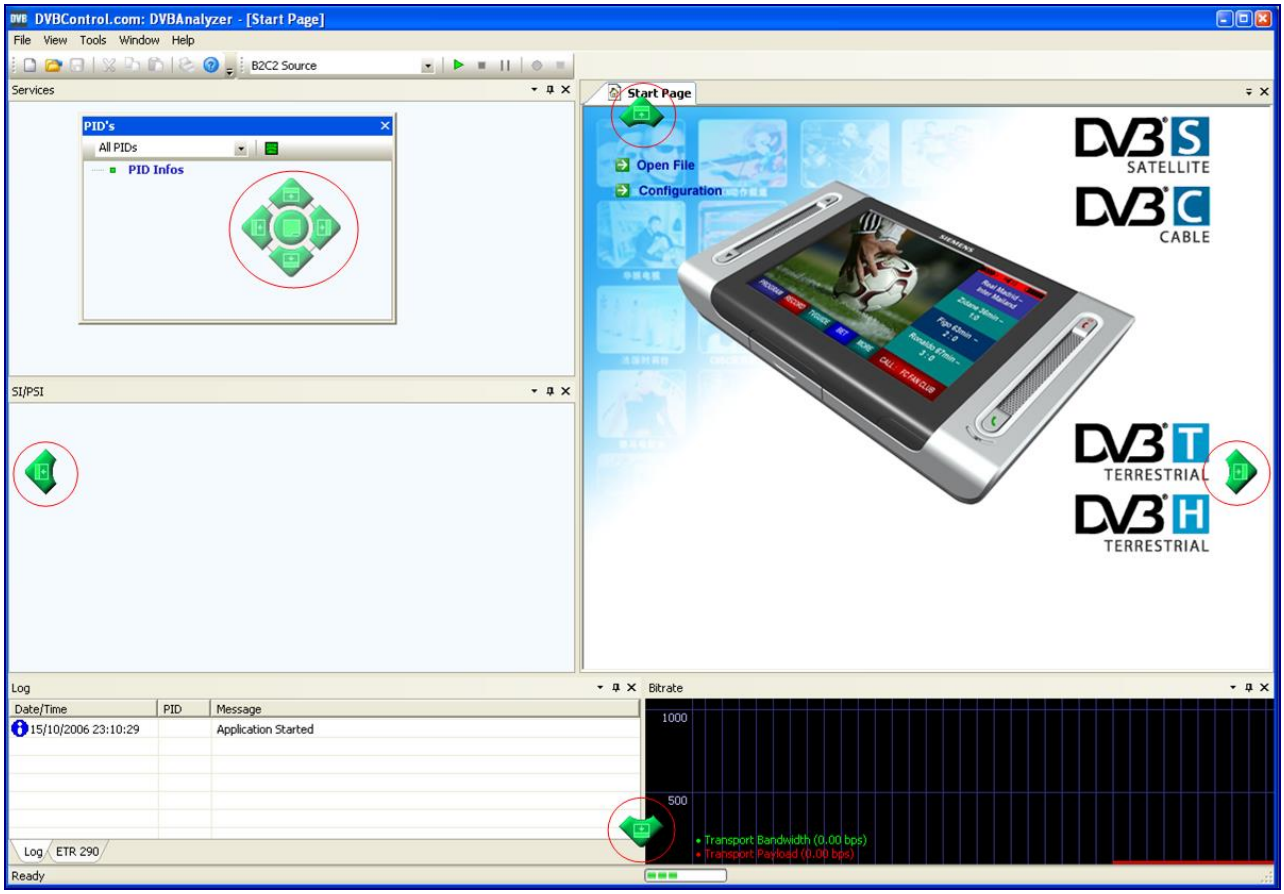
Enable different application looks:

- Office 2000
- Office XP
- Office 2003
- Visual Studio.NET 2005
- Visual Studio.NET 2008
- Visual Studio.NET 2010
- Windows XP
- Office 2007 (Blue, Black, Aqua or Silver style)
- Office 2010 (Blue, Black or Silver style)
- Carbon

All windows can be configured depending on the chosen Application Look:



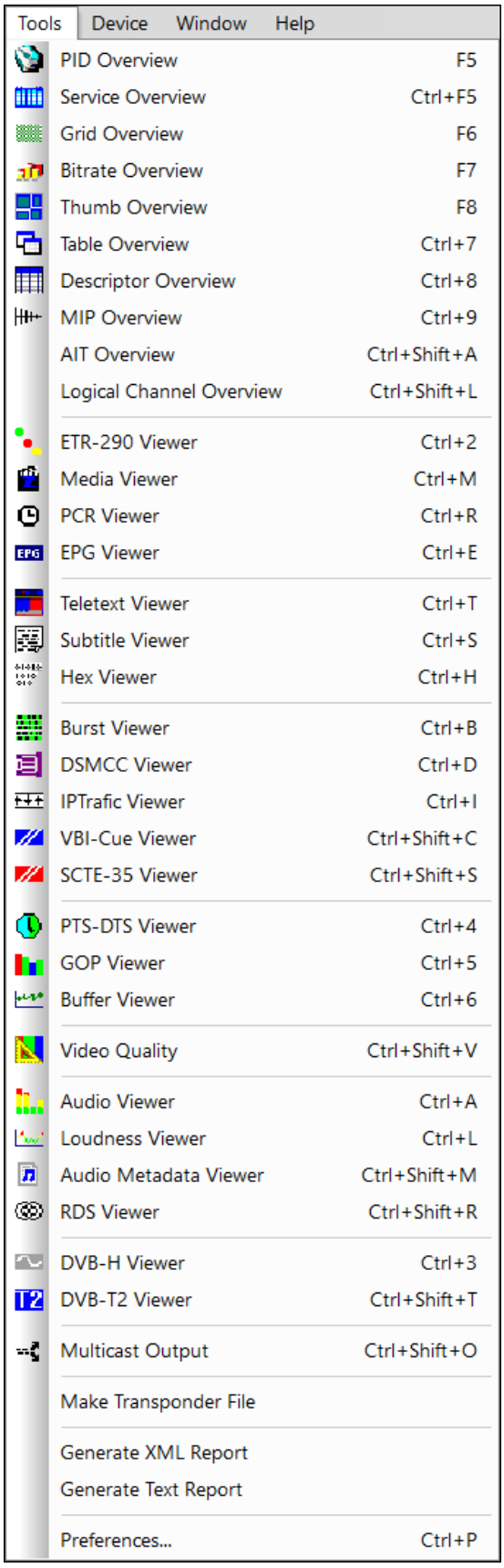
- Floating, Docking, Auto Hide or Hide
- Change sizes
- Change positions



By clicking with the left-mouse button on a window and dragging it to another position, the various possible positions are displayed.

Tools

All DVBAnalyzer tools can be selected via the Tools Menu option and have their own icon.



Most tools can be selected more than once. This way multiple variations of a tool can be presented in parallel.

Tools menu	Hot key	Principal functions
PID Overview	F5	Enable PID Overview window
Service Overview	Ctrl + F5	Enable Service Overview window
Grid Overview	F6	Enable Grid Overview window
Bitrate Overview	F7 *	Enable Bitrate Overview window
Thumb Overview	F8	Enable Thumb Overview window
Table Overview	Ctrl + 7	Enable Table Overview window
Descriptor Overview	Ctrl + 8	Enable Descriptor Overview window
MIP Overview	Ctrl + 9	Enable Descriptor Overview window
AIT Overview	Ctrl + Shift + A	Enable AIT Overview window
Logical Channel Overview	Ctrl + Shift + L	Enable Logical Channel Overview window
ETR290 Viewer	Ctrl + 2	Enable ETR290 Viewer window
Media Viewer	Ctrl + M *	Enable Media Viewer window
PCR Timing Viewer	Ctrl + R *	Enable PCR Timing Viewer window
EPG Viewer	Ctrl + E *	Enable EPG Viewer window
Teletext Viewer	Ctrl + T *	Enable Teletext Viewer window
Subtitle Viewer	Ctrl + S *	Enable DVB Subtitle Viewer window
Hex Viewer	Ctrl + H	Enable Hex Viewer window
Burst Viewer	Ctrl + B	Enable Burst Viewer window
DSMCC Viewer	Ctrl + Shift + S	Enable Data/Object Carousel (DSMCC) Viewer window
IP Traffic Viewer	Ctrl + I *	Enable IP Traffic Viewer window
VBI-Cue Viewer	Ctrl + Shift + C	Enable IP Traffic Viewer window
SCTE-35 Viewer	Ctrl + Shift + S	Enable IP Traffic Viewer window
PTS-DTS Viewer	Ctrl + 4 *	Enable PTS-DTS Viewer window
GOP Viewer	Ctrl + 5 *	Enable GOP Viewer window
Buffer Viewer	Ctrl + 6 *	Enable Buffer Viewer window
Video Quality Viewer	Ctrl + Shift + V	Enable Video Quality Viewer window
Audio Viewer	Ctrl + A *	Enable Audio Viewer window
Loudness Viewer	Ctrl + L	Enable Loudness Viewer window
Audio Metadata Viewer	Ctrl + Shift + M	Enable Audio Metadata Viewer window
RDS Viewer	Ctrl + Shift + R *	Enable RDS Viewer window
DVB-H Viewer	Ctrl + 3	Enable DVB-H Viewer window
DVB-T2 Viewer	Ctrl + Shift + T	Enable DVB-T2 Viewer window
Multicast Output	Ctrl + Shift + O	Enable UDP Multicast Output window
Preferences	Ctrl + P	Open Preferences edit window

* These Tools can be opened more than once.

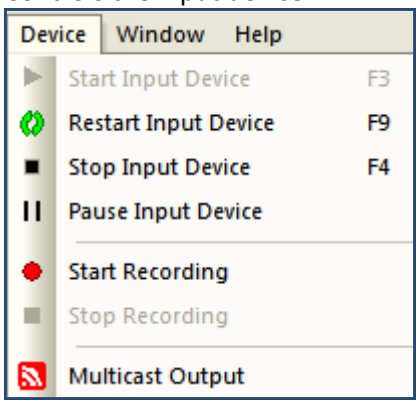
All Tools are described in detail in their respective chapters.

Generate XML Report
Generates a detailed XML report of all analyzed TS settings.

Generate Text Report
Generates a detailed Text report of all analyzed TS settings.

Device

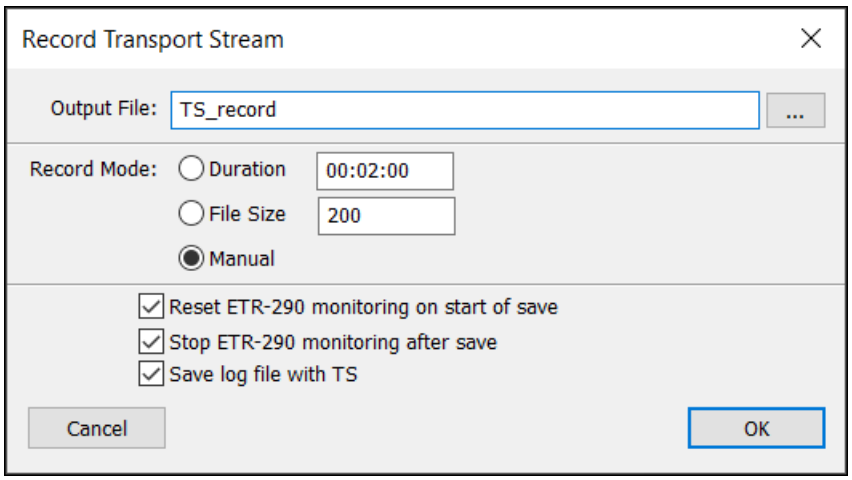
Controls the input device



Device menu	Hot key	Principal functions
Start Input Device	F3	Start the input device
Restart Input Device	F9	Restart the input device
Stop Input Device	F4	Stop input device
Pause Input Device		Pause input
Start Recording		Start Recording the input as TS
Stop Recording		Stop Recording
Multicast Output		Enable/disable multicast of total Transport stream

The Device toolbar shows also all buttons:

When starting a TS recording you get the following dialog box.



A TS recording can be made”

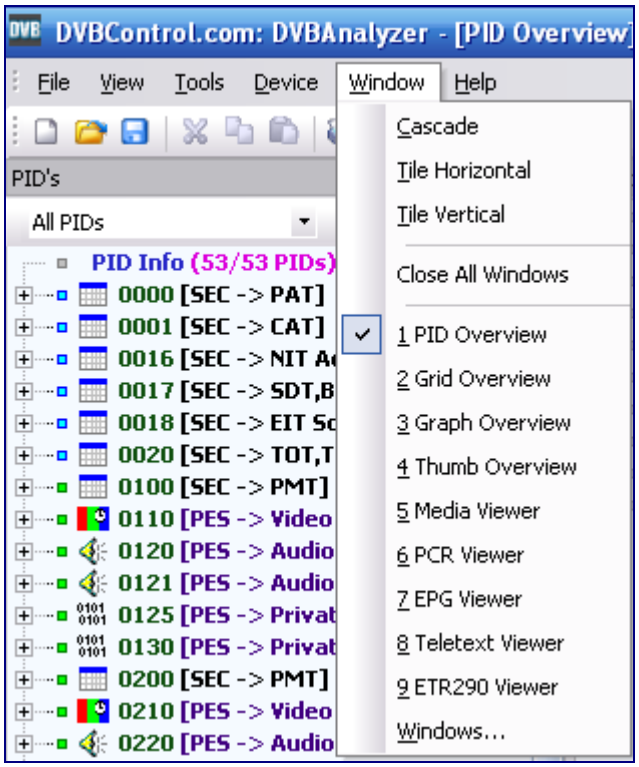
- Duration
- File Size
- Manual

Extra options can be enabled:

- Reset ETR-290 monitoring on start of save
- Stop ETR-290 monitoring after save
- Save log file with TS

Windows

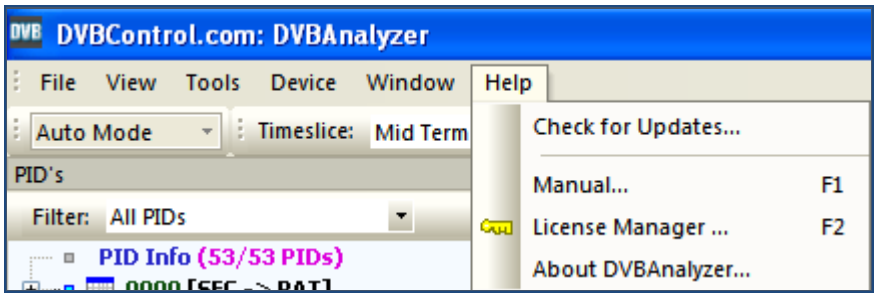
The various opened Tool windows can be presented in different styles (Cascade, Tile Horizontal, and Tile Vertical).



Window menu	Short key	Principal functions
Next Tool	Ctrl+Tab	Focus on next Tool
Previous Tool	Ctrl+Shift+Tab	Focus on previous Tool

Help

All Help related subjects can be selected via the Help menu option.



Check for Updates
Downloads the latest updates.

Manual
Opens the DVBAnalyzer manual (PDF)

License Manager
Administers the application licenses.

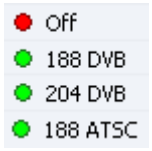
About DVBAnalyzer
Displays the application version number information.

2.2 Status bar

The Status Bar gives information about

- Input-kind: File, ASI, DVB-S, DVB-C, DVB-T, UPD or UDP Multicast
- Input-source: Filename, Frequency or IP-number
- CPU load
- Bitrate/payload Transport Stream
- Validation (see below)
- Amount of Bytes in Packet (188, 192 of 204)
- DVB, ATSC or ISDB
- TS date/time (TDT/TOT)

The examples of the validation of the Transport Stream can be:



DVBAnalyzer displays the time provided by the TDT table and locks this to the MGB2 PCR time. This means when a transport stream enters a loop, the correct start time will be displayed.

2.3 General Preferences

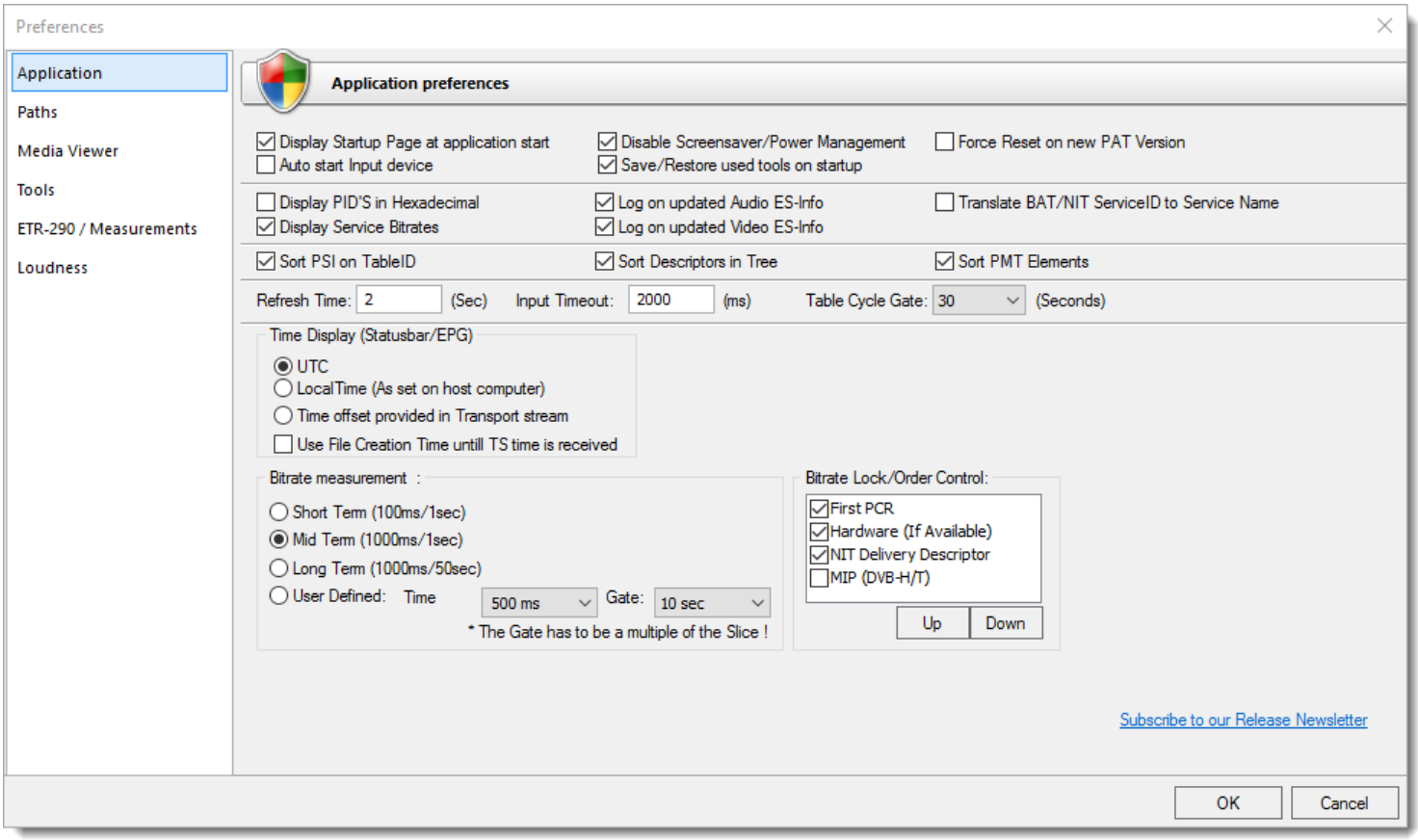
Customized preferences have impact on behavior and are categorized:

- Application
- Paths
- Media Viewer
- Tools
- ETR-290 / Measurements
- Loudness

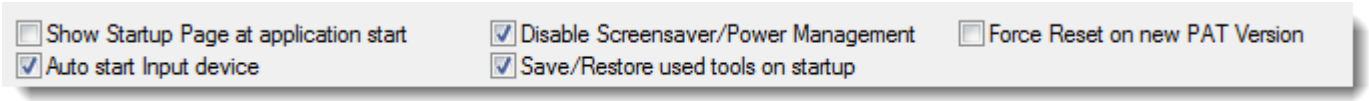
2.3.1 Application Preferences

Application settings for:

- General preferences
- Time Display
- Bitrate measurement
- Bitrate Lock/Order Control



General preferences



Show Startup Page at application start
If enabled, the start page window is displayed at application start

Auto start Input device
After application start, the input device will tune to its latest used source.

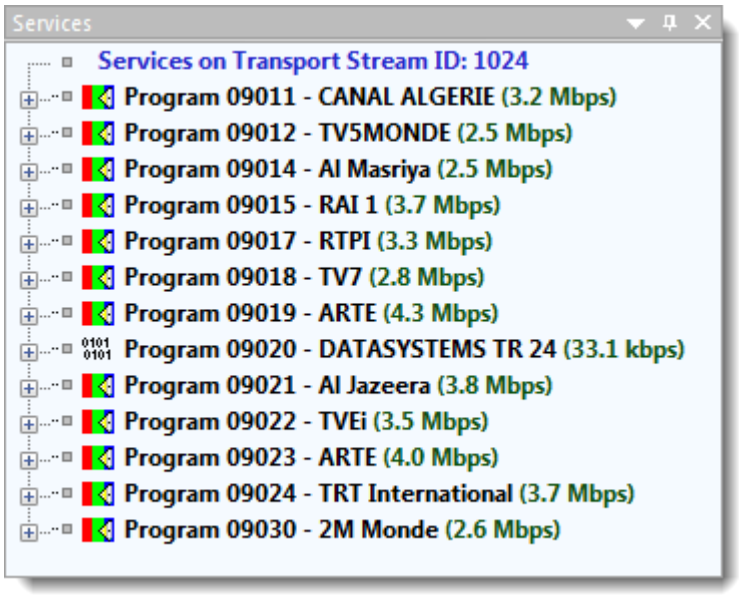
Disable Screensaver/Power Management
If enabled, the PC will not go into Screensaver mode or Power Management mode.

Save/Restore used tools on startup
If enabled, the application will start al viewers which were open the last time the application was used.
Force Reset on new PAT Version

If enabled, a reset is forced when receiving a new PAT version.

Show PIDs in Hexadecimal
If enabled, all PID values are displayed in hexadecimal. Otherwise PID values are displayed in decimal.

Show Service Bitrates
If enabled, additional Bitrate information is show in the Service Bar



Log on updated Audio ES Info
New/updated Audio ES info is also show in the Log Bar.

Log on updated Video ES Info
New/updated video ES info is also show in the Log Bar.

Translate BAT/NIT ServiceID to Service Name
If enabled, Service name is translated from BAT/NIT Service-ID.

Sort PSI on TableID
Listed tables in the SI/PSI/PSIP Bar are sort numerical on Table id.

Sort Descriptor's in Tree
If enabled, sorts the descriptor order alphabetical in a tree

Sort PMT Elements
If enabled, sorts the PMT elementary PIDs alphabetical in a tree

---

Refresh Time
Time interval in which screens data will be updated.

Input Timeout
Timeout value that is considered as a TS sync loss.

Table Cycle Gate
Table Overview uses slices of 1 second. The Gate interval can be chosen.

Time Display

Selection of time source:

- UTC (Coordinated Universal Time)
- Local Time (As set on host computer)
- Time provided in transport stream (TS Time) (tables: TDT/TOT/SIT)
    - Option: Use File creation time until TS time is received
- Use File Creation Time until TS time is received

Bitrate Measurement

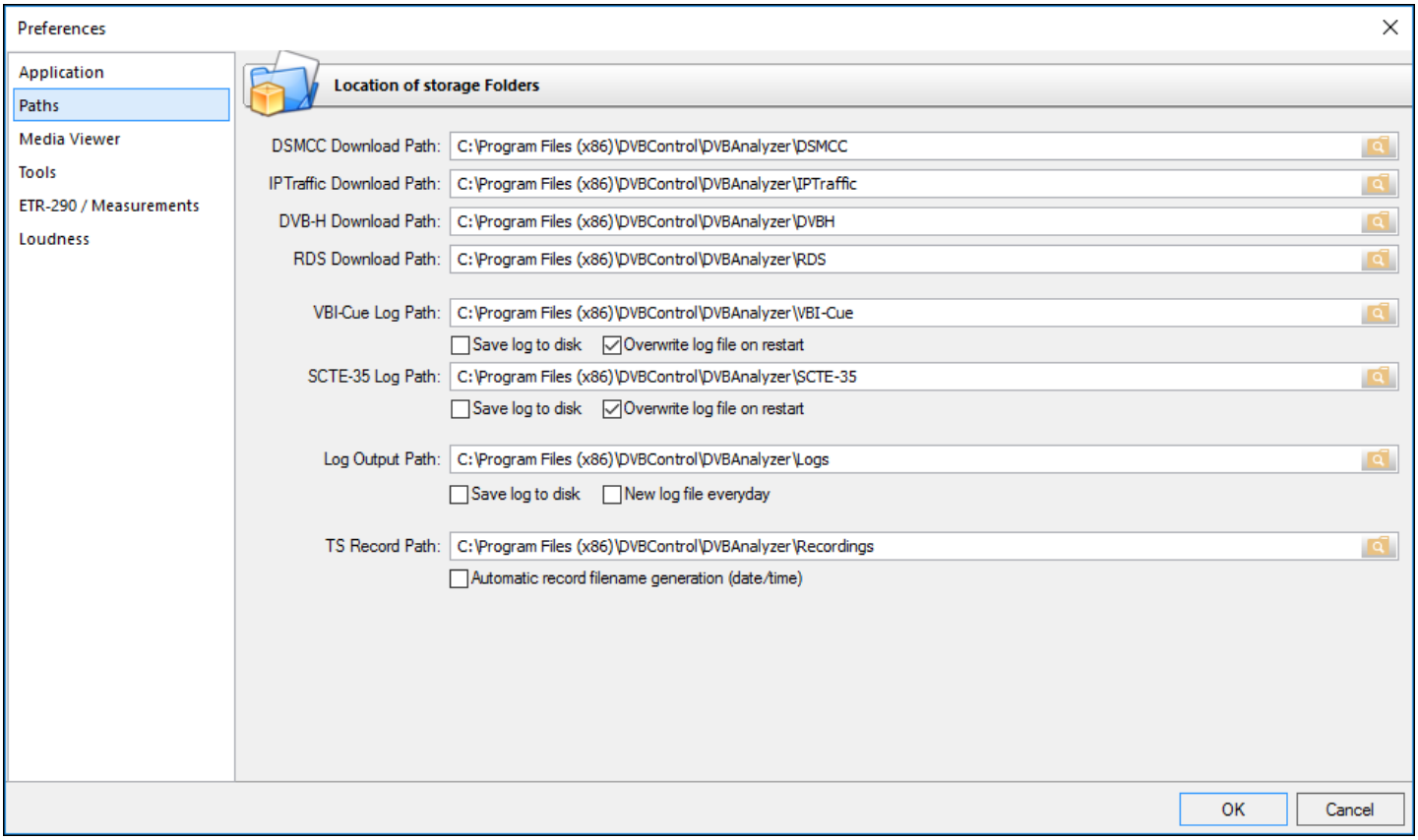
Gate/slice possibilities which are used for bitrate measurement.

Bitrate Lock/Order Control

Selection in which priority (via Up/Down) the Transport stream bitrates method is used:

- Hardware (If Available)
- First PCR-PID found (Specially for File input)
- MIP (DVB-H/T)
- NIT Delivery Descriptor

2.3.2 Paths Preferences



Paths can be given for

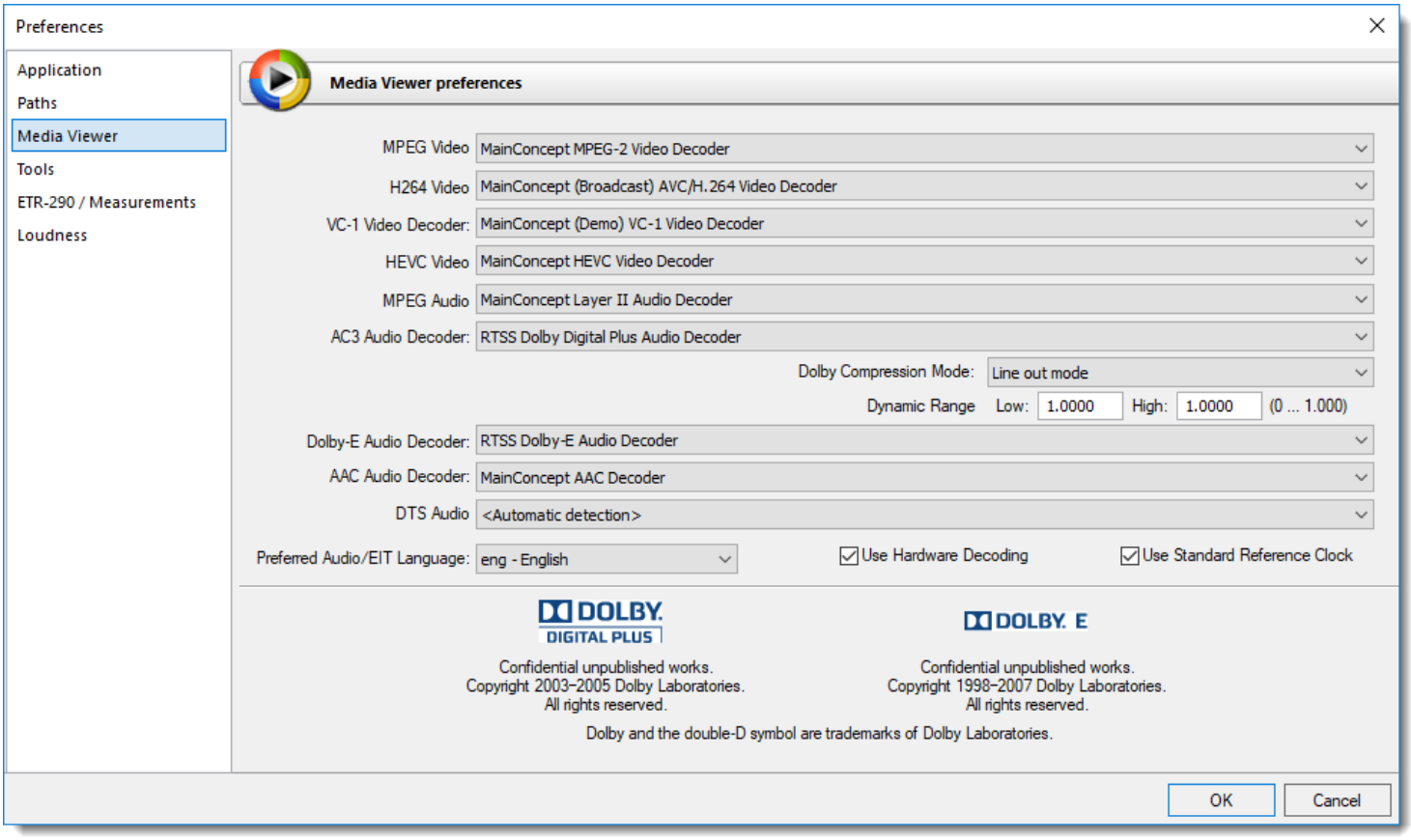
- DSMCC download
- IP Traffic download
- DVB-H download
- RDS download
- VBI-Cue download
- SCTE-35 download
- Log output
- TS records

For Log output extra parameters can be use:

- Max. errors per PID
- Save log to disk
- New log file everyday

For TS records it can be chosen that the filename is automatically generated by combining date and time.

2.3.3 Media Viewer Preferences



Preferred Media Viewer decoders (direct show filters) can be chosen for:

- MPEG Video
- H264 Video (H264 = AVC = MPEG-4 part 10)
- VC-1 Video Decoder
- HEVC Video (H265)
- MPEG Audio
- Dolby® Digital Plus, AC3 Audio
- Dolby®-E audio
- AAC Audio
- DTS Audio

For Dolby® Digital Plus decoding, different Dolby® compression modes can be selected:

- Custom 0 mode (no digital dialog normalization)
- Custom 1 mode(digital dialog normalization)
- Line out mode
- RF mode

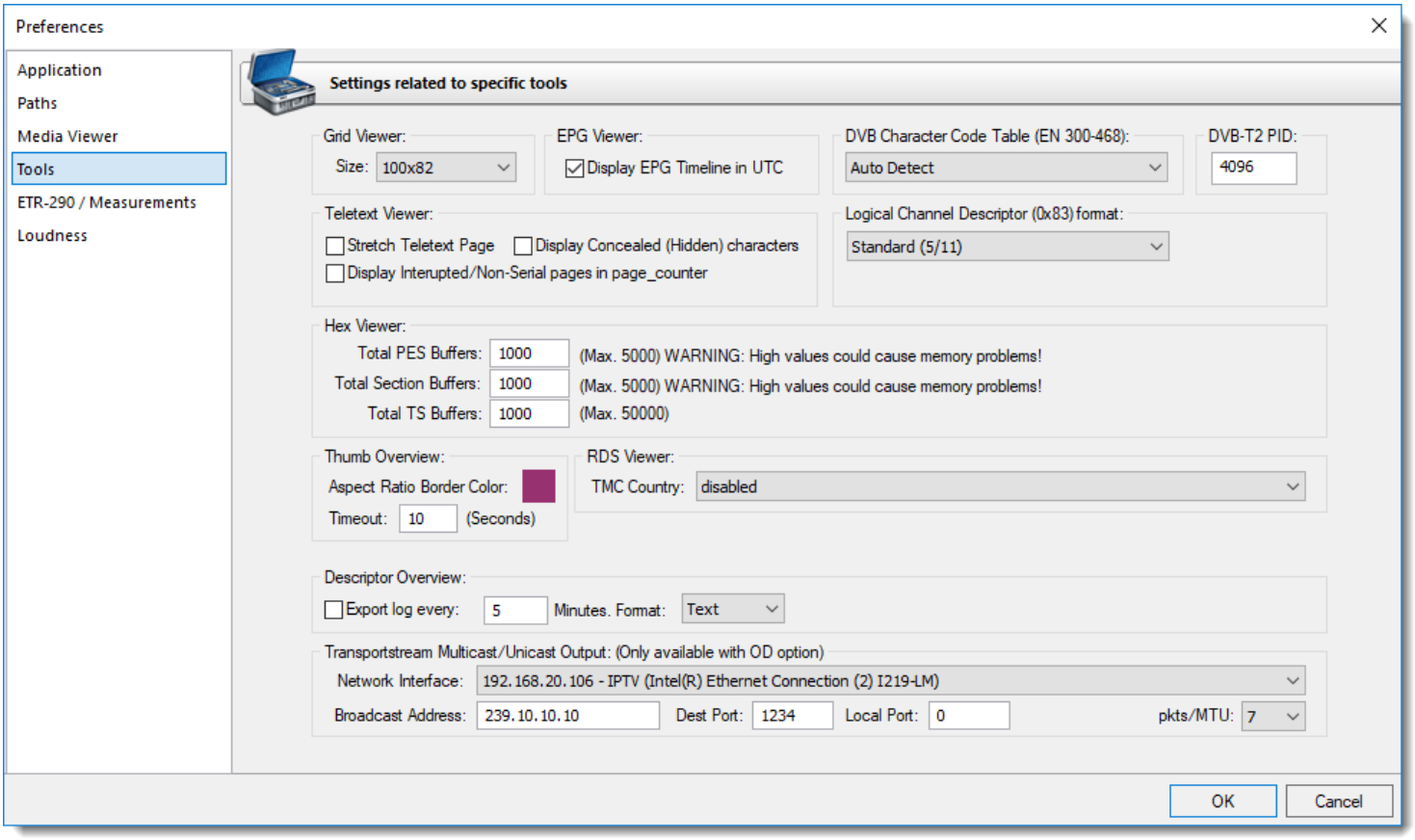
The effective Dynamic Range can be chosen for Low and High.

Preferred Audio/EIT Language
The preferred Audio Language (if available in the tuned service) can be chosen.

Use Hardware Decoding
When enabled, DVBAnalyzer will use hardware decoding

Use Standard Reference Clock
When enabled, DVBAnalyzer will use the Standard Reference Clock

2.3.4 Tools Preferences



Grid Viewer
Different grid size can be chosen:

- 100 x 82
- 128 x 64

EPG Viewer
Yes/No EPG Timeline in UTC

DVB Character Code Table
Selection of default Character Code Table.

DVB-T2 PID
Default DVB-T2 PID

Teletext Viewer

- Possibility to stretch Teletext pages
- Yes/no display concealed (hidden) characters.
- Yes/no display interrupted/Non-serial pages in page-counter.

Logical Channel Descriptor (0x83) format
Option to specify the old/new (Australia) format

Hex Viewer

- Enable extended details. (Warning: Complex PES analyzing will introduce wait time)
- Set the maximum amount of PES to be buffered
- Set the maximum amount of Sections to be buffered
- Set the maximum amount of TS packets to be buffered

Thumb Overview

- Aspect Border Color: Pick color which should be used around the aspect ratio border.
- Timeout, when Video service is not decodable.

RDS Viewer

- TMC Country: Select Country for traffic message locations
    - Disabled
    - Finland
    - Germany
    - Netherlands

All countries are folders in the config/TMC directory.
The data is using the 'TMC Location Database Exchange Format'.

Descriptor Overview

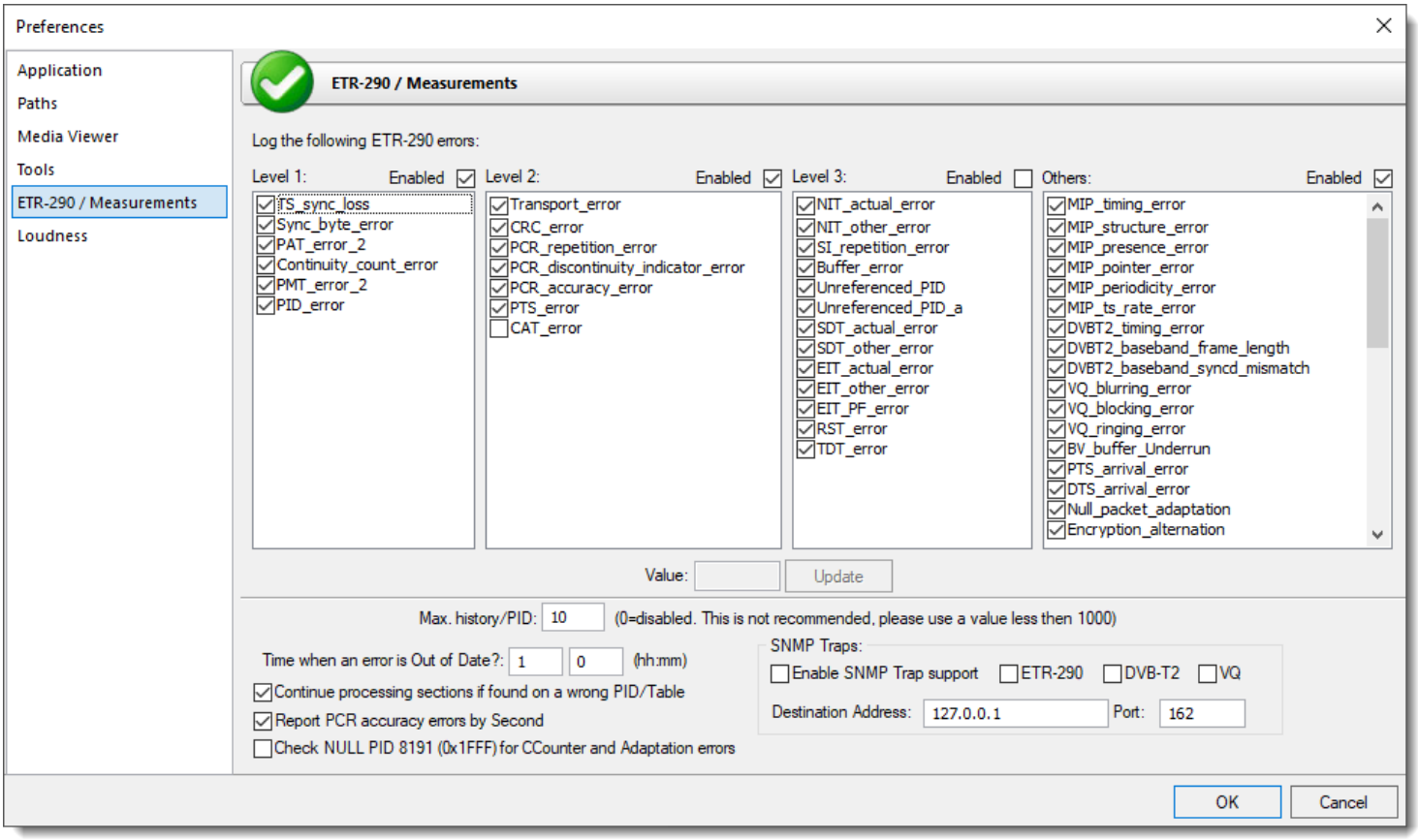
Possibility to export the used descriptors:

- Select time report interval
- Select Time or XML format

Transport stream Multicast Output (Only available with OD option)

Possibility to select a Network Interface and give the Multicast Address and Port number on which the total Transport stream can be multicast.

2.3.5 ETR-290 / Measurements Preferences



ETR-290 / Measurements can be enabled per test and/or per level

Possibility to enable/disable each ETR-290 test/level.

Level 1

- TS_sync_loss
- Sync_byte_error
- PAT_eror_2
- Continuity_count_error
- PMT_error_2
- PID_error

Level 2

- Transport_error
- CRC_error
- PCR_repetition_error
- PCR_discontinuity_indicator_error
- PCR_accuracy_error
- PTS_error
- CAT_error

Level 3

- NIT_actual_error
- NIT_other_error
- SI_repetition_error
- Buffer_error
- Unreferenced_PID
- Unreferenced_PID_a
- SDT_actual_error
- SDT_other_error
- EIT_actual_error
- EIT_other_error
- EIT-PF_error
- RST_error
- TDT_error

Others

- MIP_timing_error
- MIP_structure_error
- MIP_presence_error
- MIP_pointer_error
- MIP_periodicity_error
- MIP_ts_rate_error
- DVBT2_Timing_error
- DVBT2_Basedband_frame_length
- DVBT2_Basedband_syncd_mismatch
- VQ_Blurring_error
- VQ_Blocking_error
- VQ_Ringing_error
- BV_Buffer_Underrun
- PTS_Arrival_error
- DTS_Arrival_error
- Null_Packet_adaptation
- Encryption_alternation
- Encryption_synchronisation
- ECM_Duplicate_Key
- ECM_Invalid_Key
- PES_not_scrambled
- Incomplete_section
- Error Description Loop
- Error Section Syntax_Indicator
- Error Wrong Teletext Magazine
- Teletext_hamming_error
- Teletext_framecode_error
- PTS_PCR_Delay_error_MPEG2
- DTS_PCR_Delay_error_MPEG2
- PTS_PCR_Delay_error_AVC
- DTS_PCR_Delay_error_AVC
- PTS_PCR_Delay_error_Still
- DTS_PCR_Delay_error_Still
- PTS_Drift_error
- PES_Length_Mismatch

Different extra preferences can be made:

- The maximum history per PID.
- Out of Date time.
- Yes/no continue processing sections if there are found on a wrong PID/Table
- Yes/no check PID 8192 (0x1FFF) for Continuity Counter Errors

SNMP Traps

SNMP (Simple Network Management Protocol) can be used to inform network-attached devices for the condition of DVBAnalyzer.

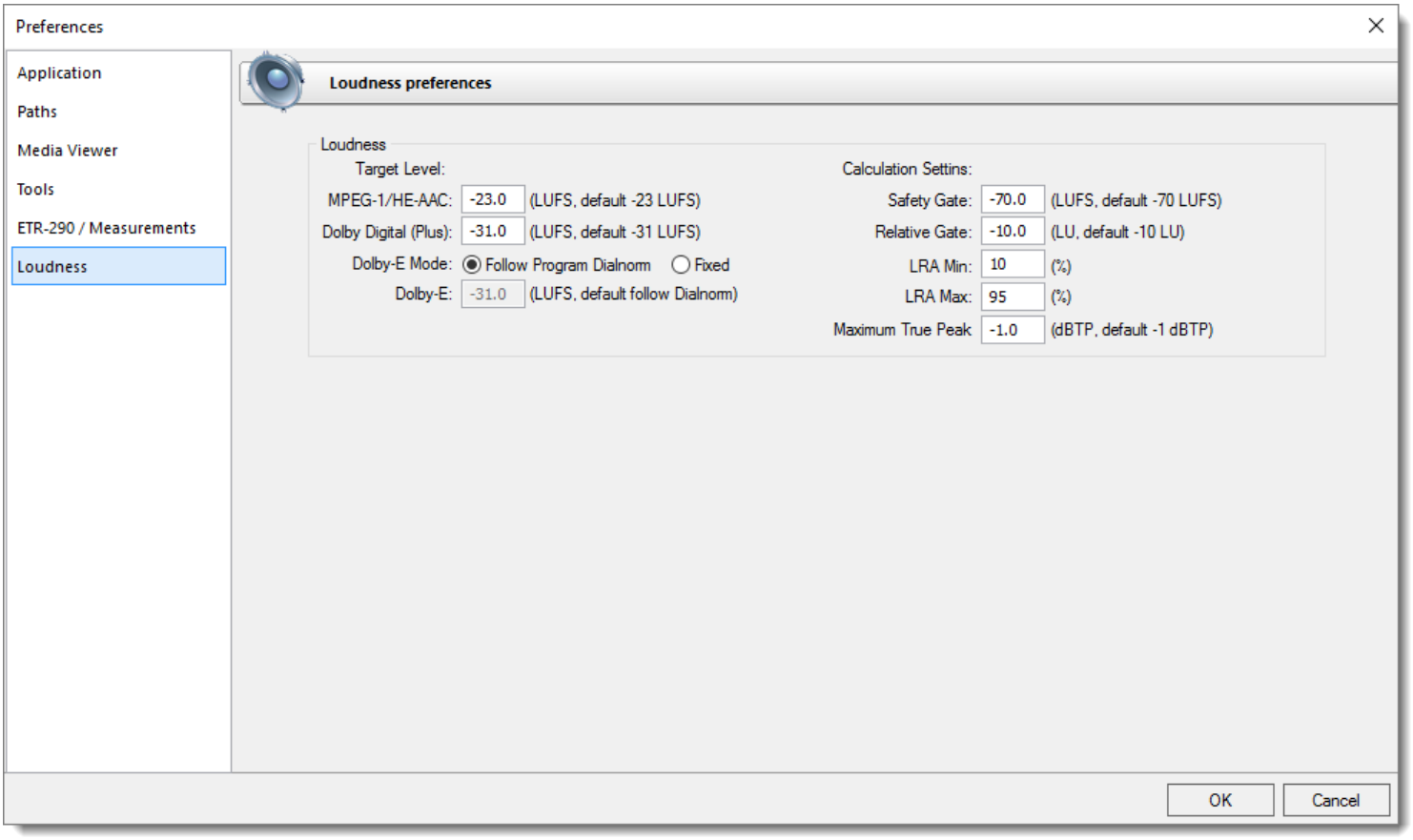
The DVB-DASYSTEM-MIB.mib file can be found in the Program Files\DVBControl\DVBAnalyzer\Help directory.

Enable SNMP Trap support
If enabled, SNMP will be used for giving alarms.
Different check categories can be enabled:

- ETR-290
- DVB-T2
- VQ (Video Quality)

Destination Addresses/Port
IP Address/Port settings for sending SNMP Traps.

2.3.6 Loudness Preferences



Target Level MPEG-1/HE-AAC
Target Program/Station Loudness level for MPEG-1 and HE-AAC audio components.

Target Level Dolby Digital Plus
Target Program/Station Loudness level Dolby® Digital Plus audio components.

Dolby-E Mode
Possibility to change the Dolby®-E loudness mode

- Follow Program Dialnorm
- Fixed

Target Level Dolby-E
Target Program/Station Loudness level Dolby®-E audio components.

Safety Gate
Absolute ‘silence’ gate

Relative Gate
Relative threshold gating

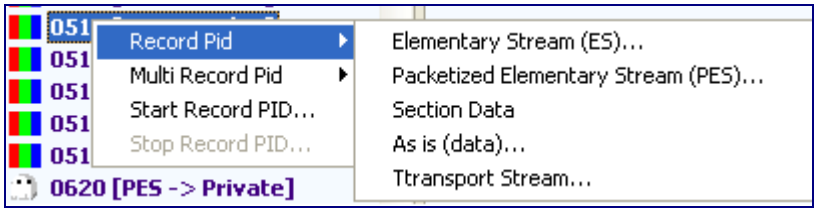
LRA Min
Lower percentile of the distribution

LRA Max
Upper percentile of the distribution

Maximum True Peak Level
Maximum permitted True Peak Level.

2.4 Context menus

When pressing the right mouse button, different context menus appear.



All context menus are described in their related chapters.

3 Detailed information

Information can sometimes be found on multiple locations within DVBAnalyzer.

3.1 Resolution and Aspect Ratio

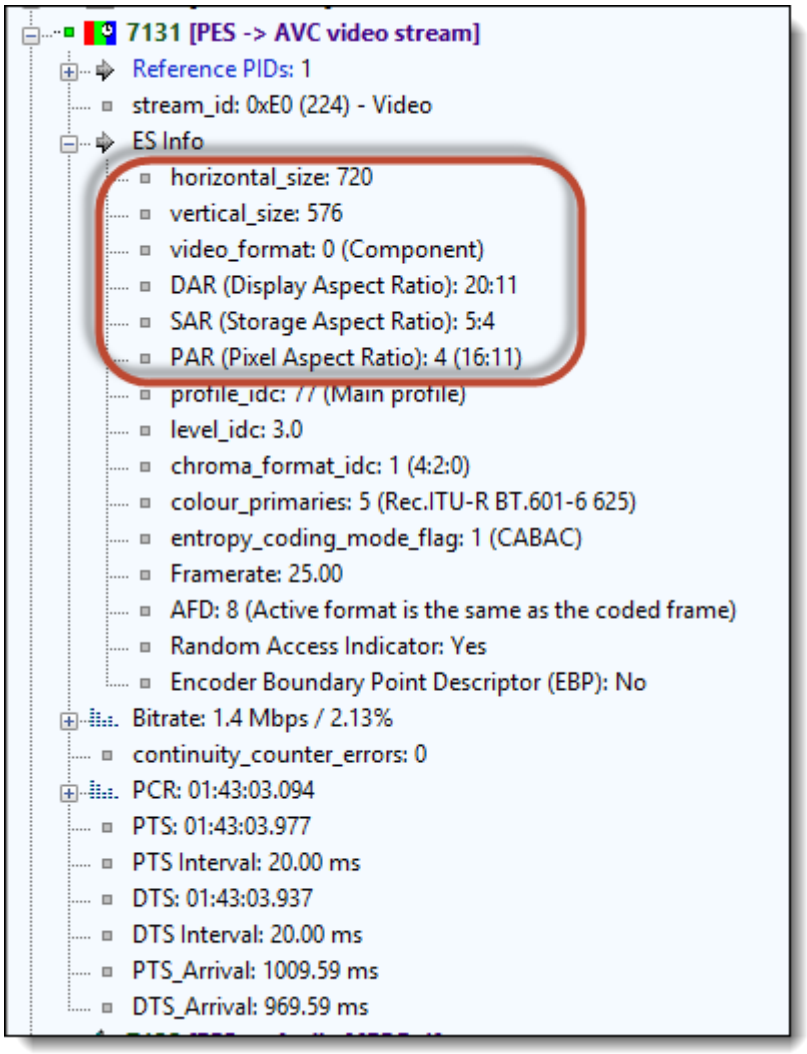
For example, the video resolution and aspect ratio detail information can be found in:

- PID tree
- PID overview
- Hex Viewer

Of course, the video PID should not be scrambled.

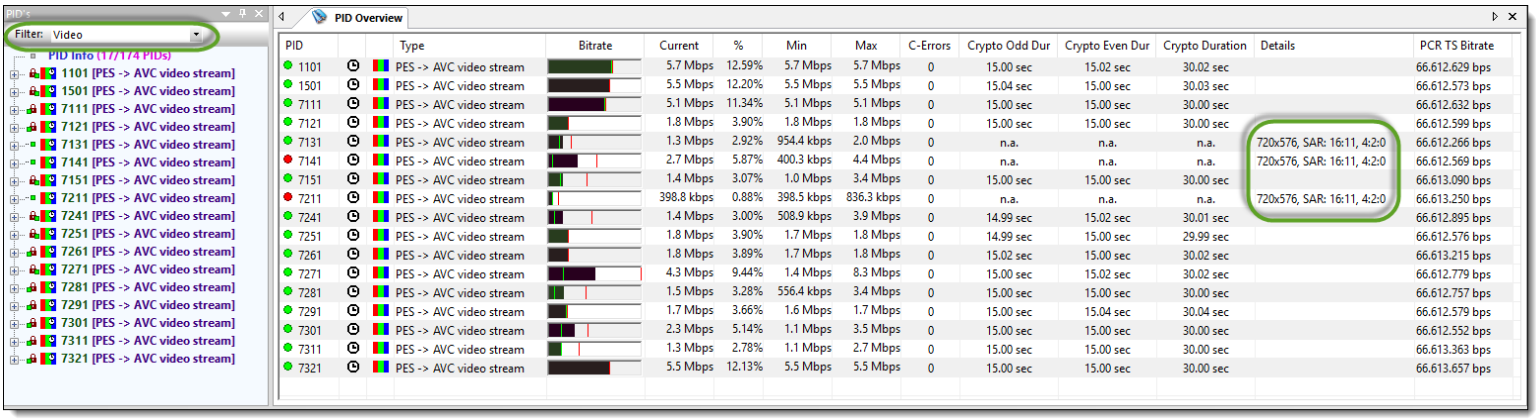
PID Tree

Opening ES info, of a Video PID



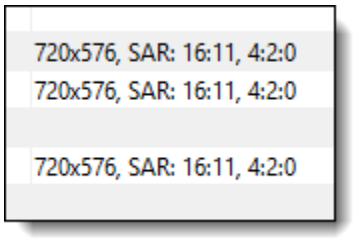
PID Overview

Even handier to first filter in the PID tree only on Video PIDs. Then the PID overview will show all Video PID, with their details



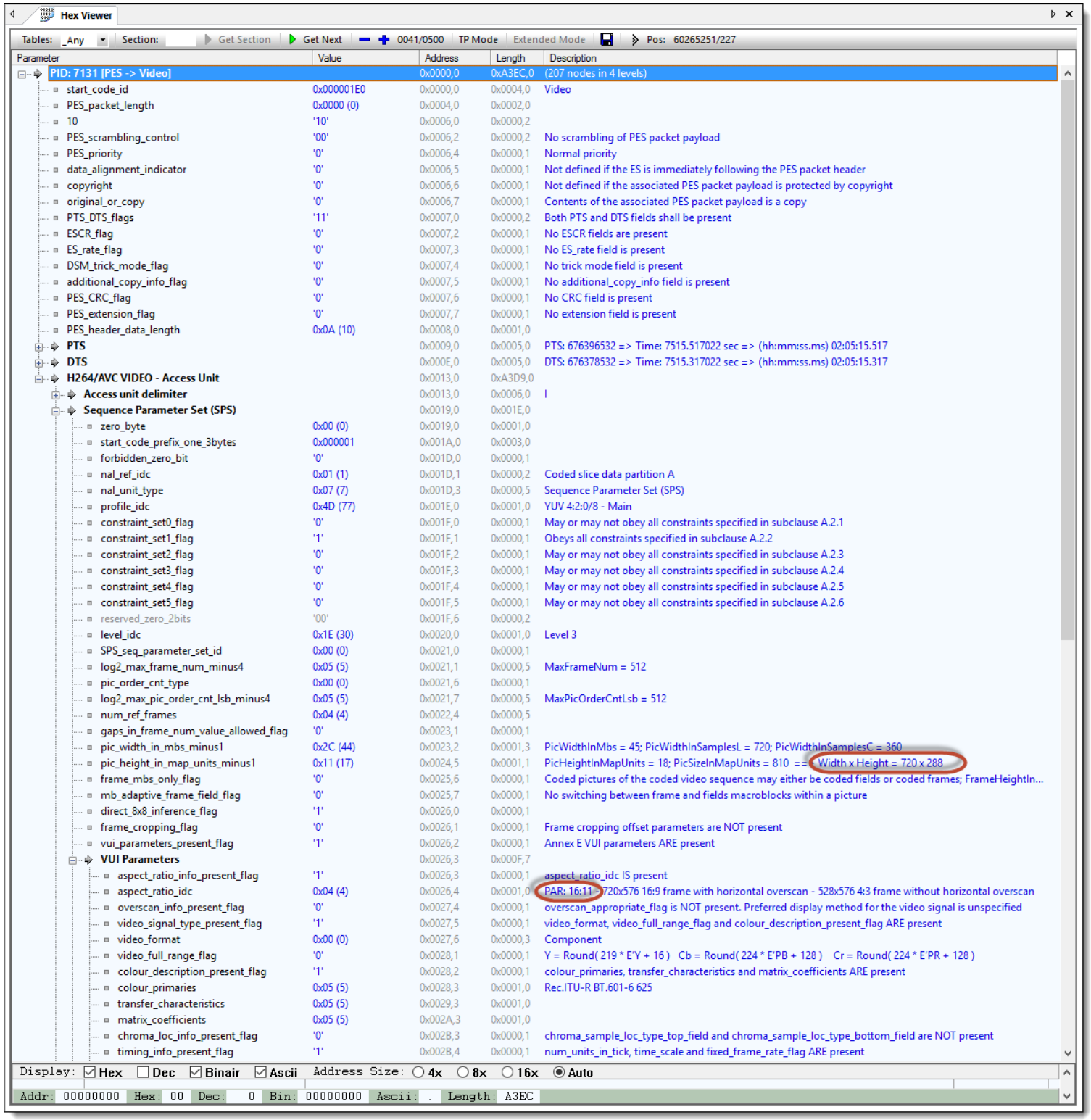
PID	Type	Bitrate	Current	%	Min	Max	C-Errors	Crypto Odd Dur	Crypto Even Dur	Crypto Duration	Details	PCR TS Bitrate
1101	PES -> AVC video stream		5.7 Mbps	12.59%	5.7 Mbps	5.7 Mbps	0	15.00 sec	15.02 sec	30.02 sec		66.612.629 bps
1501	PES -> AVC video stream		5.5 Mbps	12.20%	5.5 Mbps	5.5 Mbps	0	15.04 sec	15.00 sec	30.03 sec		66.612.573 bps
7111	PES -> AVC video stream		5.1 Mbps	11.34%	5.1 Mbps	5.1 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.612.632 bps
7121	PES -> AVC video stream		1.8 Mbps	3.90%	1.8 Mbps	1.8 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.612.599 bps
7131	PES -> AVC video stream		1.3 Mbps	2.92%	954.4 kbps	2.0 Mbps	0	n.a.	n.a.	n.a.	720x576, SAR: 16:11, 4:2:0	66.612.266 bps
7141	PES -> AVC video stream		2.7 Mbps	5.87%	400.3 kbps	4.4 Mbps	0	n.a.	n.a.	n.a.	720x576, SAR: 16:11, 4:2:0	66.612.569 bps
7151	PES -> AVC video stream		1.4 Mbps	3.07%	1.0 Mbps	3.4 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.613.090 bps
7211	PES -> AVC video stream		398.8 kbps	0.88%	398.5 kbps	836.3 kbps	0	n.a.	n.a.	n.a.	720x576, SAR: 16:11, 4:2:0	66.613.250 bps
7241	PES -> AVC video stream		1.4 Mbps	3.00%	508.9 kbps	3.9 Mbps	0	14.99 sec	15.02 sec	30.01 sec		66.612.895 bps
7251	PES -> AVC video stream		1.8 Mbps	3.90%	1.7 Mbps	1.8 Mbps	0	14.99 sec	15.00 sec	29.99 sec		66.612.576 bps
7261	PES -> AVC video stream		1.8 Mbps	3.89%	1.7 Mbps	1.8 Mbps	0	15.02 sec	15.00 sec	30.02 sec		66.613.215 bps
7271	PES -> AVC video stream		4.3 Mbps	9.44%	1.4 Mbps	8.3 Mbps	0	15.00 sec	15.02 sec	30.02 sec		66.612.779 bps
7281	PES -> AVC video stream		1.5 Mbps	3.28%	556.4 kbps	3.4 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.612.757 bps
7291	PES -> AVC video stream		1.7 Mbps	3.66%	1.6 Mbps	1.7 Mbps	0	15.00 sec	15.04 sec	30.04 sec		66.612.579 bps
7301	PES -> AVC video stream		2.3 Mbps	5.14%	1.1 Mbps	3.5 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.612.552 bps
7311	PES -> AVC video stream		1.3 Mbps	2.78%	1.1 Mbps	2.7 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.613.363 bps
7321	PES -> AVC video stream		5.5 Mbps	12.13%	5.5 Mbps	5.5 Mbps	0	15.00 sec	15.00 sec	30.00 sec		66.613.657 bps

With the details:



Hex Viewer

By selecting a Video PID in the PID tree, Hex Viewer will show the total bit interpretation of this Video PID. Opening the header folders will show all underlying parameter details.



Base software ‘DA-Base’

- PID Bar
- Service Bar
- SI/PSI/PSIP Bar
- Log Bar
- EIT Now/Next Bar
- Favorite Bar
- Bitrate Bar

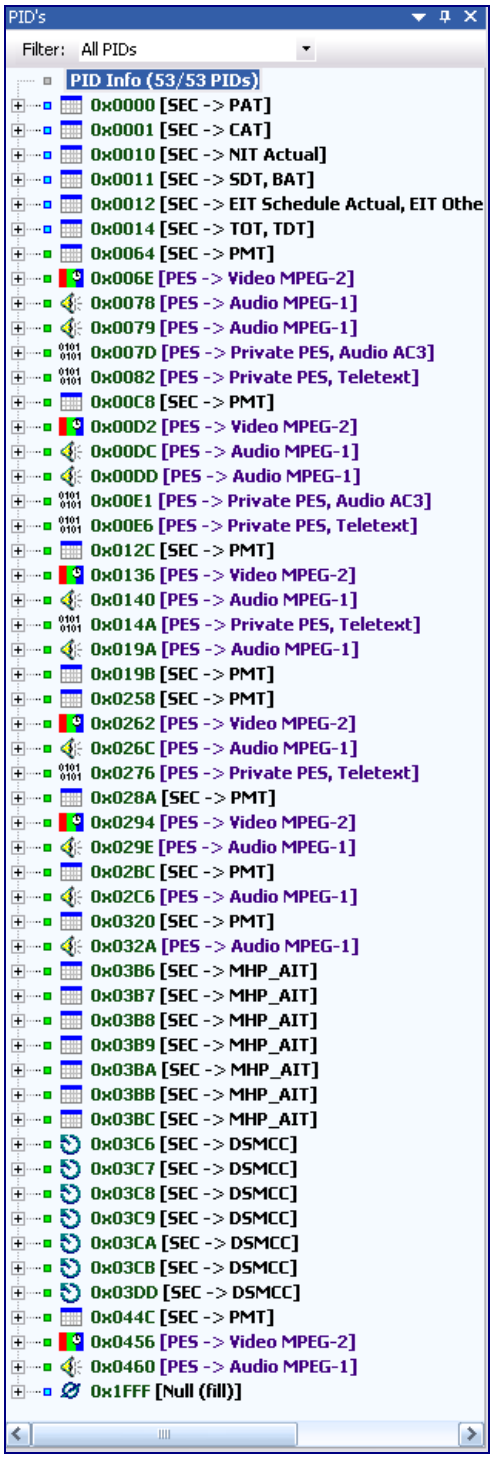
- PID Overview
- Service Overview
- Grid Overview
- Bitrate Overview
- Thumb Overview
- Table Overview
- Descriptor Overview
- MIP Overview
- AIT Overview
- Logical Number Overview

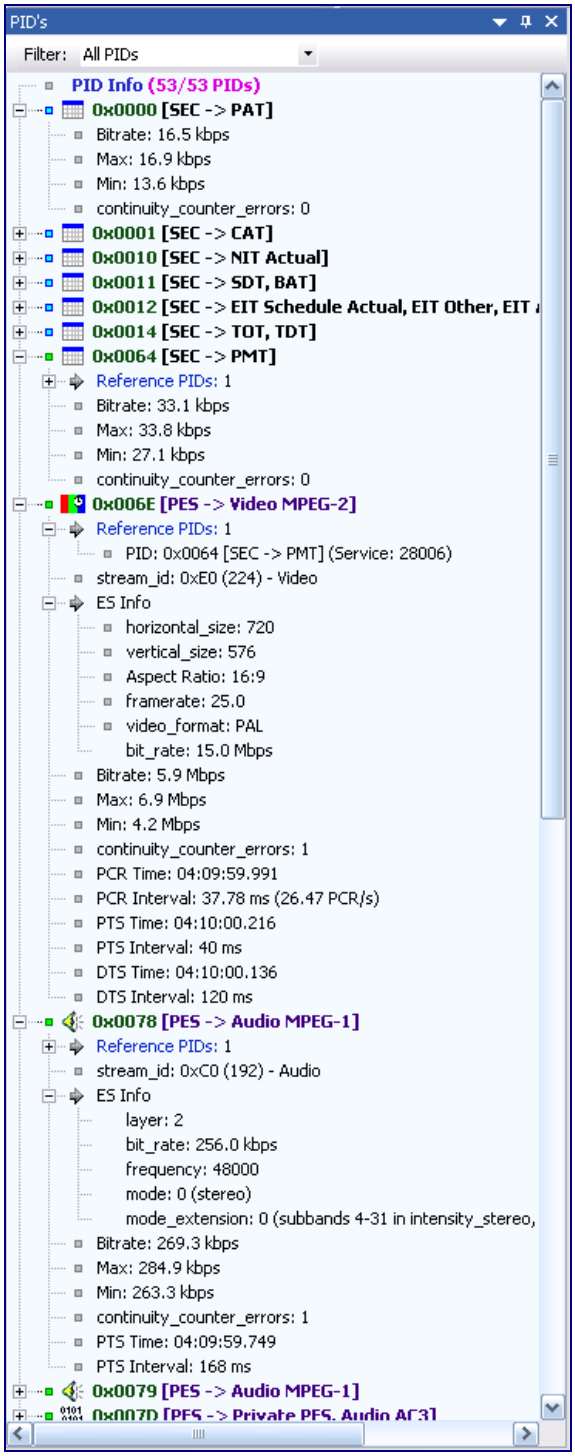
- ETR-290 Viewer
- Media Viewer
- PCR Viewer
- EPG Viewer

4 PID Bar

Easy list view of all available PIDs, with detailed information

The PID view displays information about all the PIDs found in the Transport Stream.





Every PID has 2 icons.

The first icon symbolizes the reference:

Icon	Description
	Reserved PID
	Referenced PID
	Referenced PID, Scrambled (even key)
	Referenced PID, Scrambled (odd key)
	Unreferenced PID

Reserved PIDs are PID specific like PAT, CAT, NIT, etc.
Referenced PIDs are referenced by PAT, PMT or AIT tables.
Unreferenced PIDs are All PIDs – Reserved PIDs – Referenced PIDs.

The second icon symbolizes the sort of PID:

Icon	Description
	Video PID
	Video PID, with PCR
	Audio PID
	Audio PID, with PCR
	Private data PID
	PCR PID
	Table PID
	Object/Data Carousel PID
	Null PID (8191)
	Conditional Access PID (ECM, EMM)
	Unreferenced (Ghost) PID
	Referenced, but not existing PID
	Unknown PID

There are three kinds of PIDs:

- SEC
- PES
- PRIVATE
- NULL

SEC

All tables are transported via SECTION PIDs.

PES
Video, Audio and Private data are transported via PES (Packetized Elementary Stream)

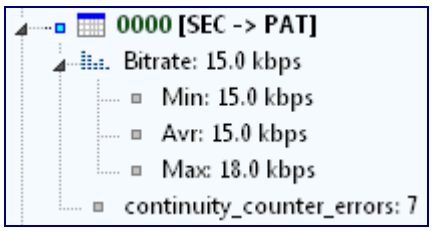
PRIVATE
PIDs that are neither Sections or PES

NULL
Only PID 8191 (0x1FFF) is the NULL filler PID

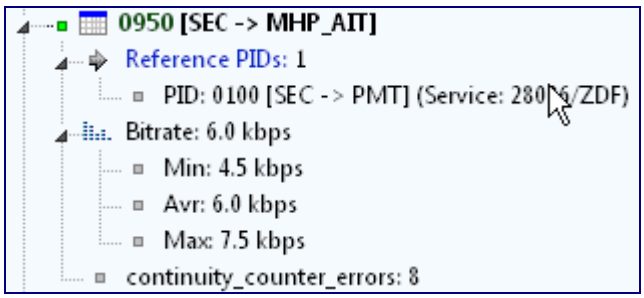
When PIDs are locked (scrambled) it is indicated with an extra icon.

4.1 Details

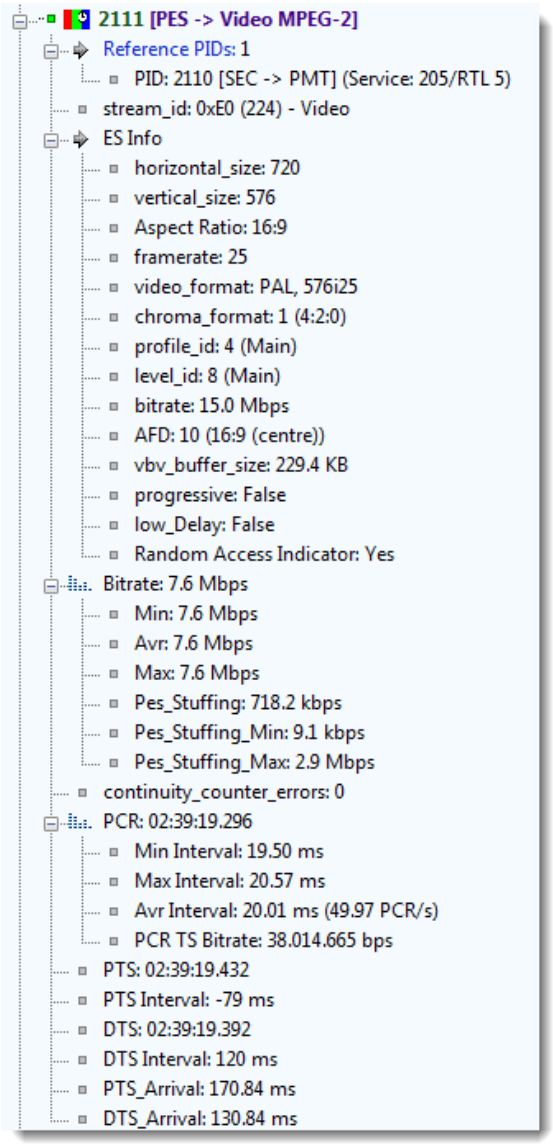
When opening a PID, more information is given about the bitrates and errors.



When a PID is referenced, as identified in the PMT table, it is displayed in the PID structure.

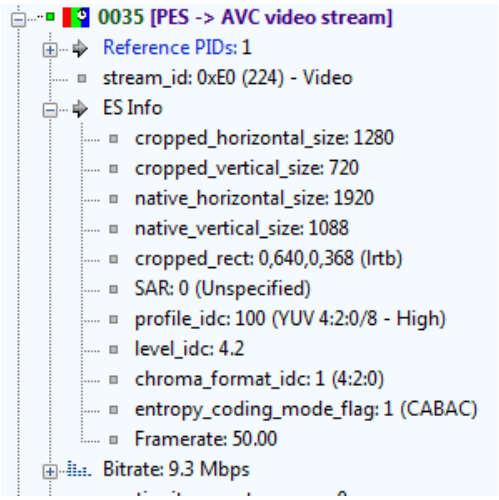


PES PIDs (Video, Audio, and Private) also show ES (Elementary Stream) metadata in the PID structure.



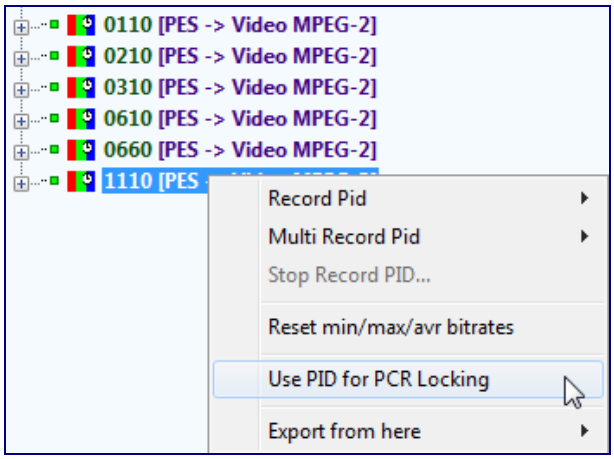
The PCR Time is displayed in real-time for PIDs which contain PCR information.

In case of cropping, this will be shown extra:



PCR TS BItrate

A PCR PID can be forced, to be used for calculating the TS bitrate, by using the right button context menu.



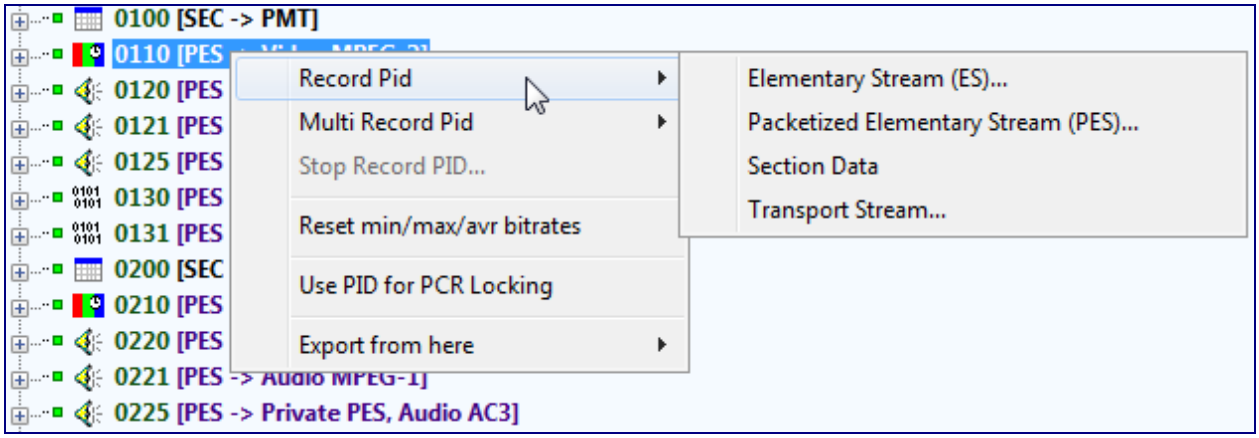
Reset min/max/avc bitrates

All minimum, maximum and average bitrates can be reset.

4.2 Export

You can export one or multiple PIDs from the incoming Transport Stream in different formats:

- Packetized Elementary Stream (PES)
- Elementary Stream (ES)
- Transport Stream (TS)
- Section Data
- Raw Data



When a PID is in record mode, it is indicated with an  icon.

File Extensions

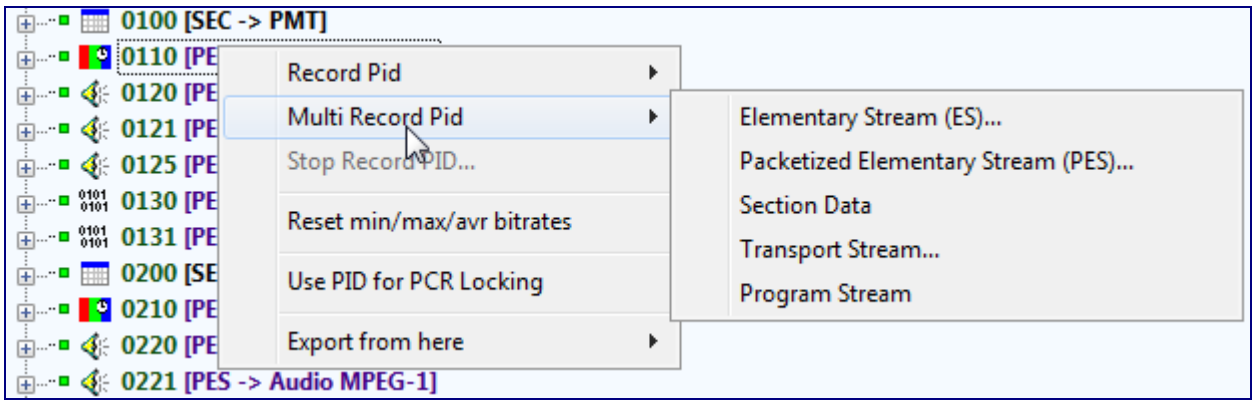
Different file extensions are used when recording PIDs:

Record	ES-kind	Extension
Elementary Stream (ES)	MPEG-2 Video	m2v
	MPEG-2 Audio	m2a
	MPEG-4 AVC/H264	h264
		aac
		ac3
	other	es
Packetized Elementary Stream (PES)	all	pes
Program Stream (PS)	all	mpg
Raw	all	ts

Remark: It is also possible to output PIDs via UDP Multicast. This streaming is done via the Multicast Output window.

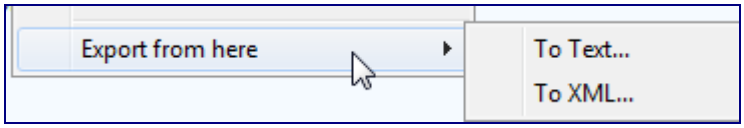
Multi Record PID

Multiple PIDs can be recorded by using the <CTRL/SHIFT> button.



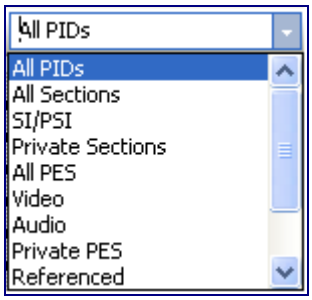
Export from here

You can export all information displayed to Text or XML Format.



4.3 Filter

Via the pull down button all PIDs can be filtered in the Transport Stream.

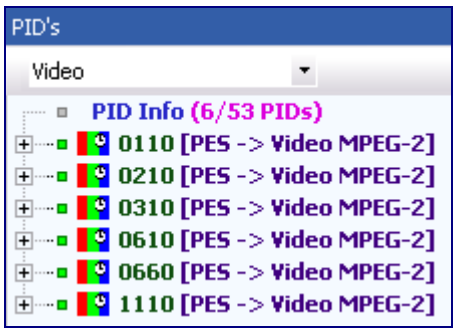


Filtering PIDs also affects the PID Overview and Bitrate Overview windows. This is very interesting for comparing/analyzing different PIDs in more detail.

Filter options are:

Filter	Description
All PIDs	Show all PIDs
All Sections	Show all Section PIDs, so all tables
SI/PSI/PSIP	Show all SI/PSI table/PSIP PIDs
Private Sections	Show all Private Section PIDs
All PES	Show all PES (Packetized Elementary Stream) PIDs (Video, Audio, Private Data)
Video	Show all Video PIDs
Audio	Show all Audio PIDs
Private PES	Show all Private data PIDs
Reserved	Show all Reserved PIDs. PID: 0..31, 8191
Referenced	Show all Referenced PIDs. PIDs which are referred to in PMT tables
Unreferenced	Show all Unreferenced PIDs. Unreferenced PIDs = All PIDs - Reserved - Referenced
Locked	Show all Unlocked (not scrambled) PIDs
Unlocked	Show all Locked (scrambled) PIDs

After filtering for eq. Video, the PID tree will look like this:



4.4 Related Windows

Views of different windows are affected by actions done in the PID Bar:

- PID Overview
- Bitrate Overview
- Hex Viewer

PID Overview

The PID Overview window shows only the comparable detail PID information of the PIDs which are selected after filtering in de PID window.
The PID Overview window is described in detail in the PID Overview Chapter.

Bitrate Overview

The Graph Window has 3 modes: Bar, Pie and Time.
Only graph information of the selected PIDs are displayed in Bar and Pie mode. In Time mode, default cumulated graph information of PID sorts (Video, Audio, and SI/PSI/PSIP) are displayed. If filtering is used in the PID window, the time mode shows graph information of the filtered PIDs.
The Bitrate Overview window is described in detail in the Bitrate Overview Chapter.

Hex Viewer

When clicking on a PID in the PID window, the Hex Viewer directly shows the Interpretation plus hex dump of the selected PID.
The Hex Viewer window is described in detail in the Hex Viewer Chapter.

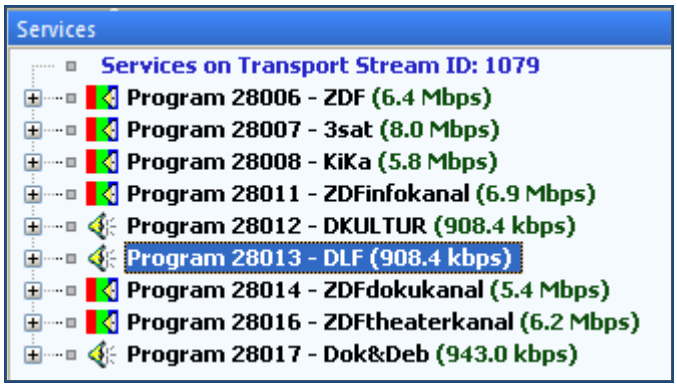
4.5 Properties

- Sort PIDs
- Show PIDs in hexadecimal

5 Service Bar

Easy list view of all available Services, with detailed information

The Services view provides a fast overview of the transport stream contents in terms of Service content, Service components and Descriptors.



The Bitrates are only displayed when this is enabled in Preferences.

Icons symbolize different sorts of Services:

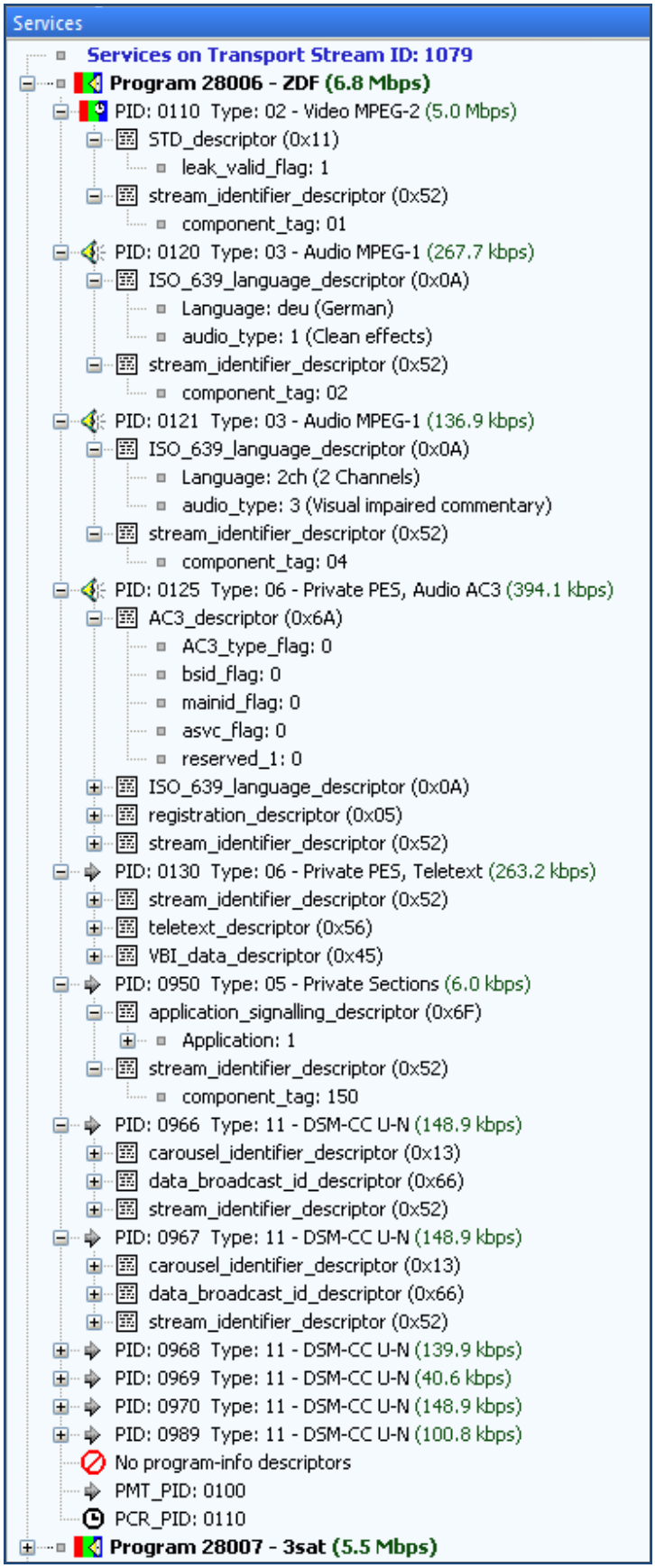
Icon	Description
	TV Service, only video
	TV Service, video and audio
	Radio Service
	Data Service

Services which are locked according to the SDT table (scrambled), show the extra  icon.

5.1 Details

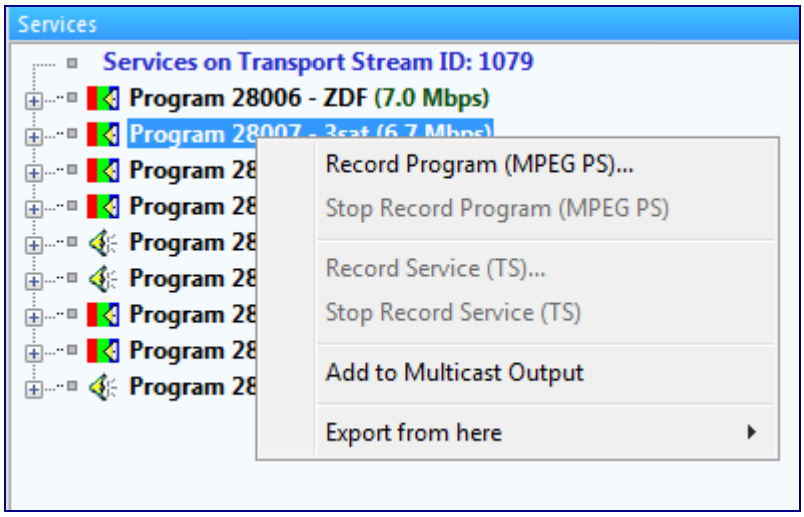
When opening a Service, more information is given about the Service components and Descriptors.

All Service component PIDs are labeled “Referenced” in the PID window.



5.2 Export

You can also export a Service from the incoming Transport Stream into a Program stream (PS).



When a Service is in record mode, the Audio and Video PID in the PID window shows the  icon.

File extensions

The file extension for recorded Services:

Record	ES-kind	Extension
Program Stream (PS)	all	mpg

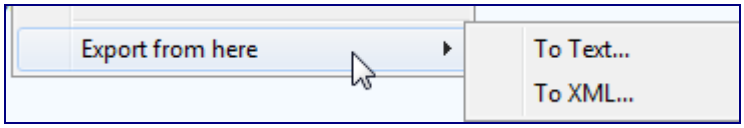
Remark: It is also possible to output Service PIDs via UDP Multicast. This streaming is done via the Multicast Output window.

Add to multicast Output

Add a new service to the multicast output list.
See also Chapter 26 'UDP Multicast/Unicast Output'

Export from here

You can export all information displayed Text or XML Format.



5.3 Related Windows

Actions taken on the Services window affect:

- Hex Viewer

Hex Viewer

When clicking on a Service in the Services window, the Hex Viewer directly shows the Interpretation plus hex dump of the selected Service PMT table.
The Hex Viewer window is described in detail in the Hex Viewer Chapter.

5.4 Properties

- Sort Programs

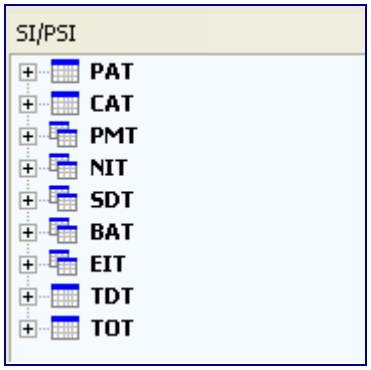
6 SI/PSI/PSIP Bar

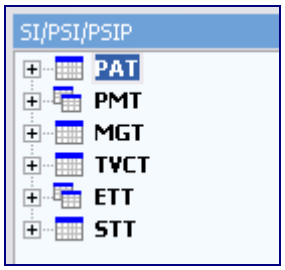
Easy list view of all available Tables, with detailed information

The SI/PSI/PSIP (Tables) view displays the service information tables that have occurred in the analyzed stream which comply with the selected digital video standard.

Table analyzing:

- MPEG Specific Program Information (PSI)
- DVB Service Information (SI)
- ATSC Program and System Protocol Information (PSIP)
- ISDB Service Information (SI)





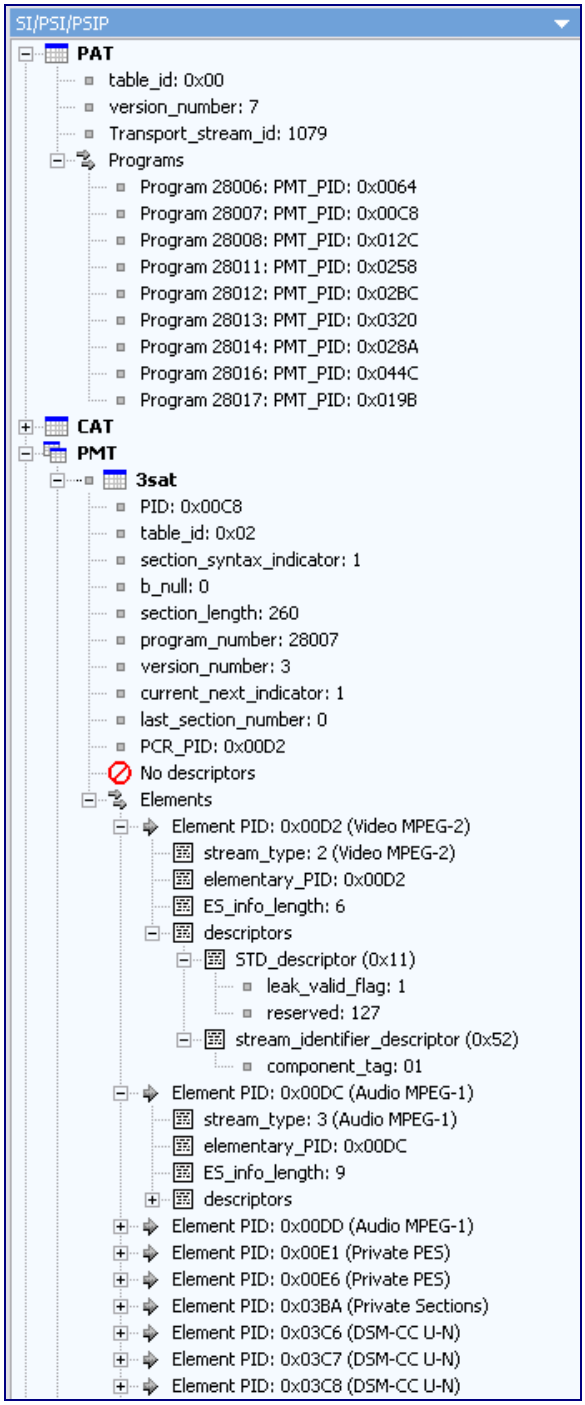
Icons symbolize different amounts of tables:

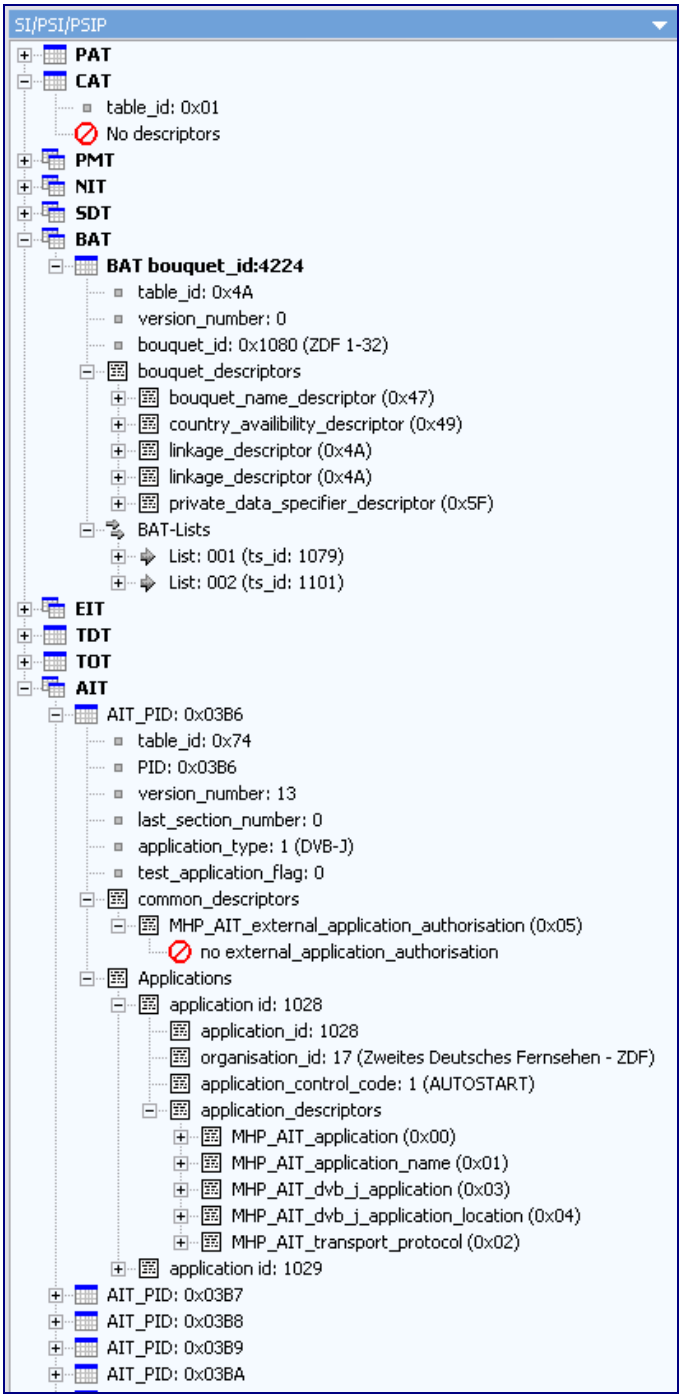
Icon	Description
	1 Table
	Multiple Tables

6.1 Details

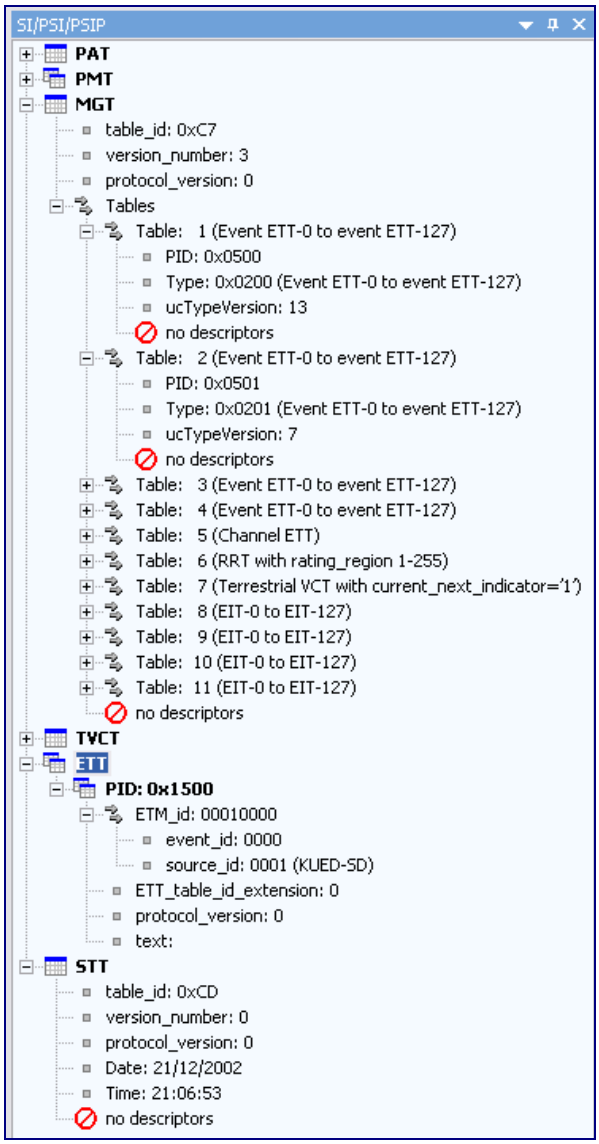
When opening a Table, more information is given about the Table components and Descriptors.

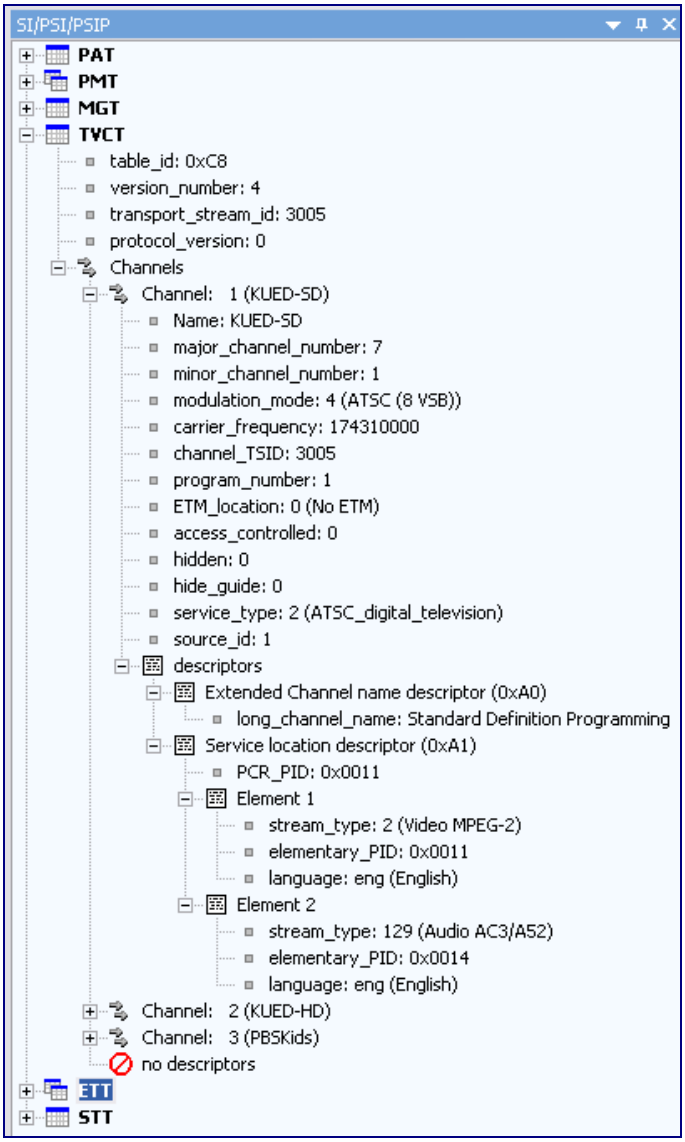
DVB





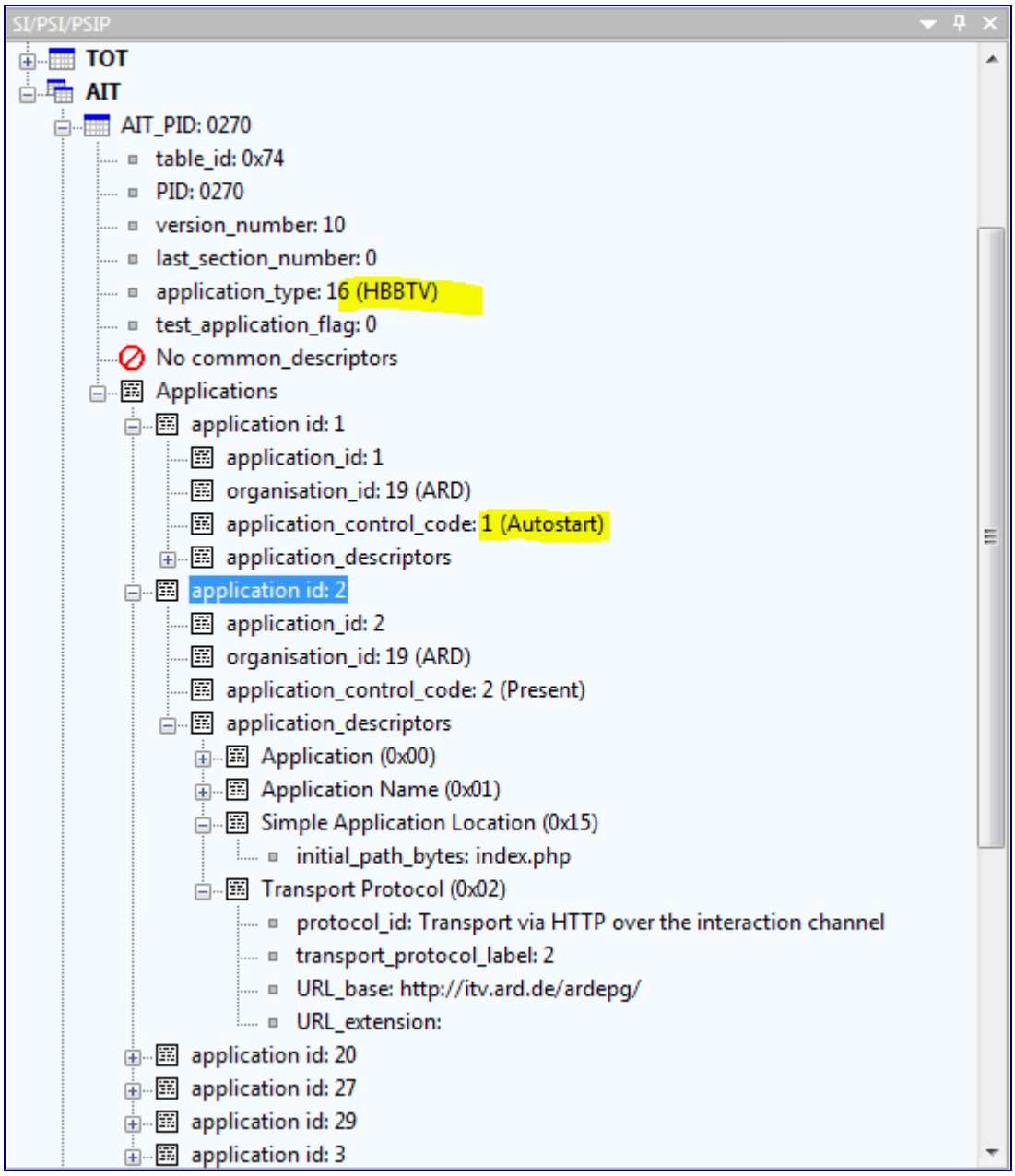
ATSC


SI/PSI/PSIP
PAT
PMT
MGT
table_id: 0xC7
version_number: 3
protocol_version: 0
Tables
Table: 1 (Event ETT-0 to event ETT-127)
PID: 0x0500
Type: 0x0200 (Event ETT-0 to event ETT-127)
ucTypeVersion: 13
no descriptors
Table: 2 (Event ETT-0 to event ETT-127)
PID: 0x0501
Type: 0x0201 (Event ETT-0 to event ETT-127)
ucTypeVersion: 7
no descriptors
Table: 3 (Event ETT-0 to event ETT-127)
Table: 4 (Event ETT-0 to event ETT-127)
Table: 5 (Channel ETT)
Table: 6 (RRT with rating_region 1-255)
Table: 7 (Terrestrial VCT with current_next_indicator='1')
Table: 8 (EIT-0 to EIT-127)
Table: 9 (EIT-0 to EIT-127)
Table: 10 (EIT-0 to EIT-127)
Table: 11 (EIT-0 to EIT-127)
no descriptors
TVCT
ETT
PID: 0x1500
ETM_id: 00010000
event_id: 0000
source_id: 0001 (KUED-SD)
ETT_table_id_extension: 0
protocol_version: 0
text:
STT
table_id: 0xCD
version_number: 0
protocol_version: 0
Date: 21/12/2002
Time: 21:06:53
no descriptors


SI/PSI/PSIP
PAT
PMT
MGT
TVCT
table_id: 0xC8
version_number: 4
transport_stream_id: 3005
protocol_version: 0
Channels
Channel: 1 (KUED-SD)
Name: KUED-SD
major_channel_number: 7
minor_channel_number: 1
modulation_mode: 4 (ATSC (8 VSB))
carrier_frequency: 174310000
channel_TSID: 3005
program_number: 1
ETM_location: 0 (No ETM)
access_controlled: 0
hidden: 0
hide_guide: 0
service_type: 2 (ATSC_digital_television)
source_id: 1
descriptors
Extended Channel name descriptor (0xA0)
long_channel_name: Standard Definition Programming
Service location descriptor (0xA1)
PCR_PID: 0x0011
Element 1
stream_type: 2 (Video MPEG-2)
elementary_PID: 0x0011
language: eng (English)
Element 2
stream_type: 129 (Audio AC3/A52)
elementary_PID: 0x0014
language: eng (English)
Channel: 2 (KUED-HD)
Channel: 3 (PBSKids)
no descriptors
ETT
STT

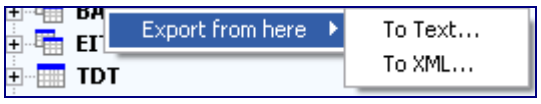
AIT

When using AIT (Application Information Table), details are shown.
More information is shown in the 'AIT Overview' (see chapter 16).



6.2 Export

You can export all information displayed in the tables from the incoming Transport Stream in Text or XML Format.



6.3 Related Windows

Actions taken on the SI/PSI/PSIP Windows affect:

- Hex Viewer

Hex Viewer

When clicking on a Table in the SI/PSI/PSIP window, the Hex Viewer directly shows the Interpretation plus hex dump of the selected table.
The Hex Viewer window is described in detail in the Hex Viewer Chapter.

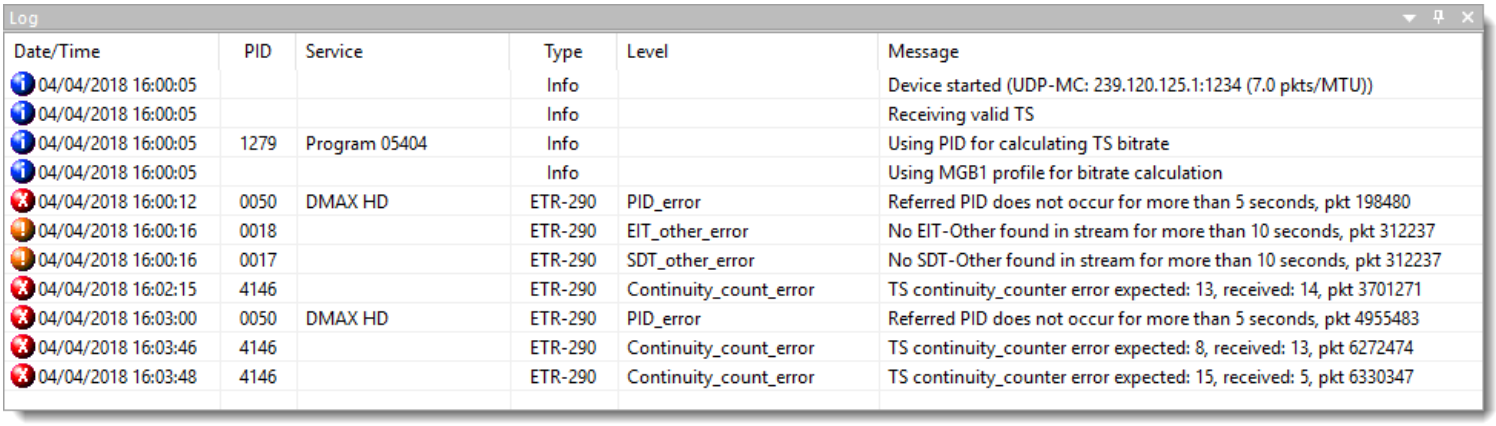
6.4 Properties

- Sort PSI on TableID

7 Log Bar

History log of all events, showing detailed information

All DVBAnalyzer log information is displayed in the Log window.



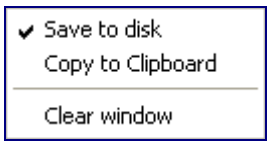
Different log types are used:

Signaling	Description
Error	Error log line
Warning	Warning log line
Info	Information log line

In different columns detailed information is given

Filter	Description
Date/time	The date and time the log information was generated
PID	Optional: The PID to which the log information was related
Service	Optional: The Service name, or if now know the Service ID
Type	Different log types: Info, ETR-290, VQ (Video Quality)
Level	Optional: Name of test
Message	The log message

By using the right mouse key, extra actions can be taken.



Save to disk, will automatically save the Log lines and the ETR-290 History lines.

7.1 Properties

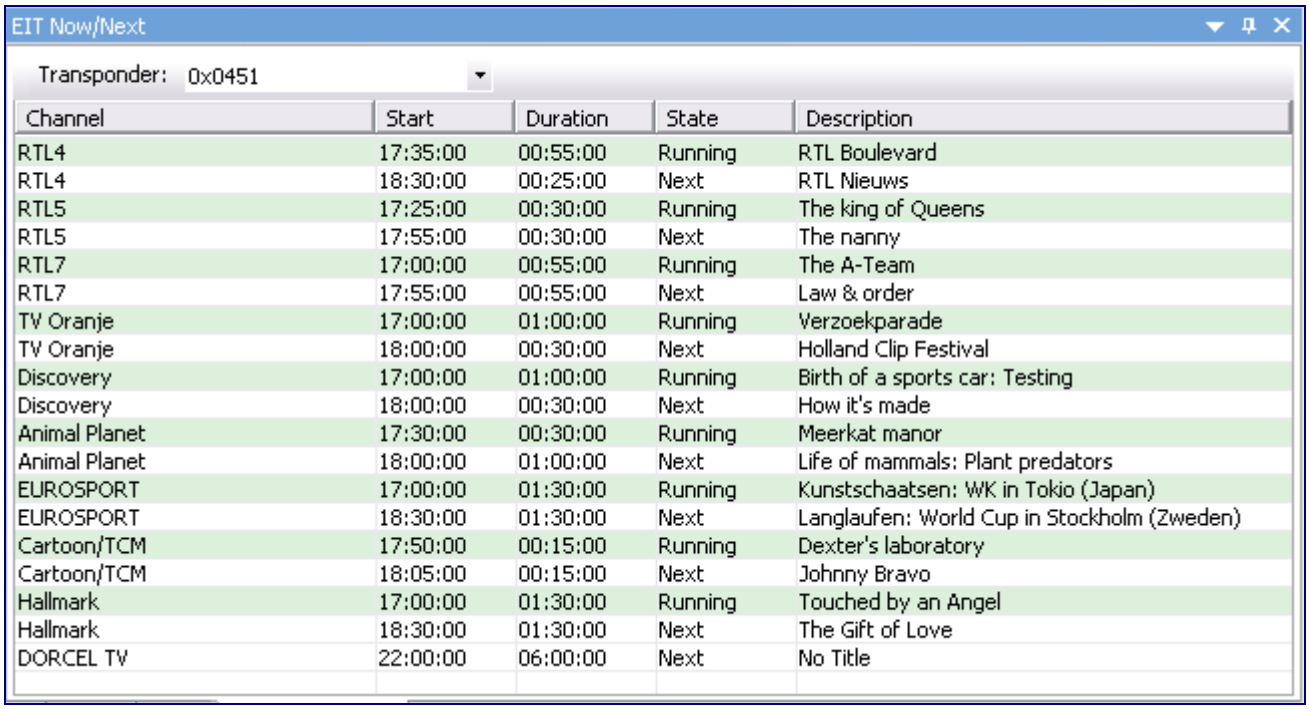
- Log output path

Log file names are named [date]_[time]_log.txt
Eq. When analyzing the Transport Stream,”20061019_123759_log.txt”
Means: start 19 October 2006 at 12:37:59.

8 EIT Now/Next Bar

Now/Next program list of multiple services

The EIT Now/next bar summarizes the now/next events.

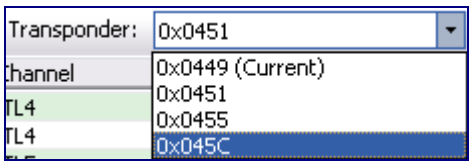


Channel	Start	Duration	State	Description
RTL4	17:35:00	00:55:00	Running	RTL Boulevard
RTL4	18:30:00	00:25:00	Next	RTL Nieuws
RTL5	17:25:00	00:30:00	Running	The king of Queens
RTL5	17:55:00	00:30:00	Next	The nanny
RTL7	17:00:00	00:55:00	Running	The A-Team
RTL7	17:55:00	00:55:00	Next	Law & order
TV Oranje	17:00:00	01:00:00	Running	Verzoekparade
TV Oranje	18:00:00	00:30:00	Next	Holland Clip Festival
Discovery	17:00:00	01:00:00	Running	Birth of a sports car: Testing
Discovery	18:00:00	00:30:00	Next	How it's made
Animal Planet	17:30:00	00:30:00	Running	Meerkat manor
Animal Planet	18:00:00	01:00:00	Next	Life of mammals: Plant predators
EUROSPORT	17:00:00	01:30:00	Running	Kunstschaatsen: WK in Tokio (Japan)
EUROSPORT	18:30:00	01:30:00	Next	Langlaufen: World Cup in Stockholm (Zweden)
Cartoon/TCM	17:50:00	00:15:00	Running	Dexter's laboratory
Cartoon/TCM	18:05:00	00:15:00	Next	Johnny Bravo
Hallmark	17:00:00	01:30:00	Running	Touched by an Angel
Hallmark	18:30:00	01:30:00	Next	The Gift of Love
DORCEL TV	22:00:00	06:00:00	Next	No Title

In different columns detailed information is given

Filter	Description
Channel	The name of the service
Start	The start time of the event
Duration	The duration time of the event
State	The running status of the event
Description	The short_event_descriptor text of the event

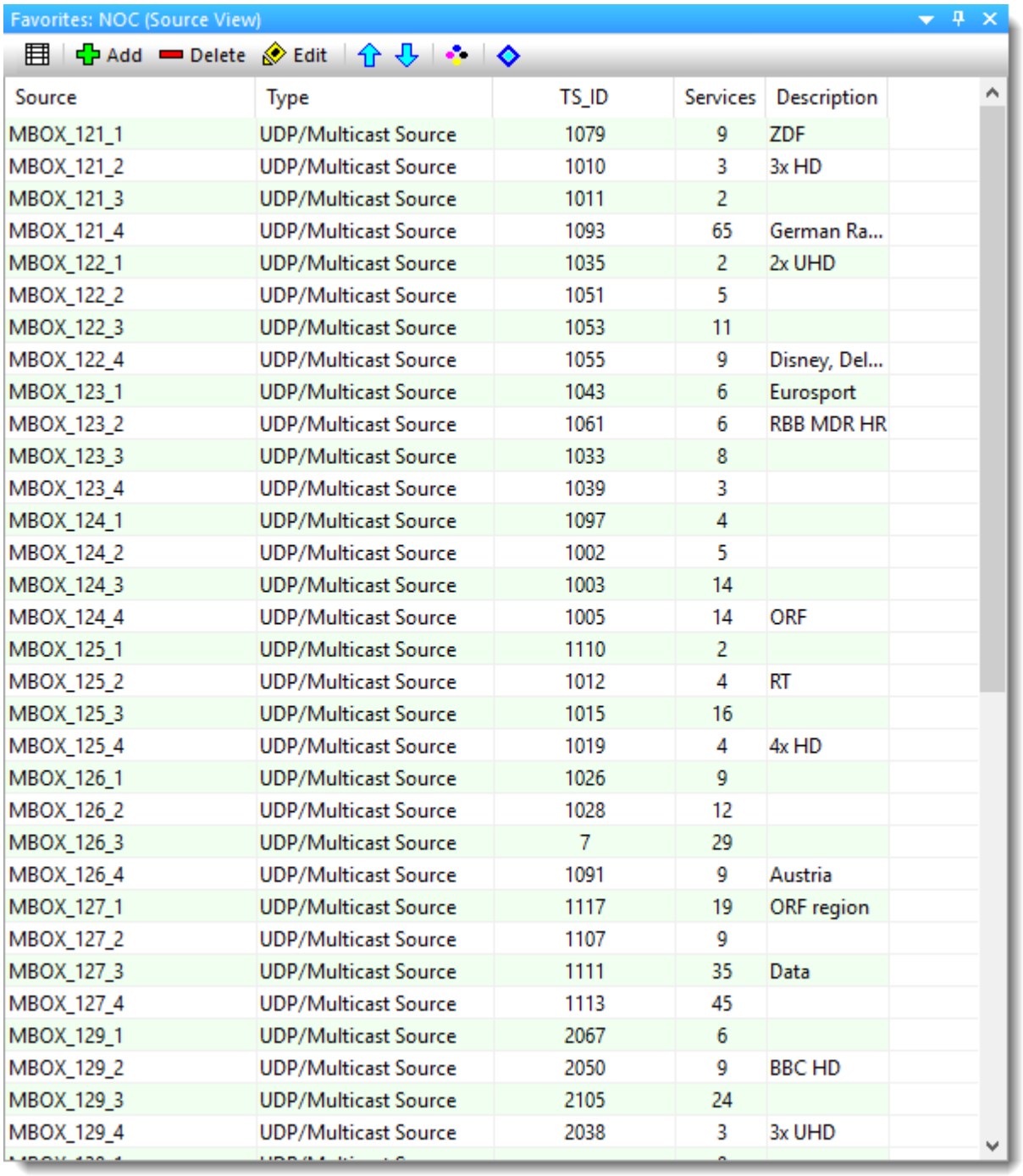
Via a pull-down menu actual and other transponders can be selected.



9 Favorites Bar

Easy management for all your Favorite inputs

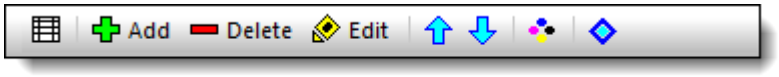
Possibility to tune to one of your favorite inputs, by only 1 mouse click.



Source	Type	TS_ID	Services	Description
MBOX_121_1	UDP/Multicast Source	1079	9	ZDF
MBOX_121_2	UDP/Multicast Source	1010	3	3x HD
MBOX_121_3	UDP/Multicast Source	1011	2	
MBOX_121_4	UDP/Multicast Source	1093	65	German Ra...
MBOX_122_1	UDP/Multicast Source	1035	2	2x UHD
MBOX_122_2	UDP/Multicast Source	1051	5	
MBOX_122_3	UDP/Multicast Source	1053	11	
MBOX_122_4	UDP/Multicast Source	1055	9	Disney, Del...
MBOX_123_1	UDP/Multicast Source	1043	6	Eurosport
MBOX_123_2	UDP/Multicast Source	1061	6	RBB MDR HR
MBOX_123_3	UDP/Multicast Source	1033	8	
MBOX_123_4	UDP/Multicast Source	1039	3	
MBOX_124_1	UDP/Multicast Source	1097	4	
MBOX_124_2	UDP/Multicast Source	1002	5	
MBOX_124_3	UDP/Multicast Source	1003	14	
MBOX_124_4	UDP/Multicast Source	1005	14	ORF
MBOX_125_1	UDP/Multicast Source	1110	2	
MBOX_125_2	UDP/Multicast Source	1012	4	RT
MBOX_125_3	UDP/Multicast Source	1015	16	
MBOX_125_4	UDP/Multicast Source	1019	4	4x HD
MBOX_126_1	UDP/Multicast Source	1026	9	
MBOX_126_2	UDP/Multicast Source	1028	12	
MBOX_126_3	UDP/Multicast Source	7	29	
MBOX_126_4	UDP/Multicast Source	1091	9	Austria
MBOX_127_1	UDP/Multicast Source	1117	19	ORF region
MBOX_127_2	UDP/Multicast Source	1107	9	
MBOX_127_3	UDP/Multicast Source	1111	35	Data
MBOX_127_4	UDP/Multicast Source	1113	45	
MBOX_129_1	UDP/Multicast Source	2067	6	
MBOX_129_2	UDP/Multicast Source	2050	9	BBC HD
MBOX_129_3	UDP/Multicast Source	2105	24	
MBOX_129_4	UDP/Multicast Source	2038	3	3x UHD

The Favorite Bar can be enabled/disabled by using the short key ‘Ctrl + F’.

Favorite Toolbar

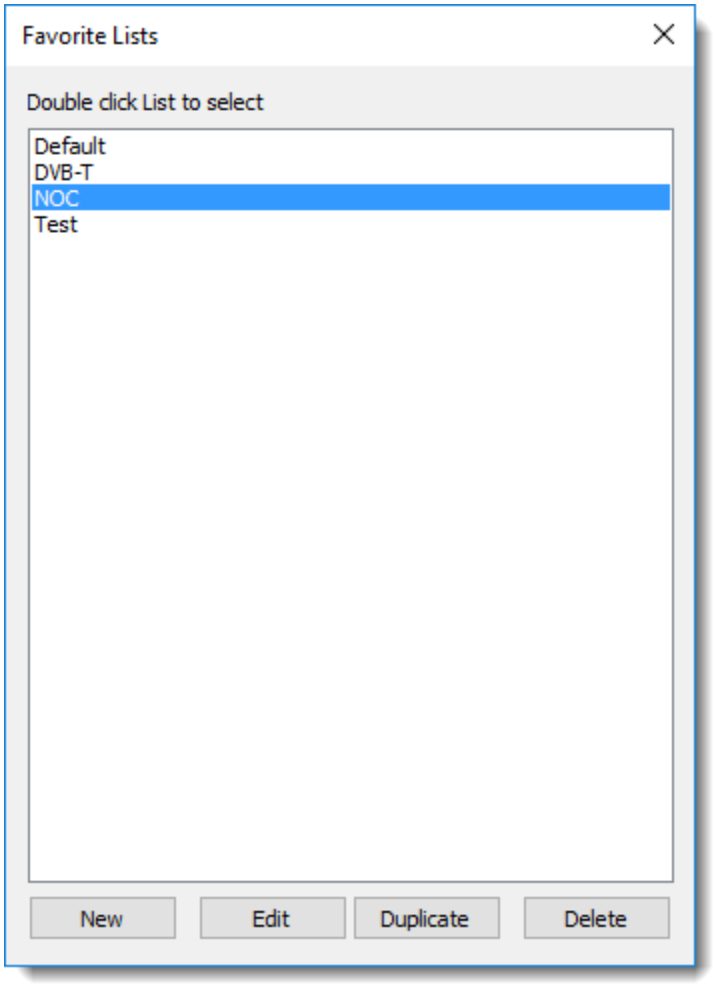


With the 'Favorite Toolbar' it is possible to manage multiple Favorite lists:

- Select List
- Add new Favorite
- Delete Favorites
- Edit a Favorite
- Move Favorite Up
- Move Favorite Down
- Toggle between Sources and Services view
- Scan all Sources

After 'Select List' it is possible to:

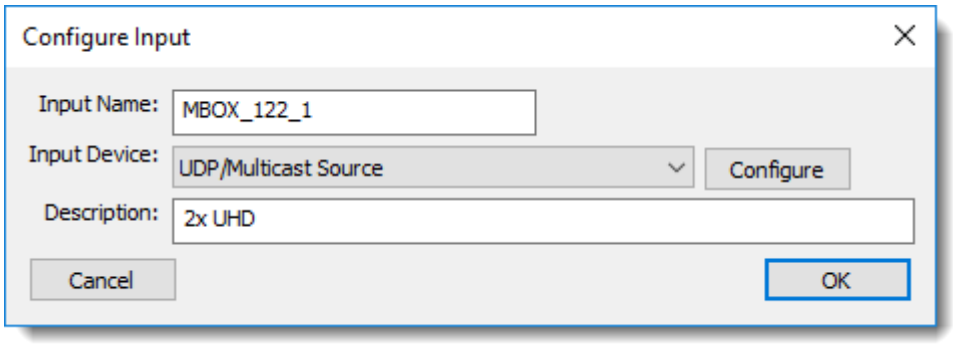
- Add a new Favorite List
- Edit the name of a Favorite List
- Duplicate a Favorite List
- Delete a Favorite List



A Favorite List is selected by double clicking on the Favorite List name.

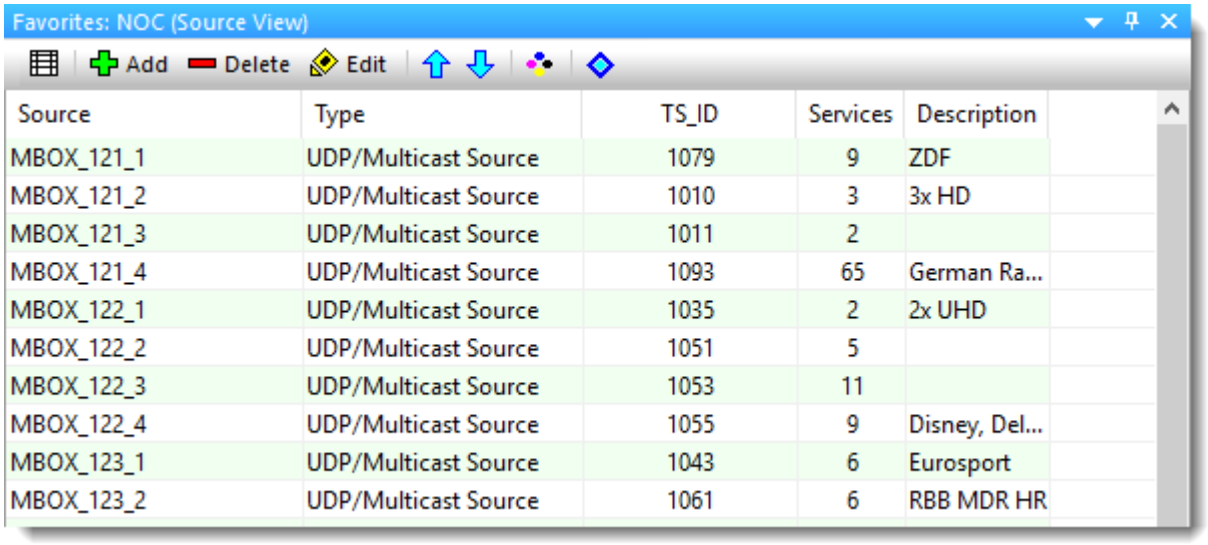
Adding a new Favorite gives the possibility to:

- Use your own input name
- Configure the Input
- Give more description information about this input (optional)



Source View

The header of the Favorite Bar shows the selected Favorite List



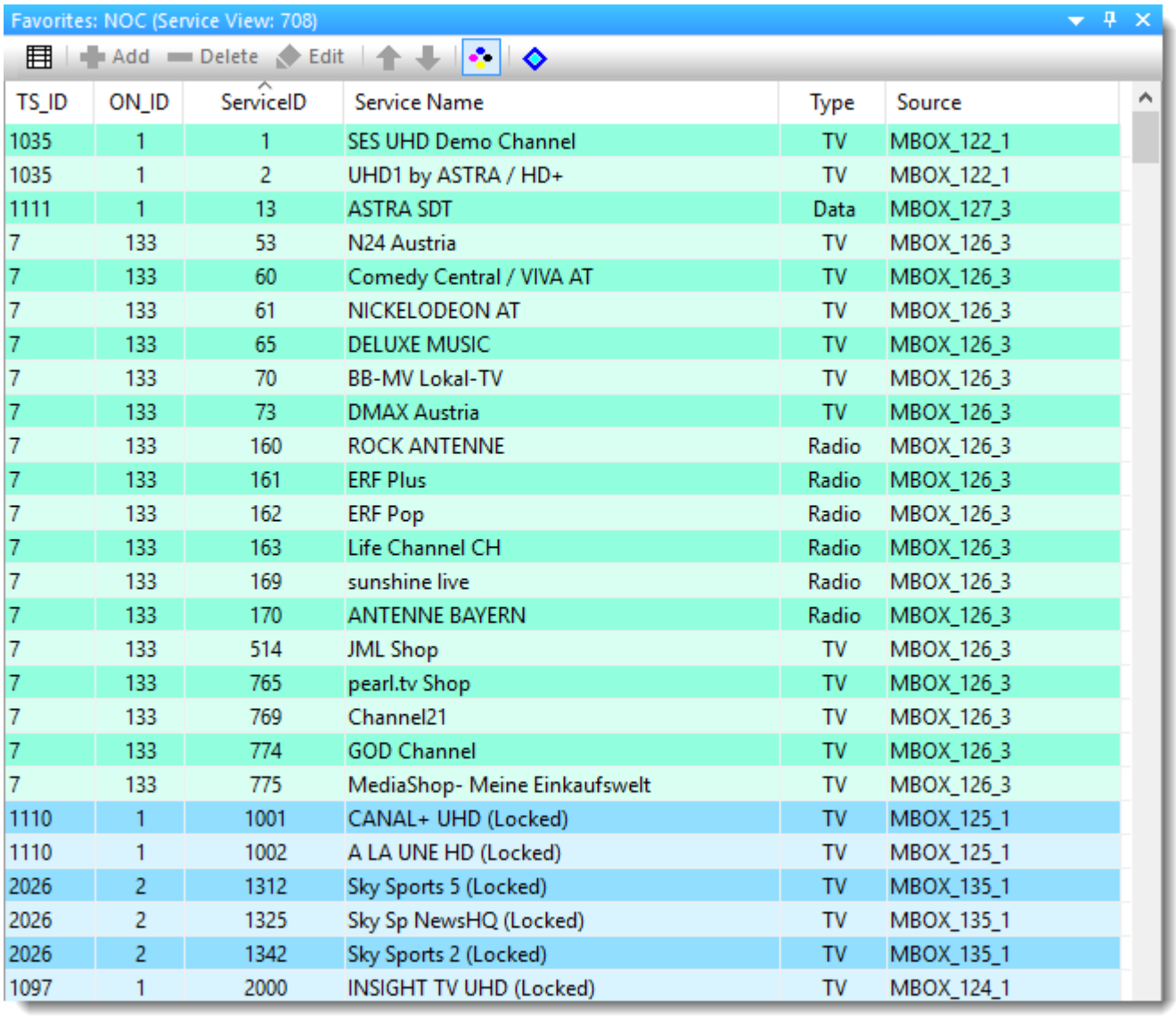
Source	Type	TS_ID	Services	Description
MBOX_121_1	UDP/Multicast Source	1079	9	ZDF
MBOX_121_2	UDP/Multicast Source	1010	3	3x HD
MBOX_121_3	UDP/Multicast Source	1011	2	
MBOX_121_4	UDP/Multicast Source	1093	65	German Ra...
MBOX_122_1	UDP/Multicast Source	1035	2	2x UHD
MBOX_122_2	UDP/Multicast Source	1051	5	
MBOX_122_3	UDP/Multicast Source	1053	11	
MBOX_122_4	UDP/Multicast Source	1055	9	Disney, Del...
MBOX_123_1	UDP/Multicast Source	1043	6	Eurosport
MBOX_123_2	UDP/Multicast Source	1061	6	RBB MDR HR

In different columns detailed information is given

Filter	Description
Source	Input name
Type	Input type
TS_ID	Transport Stream ID
Services	The amount of Services found (after scanning) in this Input
Description	Description information of this Input

Service View

The header of the Favorite Bar shows the selected Favorite List and the amount of Services which are available.



TS_ID	ON_ID	ServiceID	Service Name	Type	Source
1035	1	1	SES UHD Demo Channel	TV	MBOX_122_1
1035	1	2	UHD1 by ASTRA / HD+	TV	MBOX_122_1
1111	1	13	ASTRA SDT	Data	MBOX_127_3
7	133	53	N24 Austria	TV	MBOX_126_3
7	133	60	Comedy Central / VIVA AT	TV	MBOX_126_3
7	133	61	NICKELODEON AT	TV	MBOX_126_3
7	133	65	DELUXE MUSIC	TV	MBOX_126_3
7	133	70	BB-MV Lokal-TV	TV	MBOX_126_3
7	133	73	DMAX Austria	TV	MBOX_126_3
7	133	160	ROCK ANTENNE	Radio	MBOX_126_3
7	133	161	ERF Plus	Radio	MBOX_126_3
7	133	162	ERF Pop	Radio	MBOX_126_3
7	133	163	Life Channel CH	Radio	MBOX_126_3
7	133	169	sunshine live	Radio	MBOX_126_3
7	133	170	ANTENNE BAYERN	Radio	MBOX_126_3
7	133	514	JML Shop	TV	MBOX_126_3
7	133	765	pearl.tv Shop	TV	MBOX_126_3
7	133	769	Channel21	TV	MBOX_126_3
7	133	774	GOD Channel	TV	MBOX_126_3
7	133	775	MediaShop- Meine Einkaufswelt	TV	MBOX_126_3
1110	1	1001	CANAL+ UHD (Locked)	TV	MBOX_125_1
1110	1	1002	A LA UNE HD (Locked)	TV	MBOX_125_1
2026	2	1312	Sky Sports 5 (Locked)	TV	MBOX_135_1
2026	2	1325	Sky Sp NewsHQ (Locked)	TV	MBOX_135_1
2026	2	1342	Sky Sports 2 (Locked)	TV	MBOX_135_1
1097	1	2000	INSIGHT TV UHD (Locked)	TV	MBOX_124_1

In different columns detailed information is given

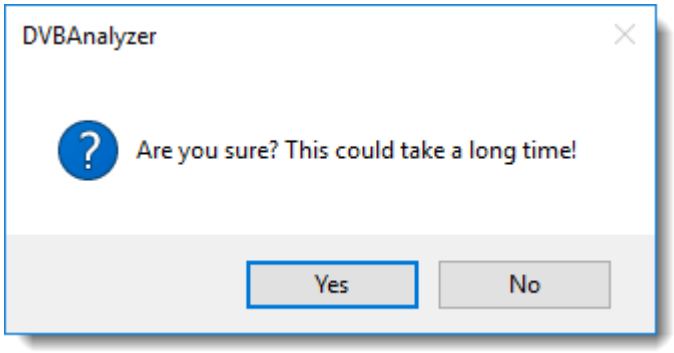
Filter	Description
TS_ID	Transport Stream ID
ON_ID	Original Network ID
Service ID	Service ID
Service Name	Service Name
Type	Service Type
Source	Input name

Open (in the clear) Services are shown with a green background.
Locked (scrambled) Services are shown with a blue background.

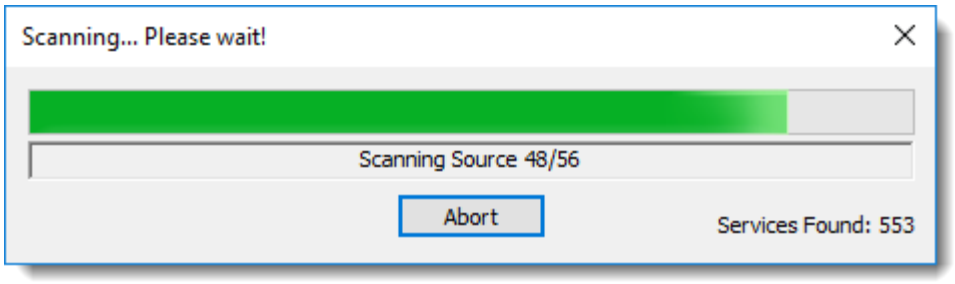
Scan all Sources

All Inputs can be scanned for all available Services.

Please be aware that this can take a long time, because all inputs have to be tuned separately to retrieve all available Services.



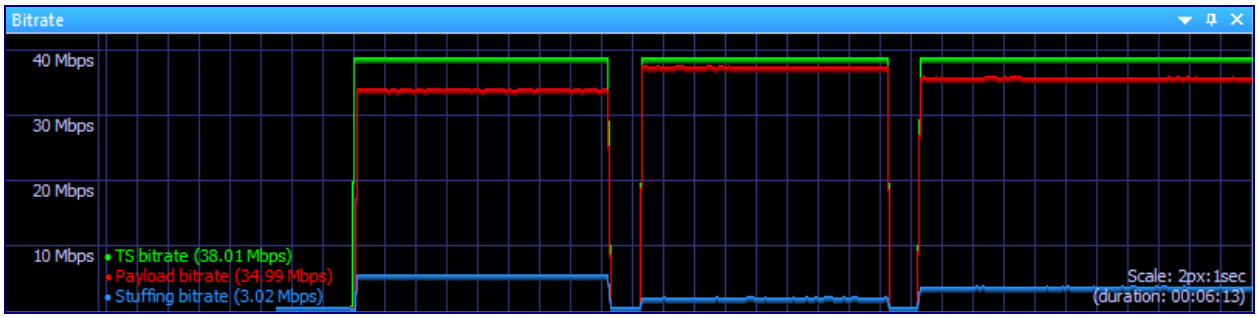
The scanning progress window will show the amount of inputs which are already scanned the amount of Services found.



10 Bitrate Bar

Easy TS bitrate view. Also showing payload and stuffing bitrate.

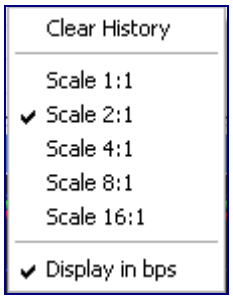
The Bitrate view displays bitrates of the analyzed Transport Stream. The green line is the Transport Stream bitrate and the red line represents the payload bitrate. The bitrate range is displayed in the Left corner.



Different coloring is used for:

- TS bitrate
- Payload bitrate
- Stuffing bitrate

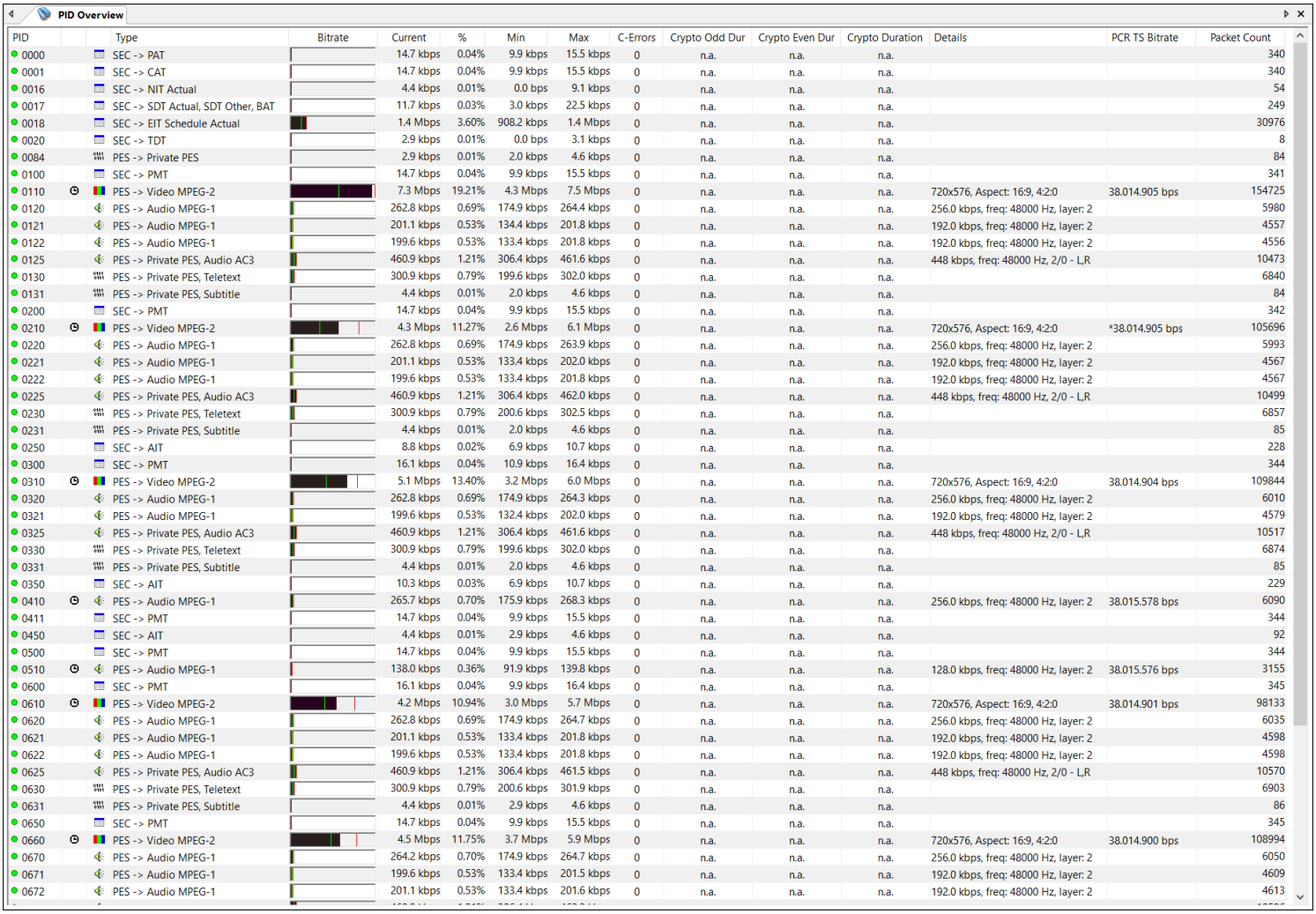
With the right mouse button the time scale can be chosen.



11 PID Overview

PID Overview showing bitrate and essence detail information

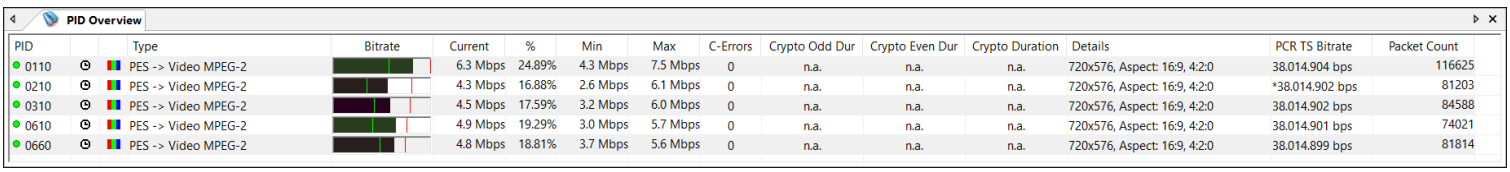
A PID-oriented overview of the analyzed Transport Stream is displayed in the PID Overview window. All PIDs are quickly comparable now.



PID Overview

PID	Type	Bitrate	Current	%	Min	Max	C-Errors	Crypto Odd Dur	Crypto Even Dur	Crypto Duration	Details	PCR TS Bitrate	Packet Count
0000	SEC -> PAT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			340
0001	SEC -> CAT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			340
0016	SEC -> NIT Actual		4.4 kbps	0.01%	0.0 bps	9.1 kbps	0	n.a.	n.a.	n.a.			54
0017	SEC -> SDT Actual, SDT Other, BAT		11.7 kbps	0.03%	3.0 kbps	22.5 kbps	0	n.a.	n.a.	n.a.			249
0018	SEC -> EIT Schedule Actual		1.4 Mbps	3.60%	908.2 kbps	1.4 Mbps	0	n.a.	n.a.	n.a.			30976
0020	SEC -> TDT		2.9 kbps	0.01%	0.0 bps	3.1 kbps	0	n.a.	n.a.	n.a.			8
0084	PES -> Private PES		2.9 kbps	0.01%	2.0 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			84
0100	SEC -> PMT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			341
0110	PES -> Video MPEG-2		7.3 Mbps	19.21%	4.3 Mbps	7.5 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.905 bps	154725
0120	PES -> Audio MPEG-1		262.8 kbps	0.69%	174.9 kbps	264.4 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2		5980
0121	PES -> Audio MPEG-1		201.1 kbps	0.53%	134.4 kbps	201.8 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4557
0122	PES -> Audio MPEG-1		199.6 kbps	0.53%	133.4 kbps	201.8 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4556
0125	PES -> Private PES, Audio AC3		460.9 kbps	1.21%	306.4 kbps	461.6 kbps	0	n.a.	n.a.	n.a.	448 kbps, freq: 48000 Hz, 2/0 - L,R		10473
0130	PES -> Private PES, Teletext		300.9 kbps	0.79%	199.6 kbps	302.0 kbps	0	n.a.	n.a.	n.a.			6840
0131	PES -> Private PES, Subtitle		4.4 kbps	0.01%	2.0 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			84
0200	SEC -> PMT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			342
0210	PES -> Video MPEG-2		4.3 Mbps	11.27%	2.6 Mbps	6.1 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	*38.014.905 bps	105696
0220	PES -> Audio MPEG-1		262.8 kbps	0.69%	174.9 kbps	263.9 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2		5993
0221	PES -> Audio MPEG-1		201.1 kbps	0.53%	133.4 kbps	202.0 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4567
0222	PES -> Audio MPEG-1		199.6 kbps	0.53%	133.4 kbps	201.8 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4567
0225	PES -> Private PES, Audio AC3		460.9 kbps	1.21%	306.4 kbps	462.0 kbps	0	n.a.	n.a.	n.a.	448 kbps, freq: 48000 Hz, 2/0 - L,R		10499
0230	PES -> Private PES, Teletext		300.9 kbps	0.79%	200.6 kbps	302.5 kbps	0	n.a.	n.a.	n.a.			6857
0231	PES -> Private PES, Subtitle		4.4 kbps	0.01%	2.0 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			85
0250	SEC -> AIT		8.8 kbps	0.02%	6.9 kbps	10.7 kbps	0	n.a.	n.a.	n.a.			228
0300	SEC -> PMT		16.1 kbps	0.04%	10.9 kbps	16.4 kbps	0	n.a.	n.a.	n.a.			344
0310	PES -> Video MPEG-2		5.1 Mbps	13.40%	3.2 Mbps	6.0 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.904 bps	109844
0320	PES -> Audio MPEG-1		262.8 kbps	0.69%	174.9 kbps	264.3 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2		6010
0321	PES -> Audio MPEG-1		199.6 kbps	0.53%	132.4 kbps	202.0 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4579
0325	PES -> Private PES, Audio AC3		460.9 kbps	1.21%	306.4 kbps	461.6 kbps	0	n.a.	n.a.	n.a.	448 kbps, freq: 48000 Hz, 2/0 - L,R		10517
0330	PES -> Private PES, Teletext		300.9 kbps	0.79%	199.6 kbps	302.0 kbps	0	n.a.	n.a.	n.a.			6874
0331	PES -> Private PES, Subtitle		4.4 kbps	0.01%	2.0 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			85
0350	SEC -> AIT		10.3 kbps	0.03%	6.9 kbps	10.7 kbps	0	n.a.	n.a.	n.a.			229
0410	PES -> Audio MPEG-1		265.7 kbps	0.70%	175.9 kbps	268.3 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2	38.015.578 bps	6090
0411	SEC -> PMT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			344
0450	SEC -> AIT		4.4 kbps	0.01%	2.9 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			92
0500	SEC -> PMT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			344
0510	PES -> Audio MPEG-1		138.0 kbps	0.36%	91.9 kbps	139.8 kbps	0	n.a.	n.a.	n.a.	128.0 kbps, freq: 48000 Hz, layer: 2	38.015.576 bps	3155
0600	SEC -> PMT		16.1 kbps	0.04%	9.9 kbps	16.4 kbps	0	n.a.	n.a.	n.a.			345
0610	PES -> Video MPEG-2		4.2 Mbps	10.94%	3.0 Mbps	5.7 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.901 bps	98133
0620	PES -> Audio MPEG-1		262.8 kbps	0.69%	174.9 kbps	264.7 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2		6035
0621	PES -> Audio MPEG-1		201.1 kbps	0.53%	133.4 kbps	201.8 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4598
0622	PES -> Audio MPEG-1		199.6 kbps	0.53%	133.4 kbps	201.8 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4598
0625	PES -> Private PES, Audio AC3		460.9 kbps	1.21%	306.4 kbps	461.5 kbps	0	n.a.	n.a.	n.a.	448 kbps, freq: 48000 Hz, 2/0 - L,R		10570
0630	PES -> Private PES, Teletext		300.9 kbps	0.79%	200.6 kbps	301.9 kbps	0	n.a.	n.a.	n.a.			6903
0631	PES -> Private PES, Subtitle		4.4 kbps	0.01%	2.9 kbps	4.6 kbps	0	n.a.	n.a.	n.a.			86
0650	SEC -> PMT		14.7 kbps	0.04%	9.9 kbps	15.5 kbps	0	n.a.	n.a.	n.a.			345
0660	PES -> Video MPEG-2		4.5 Mbps	11.75%	3.7 Mbps	5.9 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.900 bps	108994
0670	PES -> Audio MPEG-1		264.2 kbps	0.70%	174.9 kbps	264.7 kbps	0	n.a.	n.a.	n.a.	256.0 kbps, freq: 48000 Hz, layer: 2		6050
0671	PES -> Audio MPEG-1		199.6 kbps	0.53%	133.4 kbps	201.5 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4609
0672	PES -> Audio MPEG-1		201.1 kbps	0.53%	133.4 kbps	201.6 kbps	0	n.a.	n.a.	n.a.	192.0 kbps, freq: 48000 Hz, layer: 2		4613

When PIDs are filtered (via the filter pull-down option in the PID window) it looks like this:



PID Overview

PID	Type	Bitrate	Current	%	Min	Max	C-Errors	Crypto Odd Dur	Crypto Even Dur	Crypto Duration	Details	PCR TS Bitrate	Packet Count
0110	PES -> Video MPEG-2		6.3 Mbps	24.89%	4.3 Mbps	7.5 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.904 bps	116625
0210	PES -> Video MPEG-2		4.3 Mbps	16.88%	2.6 Mbps	6.1 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	*38.014.902 bps	81203
0310	PES -> Video MPEG-2		4.5 Mbps	17.59%	3.2 Mbps	6.0 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.902 bps	84588
0610	PES -> Video MPEG-2		4.9 Mbps	19.29%	3.0 Mbps	5.7 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.901 bps	74021
0660	PES -> Video MPEG-2		4.8 Mbps	18.81%	3.7 Mbps	5.6 Mbps	0	n.a.	n.a.	n.a.	720x576, Aspect: 16:9, 4:2:0	38.014.899 bps	81814

By clicking the column header, the rows can be sorted on their values.

The PID which has a PCR TS Bitrate shown with an asteriks, is the PID which is used for calculation of the TS bitrate.

Different columns show information:

Column	Description
PID test	Signaling of the ETR 290 compliancy tests
PID	PID ID number
PCR	Icon if PID contains PCR
PID icon	Icon representation of the PID
Type	Stream type
Bitrate	Graphical representation of Current/Min/Max bitrate
Current	Current bitrate
%	Percentage bitrate of total Transport Stream bitrate
Min	Min bitrate
Max	Max bitrate
C-Errors	Continuity Counter Errors
Crypto odd duration	Time duration of odd encryption
Crypto even duration	Time duration of even encryption
Details	Codec details
PCR TS Bitrate	TS Bitrate calculated with the PCR PID
Packet Count	Total TS packets for a specific PID received

11.1 Details

PID Test

Each PID is associated with a number of ETR-290 compliancy tests. Different signaling is used to indicate the status of the ETR-290 tests:

Signaling	Description
Green	No Error: Test passed
Red	Error: Test failed
Gray	Test disabled
Blue	Warning: Not mandatory

PCR

When the PID contains PCR (Program Clock Reference) information, it is indicated by an icon in the PCR column.

PID icon

Icons symbolize different sorts of PIDs:

Icon	Description
	Video PID
	Video PID, with PCR
	Audio PID
	Audio PID, with PCR
	Private data PID
	PCR PID
	Table PID
	Object/Data Carousel PID
	Null PID (8191)
	Conditional Access PID (ECM, EMM)
	Unreferenced (Ghost) PID
	Referenced, but not existing PID
	Unknown PID

Type

There are three kinds of PIDs:

- SEC
- PES
- NULL

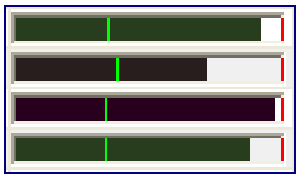
SEC
All tables are transported via Section PIDs.

PES
Video, Audio, and Private data are transported via PES (Packetized Elementary Stream)

NULL
Only PID 8191 (0x1FFF) is the NULL filler PID

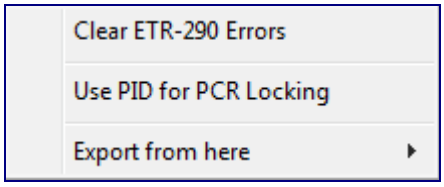
Bitrate

The visual representation of the bitrate is displayed as:

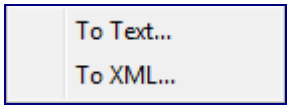


The green line represents the minimum bitrate, the red line the maximum bitrate and the black line the current bitrate.

By using the right mouse key, extra actions can be taken.



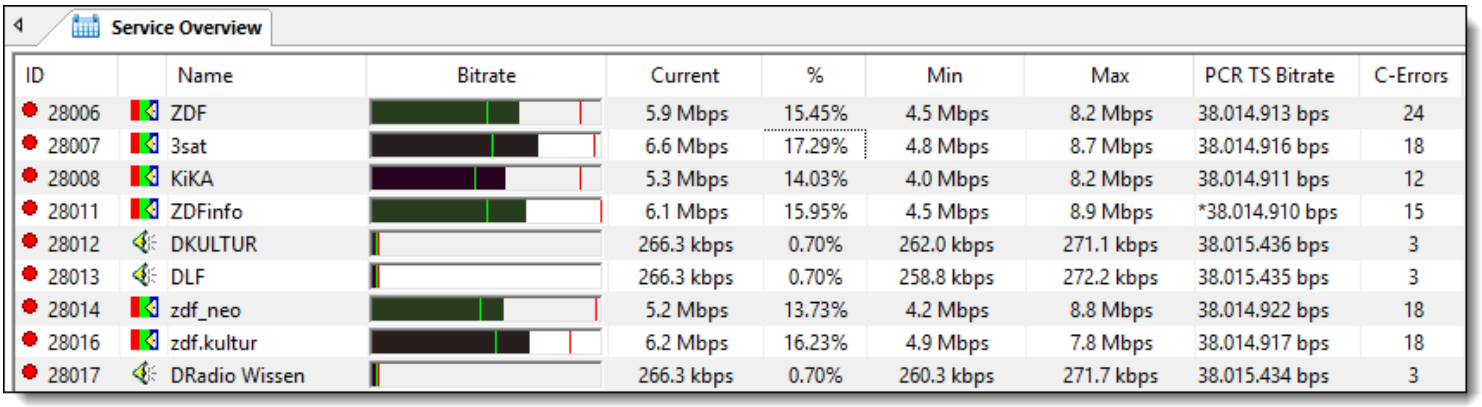
You can export all information displayed in Text or XML Format.



12 Service Overview

Service Overview showing bitrate and essence detail information

A Service-oriented overview of the analyzed Transport Stream is displayed in the Service Overview window. All Services s are quickly comparable now.



ID		Name	Bitrate	Current	%	Min	Max	PCR TS Bitrate	C-Errors
28006		ZDF		5.9 Mbps	15.45%	4.5 Mbps	8.2 Mbps	38.014.913 bps	24
28007		3sat		6.6 Mbps	17.29%	4.8 Mbps	8.7 Mbps	38.014.916 bps	18
28008		KiKA		5.3 Mbps	14.03%	4.0 Mbps	8.2 Mbps	38.014.911 bps	12
28011		ZDFinfo		6.1 Mbps	15.95%	4.5 Mbps	8.9 Mbps	*38.014.910 bps	15
28012		DKULTUR		266.3 kbps	0.70%	262.0 kbps	271.1 kbps	38.015.436 bps	3
28013		DLF		266.3 kbps	0.70%	258.8 kbps	272.2 kbps	38.015.435 bps	3
28014		zdf_neo		5.2 Mbps	13.73%	4.2 Mbps	8.8 Mbps	38.014.922 bps	18
28016		zdf.kultur		6.2 Mbps	16.23%	4.9 Mbps	7.8 Mbps	38.014.917 bps	18
28017		DRadio Wissen		266.3 kbps	0.70%	260.3 kbps	271.7 kbps	38.015.434 bps	3

By clicking the column header, the rows can be sorted on their values.

Different columns show information:

Column	Description
Service test	Signaling of the ETR 290 compliancy tests
Service ID	Service ID number
Service icon	Icon representation of the Service
Name	Service name
Bitrate	Graphical representation of Current/Min/Max bitrate
Current	Current bitrate
%	Percentage bitrate of total Transport Stream bitrate
Min	Min bitrate
Max	Max bitrate
PCR TS Bitrate	TS Bitrate calculated with the PCR PID
C-Errors	Continuity Counter Errors

The Service which has a PCR TS Bitrate shown with an asteriks, is the Service which is used for calcualtion of the TS bitrate.

12.1 Details

Service Test

Each Service is associated with a number of ETR-290 compliancy tests. Different signaling is used to indicate the status of the ETR-290 tests:

Signaling		Description
	Green	No Error: Test passed
	Red	Error: Test failed
	Gray	Test disabled
	Blue	Warning: Not mandatory

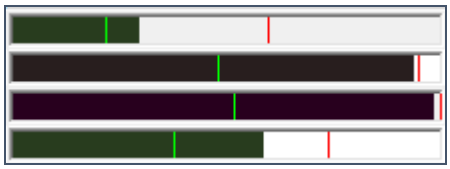
Service icon

Icons symbolize different sorts of PIDs:

Icon	Description
	TV Service, only video
	TV Service, video and audio
	Radio Service
0101 0101	Data Service

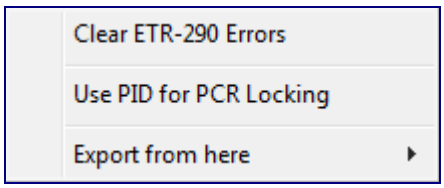
Bitrate

The visual representation of the bitrate is displayed as:

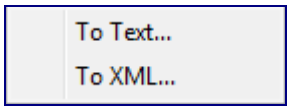


The green line represents the minimum bitrate, the red line the maximum bitrate and the black line the current bitrate.

By using the right mouse key, extra actions can be taken.



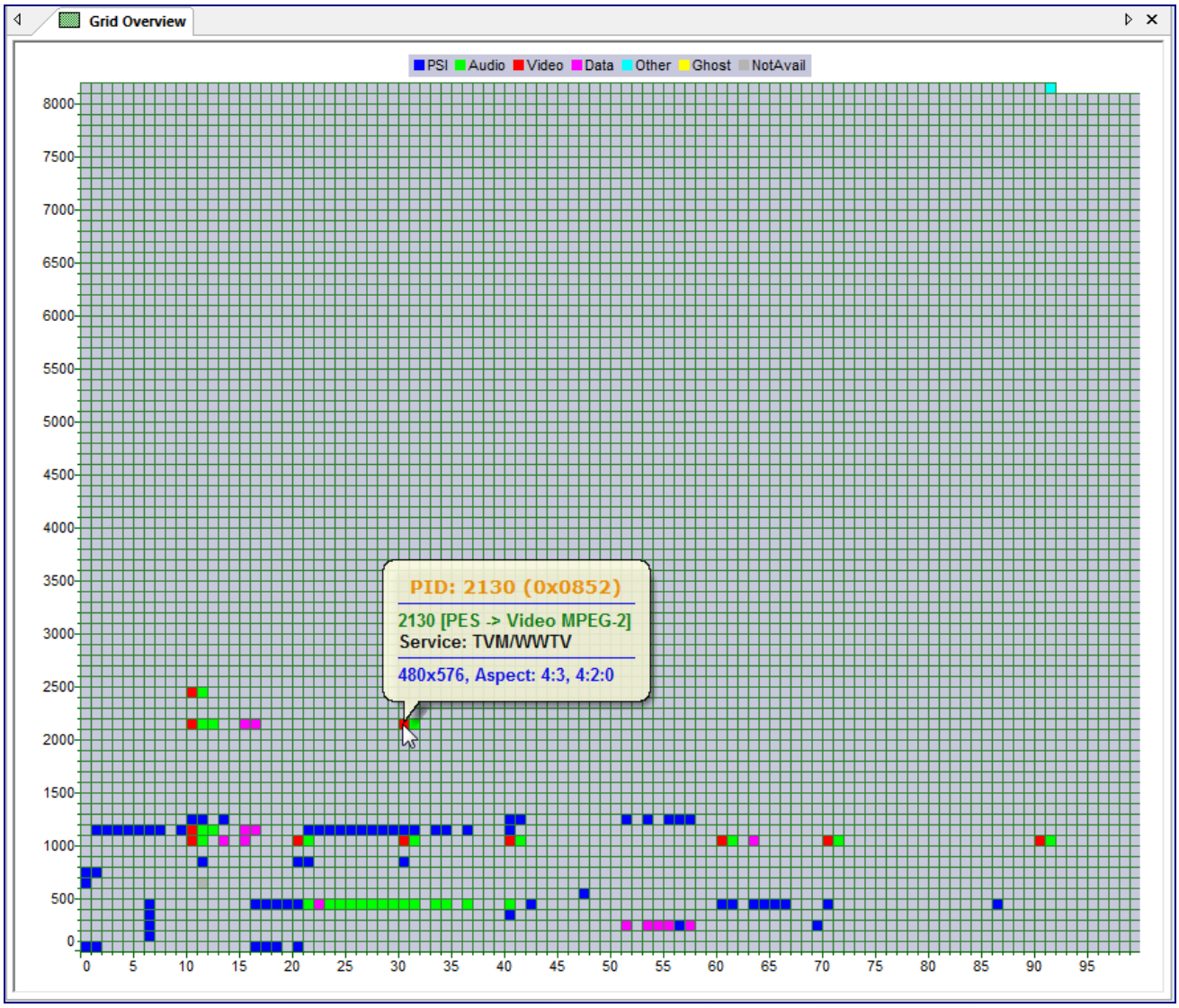
You can export all information displayed in Text or XML Format.



13 Grid Overview

Easy graphical overview of PID allocation patterns

The Grid Overview window displays the PID numbers contained in the Transport Stream in a Grid layout. This view allows quick analysis of PID patterns.



Different colors are used to classify the PID types:

By moving the mouse over the Grid, detailed PID information is displayed in a popup.

13.1 Properties

Gridview display size can be chosen, via properties or right mouse button:

- 100 x 82
- 128 x 64 (= 0x80 x 0x40)

14 Bitrate Overview

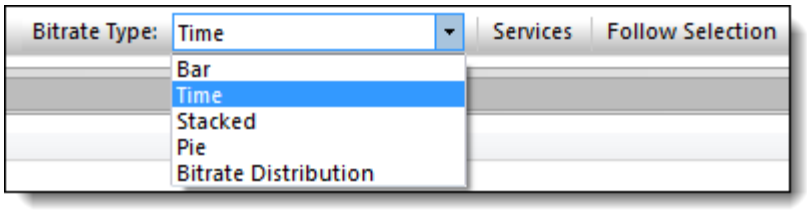
Different Graphical representations of PID and Service bitrate behaviors

Visual overviews of PID bitrates and comparisons are possible in 5 different representations:

- Bar
- Time
- Stacked
- Pie
- Bitrate Distribution

Bitrates can be shown for PID or Services.
Also, a PID filter can be used.

A Bar at the bottom gives extra control management possibilities.



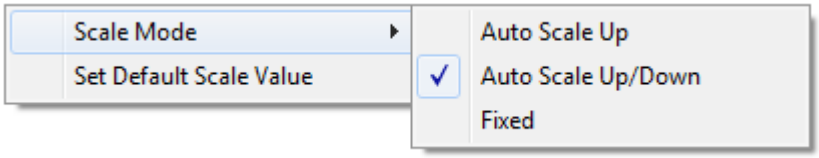
Besides using the pull-down to select, also the short-keys “1” (Bar), “2” (Time), “3” (Stacked), “4” (Pie) and “5” (Bitrate Distribution) will do the selection.

Pressing ‘Services’, toggles between showing PID or Service bitrates. Also, the short-key “S” will work.

Pressing ‘Follow Selection’, toggles between yes/no using a PID filter when showing PID bitrates. Also, the short-key “F” will work. PID filtering is realized in the PID bar.

Bitrate Overview can be opened more than once!

Using the right mouse button, different scales modes can be set.

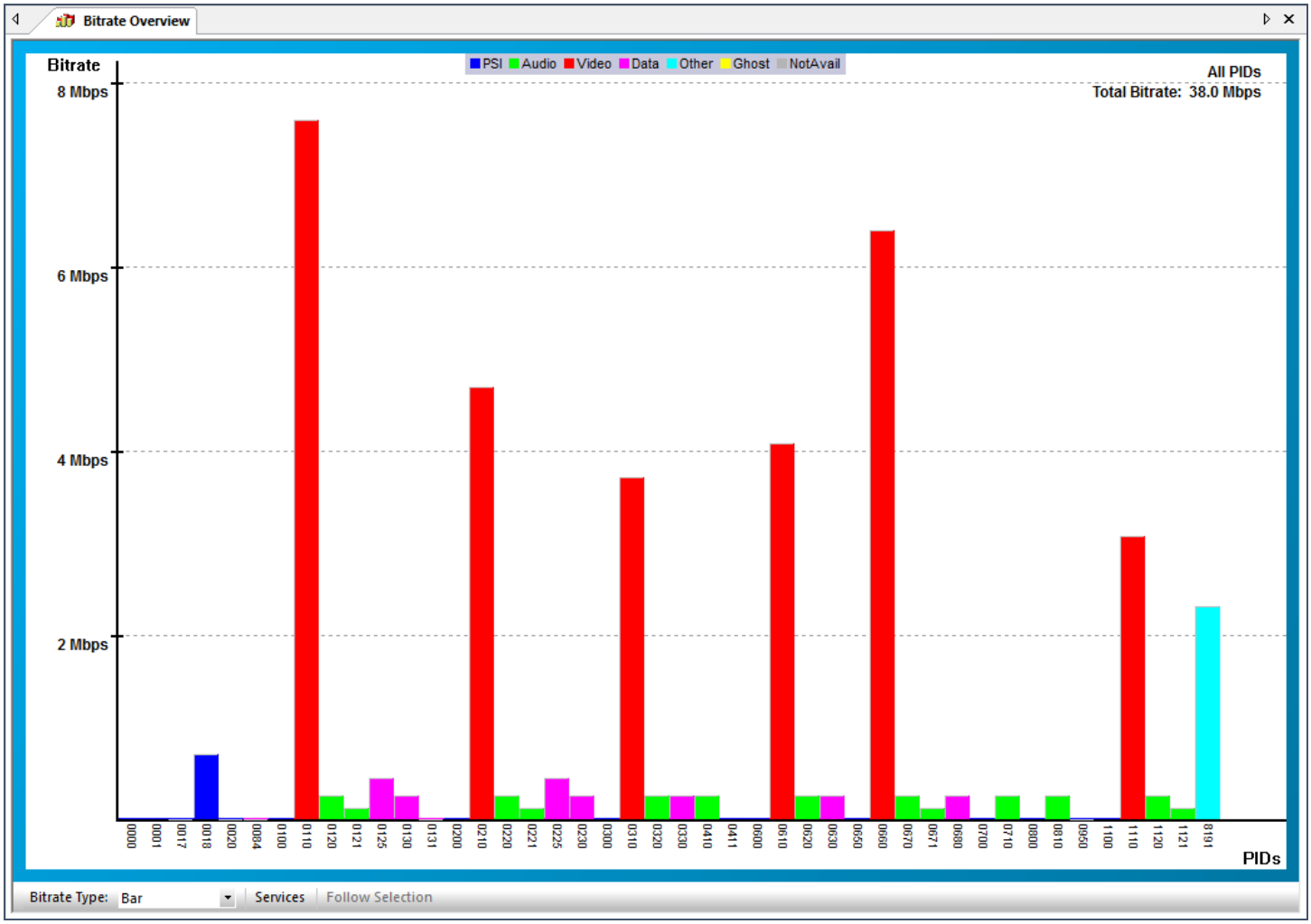


14.1 Bar

A dancing bar visual bitrate representation is given, when Bar is selected in the Bitrate Type pull-down.

PIDs

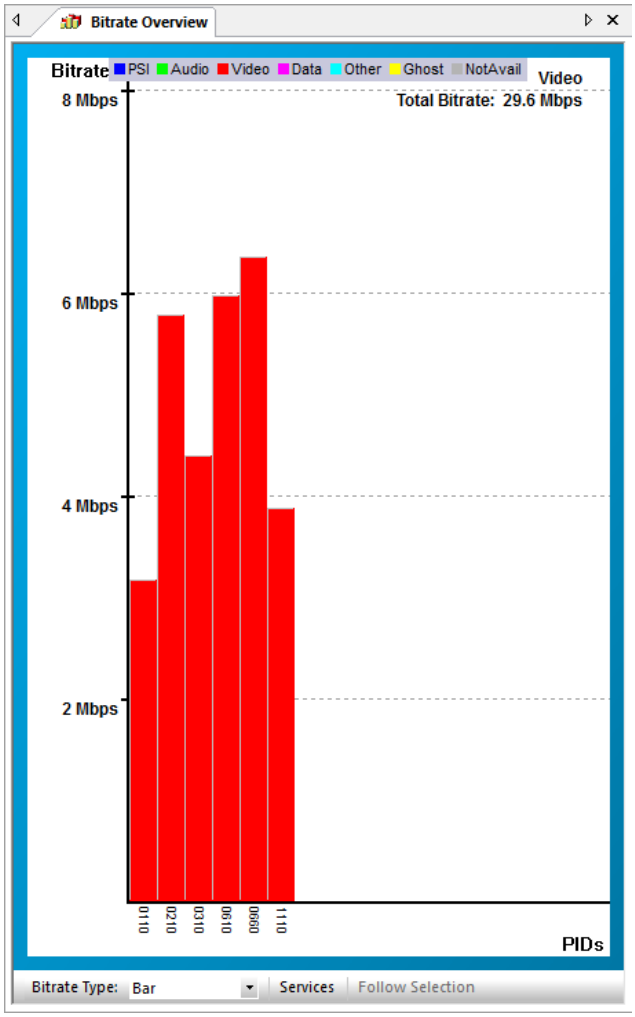
A dancing Bar graphical overview is given of all PIDs, selected in the PID Bar.



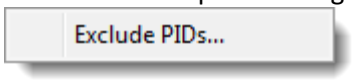
The following color codes are used:

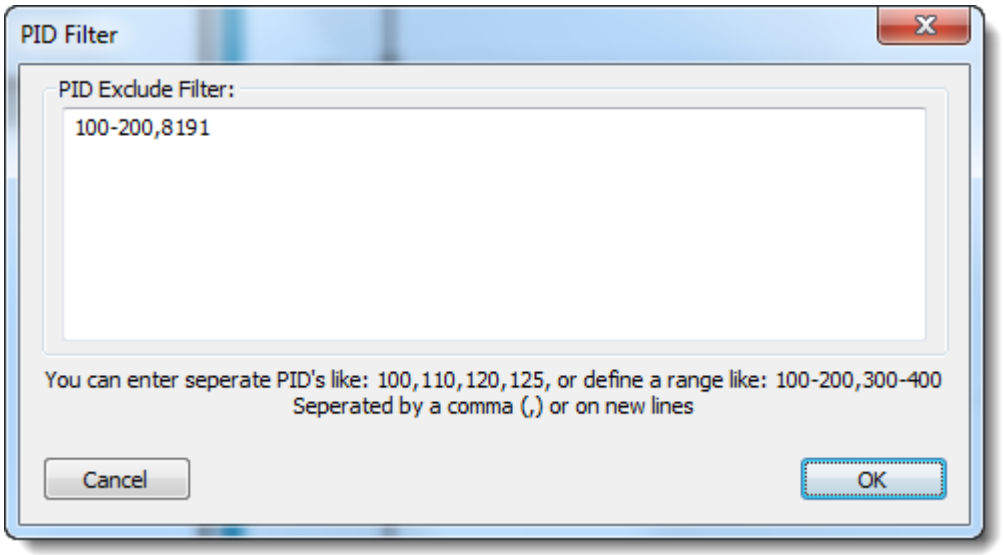
Clicking on a PID, results in information detail in the upper right corner.

When PIDs are filtered (via the filter pull-down option in the PID window) it looks like (filter on Video PID):



To exclude PIDs press the right mouse button:

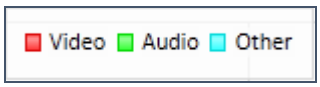




Services

Dancing bar bitrate representation of all Services.

The bitrate of all PIDs, which are referenced a the Service PMT, are cummulated.
Different coloring is used for Video, Audio and other components.
Other can be Private PES (Teletekst, DVB-subtitles) or Private sections.



Because a PID can be used in multiple Services, the bitrate of all Services together can be more, then the bitrate of all PIDs together.

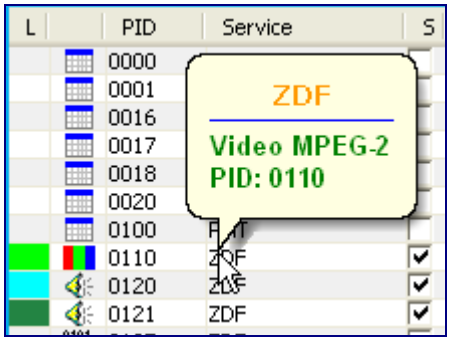
Using the right mouse button, the axis can be reset.

14.2 Time

A Time visual representation is given, when Time is selected in the Bitrate Type pull-down.

PIDs

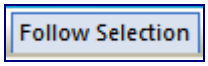
By moving the mouse over a PID number, detailed information is displayed in a balloon popup.



PIDs can be selected via:

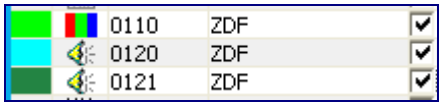
- Manual PID selection
- Follow Selection

All PIDs can be selected at once, by pressing the ‘A’ button.

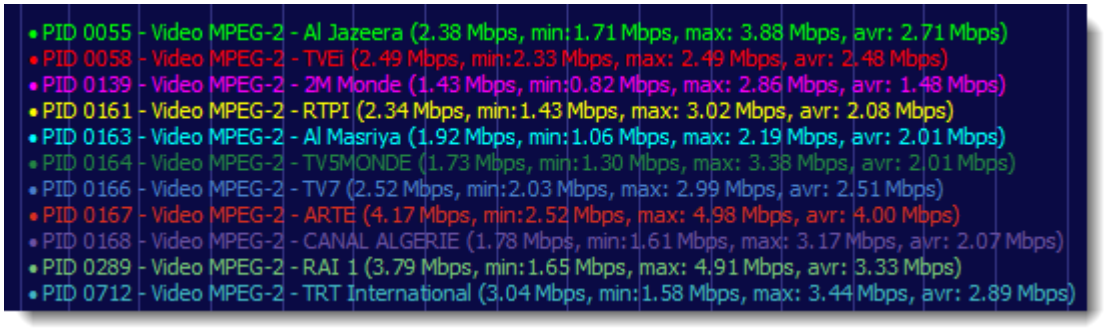


When choosing “Follow Selection”, PIDs are automatically selected when in the PID Bar a PID selection is made, or when in the Services Bar a service is selected.

Manual PID selection can be done by clicking the boxes behind the PID numbers.

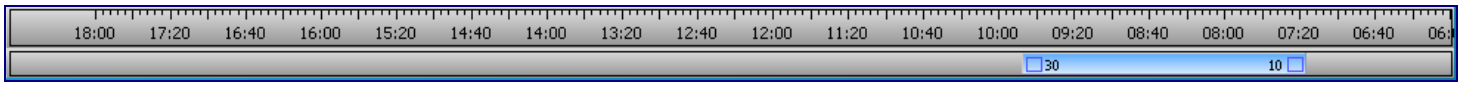


In the lower left corner a legend of all selected PIDs is giving, with actual, average, minimum and maximum bitrate measured.



On the lower right corner, the zoom factor (percentage and time-duration) is given.
Below the date and time is given of the right part of the time axis.

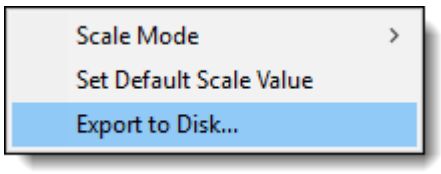
1 hour of bitrate information off all PIDs will be cached. So, after selecting PIDs the begin and end time of the measurement can be selected.



The maximum time graph is 60 minutes and the minimum time graph is 36 seconds.
With the zoom control the position and zoom factor can be altered.

A red line is given on the time axis, if a time (PCR) discontinuity is measured.

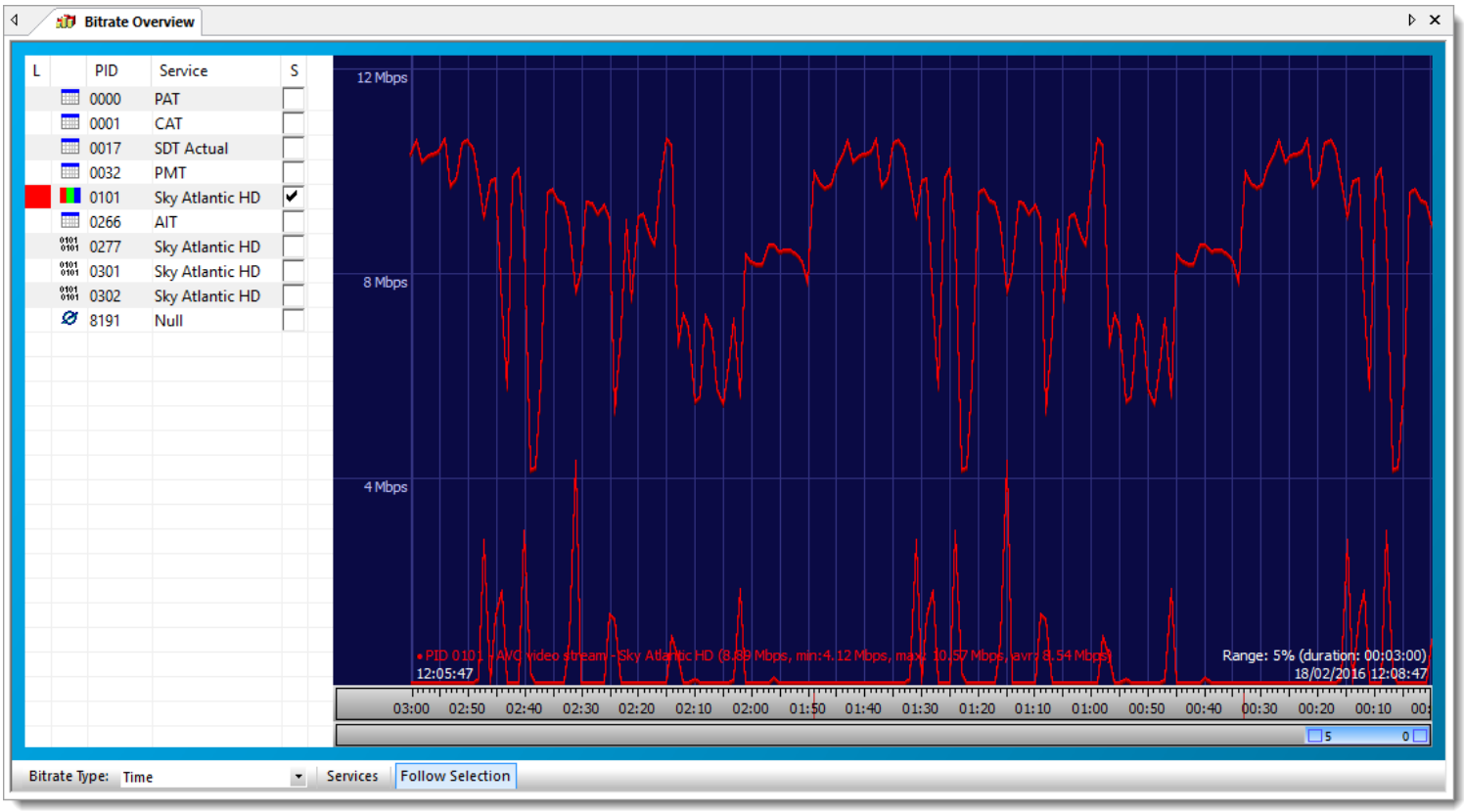
Using the right mouse button, now also the bitrates can be exported to disk



PES stuffing

Some encoders create higher PID bitrates, then the Video payload shown in the Video PID.

When showing PIDs with PES payload, besides showing the PID bitrate, also the PES filling bitrate is shown (lower line).



Services

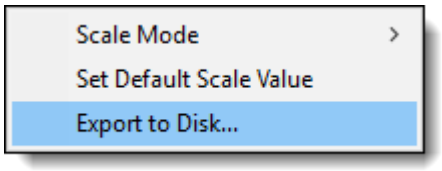
Time bitrate representation of selected Services.

14.3 Stacked

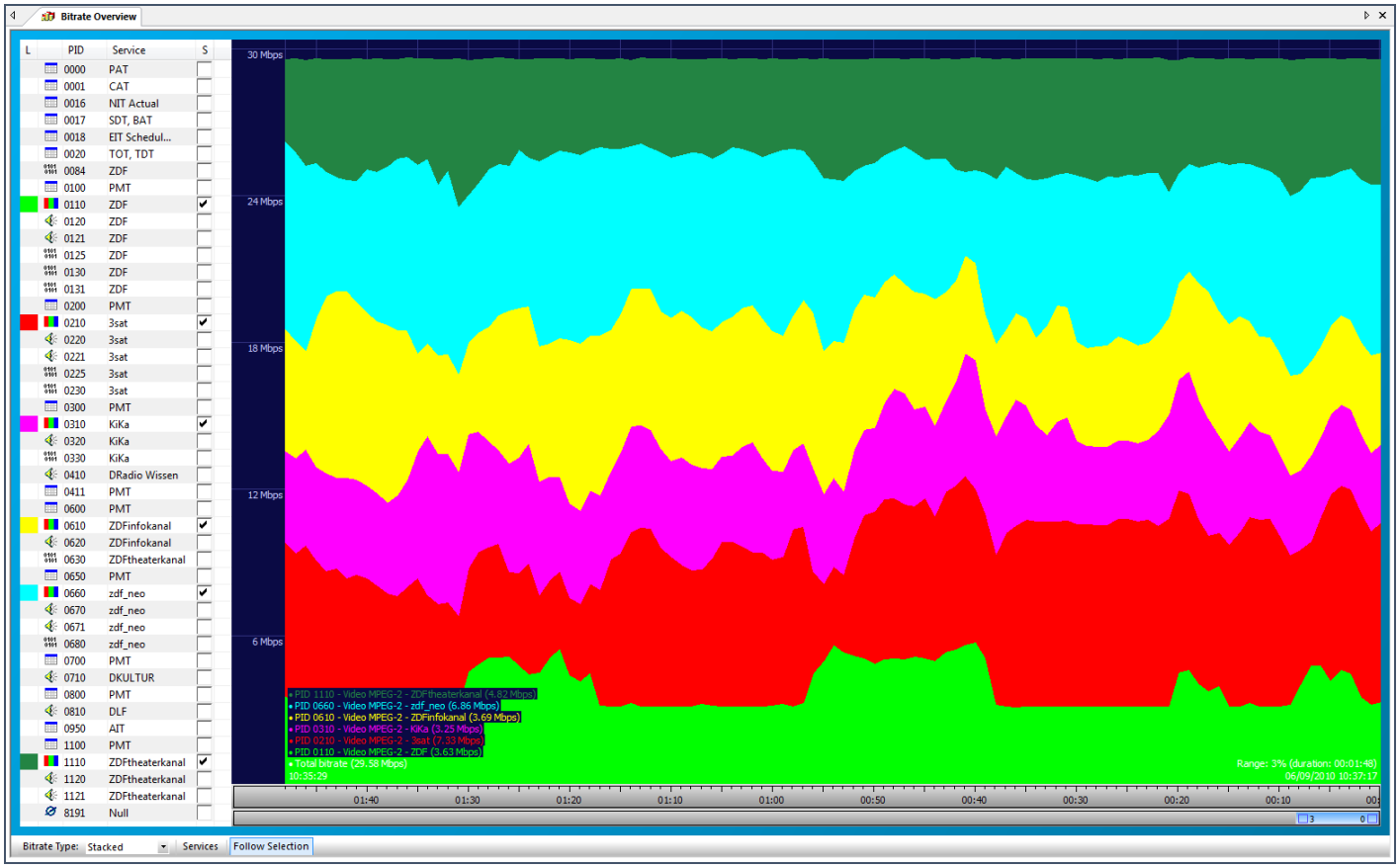
A Stacked visual representation is given, when Stacked is selected in the Bitrate Type pull-down.

Selection is realized equally to the Time representation.

Using the right mouse button, now also the bitrates can be exported to disk



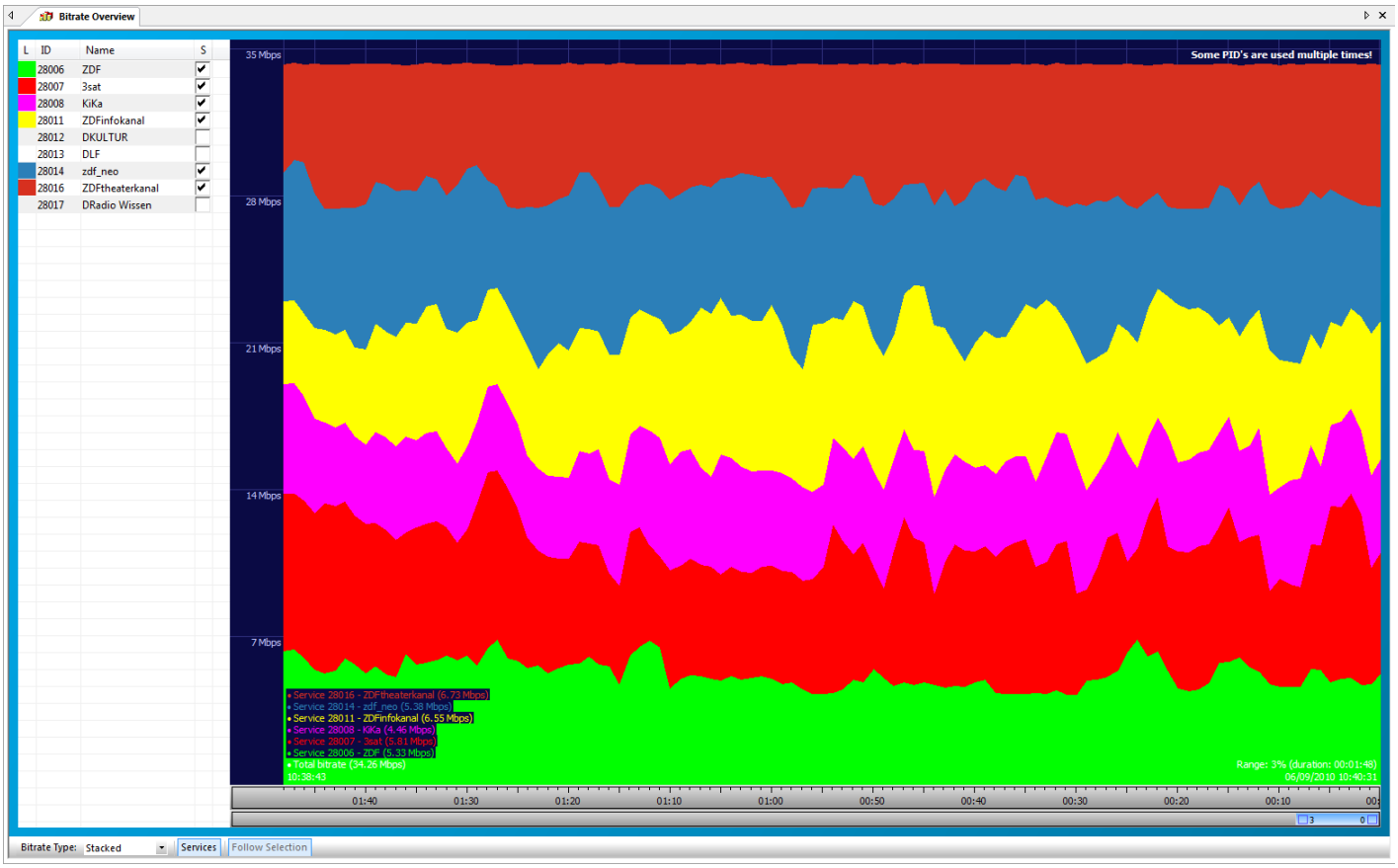
PIDs



When now showing only the Video bitrates, you get a nice presentation of the statistical multiplex behavior.

Services

Stacked bitrate representation of selected Services.

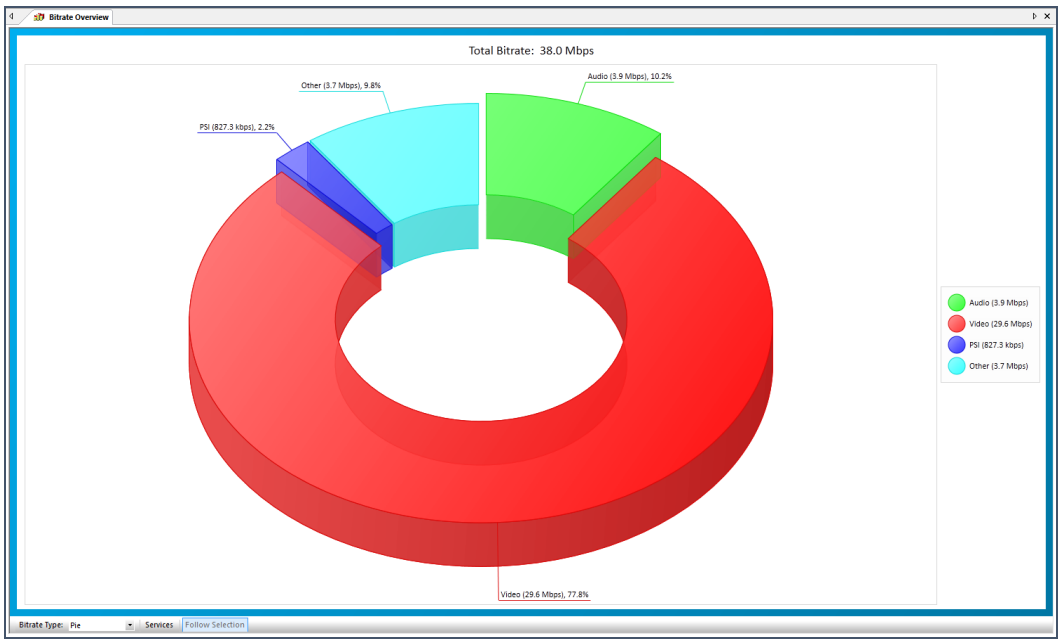


14.4 Pie

A Pie graphical overview is given, when Pie is selected in the Bitrate Type pull-down.

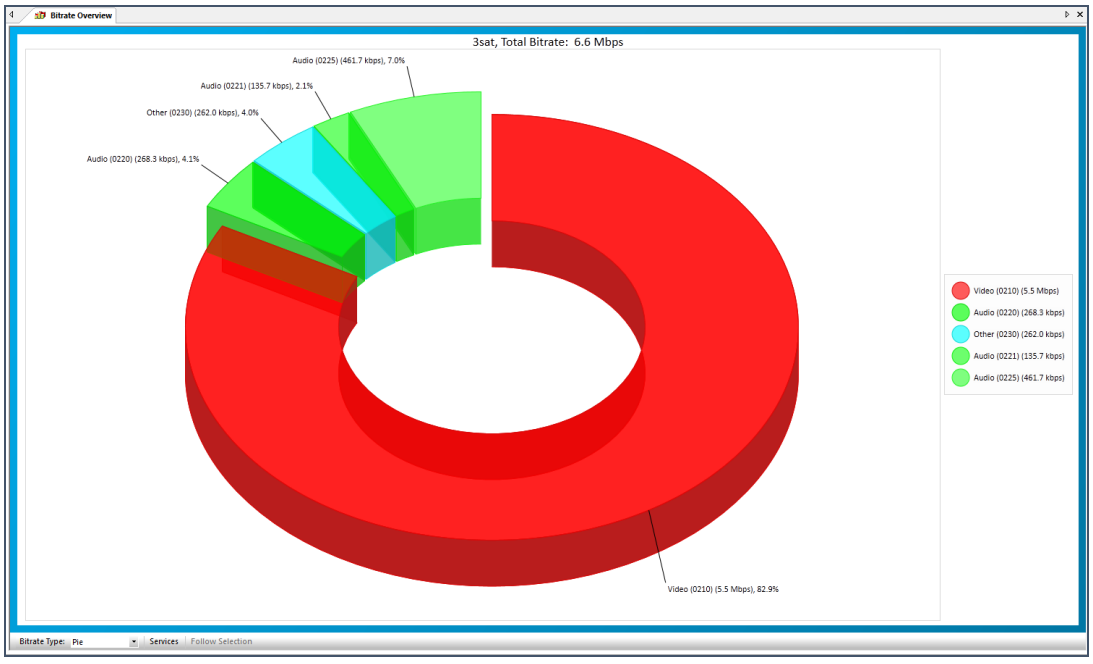
PIDs

A Pie graphical overview is given of all PIDs, categorized in different PID types (Audio, Video, PSI, Other), when there is no PID filter used and the focus in the Service Bar is not on a Service name.

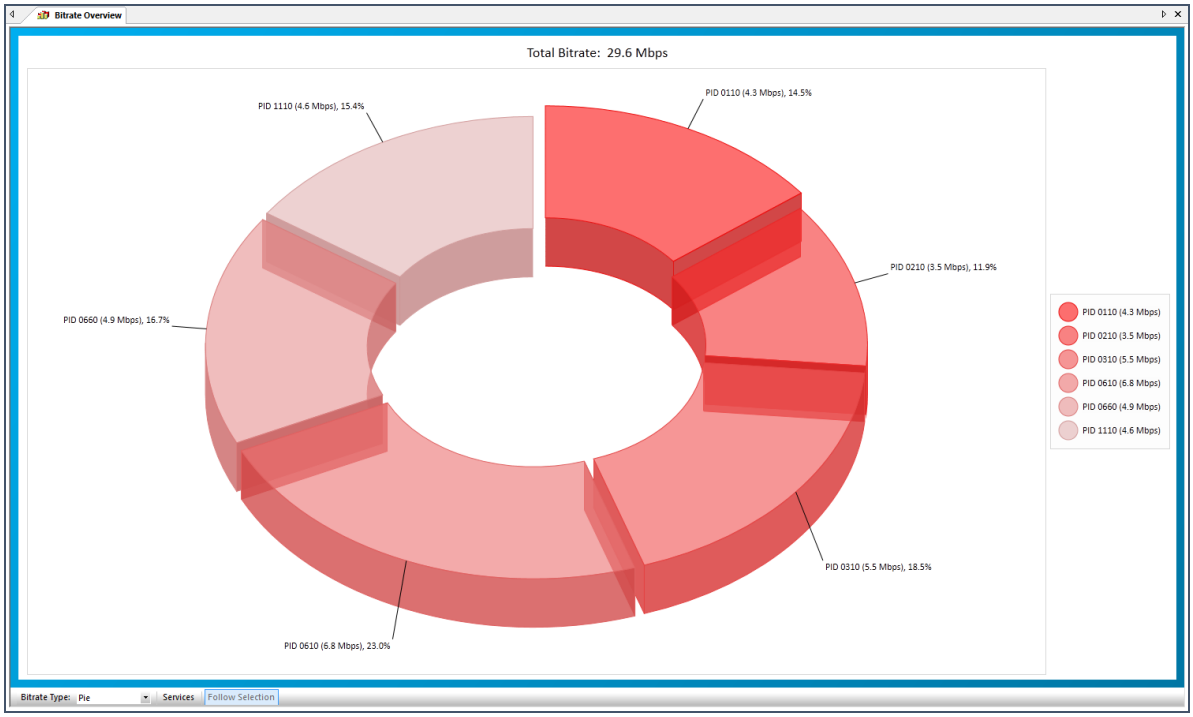


By pressing the '+' or '-' button it is possible to rotate the pie.

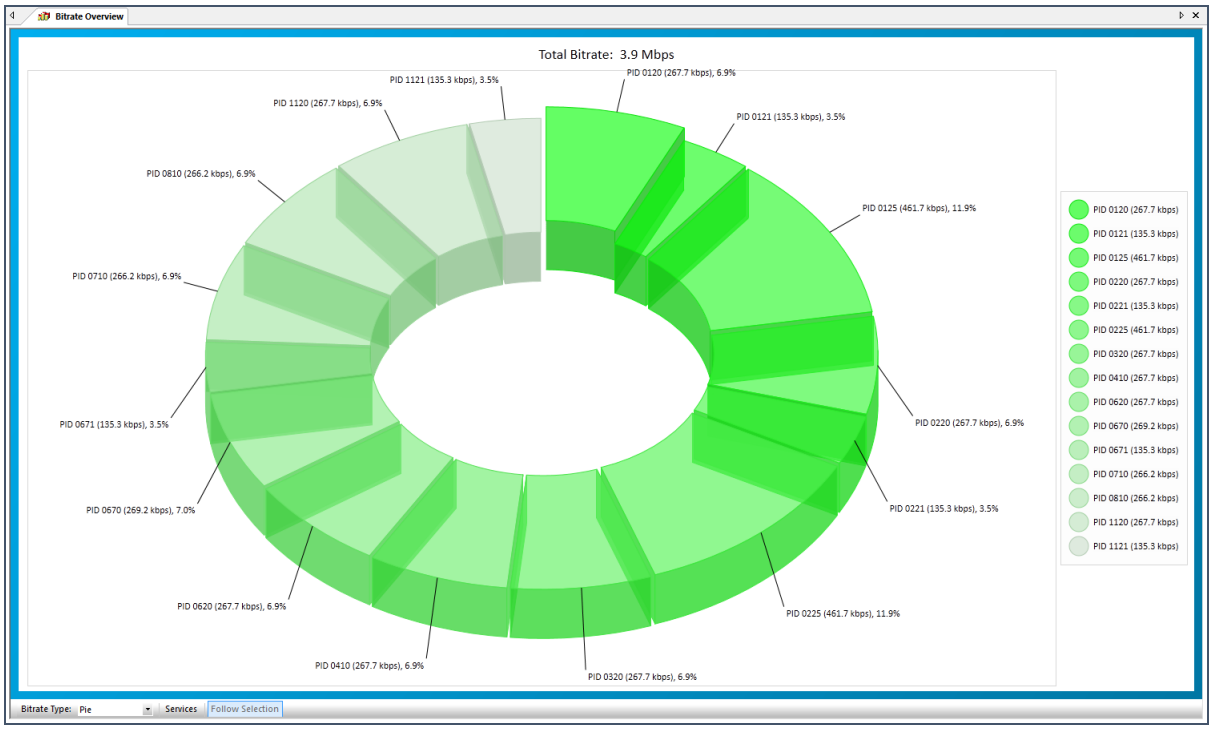
A Pie graphical overview is given of all PIDs available in a Service, when the focus in the Service Bar is on a specific Service name.



When PIDs are filtered (via the filter pull-down option in the PID window) it looks like (filter on Video PIDs):

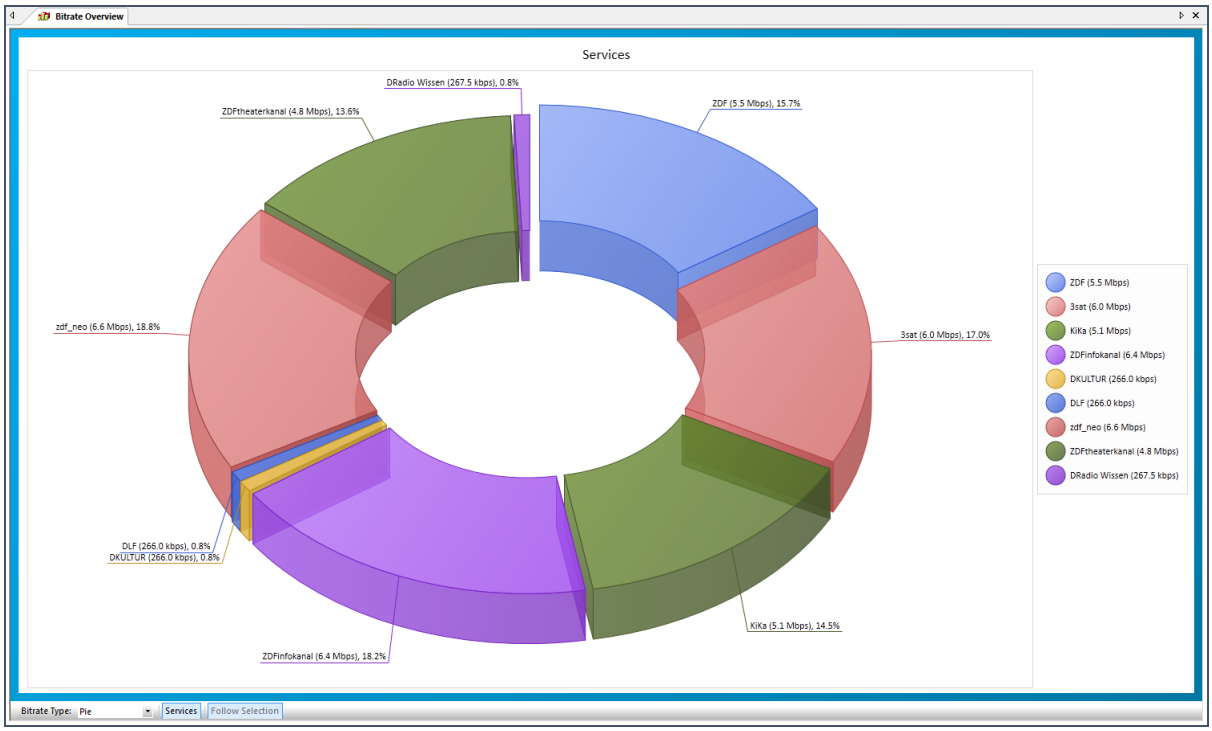


When filtered on Audio PIDs, the Pie looks like:



Services

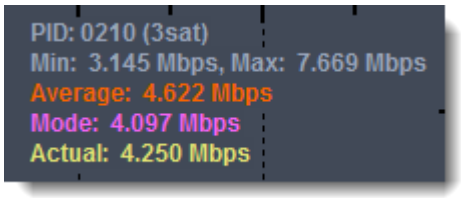
Pie graphical bitrate representation of all Services.



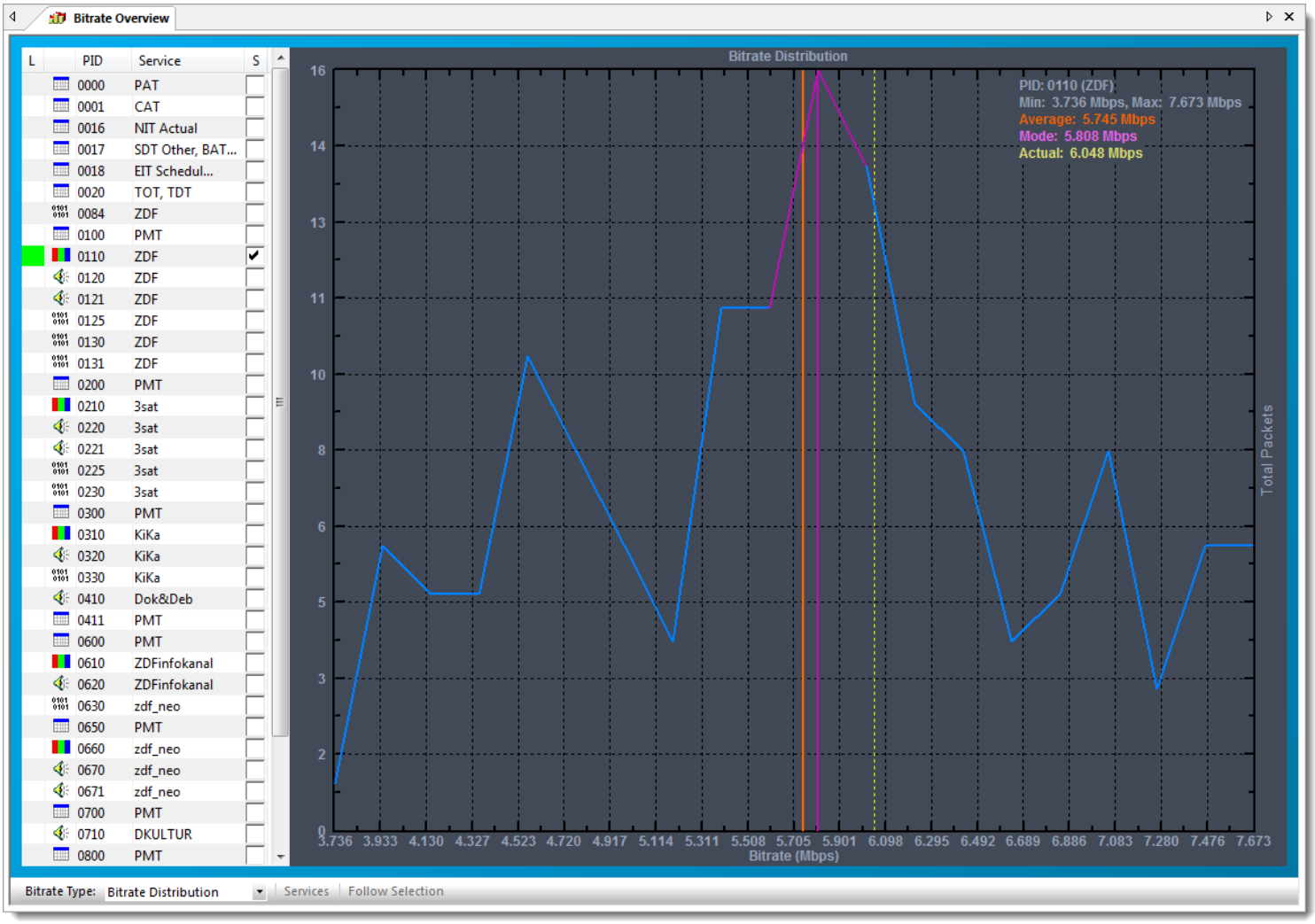
14.5 Bitrate Distribution

A Bitrate Distribution overview is given, when ‘Bitrate Distribution’ is selected in the Bitrate Type pull-down.

Different colors give the measurements for Average, Mode and Actual bitrate



PIDs



14.6 Related Windows

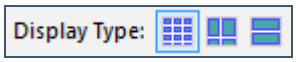
- PID Bar
- Services Bar

15 Thumb Overview

Overview of all Thumbs

Three different Thumb Overviews can be displayed, by selecting the appropriate icon:

- Thumbnails Only
- Brief Details
- Full Details

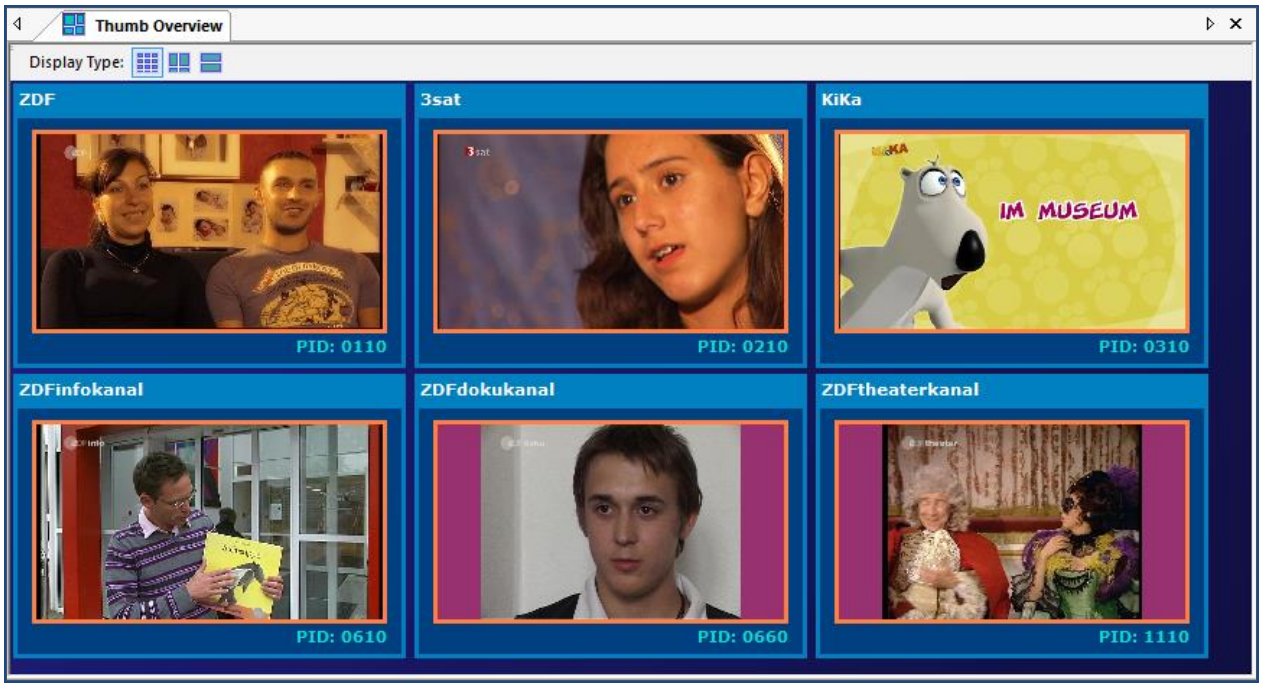


Thumbs can be made from MPEG-2, AVC/H264 and HEVC/H265 Video pictures, for all source resolutions including HD (High-Definition) and UHD (Ultra High-Definition, 4K).
Different chroma formats (4:2:0, 4:2:2 and 4:4:4) are enabled.

Thumbs are generated from I-Pictures only and therefore take less CPU. Please be aware when using Long-GOP (Group Of Pictures), that generating a new thumb will take more time.

15.1 Thumbnails Only

When selecting 'Thumbnails Only', for every Service only the thumbnails are displayed.



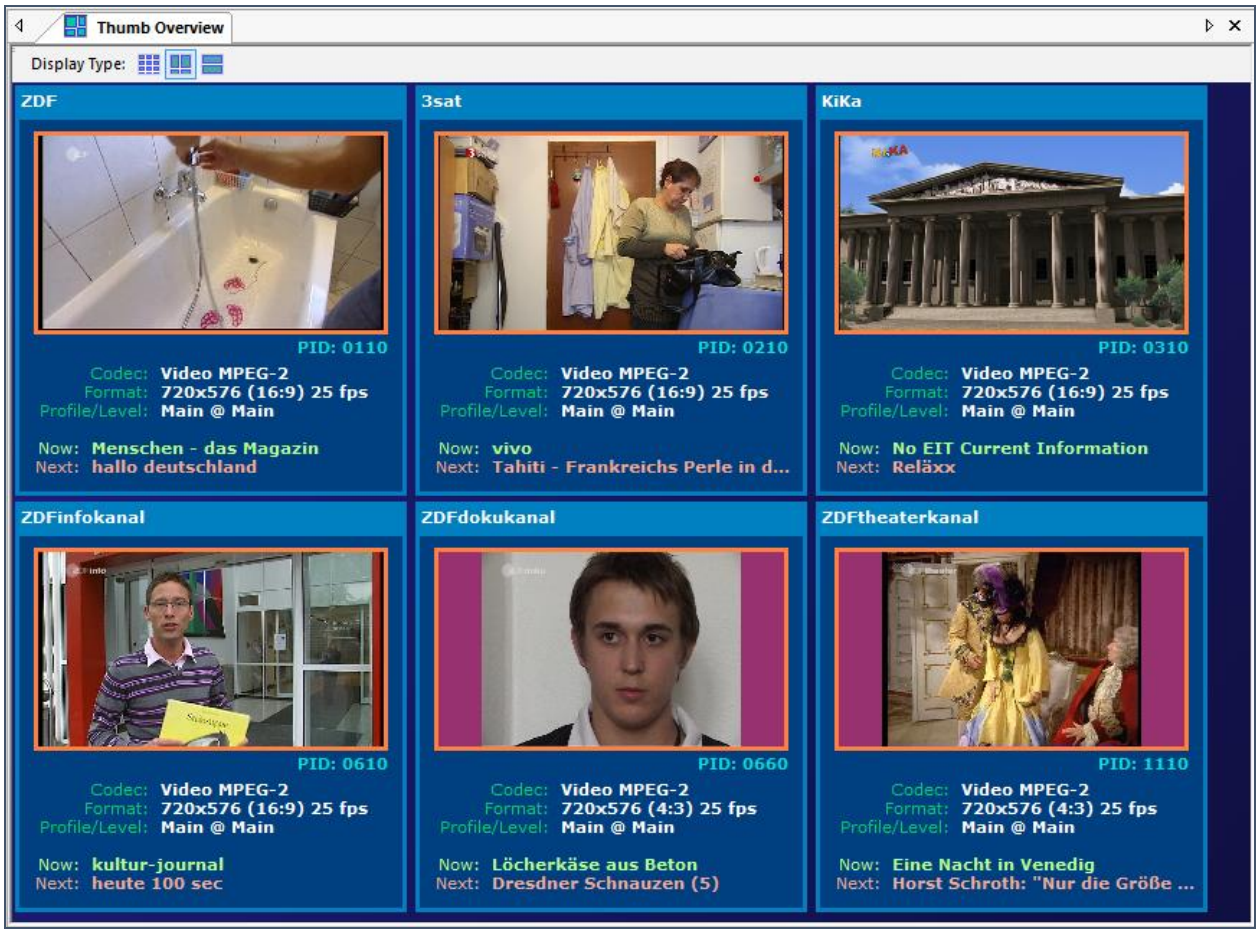
The tiles have an aspect ratio of 16:9, meaning 4:3 services will be filled up with a border color.

When TV services are scramble a “Scrambled” thumb will be displayed.

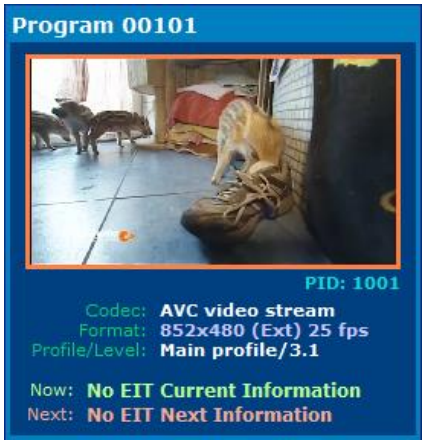
When the Video PID of the TV services does not exist, the “No Video” thumb will be displayed.
This will be done after a time-out of 10 seconds.

15.2 Brief Details

When selecting ‘Brief Details’, for every Service the thumbs and brief details are displayed.



In case of video cropping, the format will be shown in bleu:



15.3 Full Details

When selecting ‘Full Details’, for every Service the thumbs and full details are displayed.

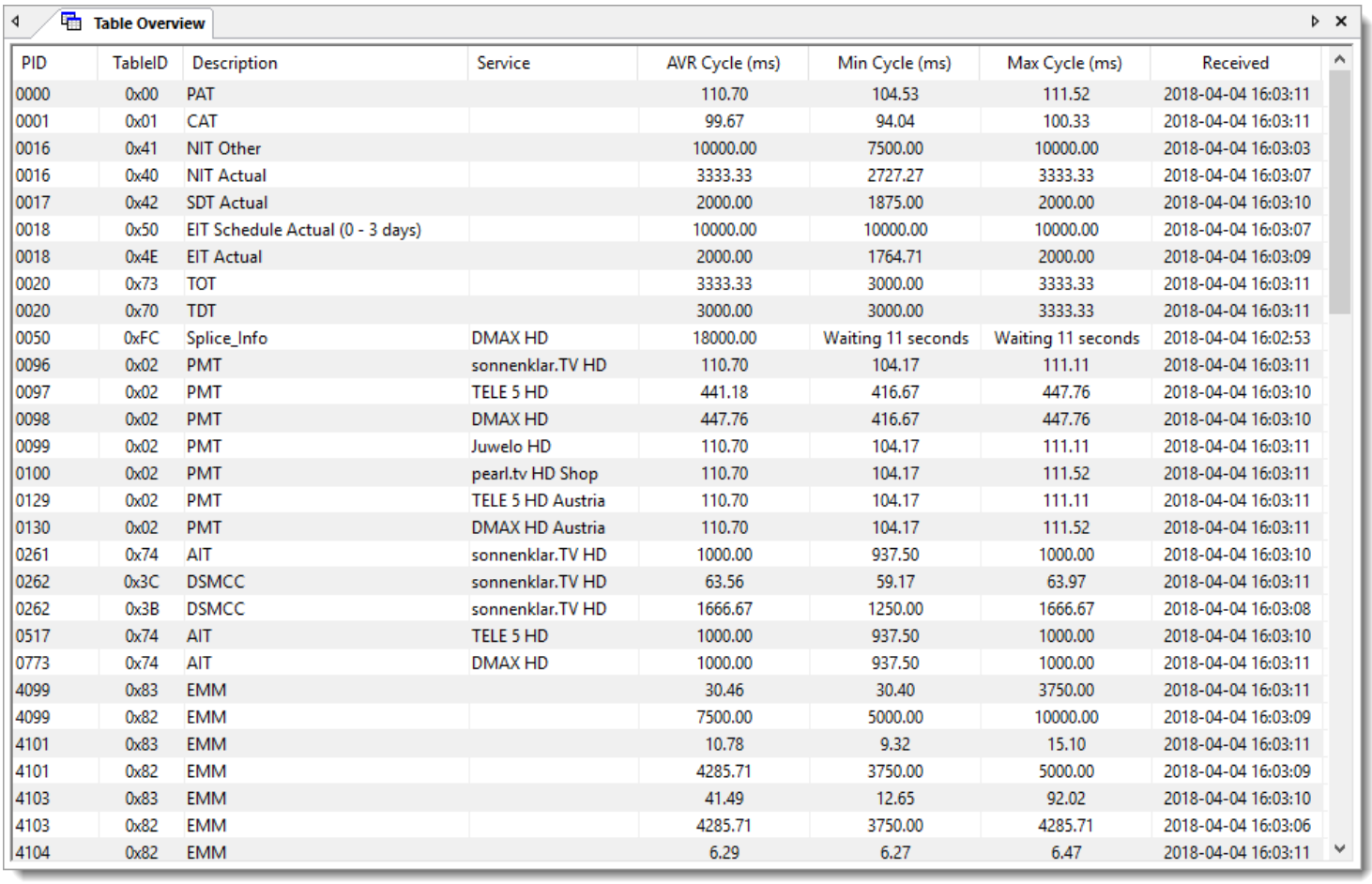
With a scrollbar, all details of all services can be shown.

15.4 Properties

- Aspect Border Color: Pick color which should be used around the aspect ratio border.

16 Table Overview

Overview of all used Tables (sections) with their cycle times



PID	TableID	Description	Service	AVR Cycle (ms)	Min Cycle (ms)	Max Cycle (ms)	Received
0000	0x00	PAT		110.70	104.53	111.52	2018-04-04 16:03:11
0001	0x01	CAT		99.67	94.04	100.33	2018-04-04 16:03:11
0016	0x41	NIT Other		10000.00	7500.00	10000.00	2018-04-04 16:03:03
0016	0x40	NIT Actual		3333.33	2727.27	3333.33	2018-04-04 16:03:07
0017	0x42	SDT Actual		2000.00	1875.00	2000.00	2018-04-04 16:03:10
0018	0x50	EIT Schedule Actual (0 - 3 days)		10000.00	10000.00	10000.00	2018-04-04 16:03:07
0018	0x4E	EIT Actual		2000.00	1764.71	2000.00	2018-04-04 16:03:09
0020	0x73	TOT		3333.33	3000.00	3333.33	2018-04-04 16:03:11
0020	0x70	TDT		3000.00	3000.00	3333.33	2018-04-04 16:03:11
0050	0xFC	Splice_Info	DMAX HD	18000.00	Waiting 11 seconds	Waiting 11 seconds	2018-04-04 16:02:53
0096	0x02	PMT	sonnenklar.TV HD	110.70	104.17	111.11	2018-04-04 16:03:11
0097	0x02	PMT	TELE 5 HD	441.18	416.67	447.76	2018-04-04 16:03:10
0098	0x02	PMT	DMAX HD	447.76	416.67	447.76	2018-04-04 16:03:10
0099	0x02	PMT	Juwelo HD	110.70	104.17	111.11	2018-04-04 16:03:11
0100	0x02	PMT	pearl.tv HD Shop	110.70	104.17	111.52	2018-04-04 16:03:11
0129	0x02	PMT	TELE 5 HD Austria	110.70	104.17	111.11	2018-04-04 16:03:11
0130	0x02	PMT	DMAX HD Austria	110.70	104.17	111.52	2018-04-04 16:03:11
0261	0x74	AIT	sonnenklar.TV HD	1000.00	937.50	1000.00	2018-04-04 16:03:10
0262	0x3C	DSMCC	sonnenklar.TV HD	63.56	59.17	63.97	2018-04-04 16:03:11
0262	0x3B	DSMCC	sonnenklar.TV HD	1666.67	1250.00	1666.67	2018-04-04 16:03:08
0517	0x74	AIT	TELE 5 HD	1000.00	937.50	1000.00	2018-04-04 16:03:10
0773	0x74	AIT	DMAX HD	1000.00	937.50	1000.00	2018-04-04 16:03:11
4099	0x83	EMM		30.46	30.40	3750.00	2018-04-04 16:03:11
4099	0x82	EMM		7500.00	5000.00	10000.00	2018-04-04 16:03:09
4101	0x83	EMM		10.78	9.32	15.10	2018-04-04 16:03:11
4101	0x82	EMM		4285.71	3750.00	5000.00	2018-04-04 16:03:09
4103	0x83	EMM		41.49	12.65	92.02	2018-04-04 16:03:10
4103	0x82	EMM		4285.71	3750.00	4285.71	2018-04-04 16:03:06
4104	0x82	EMM		6.29	6.27	6.47	2018-04-04 16:03:11

Different columns show information:

Column	Description
PID	PID ID number
TableID	Table ID number
Description	Table description
Service	Service name
AVC Cycle (ms)	Average cycle time
Min Cycle (ms)	Minimum cycle time using the table cycle gate
Max Cycle (ms)	Maximum cycle time using the table cycle gate
Received	Last received

Now it is easy to see if the tables you expected are available and the cycle times are correct.

By clicking the column header, the values can be sorted.

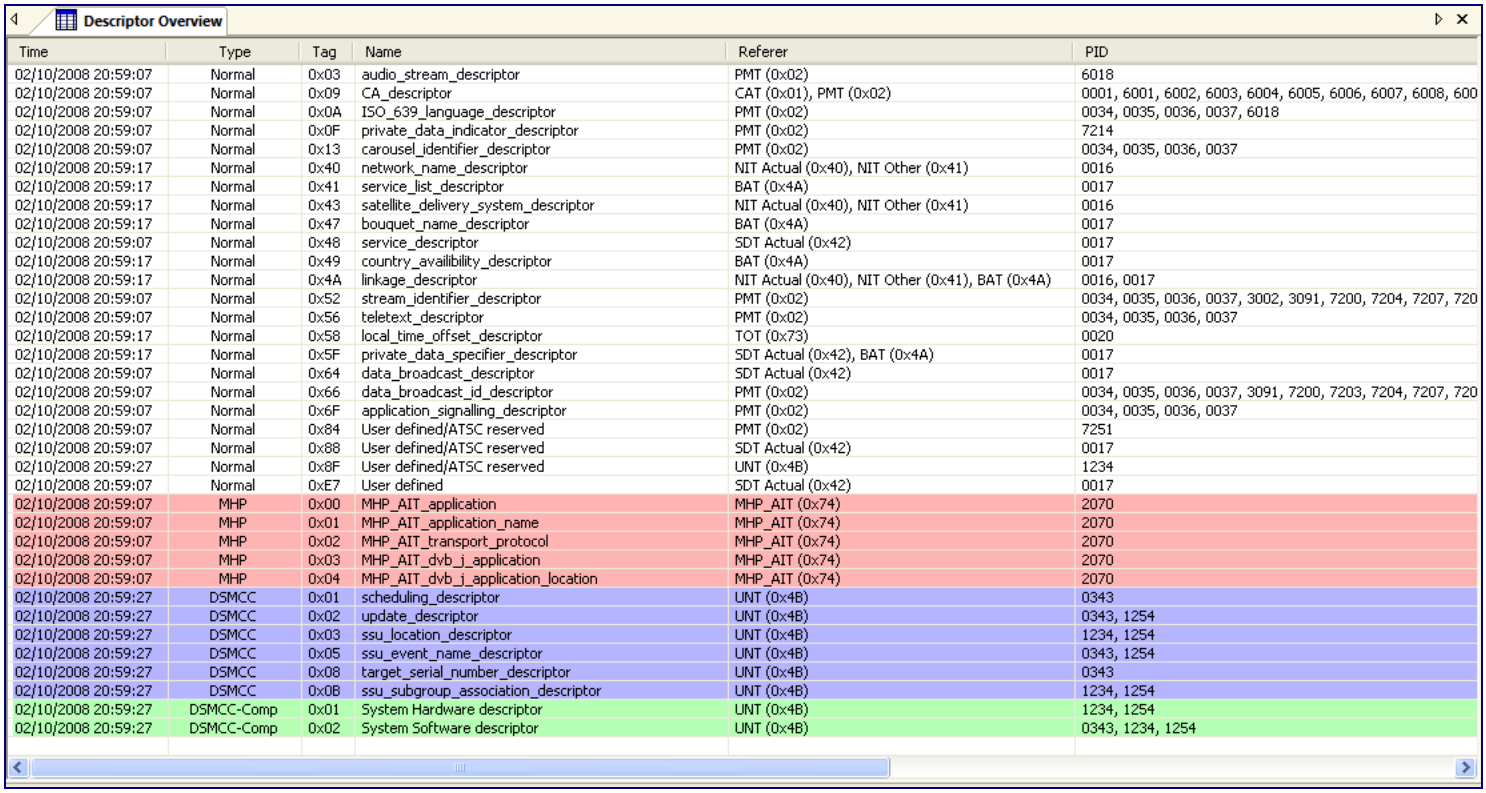
See appendix C.2 for a list of available Table identifiers.

16.1 Properties

- Table Cycle gate

17 Descriptor Overview

Overview of all used Descriptors in the Transport stream



Time	Type	Tag	Name	Referer	PID
02/10/2008 20:59:07	Normal	0x03	audio_stream_descriptor	PMT (0x02)	6018
02/10/2008 20:59:07	Normal	0x09	CA_descriptor	CAT (0x01), PMT (0x02)	0001, 6001, 6002, 6003, 6004, 6005, 6006, 6007, 6008, 600
02/10/2008 20:59:07	Normal	0x0A	ISO_639_language_descriptor	PMT (0x02)	0034, 0035, 0036, 0037, 6018
02/10/2008 20:59:07	Normal	0x0F	private_data_indicator_descriptor	PMT (0x02)	7214
02/10/2008 20:59:07	Normal	0x13	carousel_identifier_descriptor	PMT (0x02)	0034, 0035, 0036, 0037
02/10/2008 20:59:17	Normal	0x40	network_name_descriptor	NIT Actual (0x40), NIT Other (0x41)	0016
02/10/2008 20:59:17	Normal	0x41	service_list_descriptor	BAT (0x4A)	0017
02/10/2008 20:59:17	Normal	0x43	satellite_delivery_system_descriptor	NIT Actual (0x40), NIT Other (0x41)	0016
02/10/2008 20:59:17	Normal	0x47	bouquet_name_descriptor	BAT (0x4A)	0017
02/10/2008 20:59:07	Normal	0x48	service_descriptor	SDT Actual (0x42)	0017
02/10/2008 20:59:17	Normal	0x49	country_availibility_descriptor	BAT (0x4A)	0017
02/10/2008 20:59:17	Normal	0x4A	linkage_descriptor	NIT Actual (0x40), NIT Other (0x41), BAT (0x4A)	0016, 0017
02/10/2008 20:59:07	Normal	0x52	stream_identifier_descriptor	PMT (0x02)	0034, 0035, 0036, 0037, 3002, 3091, 7200, 7204, 7207, 720
02/10/2008 20:59:07	Normal	0x56	teletext_descriptor	PMT (0x02)	0034, 0035, 0036, 0037
02/10/2008 20:59:17	Normal	0x58	local_time_offset_descriptor	TOT (0x73)	0020
02/10/2008 20:59:17	Normal	0x5F	private_data_specifier_descriptor	SDT Actual (0x42), BAT (0x4A)	0017
02/10/2008 20:59:07	Normal	0x64	data_broadcast_descriptor	SDT Actual (0x42)	0017
02/10/2008 20:59:07	Normal	0x66	data_broadcast_id_descriptor	PMT (0x02)	0034, 0035, 0036, 0037, 3091, 7200, 7203, 7204, 7207, 720
02/10/2008 20:59:07	Normal	0x6F	application_signalling_descriptor	PMT (0x02)	0034, 0035, 0036, 0037
02/10/2008 20:59:07	Normal	0x84	User defined/ATSC reserved	PMT (0x02)	7251
02/10/2008 20:59:07	Normal	0x88	User defined/ATSC reserved	SDT Actual (0x42)	0017
02/10/2008 20:59:27	Normal	0x8F	User defined/ATSC reserved	UNT (0x4B)	1234
02/10/2008 20:59:07	Normal	0xE7	User defined	SDT Actual (0x42)	0017
02/10/2008 20:59:07	MHP	0x00	MHP_AIT_application	MHP_AIT (0x74)	2070
02/10/2008 20:59:07	MHP	0x01	MHP_AIT_application_name	MHP_AIT (0x74)	2070
02/10/2008 20:59:07	MHP	0x02	MHP_AIT_transport_protocol	MHP_AIT (0x74)	2070
02/10/2008 20:59:07	MHP	0x03	MHP_AIT_dvb_j_application	MHP_AIT (0x74)	2070
02/10/2008 20:59:07	MHP	0x04	MHP_AIT_dvb_j_application_location	MHP_AIT (0x74)	2070
02/10/2008 20:59:27	DSMCC	0x01	scheduling_descriptor	UNT (0x4B)	0343
02/10/2008 20:59:27	DSMCC	0x02	update_descriptor	UNT (0x4B)	0343, 1254
02/10/2008 20:59:27	DSMCC	0x03	ssu_location_descriptor	UNT (0x4B)	1234, 1254
02/10/2008 20:59:27	DSMCC	0x05	ssu_event_name_descriptor	UNT (0x4B)	0343, 1254
02/10/2008 20:59:27	DSMCC	0x08	target_serial_number_descriptor	UNT (0x4B)	0343
02/10/2008 20:59:27	DSMCC	0x0B	ssu_subgroup_association_descriptor	UNT (0x4B)	1234, 1254
02/10/2008 20:59:27	DSMCC-Comp	0x01	System Hardware descriptor	UNT (0x4B)	1234, 1254
02/10/2008 20:59:27	DSMCC-Comp	0x02	System Software descriptor	UNT (0x4B)	0343, 1234, 1254

Different columns show information:

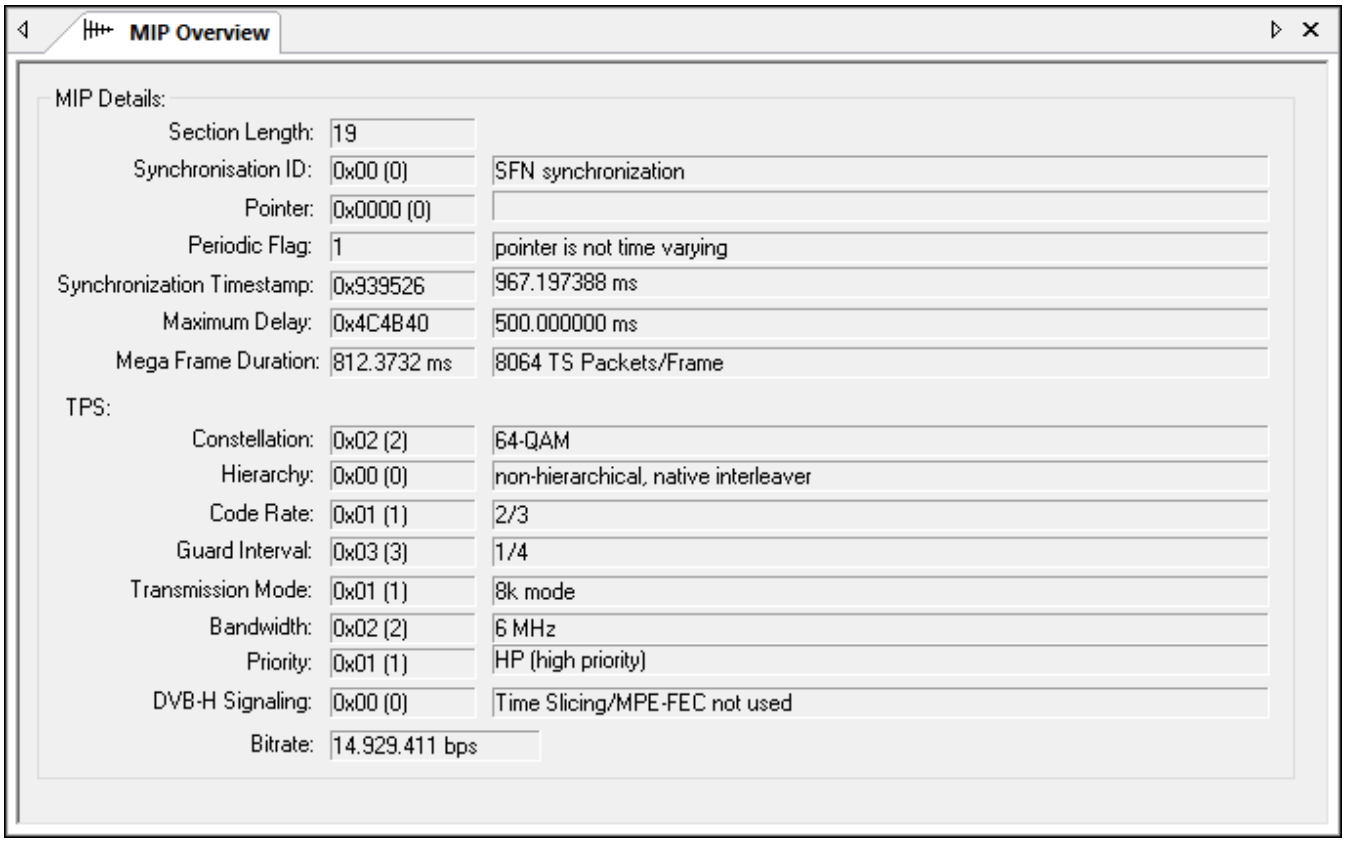
Column	Description
Time	Time of first occurrence
Type	Descriptor type (Normal, MHP or DSMCC)
Tag	Descriptor Tag
Name	Descriptor name
Referrer	Table list where the Descriptor is used
PID	PIDs where the Descriptor is used

See appendix C.3 for a list of available Descriptor identifiers.

By clicking the column header, the values can be sorted.

18 MIP Overview

Overview of Mega-frame Initialization Packet (MIP) details

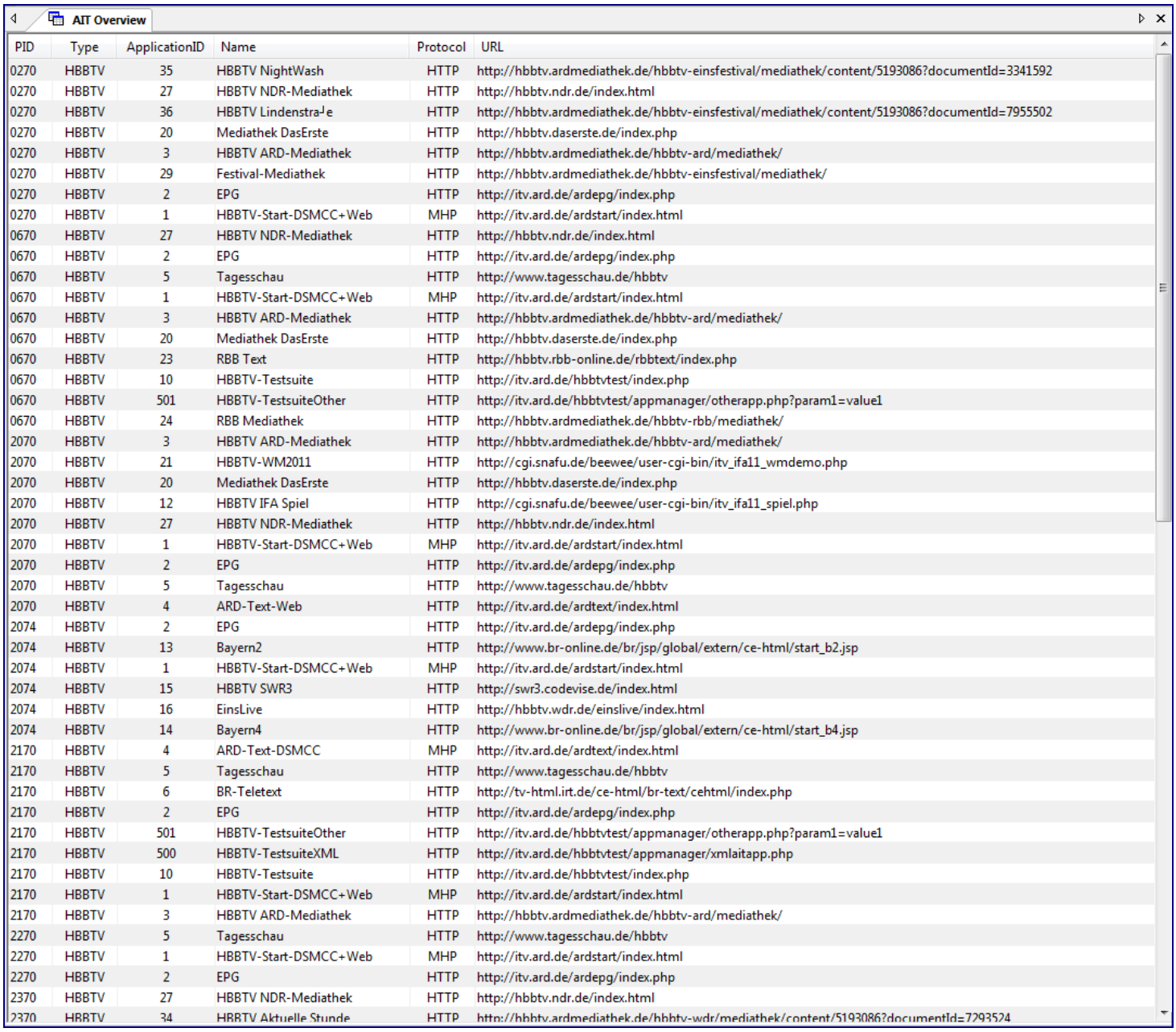


Mega-frame Initialization Packet (MIP) detailed information can be shown, when available in DVB-T SFN transport streams.

19 AIT Overview

Overview of all used AIT Applications in the Transport stream

Overview of all used AIT Applications, like HbbTV and MHP.



AIT Overview

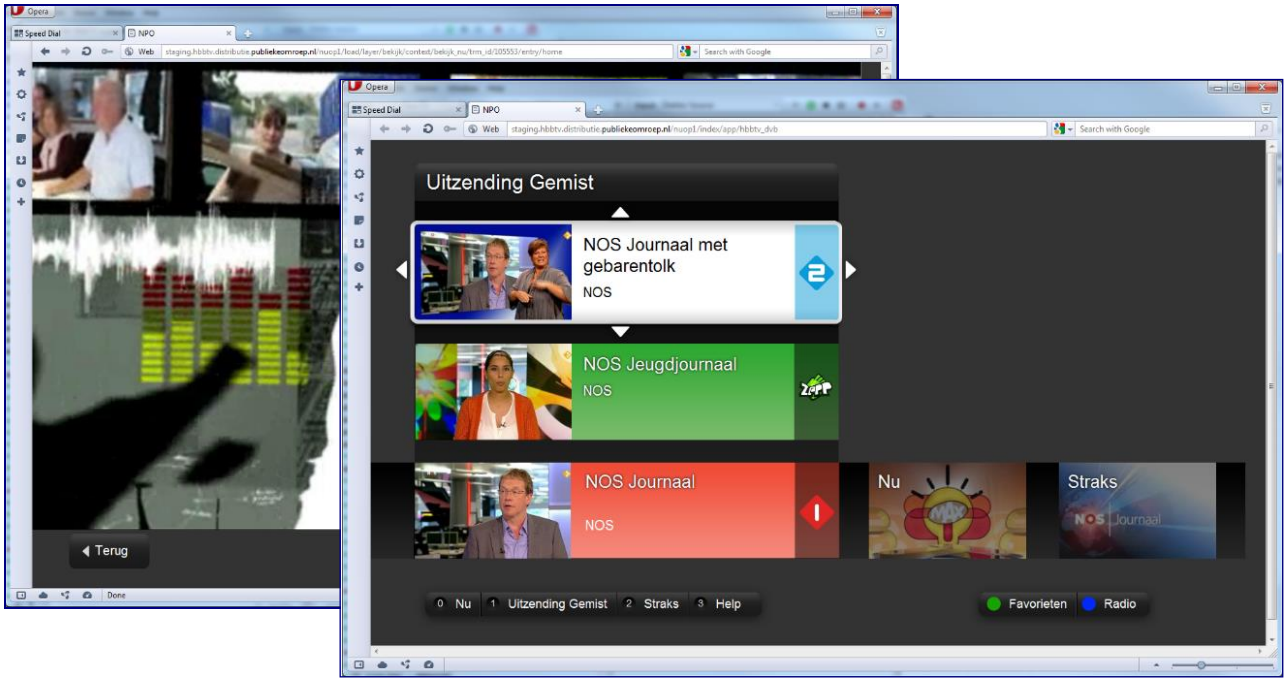
PID	Type	ApplicationID	Name	Protocol	URL
0270	HBBTV	35	HBBTV NightWash	HTTP	http://hbbtv.ardmediathek.de/hbbtv-einsfestival/mediathek/content/5193086?documentId=3341592
0270	HBBTV	27	HBBTV NDR-Mediathek	HTTP	http://hbbtv.ndr.de/index.html
0270	HBBTV	36	HBBTV Lindenstra-e	HTTP	http://hbbtv.ardmediathek.de/hbbtv-einsfestival/mediathek/content/5193086?documentId=7955502
0270	HBBTV	20	Mediathek DasErste	HTTP	http://hbbtv.daserste.de/index.php
0270	HBBTV	3	HBBTV ARD-Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-ard/mediathek/
0270	HBBTV	29	Festival-Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-einsfestival/mediathek/
0270	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
0270	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
0670	HBBTV	27	HBBTV NDR-Mediathek	HTTP	http://hbbtv.ndr.de/index.html
0670	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
0670	HBBTV	5	Tagesschau	HTTP	http://www.tagesschau.de/hbbtv
0670	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
0670	HBBTV	3	HBBTV ARD-Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-ard/mediathek/
0670	HBBTV	20	Mediathek DasErste	HTTP	http://hbbtv.daserste.de/index.php
0670	HBBTV	23	RBB Text	HTTP	http://hbbtv.rbb-online.de/rbbtext/index.php
0670	HBBTV	10	HBBTV-Testsuite	HTTP	http://itv.ard.de/hbbtvtest/index.php
0670	HBBTV	501	HBBTV-TestsuiteOther	HTTP	http://itv.ard.de/hbbtvtest/appmanager/otherapp.php?param1=value1
0670	HBBTV	24	RBB Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-rbb/mediathek/
2070	HBBTV	3	HBBTV ARD-Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-ard/mediathek/
2070	HBBTV	21	HBBTV-WM2011	HTTP	http://cgi.snafu.de/beewee/user-cgi-bin/itv_ifa11_wmdemo.php
2070	HBBTV	20	Mediathek DasErste	HTTP	http://hbbtv.daserste.de/index.php
2070	HBBTV	12	HBBTV IFA Spiel	HTTP	http://cgi.snafu.de/beewee/user-cgi-bin/itv_ifa11_spiel.php
2070	HBBTV	27	HBBTV NDR-Mediathek	HTTP	http://hbbtv.ndr.de/index.html
2070	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
2070	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
2070	HBBTV	5	Tagesschau	HTTP	http://www.tagesschau.de/hbbtv
2070	HBBTV	4	ARD-Text-Web	HTTP	http://itv.ard.de/ardtext/index.html
2074	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
2074	HBBTV	13	Bayern2	HTTP	http://www.br-online.de/br/jsp/global/extern/ce-html/start_b2.jsp
2074	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
2074	HBBTV	15	HBBTV SWR3	HTTP	http://swr3.codevise.de/index.html
2074	HBBTV	16	EinsLive	HTTP	http://hbbtv.wdr.de/einslive/index.html
2074	HBBTV	14	Bayern4	HTTP	http://www.br-online.de/br/jsp/global/extern/ce-html/start_b4.jsp
2170	HBBTV	4	ARD-Text-DSMCC	MHP	http://itv.ard.de/ardtext/index.html
2170	HBBTV	5	Tagesschau	HTTP	http://www.tagesschau.de/hbbtv
2170	HBBTV	6	BR-Teletext	HTTP	http://tv-html.irt.de/ce-html/br-text/cehtml/index.php
2170	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
2170	HBBTV	501	HBBTV-TestsuiteOther	HTTP	http://itv.ard.de/hbbtvtest/appmanager/otherapp.php?param1=value1
2170	HBBTV	500	HBBTV-TestsuiteXML	HTTP	http://itv.ard.de/hbbtvtest/appmanager/xmlaitapp.php
2170	HBBTV	10	HBBTV-Testsuite	HTTP	http://itv.ard.de/hbbtvtest/index.php
2170	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
2170	HBBTV	3	HBBTV ARD-Mediathek	HTTP	http://hbbtv.ardmediathek.de/hbbtv-ard/mediathek/
2270	HBBTV	5	Tagesschau	HTTP	http://www.tagesschau.de/hbbtv
2270	HBBTV	1	HBBTV-Start-DSMCC+Web	MHP	http://itv.ard.de/ardstart/index.html
2270	HBBTV	2	EPG	HTTP	http://itv.ard.de/ardepg/index.php
2370	HBBTV	27	HBBTV NDR-Mediathek	HTTP	http://hbbtv.ndr.de/index.html
2370	HBBTV	34	HBBTV Aktuelle Stunde	HTTP	http://hbbtv.ardmediathek.de/hbbtv-wdr/mediathek/content/5193086?documentId=7293524

Different columns show information:

Column	Description
PID	Used PID
Type	Application Type
ApplicationID	Application ID
Name	Application name
Protocol	Used Protocol
URL	Used URL

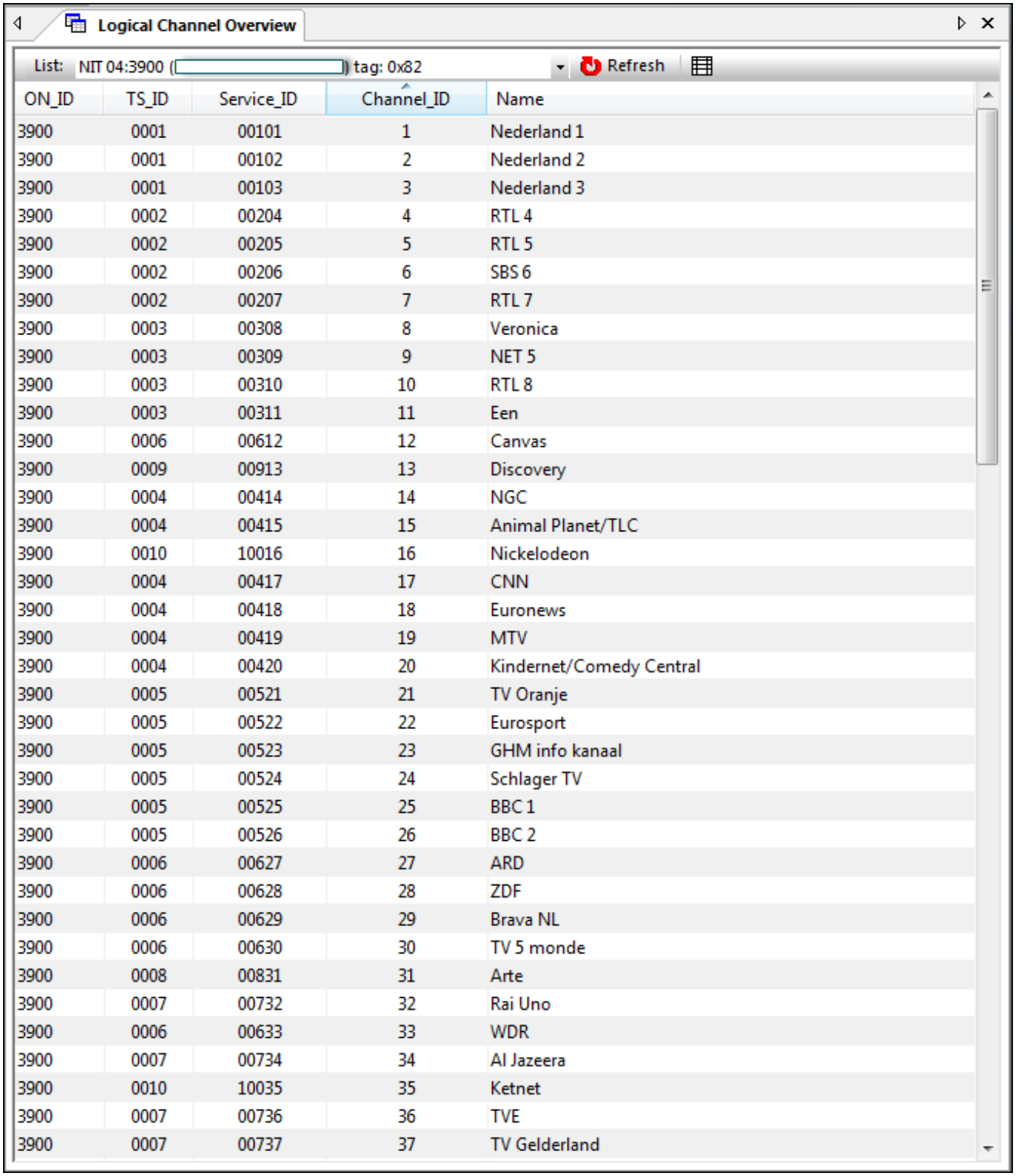
By clicking on a line using the HTTP transport protocol, the application will be launched.
Quicktime should be installed and preferable use a Firefox browser.

Recommended browser: Firefox with the Fire TV plugin.


Terug
Uitzending Gemist
NOS Journaal met gebarentolk
NOS
NOS Jeugdjournaal
NOS
NOS Journaal
NOS
Nu
Straks
0 Nu
1 Uitzending Gemist
2 Straks
3 Help
Favorieten
Radio

20 Logical Channel Overview

Overview of the Logical Channel list available in the Transport stream

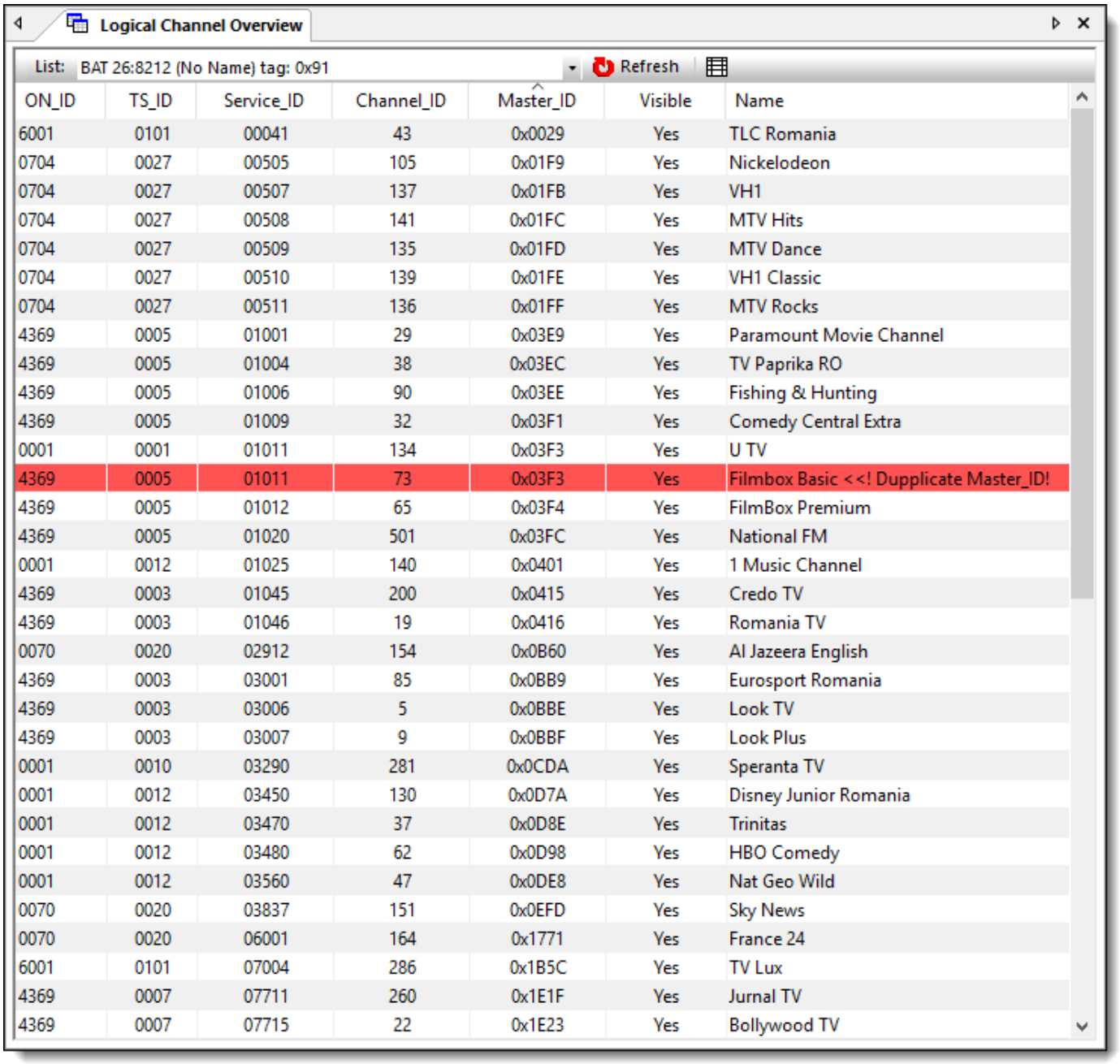


ON_ID	TS_ID	Service_ID	Channel_ID	Name
3900	0001	00101	1	Nederland 1
3900	0001	00102	2	Nederland 2
3900	0001	00103	3	Nederland 3
3900	0002	00204	4	RTL 4
3900	0002	00205	5	RTL 5
3900	0002	00206	6	SBS 6
3900	0002	00207	7	RTL 7
3900	0003	00308	8	Veronica
3900	0003	00309	9	NET 5
3900	0003	00310	10	RTL 8
3900	0003	00311	11	Een
3900	0006	00612	12	Canvas
3900	0009	00913	13	Discovery
3900	0004	00414	14	NGC
3900	0004	00415	15	Animal Planet/TLC
3900	0010	10016	16	Nickelodeon
3900	0004	00417	17	CNN
3900	0004	00418	18	Euronews
3900	0004	00419	19	MTV
3900	0004	00420	20	Kindernet/Comedy Central
3900	0005	00521	21	TV Oranje
3900	0005	00522	22	Eurosport
3900	0005	00523	23	GHM info kanaal
3900	0005	00524	24	Schlager TV
3900	0005	00525	25	BBC 1
3900	0005	00526	26	BBC 2
3900	0006	00627	27	ARD
3900	0006	00628	28	ZDF
3900	0006	00629	29	Brava NL
3900	0006	00630	30	TV 5 monde
3900	0008	00831	31	Arte
3900	0007	00732	32	Rai Uno
3900	0006	00633	33	WDR
3900	0007	00734	34	Al Jazeera
3900	0010	10035	35	Ketnet
3900	0007	00736	36	TVE
3900	0007	00737	37	TV Gelderland

The ‘Logical Channel Overview’ gives an overview of all the logical channel lists available in the transport stream. Logical channels are used a lot on satellite to generate a logical channel number for the end-users.

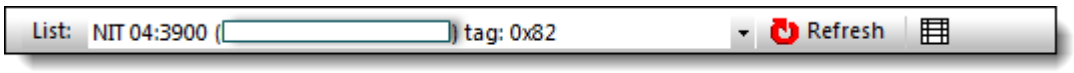
The ‘Channel Number Descriptor’ 0x81 or ‘Logical Channel Number Descriptor’ 0x91 can be used in the BAT table.

When using the ‘Logical Channel Number Descriptor’ 0x91, also the Master_ID information will be given.



ON_ID	TS_ID	Service_ID	Channel_ID	Master_ID	Visible	Name
6001	0101	00041	43	0x0029	Yes	TLC Romania
0704	0027	00505	105	0x01F9	Yes	Nickelodeon
0704	0027	00507	137	0x01FB	Yes	VH1
0704	0027	00508	141	0x01FC	Yes	MTV Hits
0704	0027	00509	135	0x01FD	Yes	MTV Dance
0704	0027	00510	139	0x01FE	Yes	VH1 Classic
0704	0027	00511	136	0x01FF	Yes	MTV Rocks
4369	0005	01001	29	0x03E9	Yes	Paramount Movie Channel
4369	0005	01004	38	0x03EC	Yes	TV Paprika RO
4369	0005	01006	90	0x03EE	Yes	Fishing & Hunting
4369	0005	01009	32	0x03F1	Yes	Comedy Central Extra
0001	0001	01011	134	0x03F3	Yes	U TV
4369	0005	01011	73	0x03F3	Yes	Filmbox Basic <<! Dupplicate Master_ID!
4369	0005	01012	65	0x03F4	Yes	FilmBox Premium
4369	0005	01020	501	0x03FC	Yes	National FM
0001	0012	01025	140	0x0401	Yes	1 Music Channel
4369	0003	01045	200	0x0415	Yes	Credo TV
4369	0003	01046	19	0x0416	Yes	Romania TV
0070	0020	02912	154	0x0B60	Yes	Al Jazeera English
4369	0003	03001	85	0x0BB9	Yes	Eurosport Romania
4369	0003	03006	5	0x0BBE	Yes	Look TV
4369	0003	03007	9	0x0BBF	Yes	Look Plus
0001	0010	03290	281	0x0CDA	Yes	Speranta TV
0001	0012	03450	130	0x0D7A	Yes	Disney Junior Romania
0001	0012	03470	37	0x0D8E	Yes	Trinitas
0001	0012	03480	62	0x0D98	Yes	HBO Comedy
0001	0012	03560	47	0x0DE8	Yes	Nat Geo Wild
0070	0020	03837	151	0x0EFD	Yes	Sky News
0070	0020	06001	164	0x1771	Yes	France 24
6001	0101	07004	286	0x1B5C	Yes	TV Lux
4369	0007	07711	260	0x1E1F	Yes	Jurnal TV
4369	0007	07715	22	0x1E23	Yes	Bollywood TV

On top different buttons can be used.



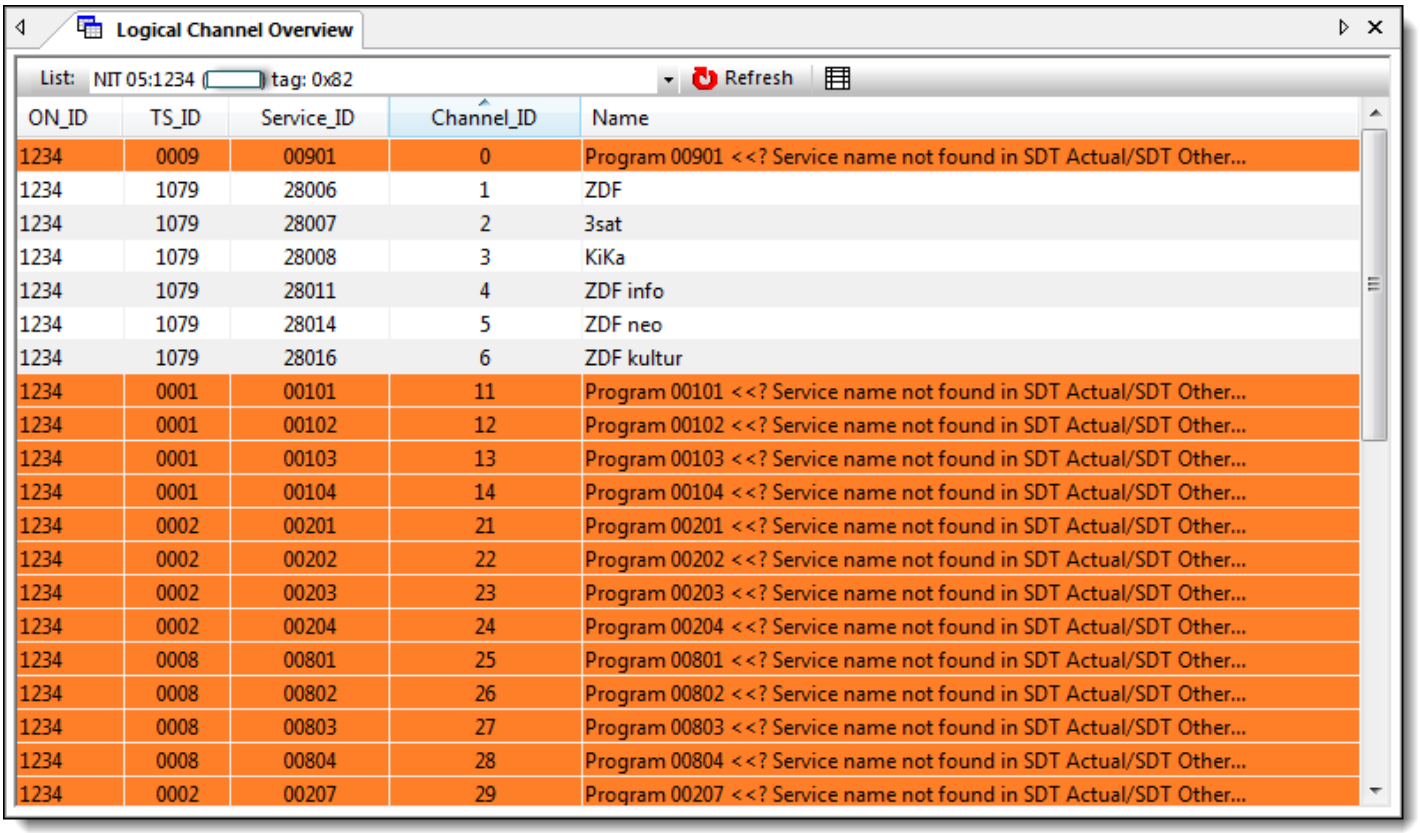
By using the List pull down button, the tag can be selected.

can be used to refresh the data.
Exporting data can be realized, using the button.

Different columns show information:

Column	Description
ON_ID	Network ID
TS_ID	Transport Stream ID
Service_ID	Service ID
Channel_ID	Logical Channel ID
Name	Service Name

Also errors will be shown:



ON_ID	TS_ID	Service_ID	Channel_ID	Name
1234	0009	00901	0	Program 00901 <<? Service name not found in SDT Actual/SDT Other...
1234	1079	28006	1	ZDF
1234	1079	28007	2	3sat
1234	1079	28008	3	KiKa
1234	1079	28011	4	ZDF info
1234	1079	28014	5	ZDF neo
1234	1079	28016	6	ZDF kultur
1234	0001	00101	11	Program 00101 <<? Service name not found in SDT Actual/SDT Other...
1234	0001	00102	12	Program 00102 <<? Service name not found in SDT Actual/SDT Other...
1234	0001	00103	13	Program 00103 <<? Service name not found in SDT Actual/SDT Other...
1234	0001	00104	14	Program 00104 <<? Service name not found in SDT Actual/SDT Other...
1234	0002	00201	21	Program 00201 <<? Service name not found in SDT Actual/SDT Other...
1234	0002	00202	22	Program 00202 <<? Service name not found in SDT Actual/SDT Other...
1234	0002	00203	23	Program 00203 <<? Service name not found in SDT Actual/SDT Other...
1234	0002	00204	24	Program 00204 <<? Service name not found in SDT Actual/SDT Other...
1234	0008	00801	25	Program 00801 <<? Service name not found in SDT Actual/SDT Other...
1234	0008	00802	26	Program 00802 <<? Service name not found in SDT Actual/SDT Other...
1234	0008	00803	27	Program 00803 <<? Service name not found in SDT Actual/SDT Other...
1234	0008	00804	28	Program 00804 <<? Service name not found in SDT Actual/SDT Other...
1234	0002	00207	29	Program 00207 <<? Service name not found in SDT Actual/SDT Other...

21 ETR-290 Viewer

ETR-290 compliancy for levels 1, 2, 3 and other

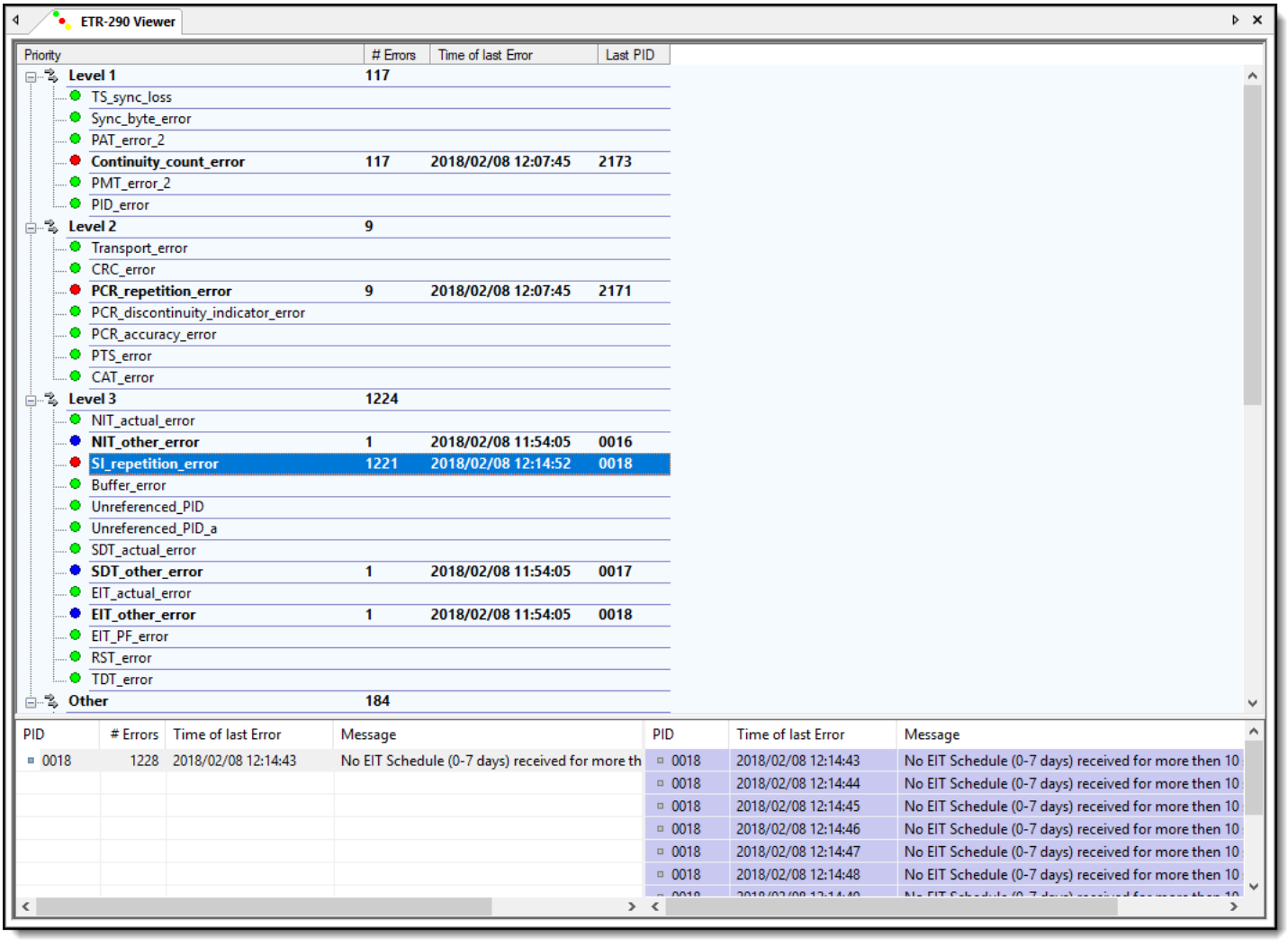
This is one of the most important checks for Transport Streams.
It consists of 3 levels, where the 1st level is the most important.
A sync lost or packet drop will automatically result in an ETR290 alarm.
Level 2 is about timing accuracy and the table CRC checks.
And level 3 is about the NIT, SDT and EIT cycle times.
For extra checks, we have created an 'other' group.

ETR-290 compliancy results are displayed in two different views:

- ETR-290 Viewer
- Log Bar

21.1 ETR-290 Viewer – Level 1,2,3, Other

The upper part of the view shows all ETR-290 errors categorized by level 1, 2, 3 and other.



Different columns show information:

Column	Description
Priority	The level, status and name of ETR-290 check
# Counts	The amount of errors per ETR-290 check
Time of last Error	Time of the last error measured
Last PID	Last PID having an error

Different signaling is used on different levels to indicate the status of the ETR-290 test:

Signaling	Description
Green	No Error: Test passed
Red	Error: Test failed
Yellow	Transient Error: Error not shortly noticed
Gray	Test disabled
Blue	Non-critical

When selecting an ETR-290 test, all measured errors are displayed in de lower part of the view.

Different columns show information:

Column	Description
PID	Related PID
Time of last Error	Time of the last error measured
Message	Detailed description of ETR-290 error

When selecting a specific PID, all related ETR-290 errors of that PID are summarized.

21.2 ETR-290 Level 1

First-priority faults are basically faults that will take you off the air.
In this case, monitoring the TS arriving at the transmitter would make sense, and the first things to look at are the first-priority fault tests, which include:

Check	Description
TS_sync_loss	The most important function for the evaluation of data from the MPEG-2 TS is the sync acquisition. The actual synchronization of the TS depends on the number of correct sync bytes necessary for the device to synchronize and on the number of distorted sync bytes which the device can not cope with. It is proposed that five consecutive correct sync bytes should be sufficient for sync acquisition, and two or more consecutive corrupted sync bytes should indicate sync loss.
Sync_byte_error	The indicator is set as soon as the correct sync byte (0x47) does not appear after 188 or 204 bytes. This is fundamental because this structure is used throughout the channel encoder and decoder chains for synchronization.
PAT_error_2	The Program Association Table (PAT), which only appears in PID 0x0000 packets, tells the decoder what programs are in the TS and points to the Program Map Tables (PMT) which in turn point to the component video, audio and data streams that make up the program. If the PAT is missing then the decoder can do nothing, no program is decodable. This error raises when: • Sections with table_id 0x00 do not occur at least every 0,5 s on PID 0x0000. • Section with table_id other than 0x00 found on PID 0x0000. • Scrambling_control_field is not 00 for PID 0x0000
Continuity_count_error	This error occurs when any of the following faults happen: • Incorrect packet order • Lost packet
PMT_error_2	The Program Association Table (PAT) tells the decoder how many programs there are in the stream and points to the PMTs which contain the information where the parts for any given event can be found. Parts in this context are the video stream (normally one) and the audio streams and the data stream (e.g. Teletext). Without a PMT the corresponding program is not decodable. This error raises when: • Sections with table_id 0x02, (i.e. a PMT), do not occur at least every 0,5 s on each program_map_PID which is referred to in the PAT • Scrambling_control_field is not 00 for all packets containing information of sections with table_id • 0x02 (i.e. a PMT) on each program_map_PID which is referred to in the PAT
PID_error	It is checked whether there exists a data stream for each PID that occurs. This error might occur where TS are multiplexed, or demultiplexed and again remultiplexed.

21.3 ETR-290 Level 2

Second-priority errors are those that could affect individual programs, but the TS is still intact.
The types of problems these errors can cause are frozen frames and loss of lip sync.
Tests for these faults include:

Check	Description
Transport_error	This flag is set in the TS header by the demodulator if it can't correct errors in the stream.
CRC_error	The CRC check for the CAT, PAT, PMT, NIT, EIT, BAT, SDT and TOT indicates whether the content of the corresponding table is corrupted. In this case no further error indication should be derived from the content of the corresponding table.
PCR_repetition_error	The PCRs are used to re-generate the local 27 MHz system clock. If the PCR do not arrive with sufficient regularity then this clock may jitter or drift. The receiver/decoder may even go out of lock. In DVB a repetition period of not more than 40 ms is recommended.
PCR_discontinity_indicator_error	This flag is set is set in the case that a discontinuity of the PCR values occurs that has not been signaled appropriately by the discontinuity indicator.
PCR_accuracy_error	This error can occur when the PCR accuracy of the selected program is outside the range of ±500ns.
PTS_error	The Presentation Time Stamps (PTS) should occur at least every 700 ms. They are only accessible if the TS is not scrambled.
CAT_error	The CAT is the pointer to enable the IRD to find the EMMs associated with the CA system(s) that it uses. If the CAT is not present, the receiver is not able to receive management messages.

21.4 ETR-290 Level 3

Third-priority errors are application dependent, which include:

Check	Description
NIT_Actual_error	Network Information Tables (NITs) as defined by DVB contain information on frequency, code rates, modulation, polarization etc. of various programs which the decoder can use. It is checked whether NITs are present in the TS and whether they have the correct PID. This error raises when: • Section with table_id other than 0x40 or 0x41 or 0x72 (i. e. not an NIT or ST) found on PID 0x0010 • No section with table_id 0x40 or 0x41 (i.e. an NIT) in PID value 0x0010 for more than 10 s
NIT_other_error	Further Network Information Tables (NITs) can be present under a separate PID and refer to other TSs to provide more information on programmes available on other channels. Their distribution is not mandatory and the checks should only be performed if they are present. This error raises when: • Interval between sections with the same section_number and table_id = 0x41 (NIT_other) on PID 0x0010 longer than a specified value (10s or higher).
SI_repetition_error	Repetition rate of SI tables outside of specified limits.
Buffer_error	This error raises when: • overflow of transport demux buffer
Unreferenced_PID	PID (other than PAT, CAT, CAT_PIDs, PMT_PIDs, NIT_PID, SDT_PID, TDT_PID, EIT_PID, RST_PID, reserved_for_future_use PIDs, or PIDs user defined as private data streams) not referred to by a PMT within 0,5 s.
Unreferenced_PID_a	PID (other than PMT_PIDs, PIDs with numbers between 0x00 and 0x1F or PIDs user defined as private data streams) not referred to by a PMT or a CAT within 0,5 s
SDT_actual_error	The SDT (Service Description Table) describes the services available to the viewer. It is split into sub-tables containing details of the contents of the current TS (mandatory) and other TS (optional). Without the SDT, the IRD is unable to give the viewer a list of what services are available. It is also possible to transmit a BAT on the same PID, which groups services into "bouquets". This error raises when: • Sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2 s • Sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011. • Any two sections with table_id = 0x42 (SDT_actual) occur on PID 0x0011 within a specified value (25 ms or lower).
SDT_other_error	This check is only performed if the presence of a SDT for other TSs has been established. This error raises when: • Interval between sections with the same section_number and table_id = 0x46 (SDT, other TS) on PID 0x0011 longer than a specified value (10s or higher).
EIT_actual_error	The EIT (Event Information Table) describes what is on now and next on each service, and optionally details the complete programming schedule. The EIT is divided into several sub-tables, with only the "present and following" information for the current TS being mandatory. If there are no 'Present' or 'Following' events, empty EIT sections will be transmitted according to TR 101 211 [8].

	The EIT schedule information is only accessible if the TS is not scrambled. This error raises when: • Section '0' with table_id = 0x4E (EIT-P, actual TS) not present on PID 0x0012 for more than 2 s • Section '1' with table_id = 0x4E (EIT-F, actual TS) not present on PID 0x0012 for more than 2 s • Sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012. • Any two sections with table_id = 0x4E (EIT-P/F, actual TS) occur on PID 0x0012 within a specified value (25ms or lower).
EIT_other_error	This check is only performed if the presence of an EIT for other TSs has been established. This error raises when: • Interval between sections '0' with table_id = 0x4F (EIT-P, other TS) on PID 0x0012 longer than a specified value (10s or higher) • Interval between sections '1' with table_id = 0x4F (EIT-F, other TS) on PID 0x0012 longer than a specified value (10s or higher).
EIT_PF_error	This error raises when: • If either section ('0' or '1') of each EIT P/F subtable is present both must exist.
RST_error	The RST is a quick updating mechanism for the status information carried in the EIT. This error raises when: • Sections with table_id other than 0x71 or 0x72 found on PID 0x0013. • Any two sections with table_id = 0x71 (RST) occur on PID 0x0013 within a specified value (25 ms or lower).
TDT_error	The TDT carries the current UTC time and date information. In addition to the TDT, a TOT can be transmitted which gives information about a local time offset in a given area. This error raises when: • Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30 s • Sections with table_id other than 0x70, 0x72 (ST) or 0x73 (TOT) found on PID 0x0014. • Any two sections with table_id = 0x70 (TDT) occur on PID 0x0014 within a specified value (25 ms or lower).

21.5 ETR-290 Level – Other

Extra checks are enables, which include:

Check	Description
MIP_timing_error	Checks if the successive STS values are self-consistent
MIP_structure_error	Checks if the MIP syntax is compliant
MIP_presence_error	Checks if the MIP is only interested in the transport stream once per mega-frame
MIP_pointer_error	Checks if the MIP pointer is correct
MIP_periodicity_error	Checks if the pointer value is constant for periodic MIP insertion
MIP_ts_rate_error	Checks if the actual transport stream rate is consistent with the DVB-T mode defined by the tps_mip
DVBT2_Timing_error	Checks if the timing interval is correct
DVBT2_Basedband_frame_length	Checks if the DVB-T2 frame length is correct
DVBT2_Basedband_syncd_mismatch	Checks if the DVB-T2 sync-word is not found on the expected position
VQ_bluring_error	Video Quality Viewer: Alerts when the blurring is more then the threshold
VQ_blocking_error	Video Quality Viewer: Alerts when the blocking is more then the threshold
VQ_ringing_error	Video Quality Viewer: Alerts when the ringing is more then the threshold
BV_buffer_Underrun	Buffer Viewer: Alerts for bugger underrun
PTS_arrival_error	Alerts if PTS arrived to late, compare with the PCR
DTS_arrival_error	Alerts if DTS arrived to late, compare with the PCR
Null_Packet_adaptation	Alerts when PID 8191 is transmitted with adaptation_field_control is ‘0’
Encryption_alternation	Alerts if the encryption alternation is not within the threshold
Encryption_synchronisation	Alerts if the encryption synchronization is not correct with the key change intervall
ECM_Duplicate_Key	Checks if the content of the ECM is changing within 20 seconds
ECM_Invalid_Key	Checks if the ECM content starts with 0x80 or 0x81
PES_not_scrambled	Alerts when the PES should be scrambled, but is not scrambled
Incomplete_section	Alerts when the section is not complete. Length not correct
Error Description Loop	Checks if the descriptor loop length is correct
Error Section Syntax_Indicator	Checks is the section_syntax_indicator is ‘1’
Error Wrong Teletext Magazine	Checks if an invalid Teletext Magazine is received when the transmission in serial mode
Teletext_hamming_error	Alerts when the Teletext hamming is not correct
Teletext_framecode_error	Alerts when no correct framecode is used
PTS_PCR_Delay_error_MPEG2	Alerts when for MPEG-2 video the PTC-PCR distance is larger then the specified time
DTS_PCR_Delay_error_MPEG2	Alerts when for MPEG-2 video the DTC-PCR distance is larger then the specified time
PTS_PCR_Delay_error_AVC	Alerts when for AVC video the PTC-PCR distance is larger then the specified time
DTS_PCR_Delay_error_AVC	Alerts when for AVC video the DTC-PCR distance is larger then the specified time
PTS_PCR_Delay_error_Still	Alerts when for a still the PTC-PCR distance is larger then the

	specified time
DTS_PCR_Delay_error_Still	Alerts when for a still the DTC-PCR distance is larger then the specified time
PTS_Drift_error	Alerts if the PTS distance is not consistent
PES_Length_Mismatch	Ales when the PES length is not correct

21.6 Properties

- Max. errors/PID
- Enable / Disable ETR-290 tests
- Log output path

In the config directory, test settings can be changed in the ETR290_profile_last.xml file.

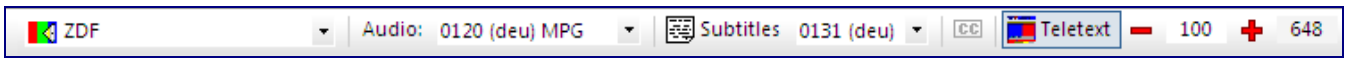
22 Media Viewer

End-User viewing behavior

All (not scrambled) TV and Radio Services can be real-time watched and listened to.

For Video decoding, codecs are used for MPEG-2, AVC and HEVC streams.
All resolutions are supported including High-Definition and Ultra High-Definition.

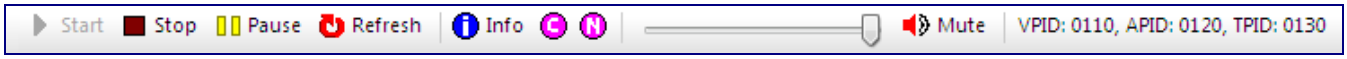
On top different buttons can be used.



Choices can be made by using:

- Service list selection
- Audio component selection
- DVB-Subtitles overlay
- DVB-Subtitle language selection
- Closed-Captioning overlay
- Teletext Overlay
- Teletext page selection

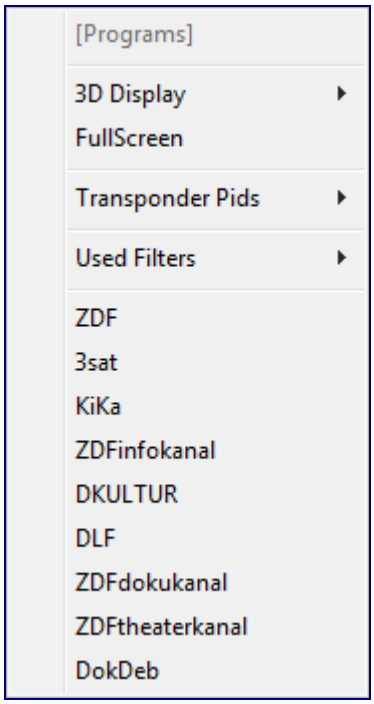
The bottom part of Media Viewer can be used for:



- Start / Stop playing the video.
- Info overlay (short now/next)
- Current event overlay
- Next event overlay
- Audio volume setting
- Audio Mute
- The selected Video, Audio, DVB-Subtitle and Teletext PID are displayed on the right

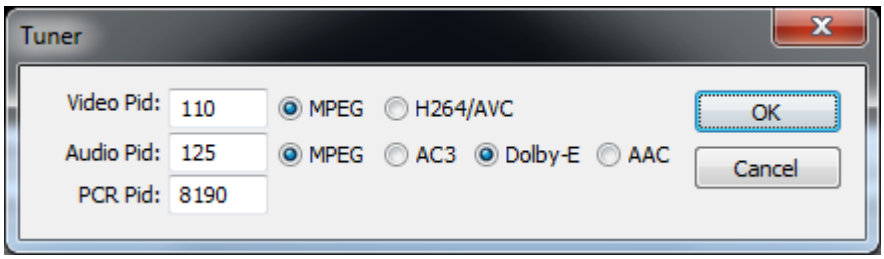
Service selection

Besides using the pull-down buttons, also service and component selections can be realized using the right mouse button.



It's also possible to select your own PID for the Video and Audio component. This can be realized by clicking the right mouse button and then selecting Transponder PIDs. It is now possible to select a known Video and Audio PID, or type in a PID number yourself. This can be handy if the Transport Stream has hidden Video and Audio PIDs.

The Video, Audio and PCR PID can also be typed in manually:



Besides the buttons also short keys can be used:

Key	Description
+	Next Channel
-	Previous Channel
I	Display Now/Next information
C	Display Current EIT Information
N	Display Next EIT Information
T	Toggle Teletext Display
S	Toggle Subtitle Display

3D Display

When the 3D option is enabled, using the right mouse button will give 3D features.
Chapter 29 shows all details.

Full Screen

There are 2 possibilities to show the video full screen:

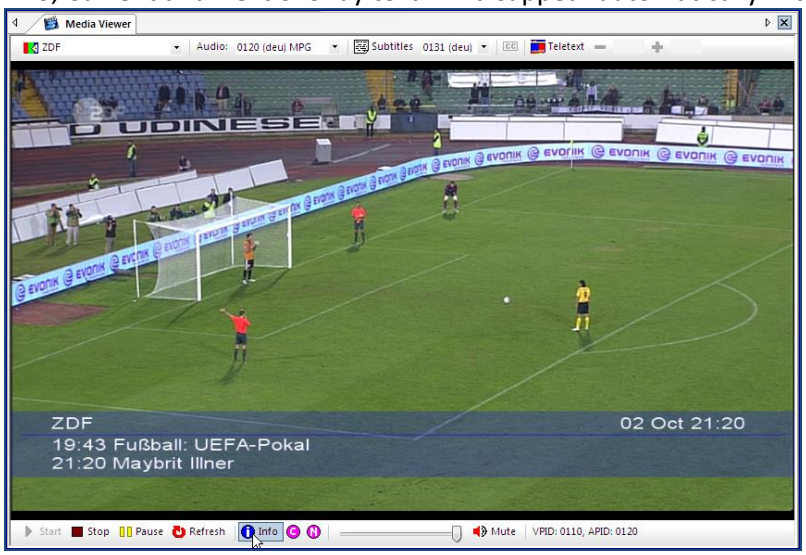
- Double click on the video
- Use the right mouse button and select Full Screen

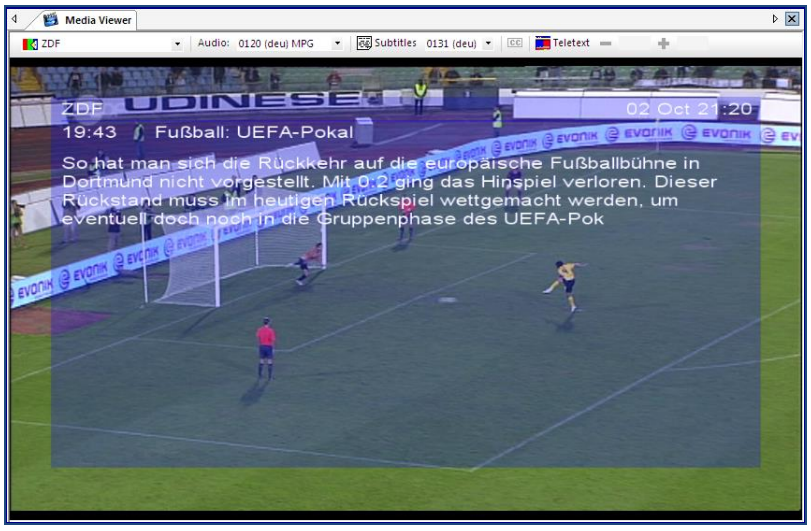
Overlay

If the video is active different short keys can be used:

Key	Description
I	Channel info
C	Current event
N	Next event

Info, Current and Next overlay text will disappear automatically within a few seconds.





If Teletext is available:

Key	Description
T	Teletext on
+	Next page
-	Previous page

If DVB-subtitles are available:

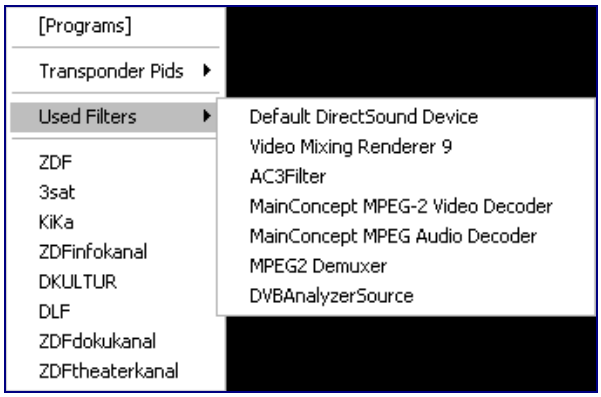
Key	Description
S	Subtitles on/off

Mute

Key	Description
M	Mute audio on/off

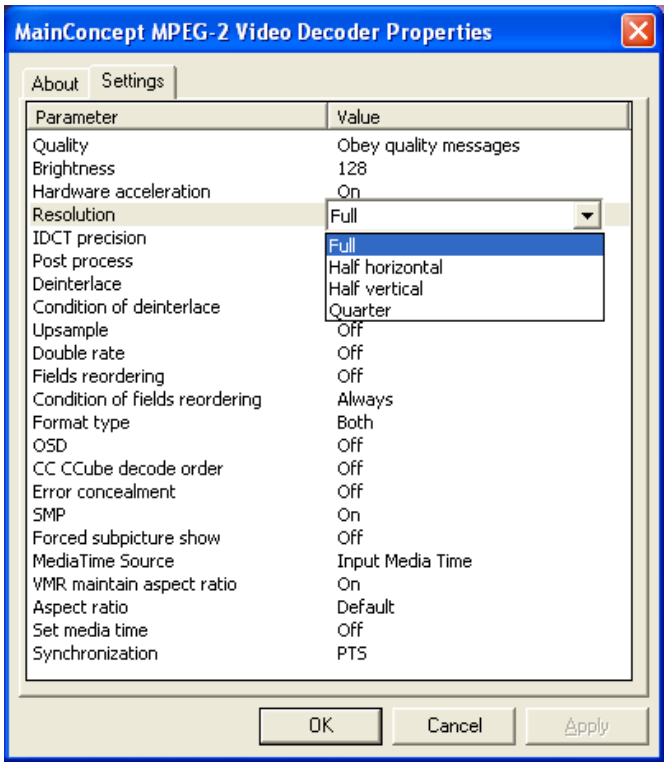
Direct Show filters

Media Viewer uses Direct Show filters.



The Used Filters pop-up menu can be used to (depending on the filter) view/change filter properties.

In the case of Main-Concept MPEG-2 Video decoding the following properties are used:



Media Viewer can be opened more than once!

22.1 Properties

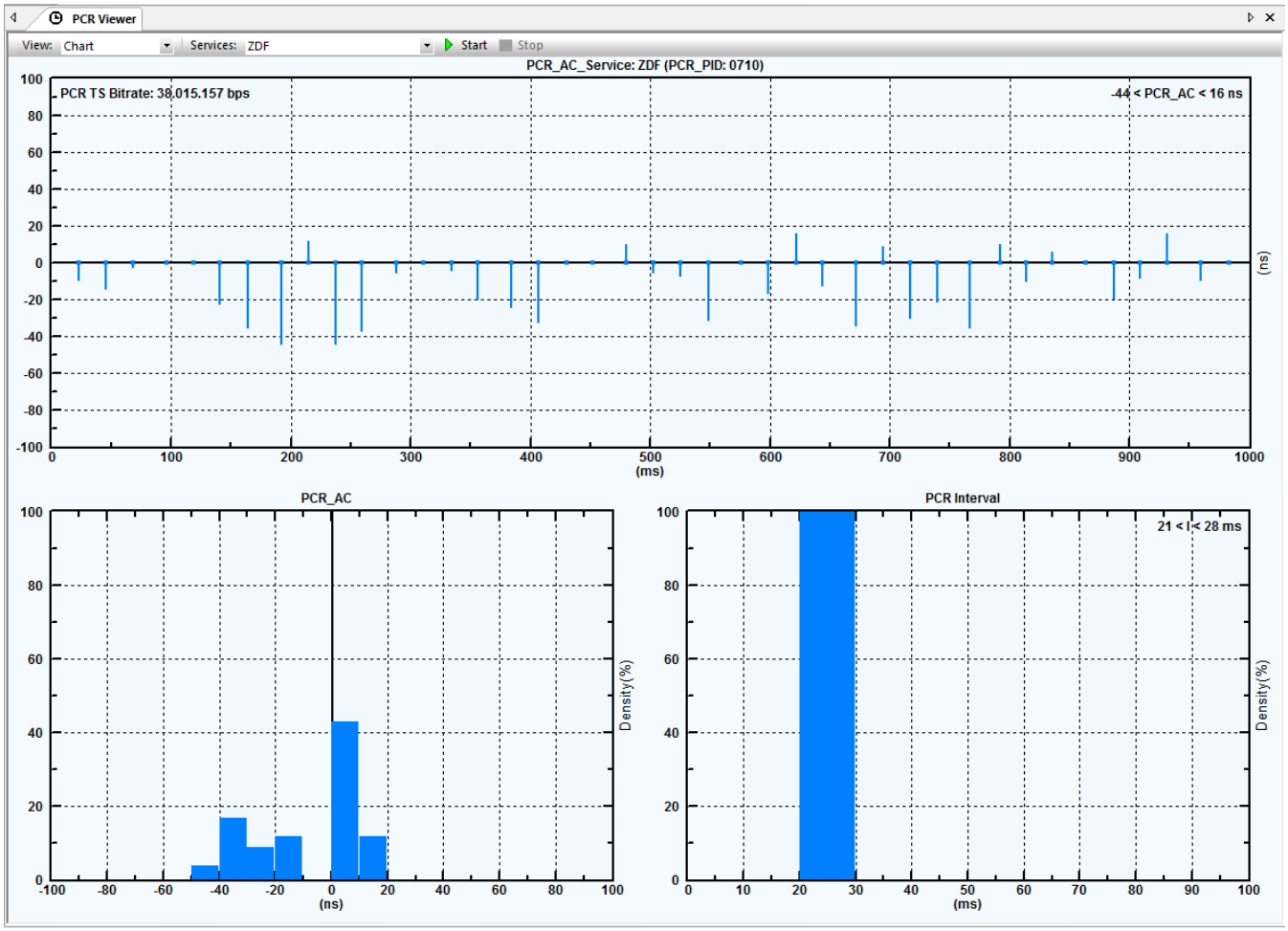
- Selection MPEG Video Decoder
- Selection H264 Video Decoder. (H264 = AVC = MPEG-4 part 10)
- Selection H265 Video Decoder. (H265 = HEVC)
- Selection MPEG Audio Decoder
- Selection AC3 Audio Decoder
- Display Closed Caption (if available)

23 PCR Viewer

Program Clock Reference (PCR) analyzing

The PCR Viewer displays every second an overview of the PCR (Program Clock Reference) frequency and precision.

23.1 Chart View

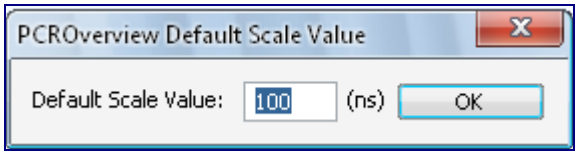


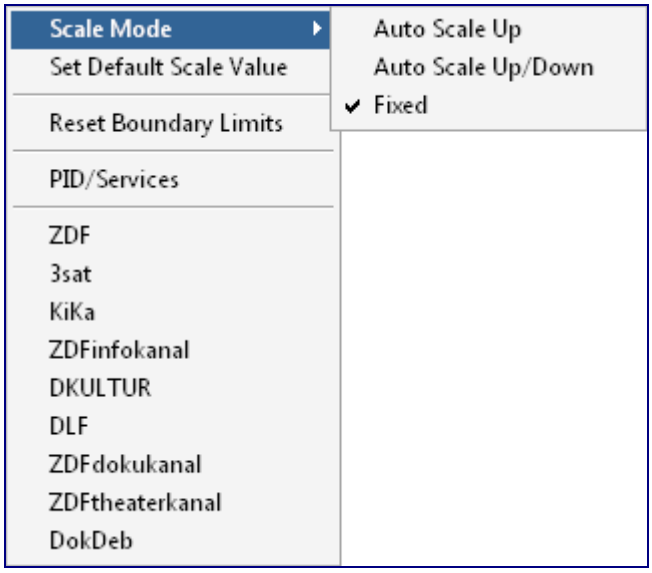
A service PCR can be selected either via the Services Pull down button or via clicking the right mouse button.

Using the right mouse button also gives the possibility to change the time scale of the PCR Jitter measurements:

- Auto Scale Up
- Auto Scale Up/Down
- Fixed

With ‘Set Default Scale Value’ the default scale can be set





'Reset Boundary Limits' will initiate the time axes again.

PCR Jitter Snapshot

The PCR Jitter Snapshot shows the PCR accuracy of a Service. Because values that exceed ± 500 ns are invalid (ETR-290), this is indicated by a red line.

PCR Jitter Density (PCR-AC)

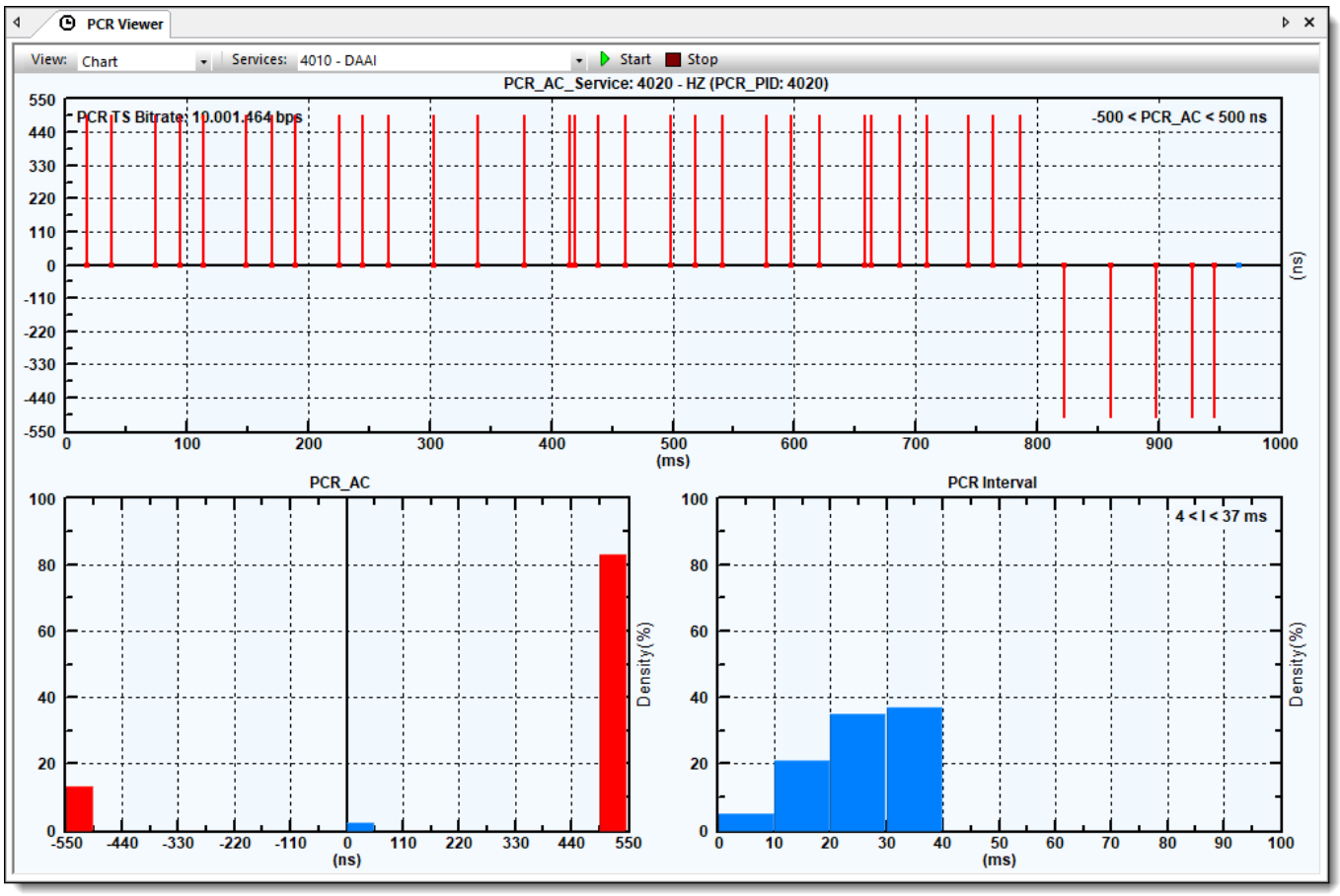
The histogram displays the PCR time stamp occurrences against their accuracy. Again, accuracy values which exceed ± 500 ns are indicated in red.

PCR Interval

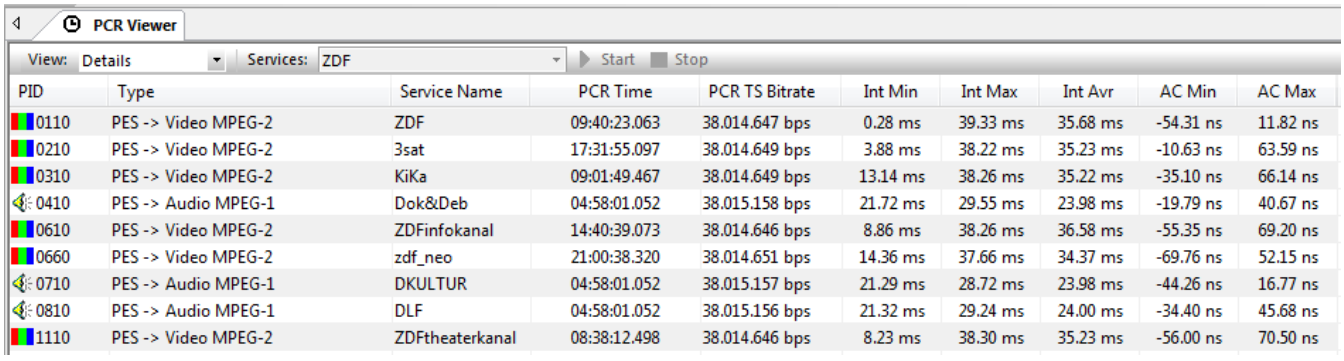
The histogram displays the PCR time stamps occurrences against their time interval. For DVB Transport Streams the interval should be less than 40ms and for ATSC Transport Streams it should be less than 100ms.

PCR Viewer can be opened more than once!

When out-of-bound values are measured, red lines are shown.



23.2 Detail View



PID	Type	Service Name	PCR Time	PCR TS Bitrate	Int Min	Int Max	Int Avr	AC Min	AC Max
0110	PES -> Video MPEG-2	ZDF	09:40:23.063	38.014.647 bps	0.28 ms	39.33 ms	35.68 ms	-54.31 ns	11.82 ns
0210	PES -> Video MPEG-2	3sat	17:31:55.097	38.014.649 bps	3.88 ms	38.22 ms	35.23 ms	-10.63 ns	63.59 ns
0310	PES -> Video MPEG-2	KiKa	09:01:49.467	38.014.649 bps	13.14 ms	38.26 ms	35.22 ms	-35.10 ns	66.14 ns
0410	PES -> Audio MPEG-1	Dok&Deb	04:58:01.052	38.015.158 bps	21.72 ms	29.55 ms	23.98 ms	-19.79 ns	40.67 ns
0610	PES -> Video MPEG-2	ZDFinfokanal	14:40:39.073	38.014.646 bps	8.86 ms	38.26 ms	36.58 ms	-55.35 ns	69.20 ns
0660	PES -> Video MPEG-2	zdf_neo	21:00:38.320	38.014.651 bps	14.36 ms	37.66 ms	34.37 ms	-69.76 ns	52.15 ns
0710	PES -> Audio MPEG-1	DKULTUR	04:58:01.052	38.015.157 bps	21.29 ms	28.72 ms	23.98 ms	-44.26 ns	16.77 ns
0810	PES -> Audio MPEG-1	DLF	04:58:01.052	38.015.156 bps	21.32 ms	29.24 ms	24.00 ms	-34.40 ns	45.68 ns
1110	PES -> Video MPEG-2	ZDFtheaterkanal	08:38:12.498	38.014.646 bps	8.23 ms	38.30 ms	35.23 ms	-56.00 ns	70.50 ns

The Detail viewer displays a complete overview of all PIDs containing PCR's with all its parameters.

23.3 Related Windows

- PCR behavior defects the ETR-290 Compliancy window results.

24 EPG Viewer

Program Guide analyzing

Electronic Program Guide information, available in the analyzed Transport Stream can be displayed in different representations:

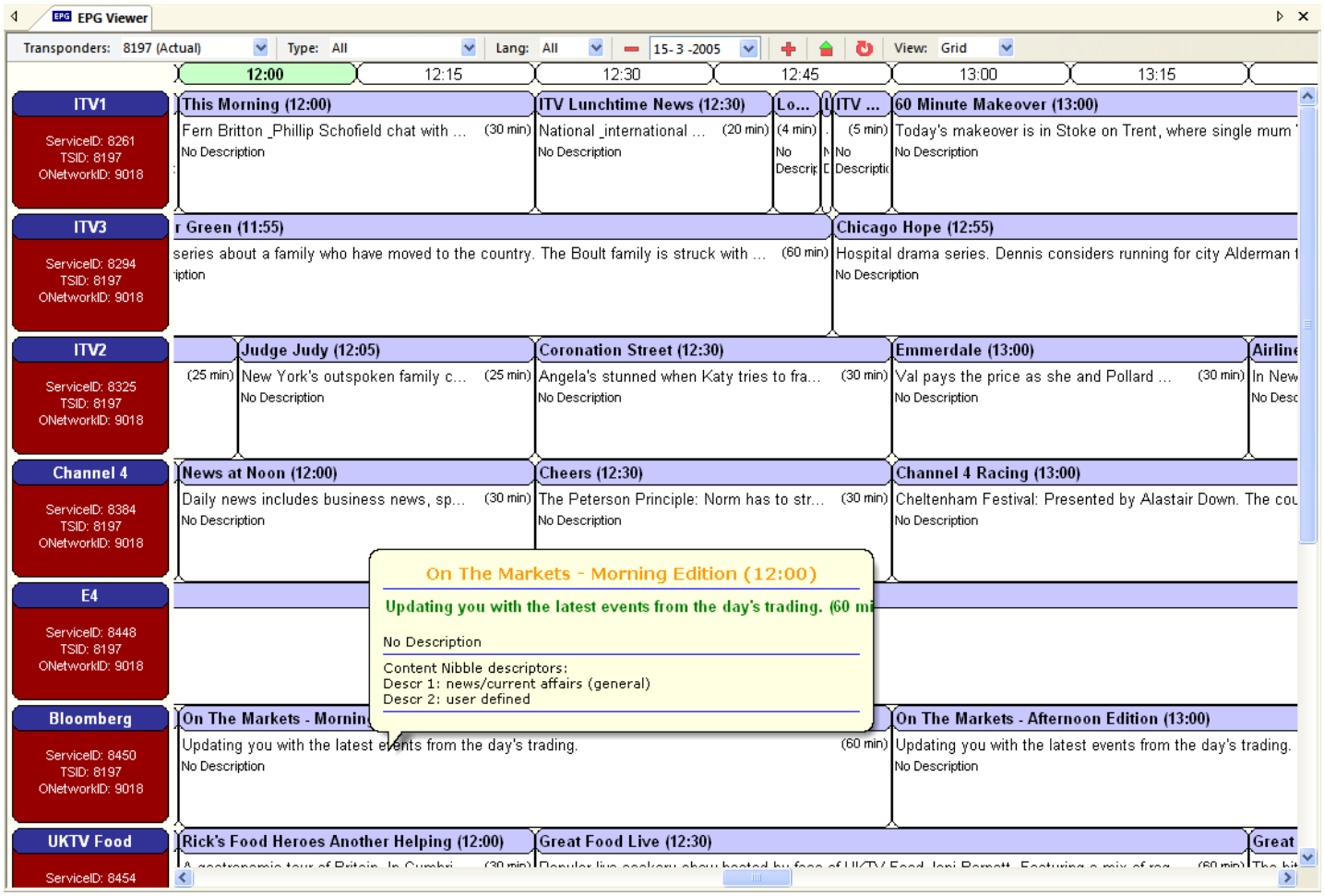
- Grid
- Details

EPG Viewer can be opened more than once!

24.1 Grid

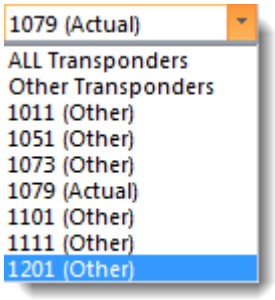
A visual grid representation of all EPG events is displayed in the EPG Viewer window.

Vertical all the channels are shown. Horizontal all the events are shown on a time scale.

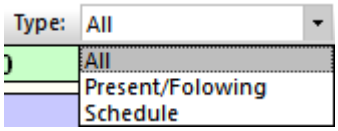


By moving the mouse over an EPG event, detailed information is displayed in a balloon popup.

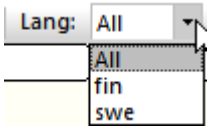
By using the pull-down button, EPG information about all Transport Streams, Other Transport Steams or selected Transport Streams can be chosen.



All events or only the EIT Present/Following or EIT Schedule events can be selected.



When Multilanguage EIT events are broadcasted, a filter on a selected language can be made.



The date and time of the EPG Viewer window can also be changed.

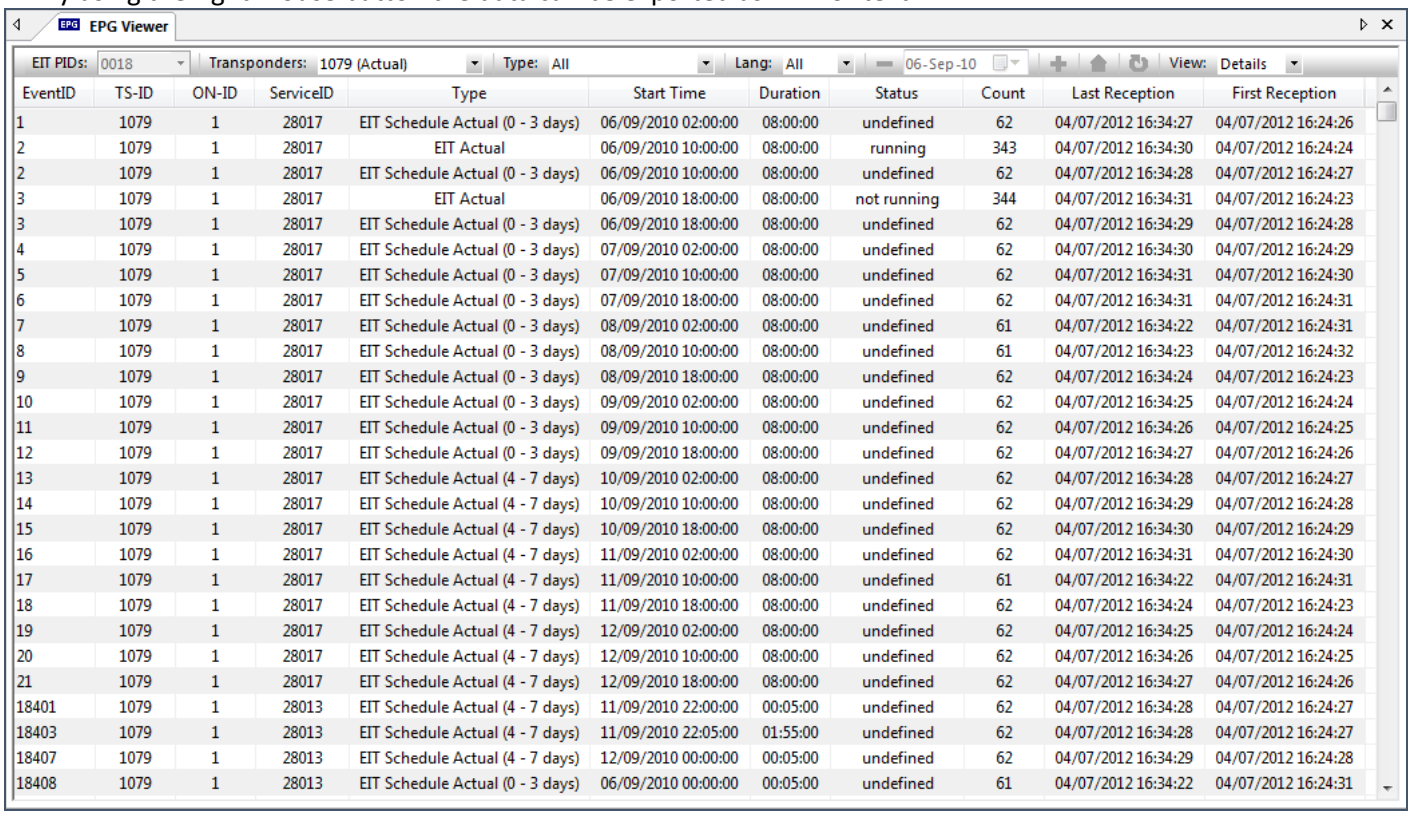
Via  the first Events can be chosen.  can be used to refresh the data.

24.2 Details

Multiple columns show information about all details available in an EPG event:

Column	Description
EventID	ID (identifier) of the Event
TS-ID	Transport stream ID
ServiceID	Service ID
Type	Table type
Start time	Start time of event
Duration	Duration of the event
Status	Running status
Count	Amount of time this event was sent
Last Reception	Last time this event was sent
First Reception	First time this event was sent

By using the right mouse button the data can be exported as XML or text.



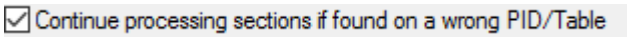
EventID	TS-ID	ON-ID	ServiceID	Type	Start Time	Duration	Status	Count	Last Reception	First Reception
1	1079	1	28017	EIT Schedule Actual (0 - 3 days)	06/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:27	04/07/2012 16:24:26
2	1079	1	28017	EIT Actual	06/09/2010 10:00:00	08:00:00	running	343	04/07/2012 16:34:30	04/07/2012 16:24:24
2	1079	1	28017	EIT Schedule Actual (0 - 3 days)	06/09/2010 10:00:00	08:00:00	undefined	62	04/07/2012 16:34:28	04/07/2012 16:24:27
3	1079	1	28017	EIT Actual	06/09/2010 18:00:00	08:00:00	not running	344	04/07/2012 16:34:31	04/07/2012 16:24:23
3	1079	1	28017	EIT Schedule Actual (0 - 3 days)	06/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:29	04/07/2012 16:24:28
4	1079	1	28017	EIT Schedule Actual (0 - 3 days)	07/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:30	04/07/2012 16:24:29
5	1079	1	28017	EIT Schedule Actual (0 - 3 days)	07/09/2010 10:00:00	08:00:00	undefined	62	04/07/2012 16:34:31	04/07/2012 16:24:30
6	1079	1	28017	EIT Schedule Actual (0 - 3 days)	07/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:31	04/07/2012 16:24:31
7	1079	1	28017	EIT Schedule Actual (0 - 3 days)	08/09/2010 02:00:00	08:00:00	undefined	61	04/07/2012 16:34:22	04/07/2012 16:24:31
8	1079	1	28017	EIT Schedule Actual (0 - 3 days)	08/09/2010 10:00:00	08:00:00	undefined	61	04/07/2012 16:34:23	04/07/2012 16:24:32
9	1079	1	28017	EIT Schedule Actual (0 - 3 days)	08/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:24	04/07/2012 16:24:23
10	1079	1	28017	EIT Schedule Actual (0 - 3 days)	09/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:25	04/07/2012 16:24:24
11	1079	1	28017	EIT Schedule Actual (0 - 3 days)	09/09/2010 10:00:00	08:00:00	undefined	62	04/07/2012 16:34:26	04/07/2012 16:24:25
12	1079	1	28017	EIT Schedule Actual (0 - 3 days)	09/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:27	04/07/2012 16:24:26
13	1079	1	28017	EIT Schedule Actual (4 - 7 days)	10/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:28	04/07/2012 16:24:27
14	1079	1	28017	EIT Schedule Actual (4 - 7 days)	10/09/2010 10:00:00	08:00:00	undefined	62	04/07/2012 16:34:29	04/07/2012 16:24:28
15	1079	1	28017	EIT Schedule Actual (4 - 7 days)	10/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:30	04/07/2012 16:24:29
16	1079	1	28017	EIT Schedule Actual (4 - 7 days)	11/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:31	04/07/2012 16:24:30
17	1079	1	28017	EIT Schedule Actual (4 - 7 days)	11/09/2010 10:00:00	08:00:00	undefined	61	04/07/2012 16:34:22	04/07/2012 16:24:31
18	1079	1	28017	EIT Schedule Actual (4 - 7 days)	11/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:24	04/07/2012 16:24:23
19	1079	1	28017	EIT Schedule Actual (4 - 7 days)	12/09/2010 02:00:00	08:00:00	undefined	62	04/07/2012 16:34:25	04/07/2012 16:24:24
20	1079	1	28017	EIT Schedule Actual (4 - 7 days)	12/09/2010 10:00:00	08:00:00	undefined	62	04/07/2012 16:34:26	04/07/2012 16:24:25
21	1079	1	28017	EIT Schedule Actual (4 - 7 days)	12/09/2010 18:00:00	08:00:00	undefined	62	04/07/2012 16:34:27	04/07/2012 16:24:26
18401	1079	1	28013	EIT Schedule Actual (4 - 7 days)	11/09/2010 22:00:00	00:05:00	undefined	62	04/07/2012 16:34:28	04/07/2012 16:24:27
18403	1079	1	28013	EIT Schedule Actual (4 - 7 days)	11/09/2010 22:05:00	01:55:00	undefined	62	04/07/2012 16:34:28	04/07/2012 16:24:27
18407	1079	1	28013	EIT Schedule Actual (4 - 7 days)	12/09/2010 00:00:00	00:05:00	undefined	62	04/07/2012 16:34:29	04/07/2012 16:24:28
18408	1079	1	28013	EIT Schedule Actual (0 - 3 days)	06/09/2010 00:00:00	00:05:00	undefined	61	04/07/2012 16:34:22	04/07/2012 16:24:31

Columns can be sorted by clicking the left mouse button on the header.
Columns can be added or hidden, by pressing the right mouse button on the header.

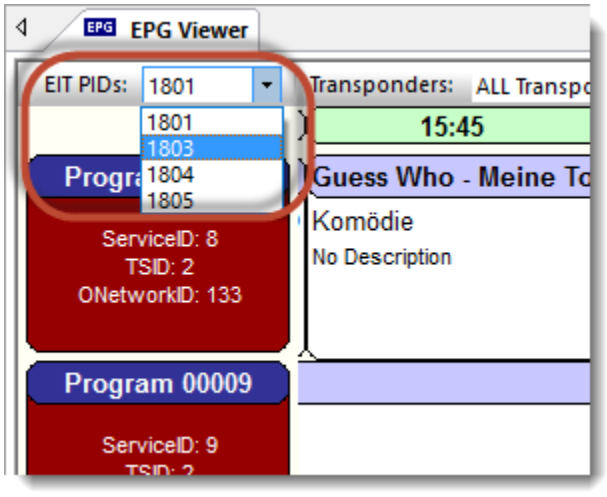
24.3 EIT data on another PID

Also EIT data nog available on the default PID (x0018) can be shown.

Therefore, Preferences > ETR290/Measurements, first the flag for 'Continue processing sections if found on a wrong PID/Table' has to be enabled.



Then in EPG Viewer a different EIT PID can be selected:



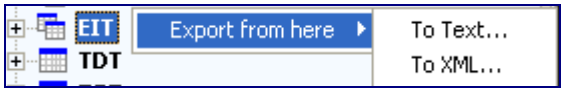
24.4 Related Windows

EPG information can also be analyzed via:

- SI/PSI/PSIP
- Hex Viewer

SI/PSI/PSIP

Exports from the EIT (EPG information) table can be made into plain Text or XML file from the incoming Transport Stream.



The SI/PSI/PSIP window is described in detail in the SI/PSI/PSIP Chapter.

Hex Viewer

By clicking on the EIT (EPG information) Table in the SI/PSI/PSIP window or by clicking on PID 18 (0x12) in the PID window, the Hex Viewer directly shows the Interpretation plus hex dump of the EIT table.
The Hex Viewer window is described in detail in the Hex Viewer Chapter.

Option ‘TP’

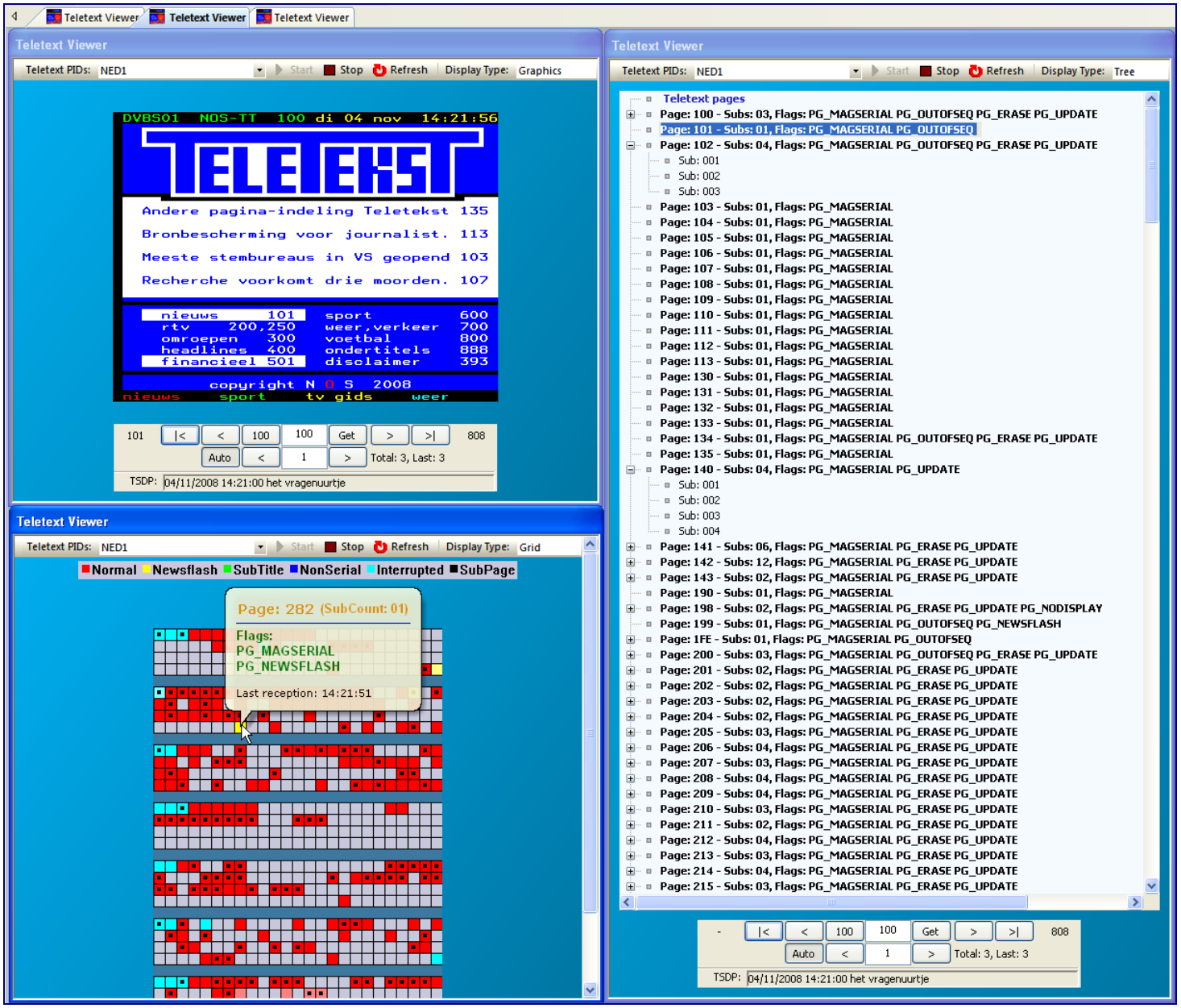
- Teletext Viewer
- Subtitle Viewer
- Hex Viewer

25 Teletext Viewer

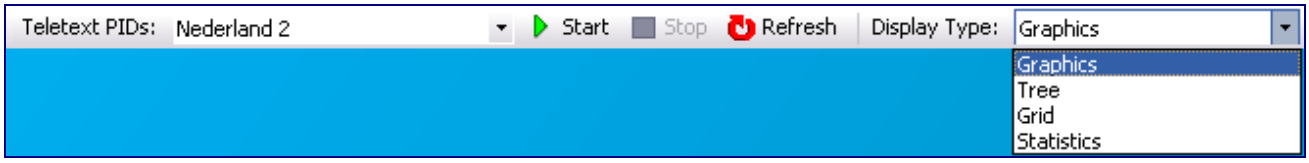
Enhanced Teletext analyzing

Teletext information available in the analyzed Transport Stream can be displayed in different representations:

- Graphics
- Raw
- Tree
- Grid
- Details
- VBI

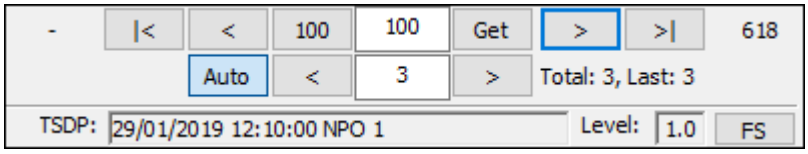


Every Teletext Viewer uses a select bar and a control bar.



The (upper) select bar gives to possibility to:

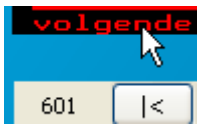
- Select a Teletext service
- Start / Stop / Refresh the Teletext viewer window
- Select the Display type



The control bar gives to possibility (for the Graphics sub-view) to go to:

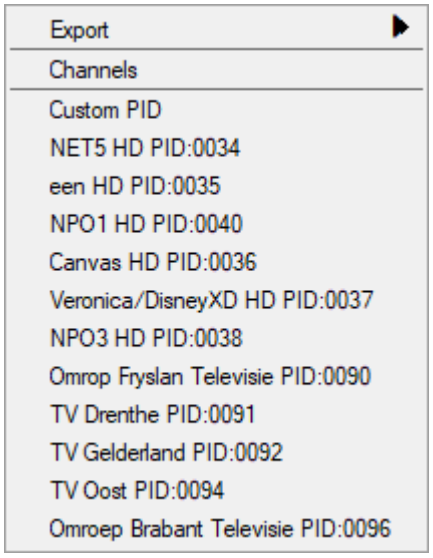
- The lowest available Teletext page
- One Teletext page lower
- Page 100
- A manual typed page number. (Press the Get button for activation)
- One Teletext page higher
- The highest available Teletext page
- Select Auto, so the viewer will show the latest sent subpage
- One subpage lower
- Selected subpage
- One subpage higher And go to Full size mode

When selecting a magazine short key, the related Teletext page number will be shown on the left.



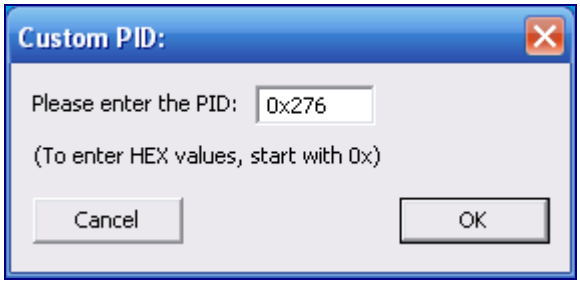
At the right position in the control bar the rolling Teletext number is displayed continuously.
Also, the total amount of cached subpages is given, with the highest received subpage number.
At the bottom the Service TSDP information, and used Level is displayed.

Using the right mouse button, gives also the possibility to select a teletext service.



And all kinds of export can be realized for the Teletext information.

It's also possible to select your own PID. This can be realized by clicking the right mouse button and then selecting Custom PID.



Besides using the pull-down to select the Display Type between Graphics, Tree, Grid or Statistics representation, also the short-keys "1" (Graphics), "2" (Tree), "3" (Grid), "4" (Details) and "5" (VBI)will do the selection.

Teletext Viewer can be opened more than once!

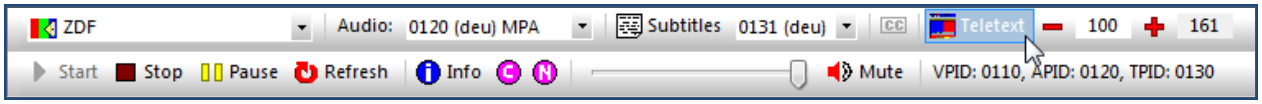
25.1 Related Windows

Teletext information can also be analyzed via:

- Media Viewer
- Hex Viewer

Media Viewer

By selecting the Subtitle button in Media Viewer, DVB-Subtitles will be overlaid on top of the Video



Hex Viewer

By clicking on a Teletext PID in the PID window, the Hex Viewer directly shows the Interpretation plus hex dump of a Teletext e PES (Packetized Elementary Stream).

The Hex Viewer window is described in detail in the Hex Viewer Chapter.

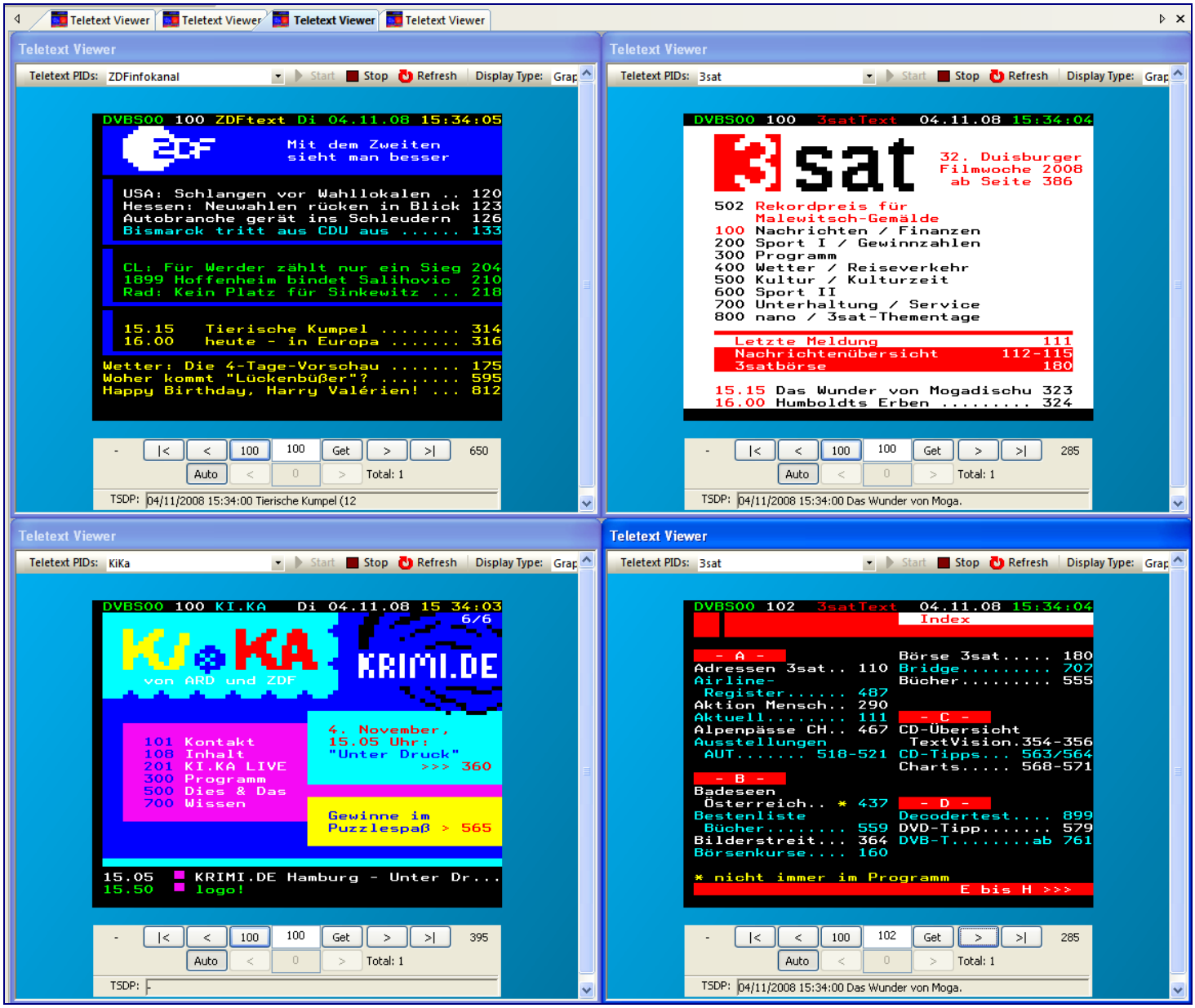
25.2 Graphics

The Graphics display type shows the Teletext information as an end-user's view.

With the asterisk key *, the Graphics Viewer can toggle between normal and full size.

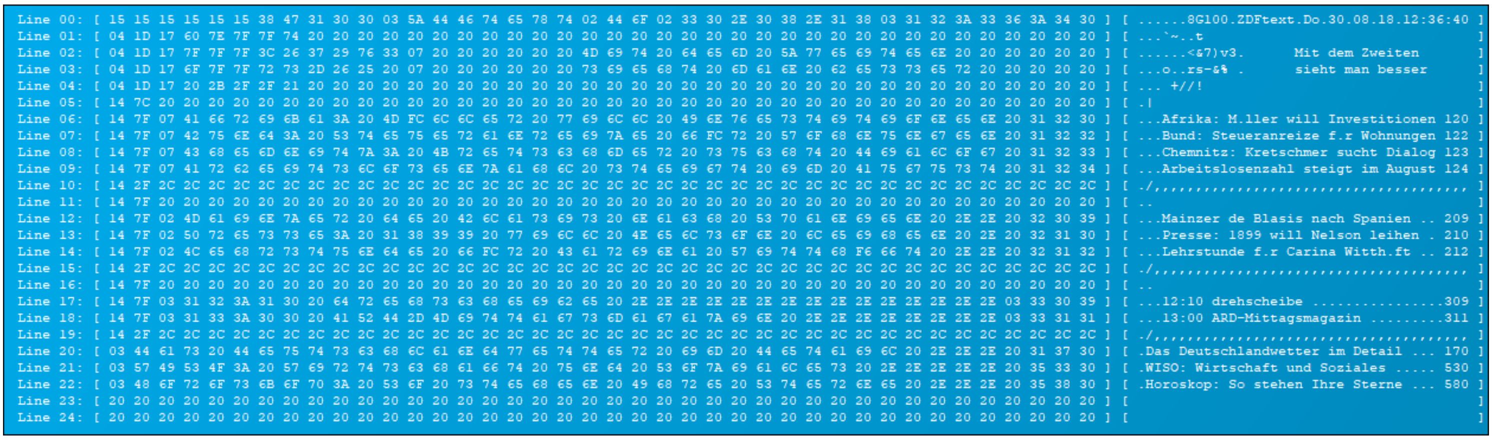
With the "+" and "-" key, it's possible to scroll quickly up and down the available Teletext pages.

Multiple Teletext Viewers can be displayed like this:



25.3 Raw

The Raw view displays the raw Teletext data, after de-Hamming.



```
Line 00: [ 15 15 15 15 15 15 38 47 31 30 30 03 5A 44 46 74 65 78 74 02 44 6F 02 33 30 2E 30 38 2E 31 38 03 31 32 3A 33 36 3A 34 30 ] [ ......8G100.ZDFtext.Do.30.08.18.12:36:40 ]
Line 01: [ 04 1D 17 60 7E 7F 7F 74 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [ ...`~..t                                 ]
Line 02: [ 04 1D 17 7F 7F 7F 3C 26 37 29 76 33 07 20 20 20 20 20 20 4D 69 74 20 64 65 6D 20 5A 77 65 69 74 65 6E 20 20 20 20 20 20 ] [ ......<&7)v3.      Mit dem Zweiten      ]
Line 03: [ 04 1D 17 6F 7F 7F 72 73 2D 26 25 20 07 20 20 20 20 20 20 73 69 65 68 74 20 6D 61 6E 20 62 65 73 73 65 72 20 20 20 20 20 ] [ ...o..rs-&% .      sieht man besser     ]
Line 04: [ 04 1D 17 20 2B 2F 2F 21 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [ ... +//!                                 ]
Line 05: [ 14 7C 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [ .|                                       ]
Line 06: [ 14 7F 07 41 66 72 69 6B 61 3A 20 4D FC 6C 6C 65 72 20 77 69 6C 6C 20 49 6E 76 65 73 74 69 74 69 6F 6E 65 6E 20 31 32 30 ] [ ...Afrika: M.ller will Investitionen 120 ]
Line 07: [ 14 7F 07 42 75 6E 64 3A 20 53 74 65 75 65 72 61 6E 72 65 69 7A 65 20 66 FC 72 20 57 6F 68 6E 75 6E 67 65 6E 20 31 32 32 ] [ ...Bund: Steueranreize f.r Wohnungen 122 ]
Line 08: [ 14 7F 07 43 68 65 6D 6E 69 74 7A 3A 20 4B 72 65 74 73 63 68 6D 65 72 20 73 75 63 68 74 20 44 69 61 6C 6F 67 20 31 32 33 ] [ ...Chemnitz: Kretschmer sucht Dialog 123 ]
Line 09: [ 14 7F 07 41 72 62 65 69 74 73 6C 6F 73 65 6E 7A 61 68 6C 20 73 74 65 69 67 74 20 69 6D 20 41 75 67 75 73 74 20 31 32 34 ] [ ...Arbeitslosenzahl steigt im August 124 ]
Line 10: [ 14 2F 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C ] [ ./,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, ]
Line 11: [ 14 7F 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [ ..                                       ]
Line 12: [ 14 7F 02 4D 61 69 6E 7A 65 72 20 64 65 20 42 6C 61 73 69 73 20 6E 61 63 68 20 53 70 61 6E 69 65 6E 20 2E 2E 20 32 30 39 ] [ ...Mainzer de Blasis nach Spanien .. 209 ]
Line 13: [ 14 7F 02 50 72 65 73 73 65 3A 20 31 38 39 39 20 77 69 6C 6C 20 4E 65 6C 73 6F 6E 20 6C 65 69 68 65 6E 20 2E 20 32 31 30 ] [ ...Presse: 1899 will Nelson leihen . 210 ]
Line 14: [ 14 7F 02 4C 65 68 72 73 74 75 6E 64 65 20 66 FC 72 20 43 61 72 69 6E 61 20 57 69 74 74 68 F6 66 74 20 2E 2E 20 32 31 32 ] [ ...Lehrstunde f.r Carina Witth.ft .. 212 ]
Line 15: [ 14 2F 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C ] [ ./,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, ]
Line 16: [ 14 7F 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [ ..                                       ]
Line 17: [ 14 7F 03 31 32 3A 31 30 20 64 72 65 68 73 63 68 65 69 62 65 20 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 2E 03 33 30 39 ] [ ...12:10 drehscheibe ................309 ]
Line 18: [ 14 7F 03 31 33 3A 30 30 20 41 52 44 2D 4D 69 74 74 61 67 73 6D 61 67 61 7A 69 6E 20 2E 2E 2E 2E 2E 2E 2E 2E 03 33 31 31 ] [ ...13:00 ARD-Mittagsmagazin .........311 ]
Line 19: [ 14 2F 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C 2C ] [ ./,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, ]
Line 20: [ 03 44 61 73 20 44 65 75 74 73 63 68 6C 61 6E 64 77 65 74 74 65 72 20 69 6D 20 44 65 74 61 69 6C 20 2E 2E 2E 20 31 37 30 ] [ .Das Deutschlandwetter im Detail ... 170 ]
Line 21: [ 03 57 49 53 4F 3A 20 57 69 72 74 73 63 68 61 66 74 20 75 6E 64 20 53 6F 7A 69 61 6C 65 73 20 2E 2E 2E 2E 2E 20 35 33 30 ] [ .WISO: Wirtschaft und Soziales ..... 530 ]
Line 22: [ 03 48 6F 72 6F 73 6B 6F 70 3A 20 53 6F 20 73 74 65 68 65 6E 20 49 68 72 65 20 53 74 65 72 6E 65 20 2E 2E 2E 20 35 38 30 ] [ .Horoskop: So stehen Ihre Sterne ... 580 ]
Line 23: [ 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [                                          ]
Line 24: [ 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 ] [                                          ]
```

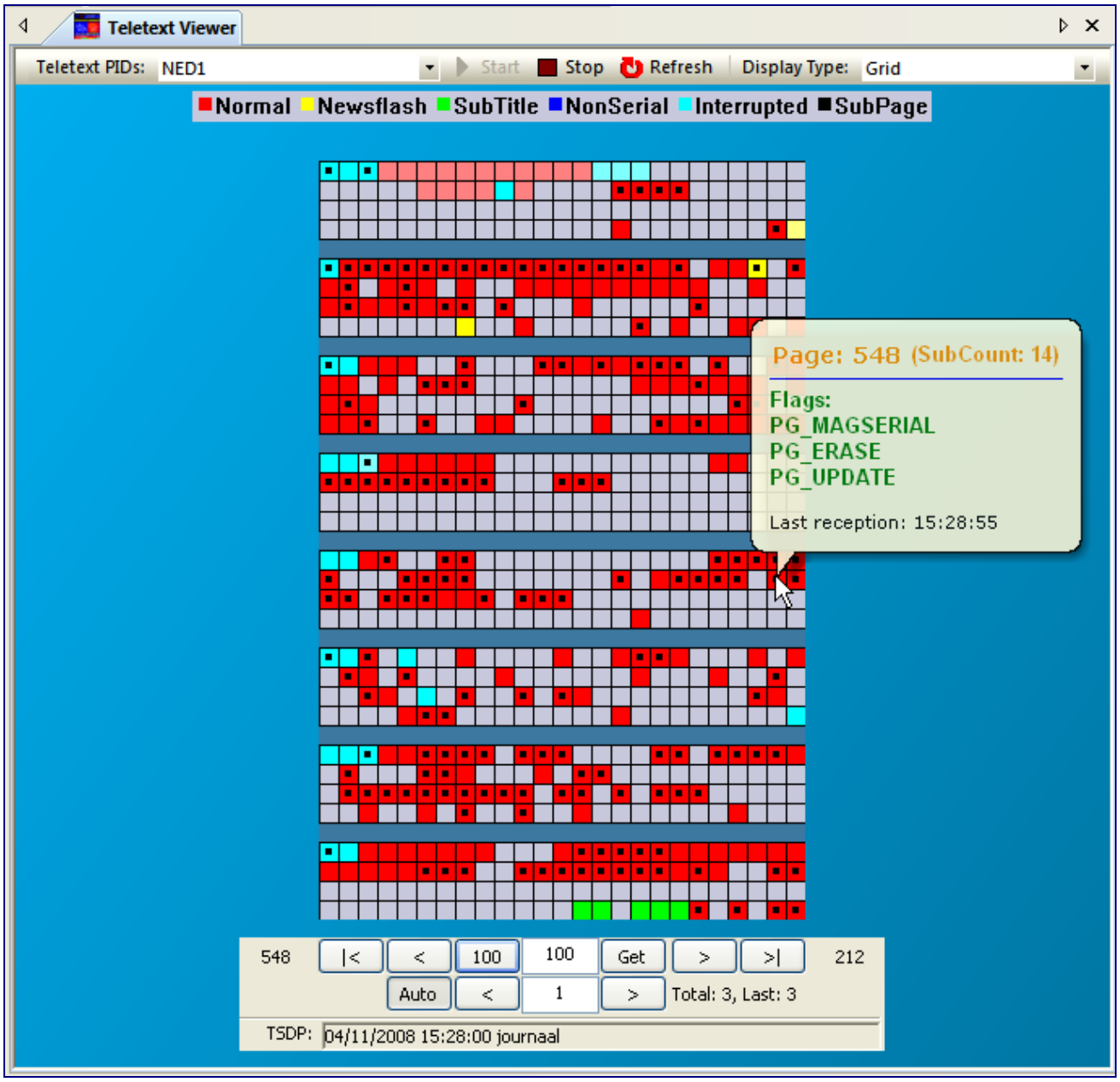
25.4 Tree

The Tree display presentation gives a tree of all broadcasted Teletext pages and sub-pages.
For each Teletext page, also information if given about the used page types.

Opening a page node shows the available subpages.


Teletext Viewer
Teletext PIDs: NED1
Start
Stop
Refresh
Display Type: Tree
Teletext pages
Page: 100 - Subs: 03, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 101 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ
Page: 102 - Subs: 04, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Sub: 001
Sub: 002
Sub: 003
Page: 103 - Subs: 01, Flags: PG_MAGSERIAL
Page: 104 - Subs: 01, Flags: PG_MAGSERIAL
Page: 105 - Subs: 01, Flags: PG_MAGSERIAL
Page: 106 - Subs: 01, Flags: PG_MAGSERIAL
Page: 107 - Subs: 01, Flags: PG_MAGSERIAL
Page: 108 - Subs: 01, Flags: PG_MAGSERIAL
Page: 109 - Subs: 01, Flags: PG_MAGSERIAL
Page: 110 - Subs: 01, Flags: PG_MAGSERIAL
Page: 111 - Subs: 01, Flags: PG_MAGSERIAL
Page: 112 - Subs: 01, Flags: PG_MAGSERIAL
Page: 113 - Subs: 01, Flags: PG_MAGSERIAL
Page: 114 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 115 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 116 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 130 - Subs: 01, Flags: PG_MAGSERIAL
Page: 131 - Subs: 01, Flags: PG_MAGSERIAL
Page: 132 - Subs: 01, Flags: PG_MAGSERIAL
Page: 133 - Subs: 01, Flags: PG_MAGSERIAL
Page: 134 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 135 - Subs: 01, Flags: PG_MAGSERIAL
Page: 140 - Subs: 04, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
Page: 141 - Subs: 06, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
Sub: 001
Sub: 002
Sub: 003
Sub: 004
Sub: 005
Sub: 006
Page: 142 - Subs: 12, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
Page: 143 - Subs: 02, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
Page: 190 - Subs: 01, Flags: PG_MAGSERIAL
Page: 198 - Subs: 02, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE PG_NODISPLAY
Page: 199 - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_NEWSFLASH
Page: 1FE - Subs: 01, Flags: PG_MAGSERIAL PG_OUTOFSEQ
Page: 200 - Subs: 03, Flags: PG_MAGSERIAL PG_OUTOFSEQ PG_ERASE PG_UPDATE
Page: 201 - Subs: 02, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
Page: 202 - Subs: 02, Flags: PG_MAGSERIAL PG_ERASE PG_UPDATE
-
|<
<
100
100
Get
>
>|
304
Auto
<
3
>
Total: 3, Last: 3
TSDP:
04/11/2008 15:27:00 journaal

25.5 Grid



The Grid view displays the Teletext Page numbers in a Grid layout. This way it's easy to analyze the Teletext Page patterns.

Different colors give information about the kind of Teletext page.

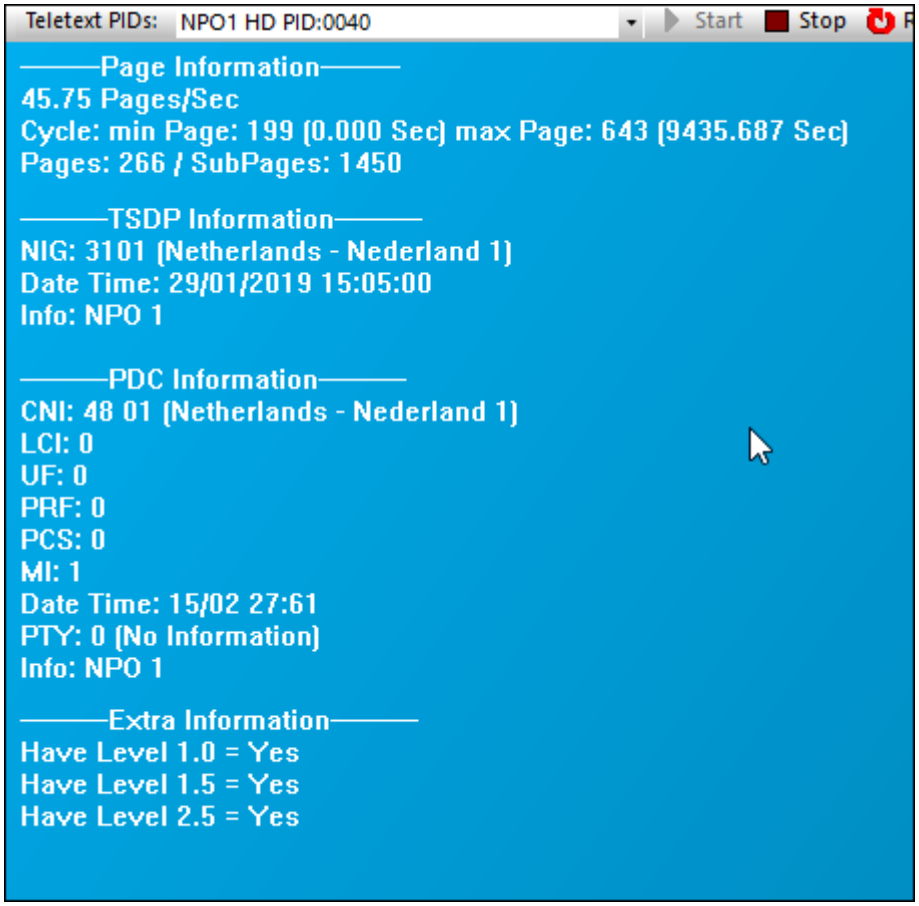
- Normal
- Newsflash
- Subtitle
- Non Serial
- Interrupted
- Subpage

By moving the mouse over the Grid, detailed Page information is displayed for 3 seconds in a balloon pop-up.

25.6 Details

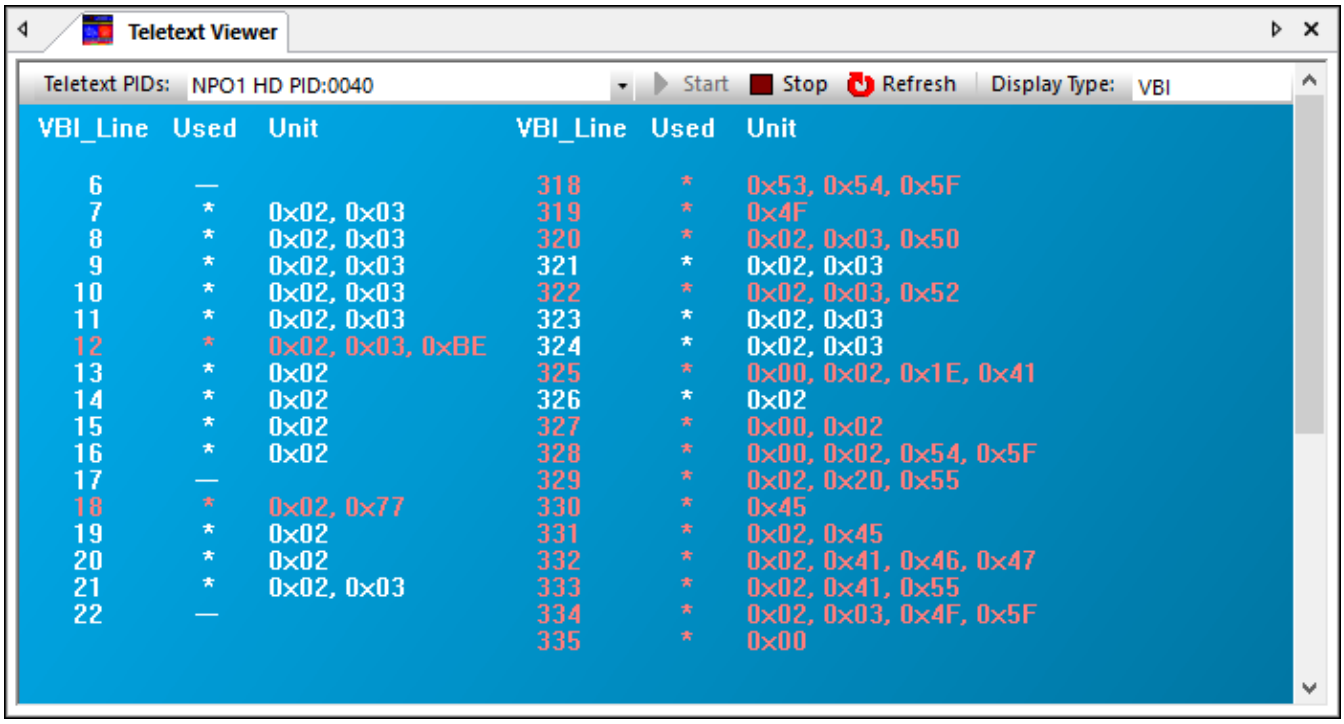
Real-time statistics are given for:

- Amount of received Teletext pages per second
- The cycle time of the whole Teletext carousel
- The number of pages and subpages which are in the carousel.
- TSDP Information
- PDC Information
- Level info



25.7 VBI

Selection of the VBI display type, will give information about the VBI lines used the SD domain.
Also, the used Unit ID's are show for each VBI line.

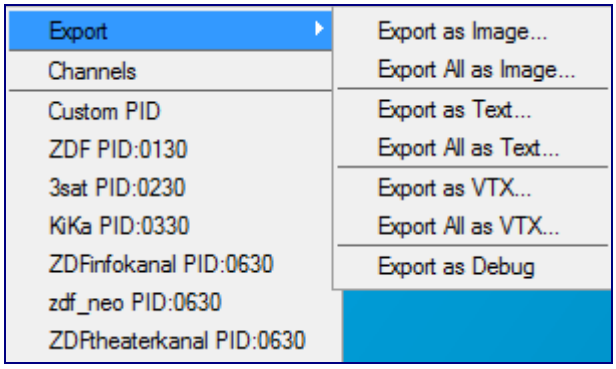


VBI_Line	Used	Unit	VBI_Line	Used	Unit
6	—		318	*	0x53, 0x54, 0x5F
7	*	0x02, 0x03	319	*	0x4F
8	*	0x02, 0x03	320	*	0x02, 0x03, 0x50
9	*	0x02, 0x03	321	*	0x02, 0x03
10	*	0x02, 0x03	322	*	0x02, 0x03, 0x52
11	*	0x02, 0x03	323	*	0x02, 0x03
12	*	0x02, 0x03, 0xBE	324	*	0x02, 0x03
13	*	0x02	325	*	0x00, 0x02, 0x1E, 0x41
14	*	0x02	326	*	0x02
15	*	0x02	327	*	0x00, 0x02
16	*	0x02	328	*	0x00, 0x02, 0x54, 0x5F
17	—		329	*	0x02, 0x20, 0x55
18	*	0x02, 0x77	330	*	0x45
19	*	0x02	331	*	0x02, 0x45
20	*	0x02	332	*	0x02, 0x41, 0x46, 0x47
21	*	0x02, 0x03	333	*	0x02, 0x41, 0x55
22	—		334	*	0x02, 0x03, 0x4F, 0x5F
			335	*	0x00

25.8 Export

The Teletext Pages can be exported in different output formats:

- Image
- All image
- Text
- Al as text
- As VTX
- All as VTX
- Export as Debug



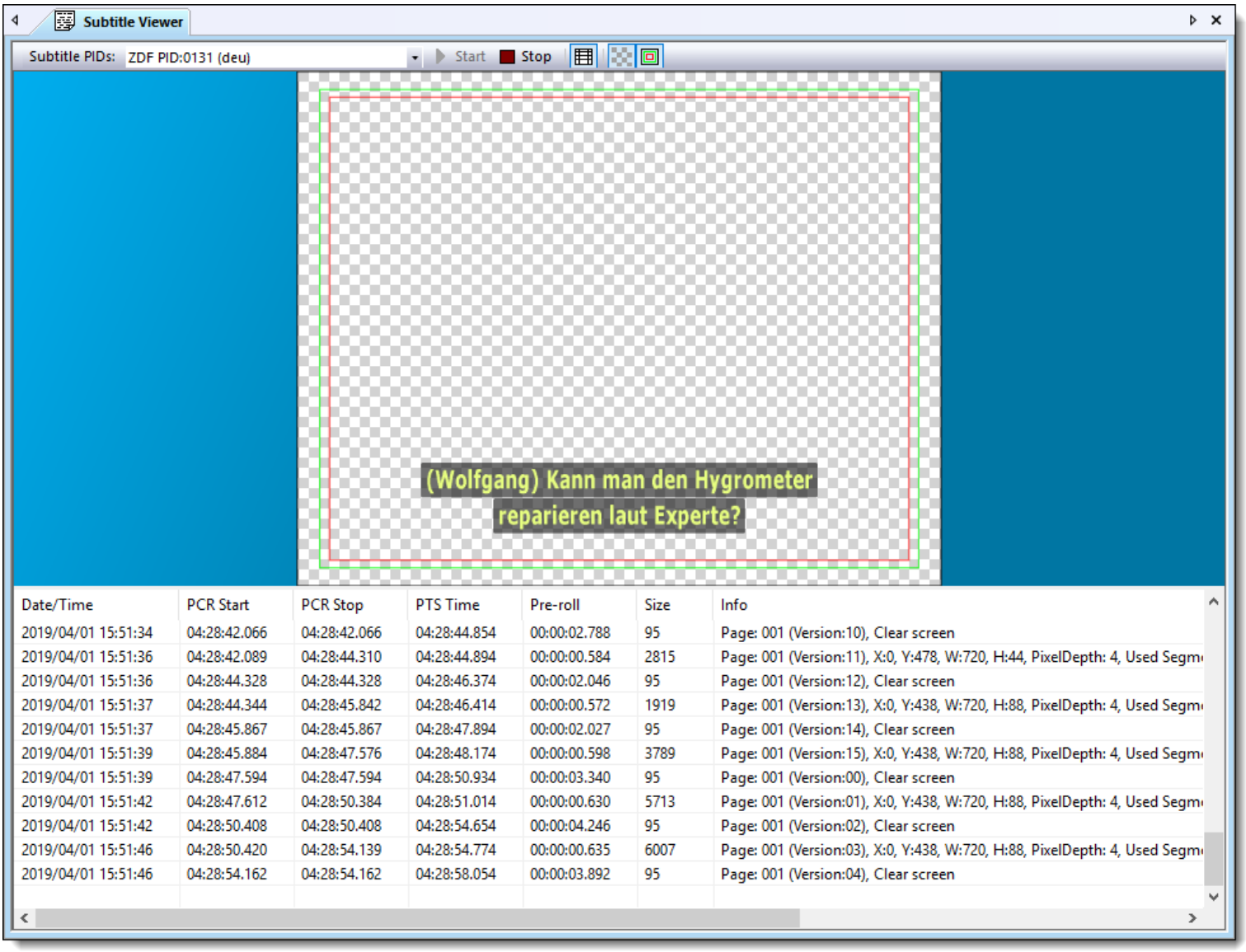
25.9 Properties

- Stretch size

26 Subtitle Viewer

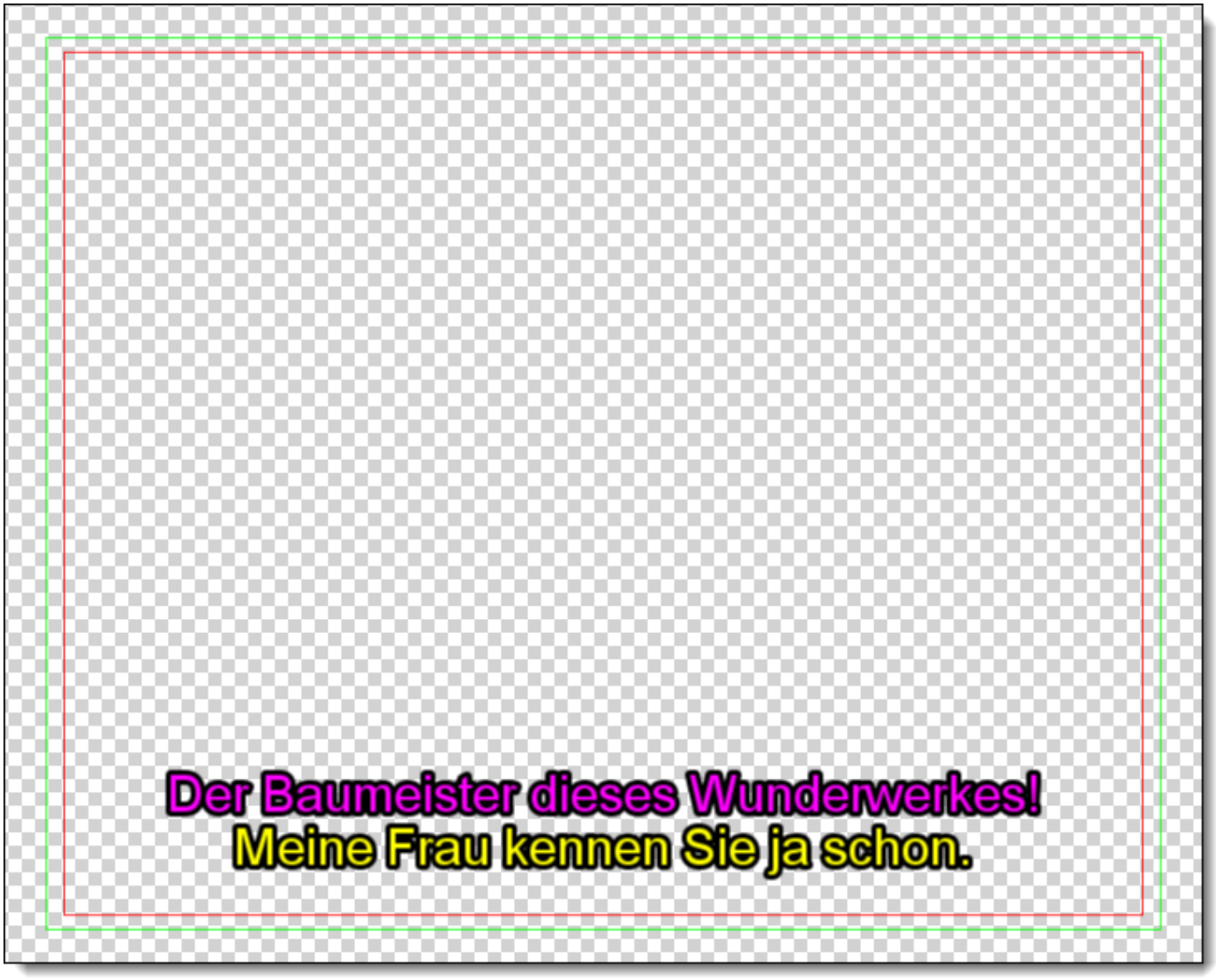
Enhanced DVB Subtitle analyzing

Subtitles and their timing properties can be displayed using the Subtitle Viewer window.

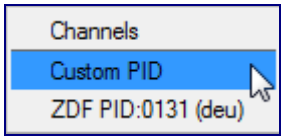


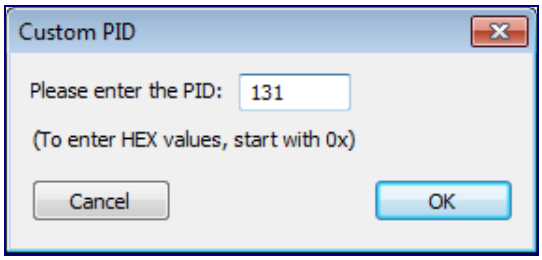
Multiple subtitle codecs are supported:

- DVB-Subtitles
- SCTE-27
- TTML
- ARIB



Using the right mouse button, a custom DVB-Subtitle PID can entered.





Date/Time	PCR Start	PCR Stop	PTS Time	Pre-roll	Size	Info
2019/04/01 16:08:25	04:45:31.275	04:45:33.725	04:45:34.334	00:00:00.609	2703	Page: 001 (Version:12), X:0, Y:478, W:720, H:44, PixelDepth: 4, Used Segm
2019/04/01 16:08:27	04:45:33.742	04:45:35.433	04:45:36.054	00:00:00.621	3213	Page: 001 (Version:13), X:0, Y:478, W:720, H:44, PixelDepth: 4, Used Segm
2019/04/01 16:08:29	04:45:35.458	04:45:37.637	04:45:38.294	00:00:00.657	5521	Page: 001 (Version:14), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:32	04:45:37.660	04:45:40.556	04:45:41.214	00:00:00.658	5525	Page: 001 (Version:15), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:36	04:45:40.581	04:45:44.281	04:45:44.934	00:00:00.653	5305	Page: 001 (Version:00), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:39	04:45:44.300	04:45:47.466	04:45:48.134	00:00:00.668	6025	Page: 001 (Version:01), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:43	04:45:47.489	04:45:51.279	04:45:51.894	00:00:00.615	3057	Page: 001 (Version:02), X:0, Y:478, W:720, H:44, PixelDepth: 4, Used Segm
2019/04/01 16:08:43	04:45:51.296	04:45:51.296	04:45:55.654	00:00:04.358	95	Page: 001 (Version:03), Clear screen
2019/04/01 16:08:48	04:45:52.036	04:45:56.072	04:45:56.734	00:00:00.662	5875	Page: 001 (Version:04), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:52	04:45:56.502	04:46:00.586	04:46:01.214	00:00:00.628	3929	Page: 001 (Version:05), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm
2019/04/01 16:08:56	04:46:00.602	04:46:04.561	04:46:05.214	00:00:00.653	5227	Page: 001 (Version:06), X:0, Y:438, W:720, H:88, PixelDepth: 4, Used Segm

Different columns show information:

Filter	Description
Date/Time	The UTC time when the Subtitle is transmitting
PCR Start	The (PCR) time when the Subtitle starts transmitting
PCR Stop	The (PCR) time when the Subtitle ends transmitting
PTS Time	The Presentation time of the Subtitle
Pre-roll	The time between PTS and PCR-Stop
Size	The size of the subtitle
Info	Technical information about the transmitted subtitle

A Subtitle service can be chosen either via the Pull down button or by clicking the right mouse button.

Subtitle Viewer can be opened more than once!

Subtitles via Teletext can be displayed with the Teletext Viewer window.

Via  the detailed report is displayed.

Via  display transparency is shown.

Via  the safety zones are displayed.

When not using transparency or safety zones, the subtitles show like:

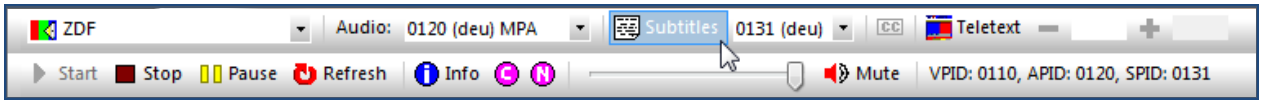
26.1 Related Windows

Subtitle information can also be analyzed via:

- Media Viewer
- Hex Viewer

Media Viewer

By selecting the Subtitle button in Media Viewer, DVB-Subtitles will be overlaid on top of the Video



Hex Viewer

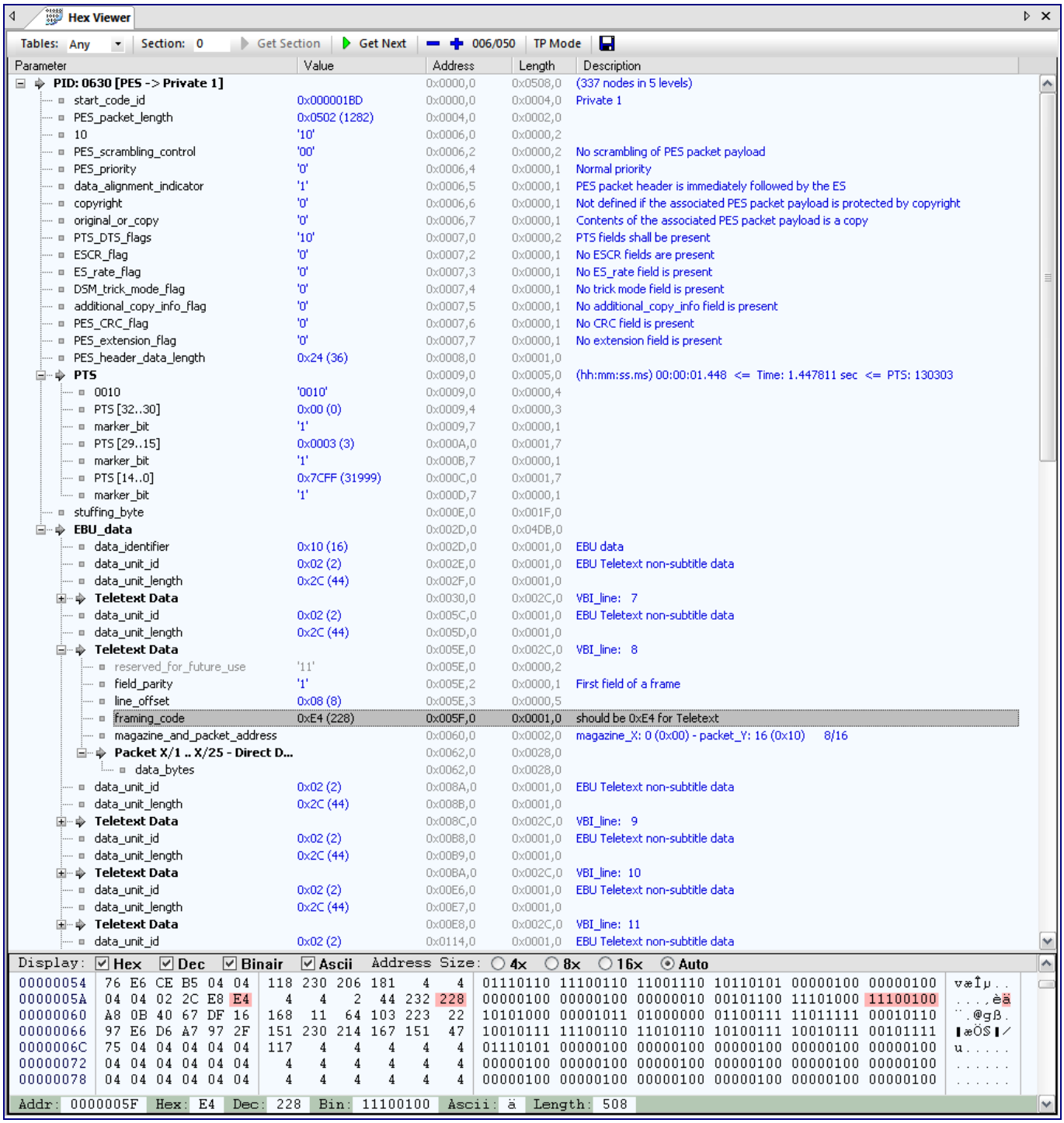
By clicking on a DVB-Subtitle PID in the PID window, the Hex Viewer directly shows the Interpretation plus hex dump of a Subtitle PES (Packetized Elementary Stream).

The Hex Viewer window is described in detail in the Hex Viewer Chapter.

27 Hex Viewer

In-depth payload extracting

The Hex Viewer enables the deepest kind of analyzing: Bits, Bytes and their interpretations.



A PID can be chosen via:

- Selecting a PID in the PID tree
- Selecting a service or a component of a service in the Services tree

The Hex Viewer exists in two parts:

- Parameter Tree View (upper part)
- Hex View (lower part)

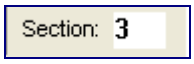
Parameter Tree View

The Tree View displays the interpretation of the viewed hex-dump. Every interpreted bit/byte is displayed in the tree.

A Bar on top gives extra control management possibilities.

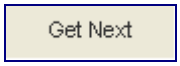
When multiple tables exist in one PID, a selection can be made via the Tables pull down button.

The selected section is highlighted

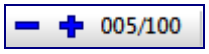


It's also possible to search a specific section. First enter the Section number and then click "Get Section"

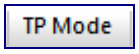
When multiple sections exist, the next section can be displayed by clicking on the "Get Next" button.



Get Next available data.



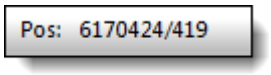
+ and – can be used to go to the next/previous buffer. In this example the 5th of 100.
Also short-keys <Shift>+<+> and <Shift>+<-> will go to the next/previous buffer.



The Buffer can be filled with TP-packets or payload (eq. Sections, PES, MIP)

In TP-Mode, using <Shift> '+' wil jump to the next Payload_unit_start TS packet.
Using <Shift> '-' will jump to the previous Payload_unit_start TS packet.

Hex buffer dumps can be saved as Binary, XML or Text files.



Shows the TS-Packet number and the delta TS-Packet number.

Every node in the Tree view is explained in different columns.

Column	Description
Parameter	Parameter (Usage) name
Value	Value of the Parameter
Address	Hexadecimal address of the Parameter
Length	Length of the Parameter
Description	Description of the Parameter

Hex View

The Hex View displays the hex-dump corresponding with the selected PES or Section which is selected in the Parameter Tree View.

A Bar on top gives extra information about the highlighted bit/byte:

It's possible to enable/disable the Hex Viewing of:

- Binary
- Hexadecimal
- ASCII

The amount of bytes per line can be chosen:

- 4
- 8
- 16
- Auto

The corresponding bytes/bits are automatically high-lighted in the Hex View when selecting a tree component in the Tree View.

27.1 PES and Section selection

The Hex Viewer can be filled with data by selecting:

- a PID in the PIDs window
- a Service in the Services window
- a Service component in the Services window
- a Table in the SI/PSI/PSIP window

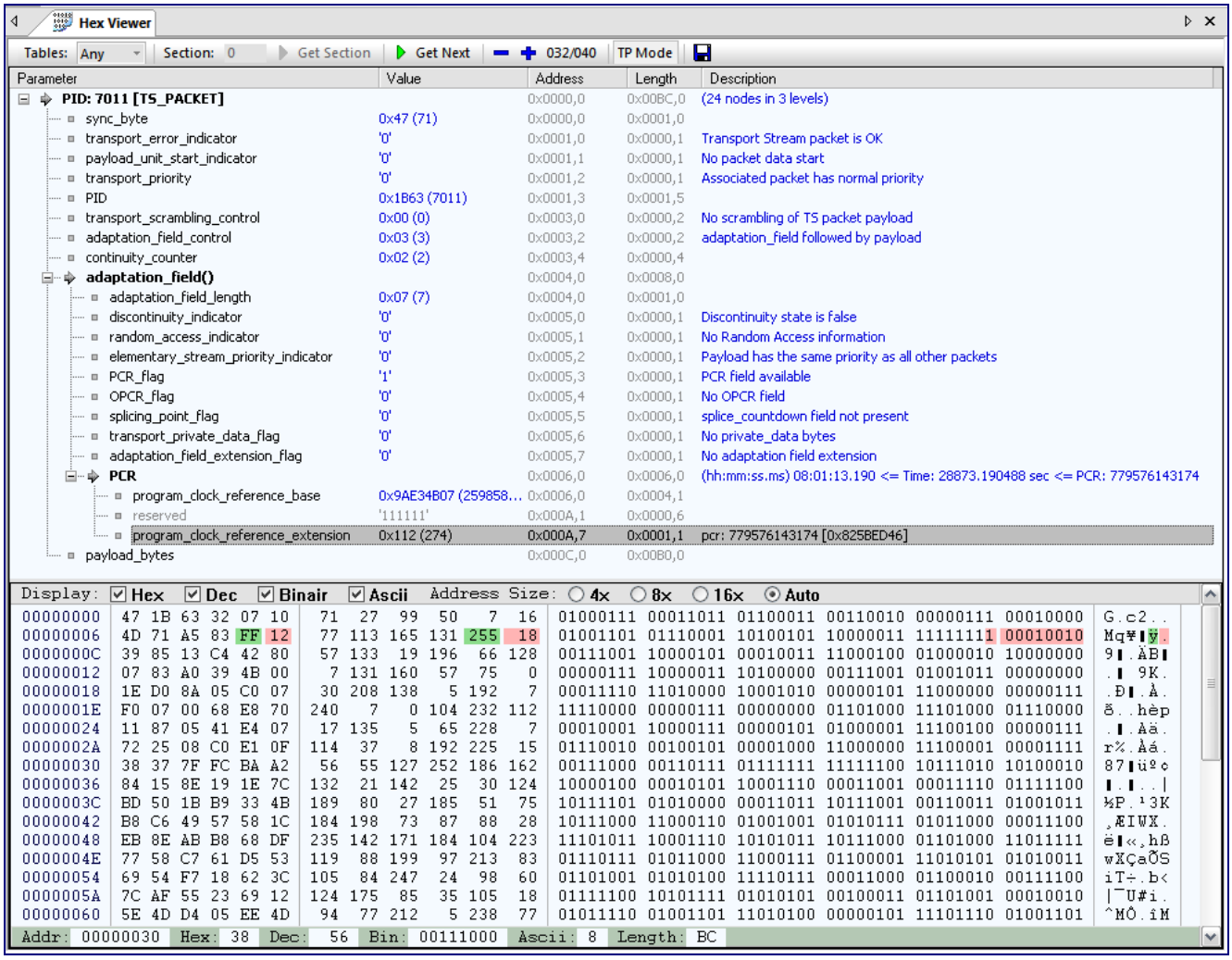
27.2 Export

The displayed hex-dump can also be saved from a special starting point, by clicking the right mouse button.

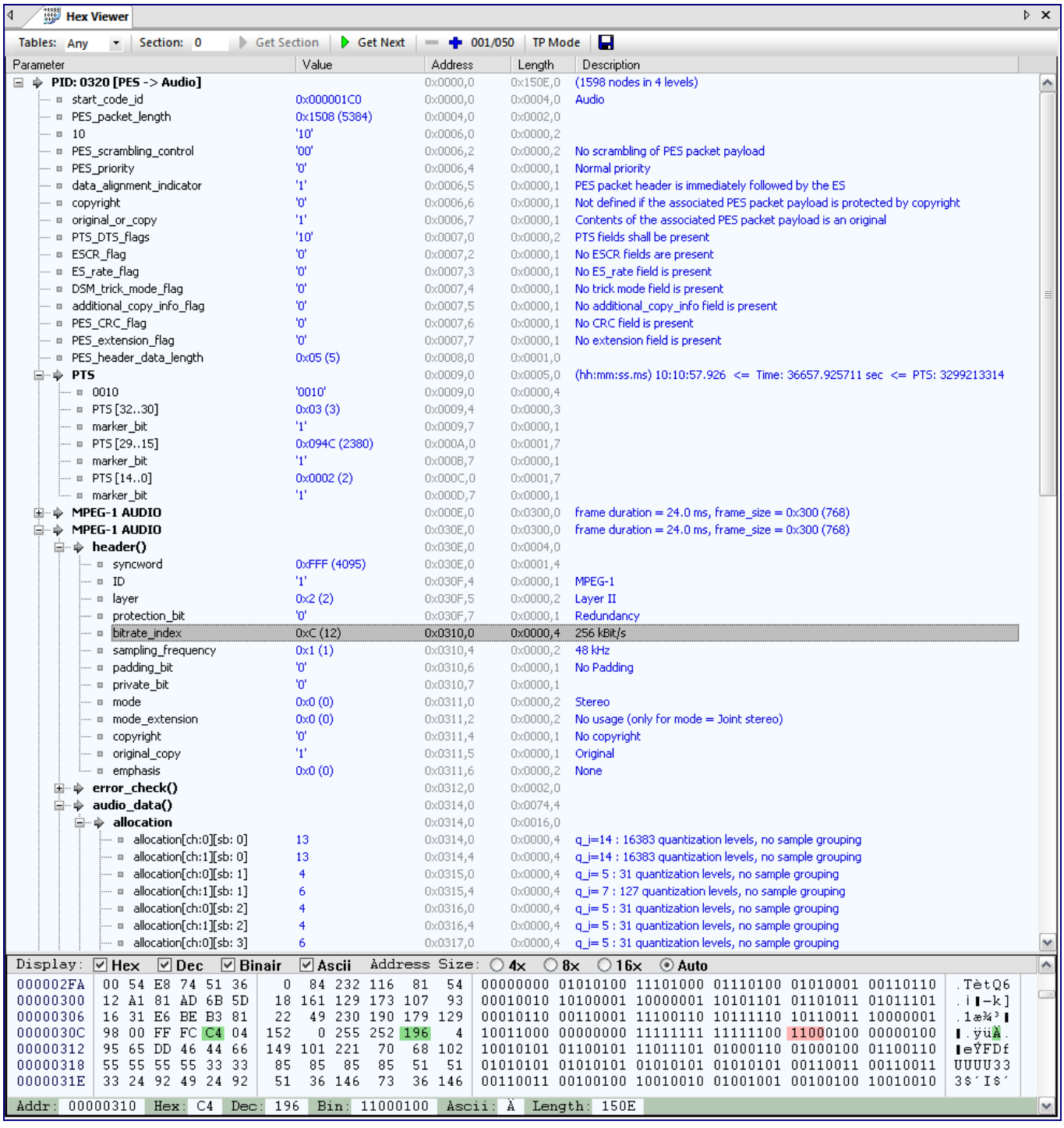
Copy of a selected hex-dump can easily be done by clicking the right mouse button.

27.3 Examples

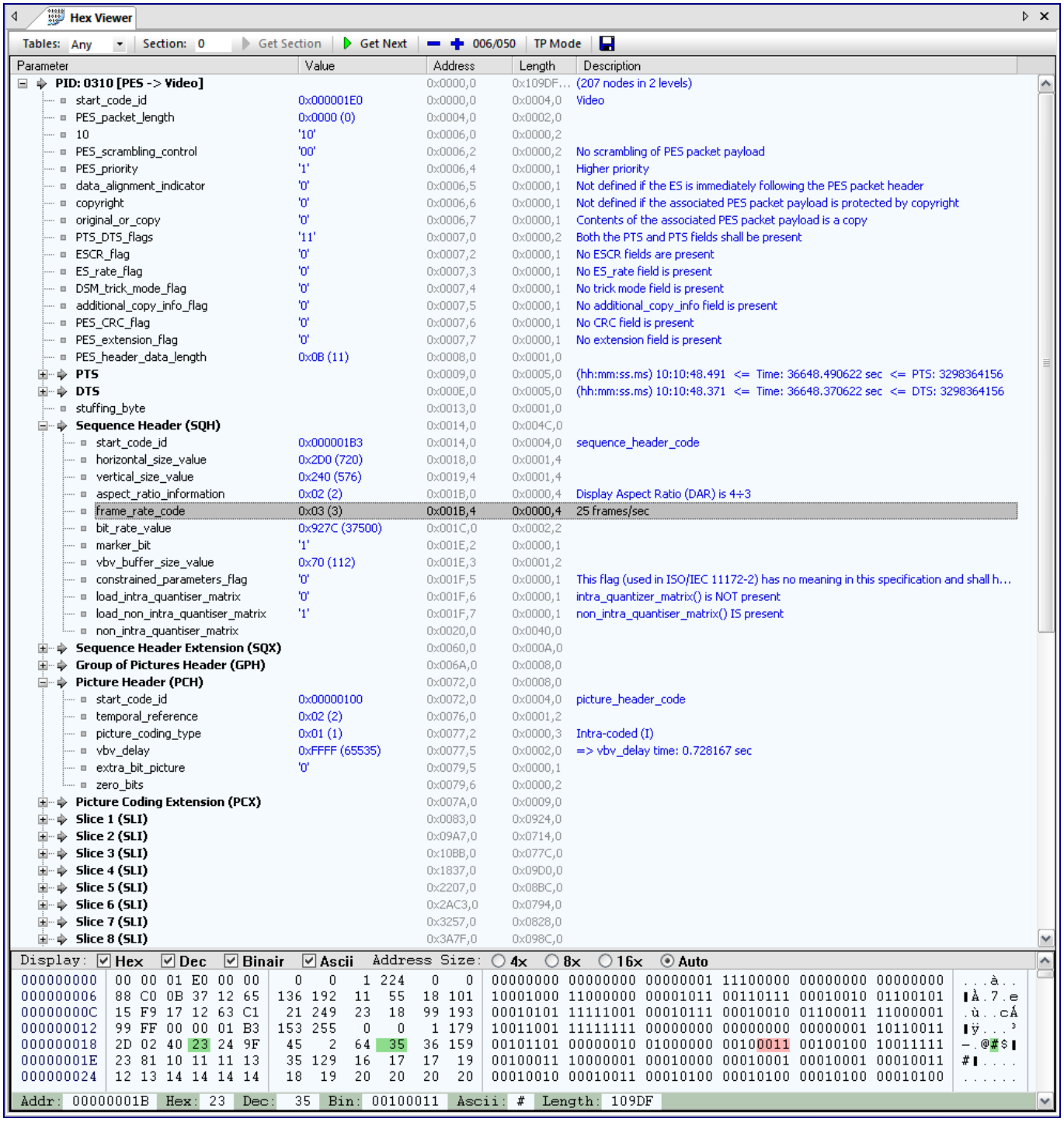
TS Packet



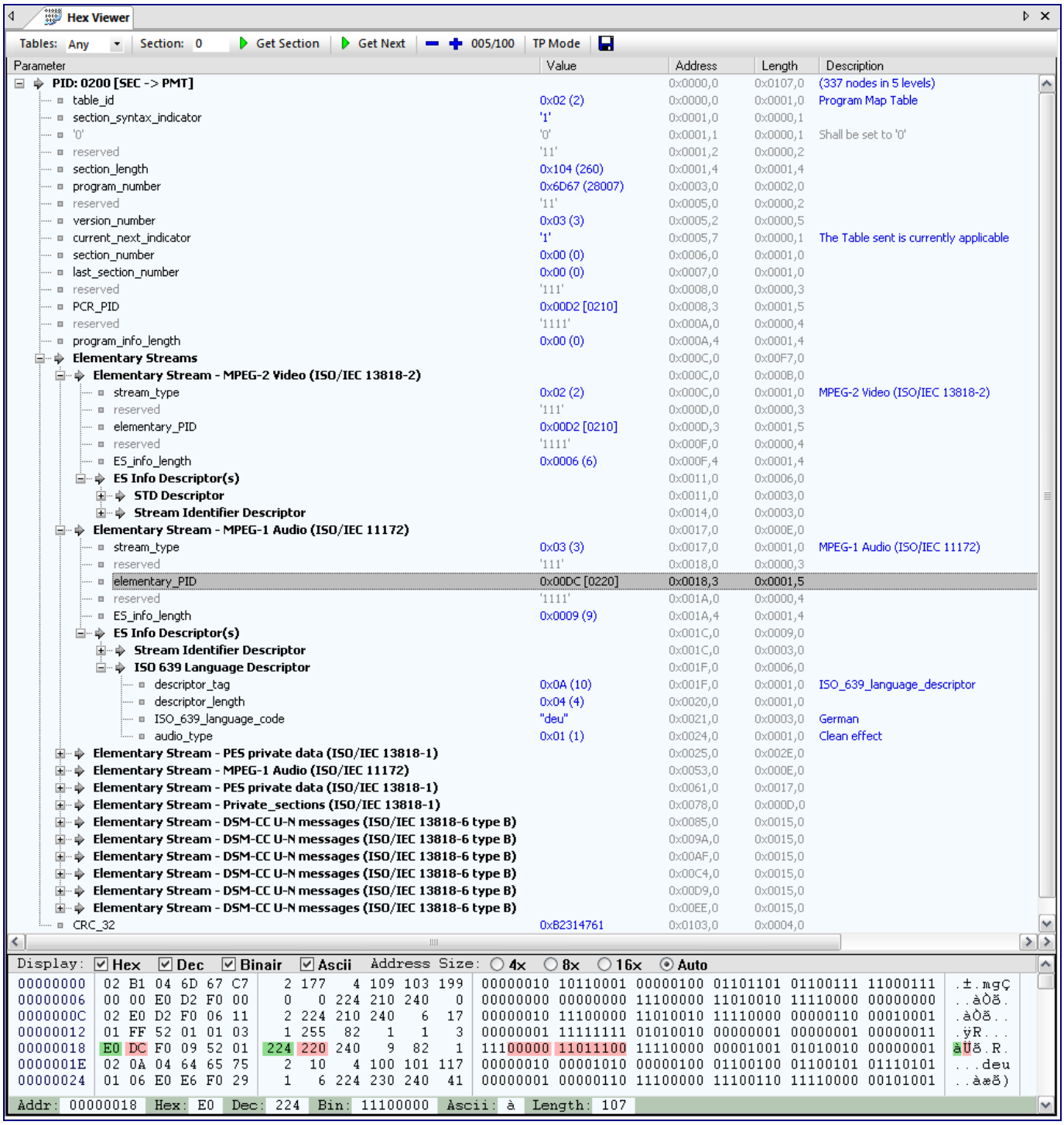
Audio PES


Hex Viewer
Tables: Any
Section: 0
Get Section
Get Next
001/050
TP Mode
Parameter
Value
Address
Length
Description
PID: 0320 [PES -> Audio]
0x0000,0
0x150E,0
(1598 nodes in 4 levels)
start_code_id
0x000001C0
0x0000,0
0x0004,0
Audio
PES_packet_length
0x1508 (5384)
0x0004,0
0x0002,0
10
'10'
0x0006,0
0x0000,2
PES_scrambling_control
'00'
0x0006,2
0x0000,2
No scrambling of PES packet payload
PES_priority
'0'
0x0006,4
0x0000,1
Normal priority
data_alignment_indicator
'1'
0x0006,5
0x0000,1
PES packet header is immediately followed by the ES
copyright
'0'
0x0006,6
0x0000,1
Not defined if the associated PES packet payload is protected by copyright
original_or_copy
'1'
0x0006,7
0x0000,1
Contents of the associated PES packet payload is an original
PTS_DTS_flags
'10'
0x0007,0
0x0000,2
PTS fields shall be present
ESCR_flag
'0'
0x0007,2
0x0000,1
No ESCR fields are present
ES_rate_flag
'0'
0x0007,3
0x0000,1
No ES_rate field is present
DSM_trick_mode_flag
'0'
0x0007,4
0x0000,1
No trick mode field is present
additional_copy_info_flag
'0'
0x0007,5
0x0000,1
No additional_copy_info field is present
PES_CRC_flag
'0'
0x0007,6
0x0000,1
No CRC field is present
PES_extension_flag
'0'
0x0007,7
0x0000,1
No extension field is present
PES_header_data_length
0x05 (5)
0x0008,0
0x0001,0
PTS
0x0009,0
0x0005,0
(hh:mm:ss.ms) 10:10:57.926 <= Time: 36657.925711 sec <= PTS: 3299213314
0010
'0010'
0x0009,0
0x0000,4
PTS [32..30]
0x03 (3)
0x0009,4
0x0000,3
marker_bit
'1'
0x0009,7
0x0000,1
PTS [29..15]
0x094C (2380)
0x000A,0
0x0001,7
marker_bit
'1'
0x000B,7
0x0000,1
PTS [14..0]
0x0002 (2)
0x000C,0
0x0001,7
marker_bit
'1'
0x000D,7
0x0000,1
MPEG-1 AUDIO
0x000E,0
0x0300,0
frame duration = 24.0 ms, frame_size = 0x300 (768)
MPEG-1 AUDIO
0x030E,0
0x0300,0
frame duration = 24.0 ms, frame_size = 0x300 (768)
header()
0x030E,0
0x0004,0
syncword
0xFFF (4095)
0x030E,0
0x0001,4
ID
'1'
0x030F,4
0x0000,1
MPEG-1
layer
0x2 (2)
0x030F,5
0x0000,2
Layer II
protection_bit
'0'
0x030F,7
0x0000,1
Redundancy
bitrate_index
0xC (12)
0x0310,0
0x0000,4
256 kBit/s
sampling_frequency
0x1 (1)
0x0310,4
0x0000,2
48 kHz
padding_bit
'0'
0x0310,6
0x0000,1
No Padding
private_bit
'0'
0x0310,7
0x0000,1
mode
0x0 (0)
0x0311,0
0x0000,2
Stereo
mode_extension
0x0 (0)
0x0311,2
0x0000,2
No usage (only for mode = Joint stereo)
copyright
'0'
0x0311,4
0x0000,1
No copyright
original_copy
'1'
0x0311,5
0x0000,1
Original
emphasis
0x0 (0)
0x0311,6
0x0000,2
None
error_check()
0x0312,0
0x0002,0
audio_data()
0x0314,0
0x0074,4
allocation
0x0314,0
0x0016,0
allocation[ch:0][sb: 0]
13
0x0314,0
0x0000,4
q_i=14 : 16383 quantization levels, no sample grouping
allocation[ch:1][sb: 0]
13
0x0314,4
0x0000,4
q_i=14 : 16383 quantization levels, no sample grouping
allocation[ch:0][sb: 1]
4
0x0315,0
0x0000,4
q_i= 5 : 31 quantization levels, no sample grouping
allocation[ch:1][sb: 1]
6
0x0315,4
0x0000,4
q_i= 7 : 127 quantization levels, no sample grouping
allocation[ch:0][sb: 2]
4
0x0316,0
0x0000,4
q_i= 5 : 31 quantization levels, no sample grouping
allocation[ch:1][sb: 2]
4
0x0316,4
0x0000,4
q_i= 5 : 31 quantization levels, no sample grouping
allocation[ch:0][sb: 3]
6
0x0317,0
0x0000,4
q_i= 5 : 31 quantization levels, no sample grouping
Display: Hex Dec Binair Ascii
Address Size: 4x 8x 16x Auto
000002FA 00 54 E8 74 51 36 0 84 232 116 81 54 00000000 01010100 11101000 01110100 01010001 00110110 .TètQ6
00000300 12 A1 81 AD 6B 5D 18 161 129 173 107 93 00010010 10100001 10000001 10101101 01101011 01011101 .i-k]
00000306 16 31 E6 BE B3 81 22 49 230 190 179 129 00010110 00110001 11100110 10111110 10110011 10000001 .1æ¾³
0000030C 98 00 FF FC C4 04 152 0 255 252 196 4 10011000 00000000 11111111 11111100 11000100 00000100 .ÿüÄ.
00000312 95 65 DD 46 44 66 149 101 221 70 68 102 10010101 01100101 11011101 01000110 01000100 01100110 eÝFDf
00000318 55 55 55 55 33 33 85 85 85 85 51 51 01010101 01010101 01010101 01010101 00110011 00110011 UUUU33
0000031E 33 24 92 49 24 92 51 36 146 73 36 146 00110011 00100100 10010010 01001001 00100100 10010010 3$'I$'
Addr: 00000310 Hex: C4 Dec: 196 Bin: 11000100 Ascii: Ä Length: 150E

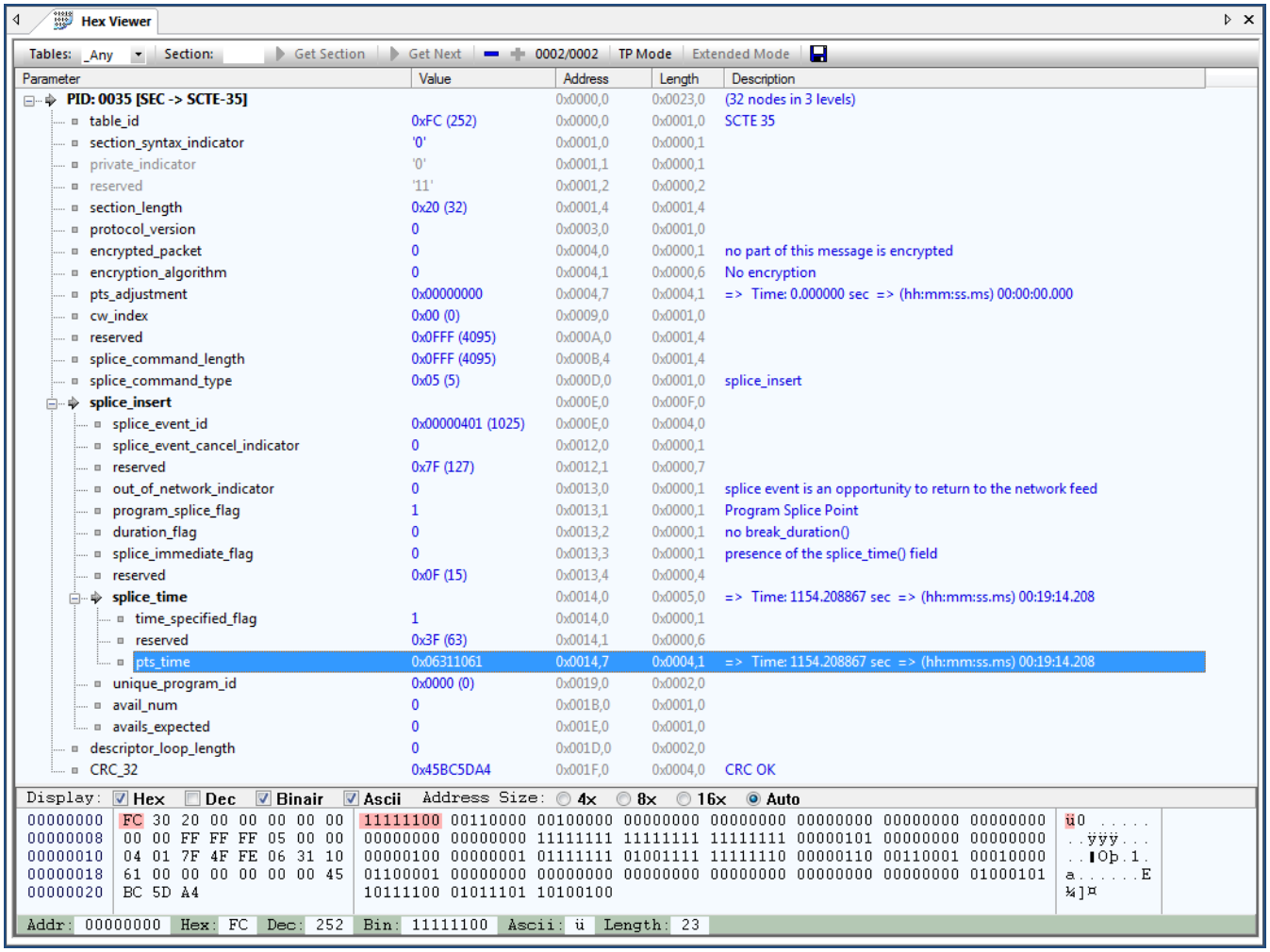
Video PES


Hex Viewer
Tables: Any
Section: 0
Get Section
Get Next
006/050
TP Mode
Parameter
Value
Address
Length
Description
PID: 0310 [PES -> Video]
start_code_id
PES_packet_length
10
PES_scrambling_control
PES_priority
data_alignment_indicator
copyright
original_or_copy
PTS_DTS_flags
ESCR_flag
ES_rate_flag
DSM_trick_mode_flag
additional_copy_info_flag
PES_CRC_flag
PES_extension_flag
PES_header_data_length
PTS
DTS
stuffing_byte
Sequence Header (SQH)
start_code_id
horizontal_size_value
vertical_size_value
aspect_ratio_information
frame_rate_code
bit_rate_value
marker_bit
vbv_buffer_size_value
constrained_parameters_flag
load_intra_quantiser_matrix
load_non_intra_quantiser_matrix
non_intra_quantiser_matrix
Sequence Header Extension (SQX)
Group of Pictures Header (GPH)
Picture Header (PCH)
start_code_id
temporal_reference
picture_coding_type
vbv_delay
extra_bit_picture
zero_bits
Picture Coding Extension (PCX)
Slice 1 (SLI)
Slice 2 (SLI)
Slice 3 (SLI)
Slice 4 (SLI)
Slice 5 (SLI)
Slice 6 (SLI)
Slice 7 (SLI)
Slice 8 (SLI)
Display: Hex Dec Binair Ascii Address Size: 4x 8x 16x Auto
Addr: 00000001B Hex: 23 Dec: 35 Bin: 00100011 Ascii: # Length: 109DF

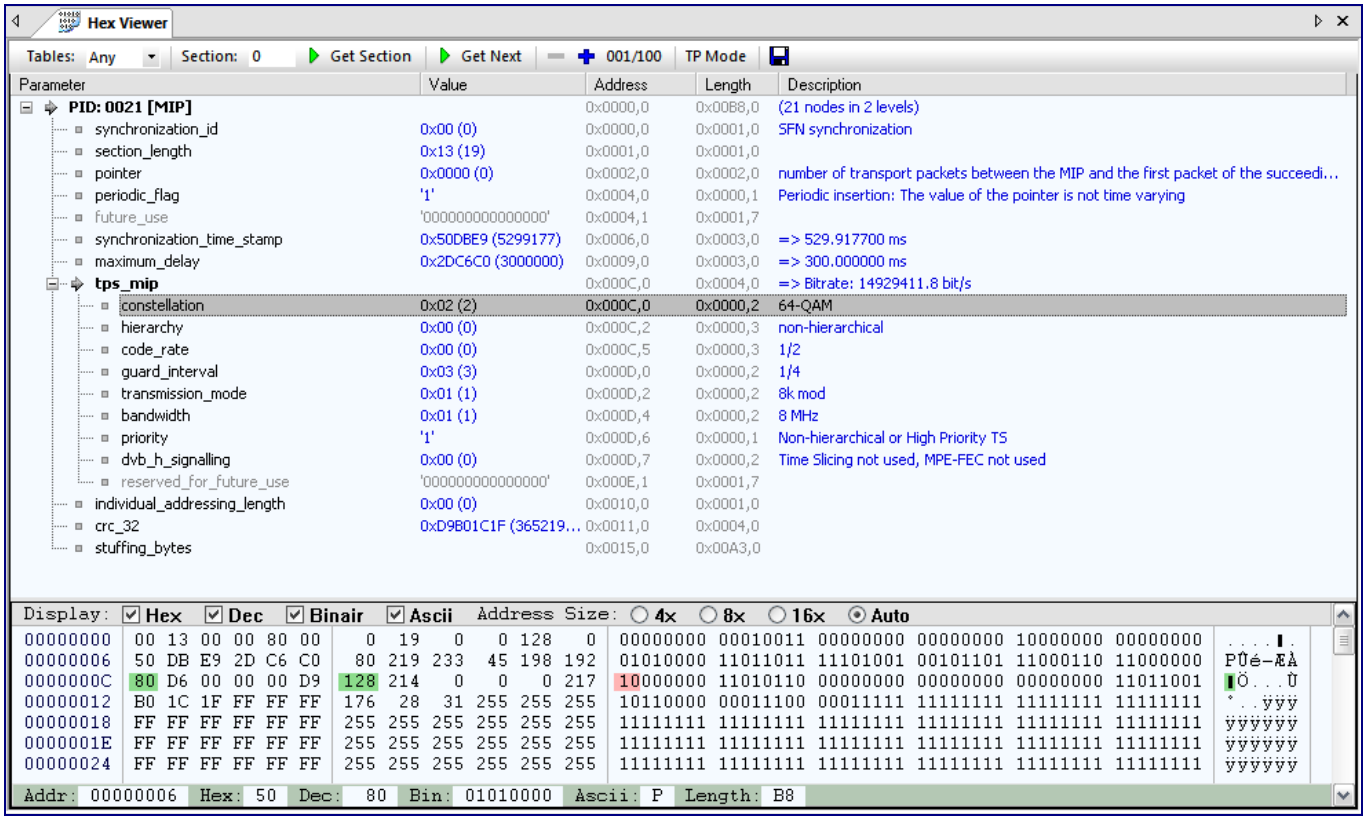
Sections


Hex Viewer
Tables: Any
Section: 0
Get Section
Get Next
005/100
TP Mode
Parameter
Value
Address
Length
Description
PID: 0200 [SEC -> PMT]
table_id
section_syntax_indicator
'0'
reserved
section_length
program_number
reserved
version_number
current_next_indicator
section_number
last_section_number
reserved
PCR_PID
reserved
program_info_length
Elementary Streams
Elementary Stream - MPEG-2 Video (ISO/IEC 13818-2)
stream_type
reserved
elementary_PID
reserved
ES_info_length
ES Info Descriptor(s)
STD Descriptor
Stream Identifier Descriptor
Elementary Stream - MPEG-1 Audio (ISO/IEC 11172)
stream_type
reserved
elementary_PID
reserved
ES_info_length
ES Info Descriptor(s)
Stream Identifier Descriptor
ISO 639 Language Descriptor
descriptor_tag
descriptor_length
ISO_639_language_code
audio_type
Elementary Stream - PES private data (ISO/IEC 13818-1)
Elementary Stream - MPEG-1 Audio (ISO/IEC 11172)
Elementary Stream - PES private data (ISO/IEC 13818-1)
Elementary Stream - Private_sections (ISO/IEC 13818-1)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
Elementary Stream - DSM-CC U-N messages (ISO/IEC 13818-6 type B)
CRC_32
Display: Hex Dec Binair Ascii
Address Size: 4x 8x 16x Auto
Addr: 00000018 Hex: E0 Dec: 224 Bin: 11100000 Ascii: à Length: 107

SCTE-35 (ad-insertion)

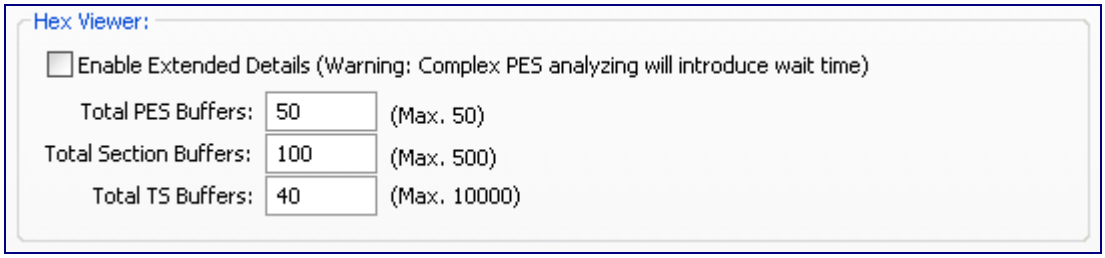


MIP (used in Single Frequency Networks. DVB-T)



27.4 Properties

- Maximum buffer sizes can be selected.



Option ‘OD’

- Burst Viewer
- DSMCC Viewer
- IP Traffic Viewer
- VBI-Cue Viewer
- SCTE-35 Viewer
- UDP Multicast/Unicast Output

28 Burst Viewer

PID repetition appearance analyzing

Burst Viewer gives the appearance of a PID during a defined time interval.

A PID can be chosen via:

- Selecting a PID in the PID tree
- Selecting a service or a component of a service in the Services tree

The visualization can be displayed in two different graph types:

- Repetition
- Histogram

Besides using the pull-down to select between Bar, Time or Pie representation, also the short-keys “1” (Repetition) and “2” (Histogram) will do the graph selection.

When multiple tables are available on the selected PID, the appropriate table can be selected via a pull-down menu.

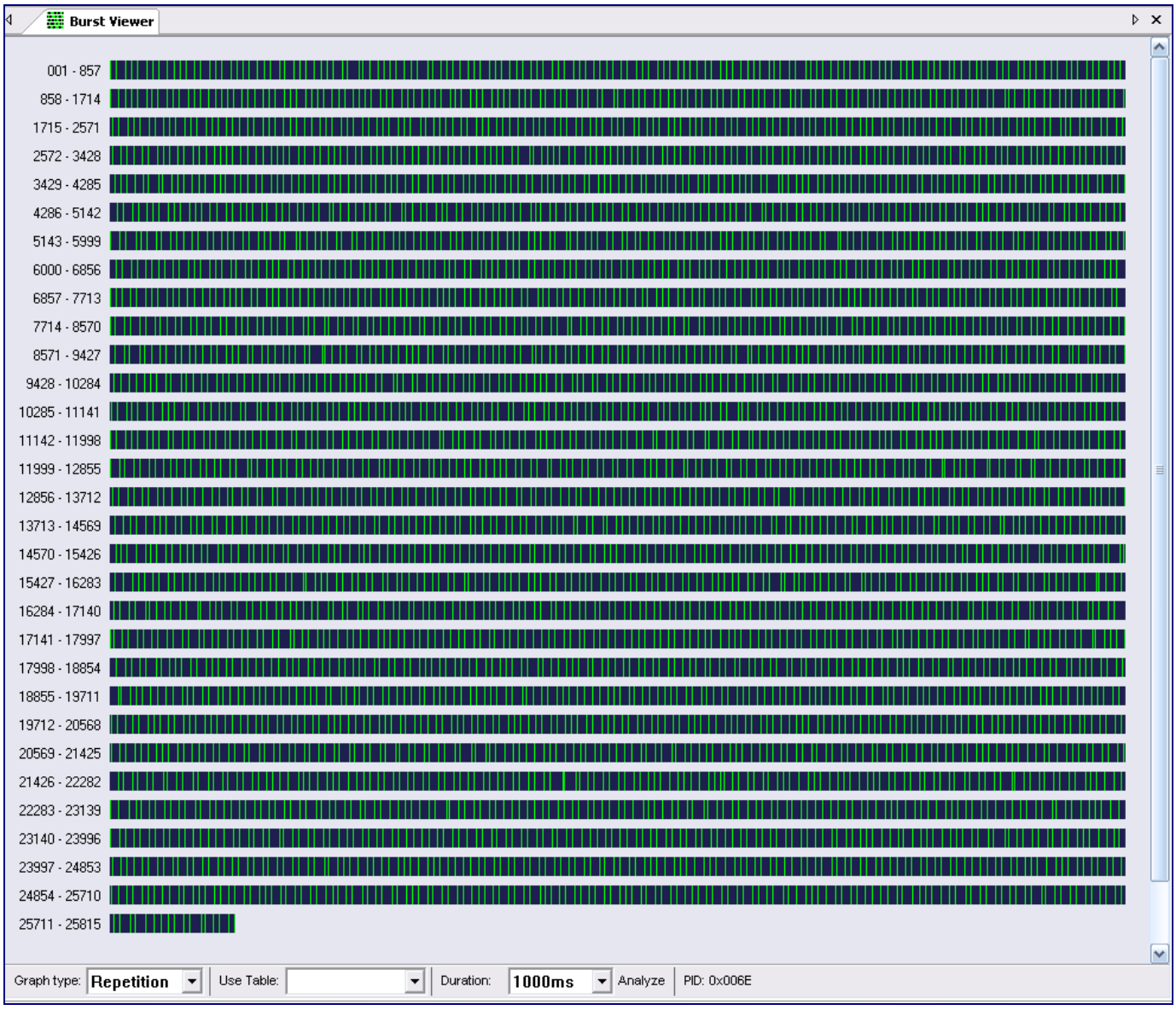
The time duration of the interval can be selected out of:

- 500ms
- 1000ms
- 2000ms
- 5000ms
- 10000ms

Analyzing is started by clicking on the Analyze Button.

28.1 Repetition graph

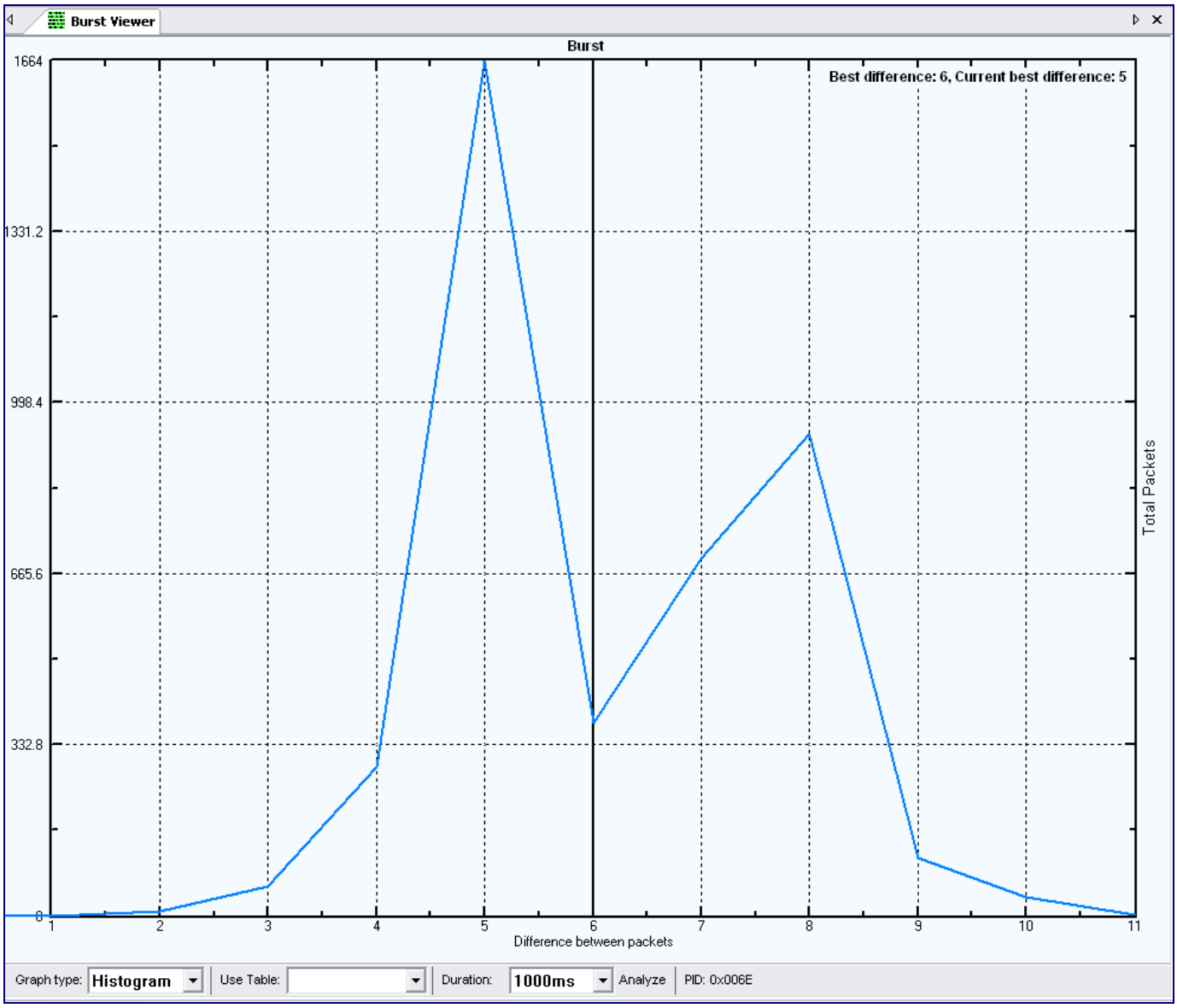
After the analyzing is done, a grid is displayed where the appearance of the selected PID is plotted during the total amount of PID packets in the analyzing duration time.



Using the '+' en '-' button on the Numeric pad of your keyboard, enable zoom in and out.

28.2 Histogram graph

After the analyzing is done, the histogram is plotted of the appearance of the selected PID during the total amount of PID packets in the analyzing duration time.

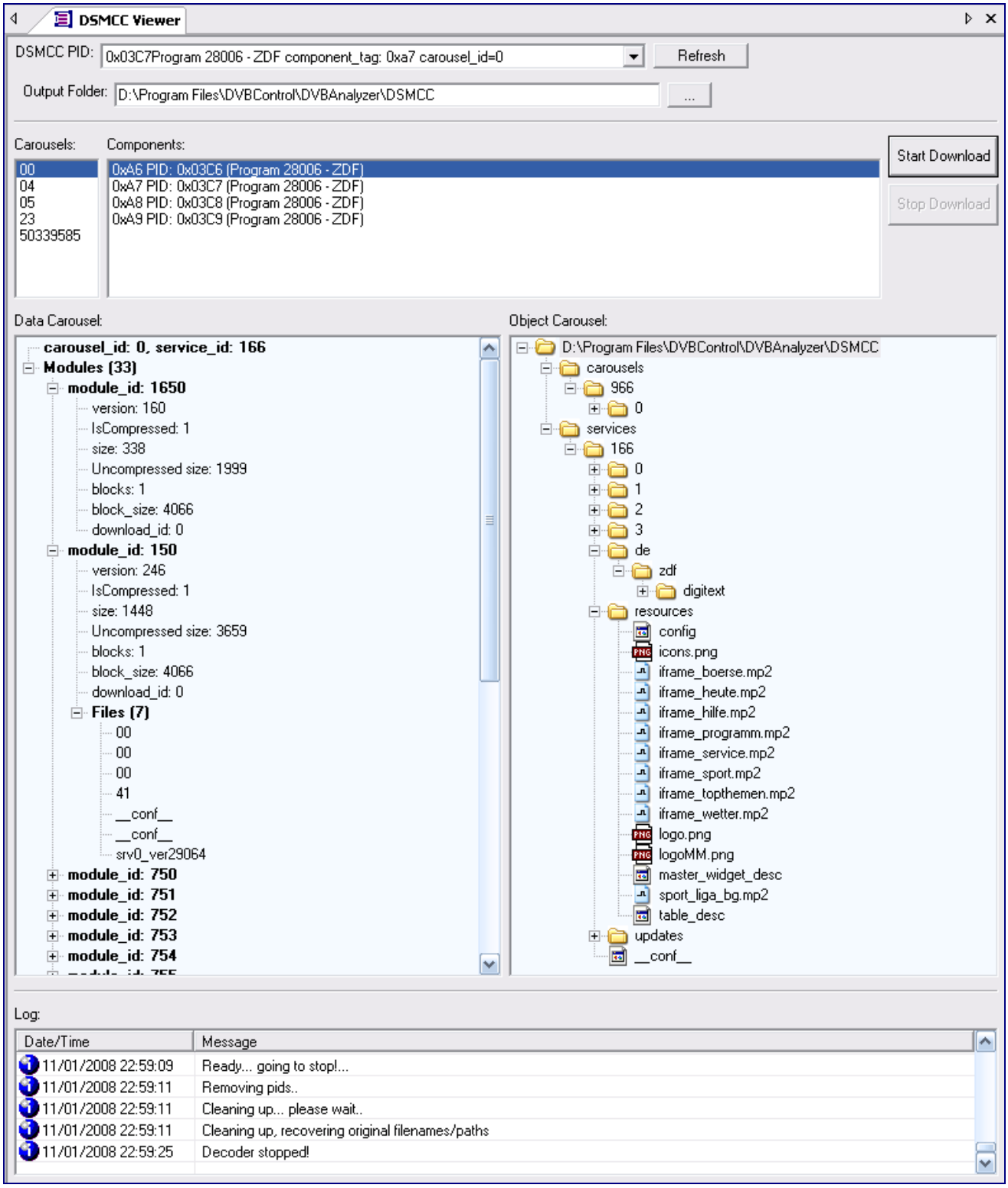


28.3 Related Windows

- PIDs
- Services

29 DSMCC Viewer

Object Carousel analyzing



DSM-CC (Digital Storage Media Command and Control) is used for Data and Object Carousel Broadcasting within Transport Streams. DSMCC Viewer enables analysis of the content and structures of the broadcasted carousels.

Different columns show information in the log:

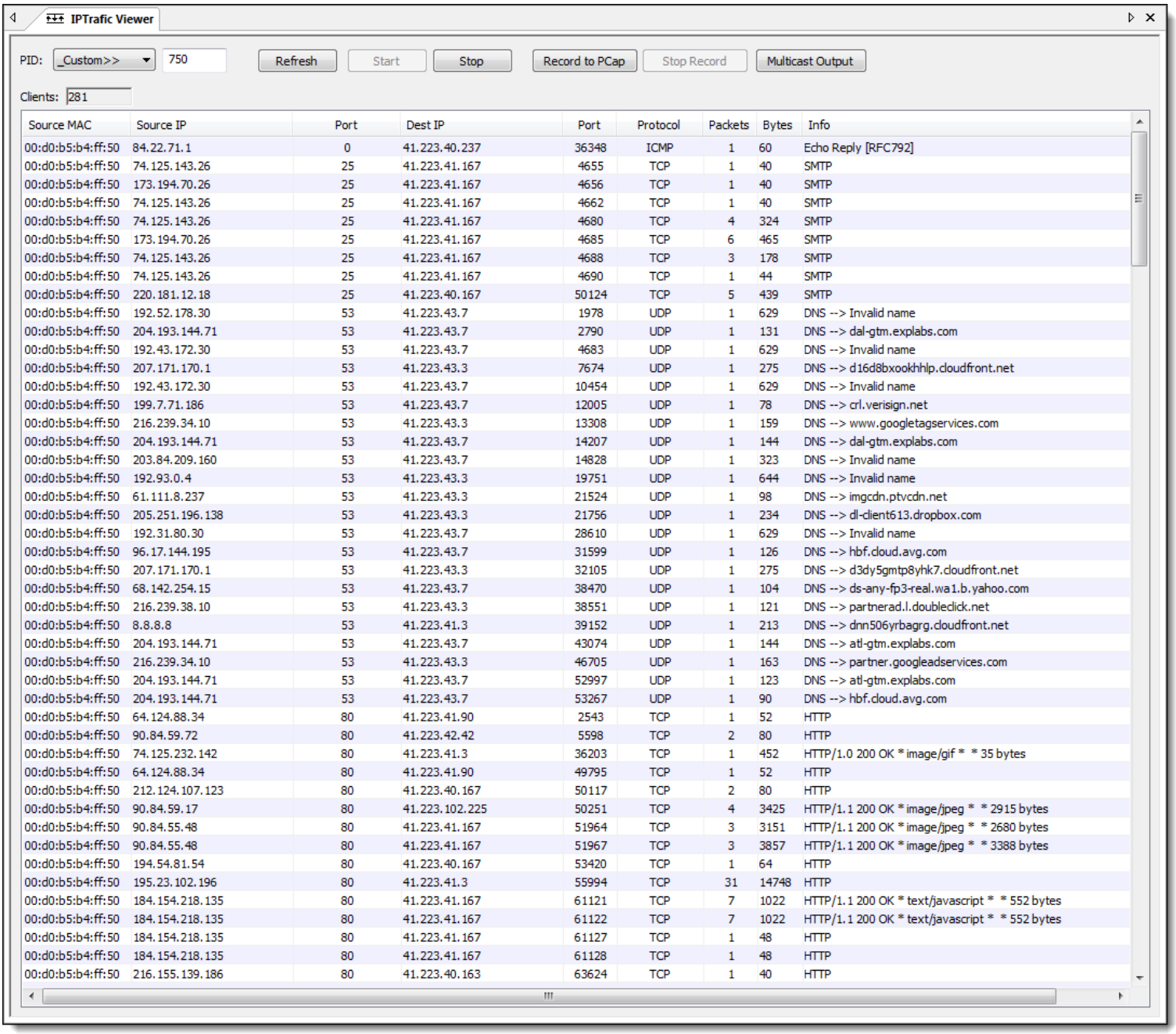
Filter	Description
Date/Time	The Date and Time the log message was generated
Message	The Message text

DSM-CC Viewer can be opened more than once!

30 IP Traffic Viewer

IP Traffic analyzing

Broadcasted IP Traffic (over DVB) can be viewed and downloaded.



Source MAC	Source IP	Port	Dest IP	Port	Protocol	Packets	Bytes	Info
00:d0:b5:b4:ff:50	84.22.71.1	0	41.223.40.237	36348	ICMP	1	60	Echo Reply [RFC792]
00:d0:b5:b4:ff:50	74.125.143.26	25	41.223.41.167	4655	TCP	1	40	SMTP
00:d0:b5:b4:ff:50	173.194.70.26	25	41.223.41.167	4656	TCP	1	40	SMTP
00:d0:b5:b4:ff:50	74.125.143.26	25	41.223.41.167	4662	TCP	1	40	SMTP
00:d0:b5:b4:ff:50	74.125.143.26	25	41.223.41.167	4680	TCP	4	324	SMTP
00:d0:b5:b4:ff:50	173.194.70.26	25	41.223.41.167	4685	TCP	6	465	SMTP
00:d0:b5:b4:ff:50	74.125.143.26	25	41.223.41.167	4688	TCP	3	178	SMTP
00:d0:b5:b4:ff:50	74.125.143.26	25	41.223.41.167	4690	TCP	1	44	SMTP
00:d0:b5:b4:ff:50	220.181.12.18	25	41.223.40.167	50124	TCP	5	439	SMTP
00:d0:b5:b4:ff:50	192.52.178.30	53	41.223.43.7	1978	UDP	1	629	DNS --> Invalid name
00:d0:b5:b4:ff:50	204.193.144.71	53	41.223.43.7	2790	UDP	1	131	DNS --> dal-gtm.explabs.com
00:d0:b5:b4:ff:50	192.43.172.30	53	41.223.43.7	4683	UDP	1	629	DNS --> Invalid name
00:d0:b5:b4:ff:50	207.171.170.1	53	41.223.43.3	7674	UDP	1	275	DNS --> d16d8bxookhhlp.cloudfront.net
00:d0:b5:b4:ff:50	192.43.172.30	53	41.223.43.7	10454	UDP	1	629	DNS --> Invalid name
00:d0:b5:b4:ff:50	199.7.71.186	53	41.223.43.7	12005	UDP	1	78	DNS --> crl.verisign.net
00:d0:b5:b4:ff:50	216.239.34.10	53	41.223.43.3	13308	UDP	1	159	DNS --> www.googletagservices.com
00:d0:b5:b4:ff:50	204.193.144.71	53	41.223.43.7	14207	UDP	1	144	DNS --> dal-gtm.explabs.com
00:d0:b5:b4:ff:50	203.84.209.160	53	41.223.43.7	14828	UDP	1	323	DNS --> Invalid name
00:d0:b5:b4:ff:50	192.93.0.4	53	41.223.43.3	19751	UDP	1	644	DNS --> Invalid name
00:d0:b5:b4:ff:50	61.111.8.237	53	41.223.43.3	21524	UDP	1	98	DNS --> imgcdn.ptvcdn.net
00:d0:b5:b4:ff:50	205.251.196.138	53	41.223.43.3	21756	UDP	1	234	DNS --> dl-client613.dropbox.com
00:d0:b5:b4:ff:50	192.31.80.30	53	41.223.43.7	28610	UDP	1	629	DNS --> Invalid name
00:d0:b5:b4:ff:50	96.17.144.195	53	41.223.43.7	31599	UDP	1	126	DNS --> hbf.cloud.avg.com
00:d0:b5:b4:ff:50	207.171.170.1	53	41.223.43.3	32105	UDP	1	275	DNS --> d3dy5gmtp8yhk7.cloudfront.net
00:d0:b5:b4:ff:50	68.142.254.15	53	41.223.43.7	38470	UDP	1	104	DNS --> ds-any-fp3-real.wa1.b.yahoo.com
00:d0:b5:b4:ff:50	216.239.38.10	53	41.223.43.3	38551	UDP	1	121	DNS --> partnerad.l.doubleclick.net
00:d0:b5:b4:ff:50	8.8.8.8	53	41.223.41.3	39152	UDP	1	213	DNS --> dnn506yrbagrg.cloudfront.net
00:d0:b5:b4:ff:50	204.193.144.71	53	41.223.43.7	43074	UDP	1	144	DNS --> atl-gtm.explabs.com
00:d0:b5:b4:ff:50	216.239.34.10	53	41.223.43.3	46705	UDP	1	163	DNS --> partner.googleadservices.com
00:d0:b5:b4:ff:50	204.193.144.71	53	41.223.43.7	52997	UDP	1	123	DNS --> atl-gtm.explabs.com
00:d0:b5:b4:ff:50	204.193.144.71	53	41.223.43.7	53267	UDP	1	90	DNS --> hbf.cloud.avg.com
00:d0:b5:b4:ff:50	64.124.88.34	80	41.223.41.90	2543	TCP	1	52	HTTP
00:d0:b5:b4:ff:50	90.84.59.72	80	41.223.42.42	5598	TCP	2	80	HTTP
00:d0:b5:b4:ff:50	74.125.232.142	80	41.223.41.3	36203	TCP	1	452	HTTP/1.0 200 OK * image/gif * * 35 bytes
00:d0:b5:b4:ff:50	64.124.88.34	80	41.223.41.90	49795	TCP	1	52	HTTP
00:d0:b5:b4:ff:50	212.124.107.123	80	41.223.40.167	50117	TCP	2	80	HTTP
00:d0:b5:b4:ff:50	90.84.59.17	80	41.223.102.225	50251	TCP	4	3425	HTTP/1.1 200 OK * image/jpeg * * 2915 bytes
00:d0:b5:b4:ff:50	90.84.55.48	80	41.223.41.167	51964	TCP	3	3151	HTTP/1.1 200 OK * image/jpeg * * 2680 bytes
00:d0:b5:b4:ff:50	90.84.55.48	80	41.223.41.167	51967	TCP	3	3857	HTTP/1.1 200 OK * image/jpeg * * 3388 bytes
00:d0:b5:b4:ff:50	194.54.81.54	80	41.223.40.167	53420	TCP	1	64	HTTP
00:d0:b5:b4:ff:50	195.23.102.196	80	41.223.41.3	55994	TCP	31	14748	HTTP
00:d0:b5:b4:ff:50	184.154.218.135	80	41.223.41.167	61121	TCP	7	1022	HTTP/1.1 200 OK * text/javascript * * 552 bytes
00:d0:b5:b4:ff:50	184.154.218.135	80	41.223.41.167	61122	TCP	7	1022	HTTP/1.1 200 OK * text/javascript * * 552 bytes
00:d0:b5:b4:ff:50	184.154.218.135	80	41.223.41.167	61127	TCP	1	48	HTTP
00:d0:b5:b4:ff:50	184.154.218.135	80	41.223.41.167	61128	TCP	1	48	HTTP
00:d0:b5:b4:ff:50	216.155.139.186	80	41.223.40.163	63624	TCP	1	40	HTTP

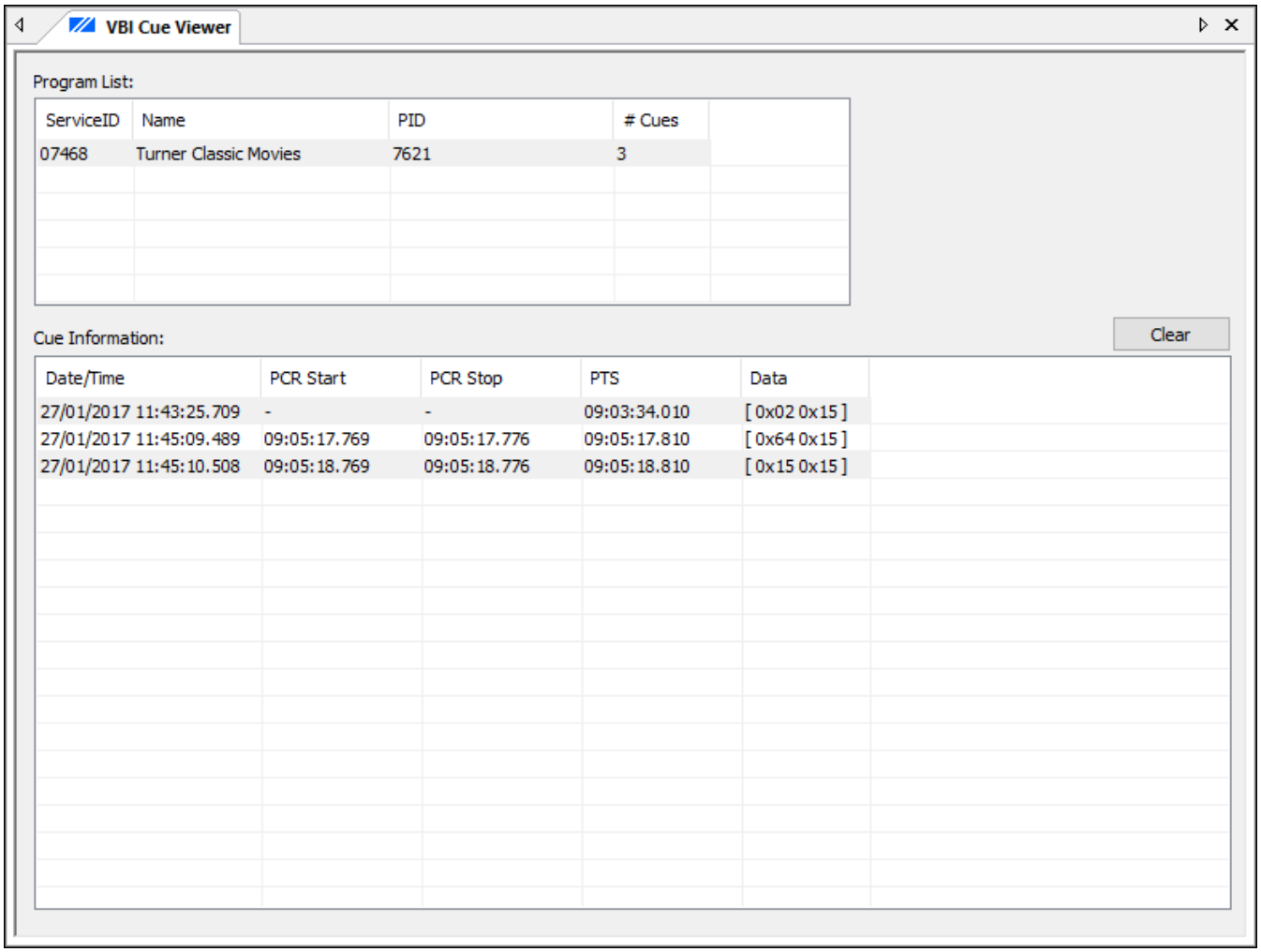
Downloads in PCap format can be used for deep analyzing in specialized network protocol analyzers, like Wireshark.

IP Traffic Viewer can be opened more than once!

31 VBI-Cue Viewer

VBI-Cue analyzing

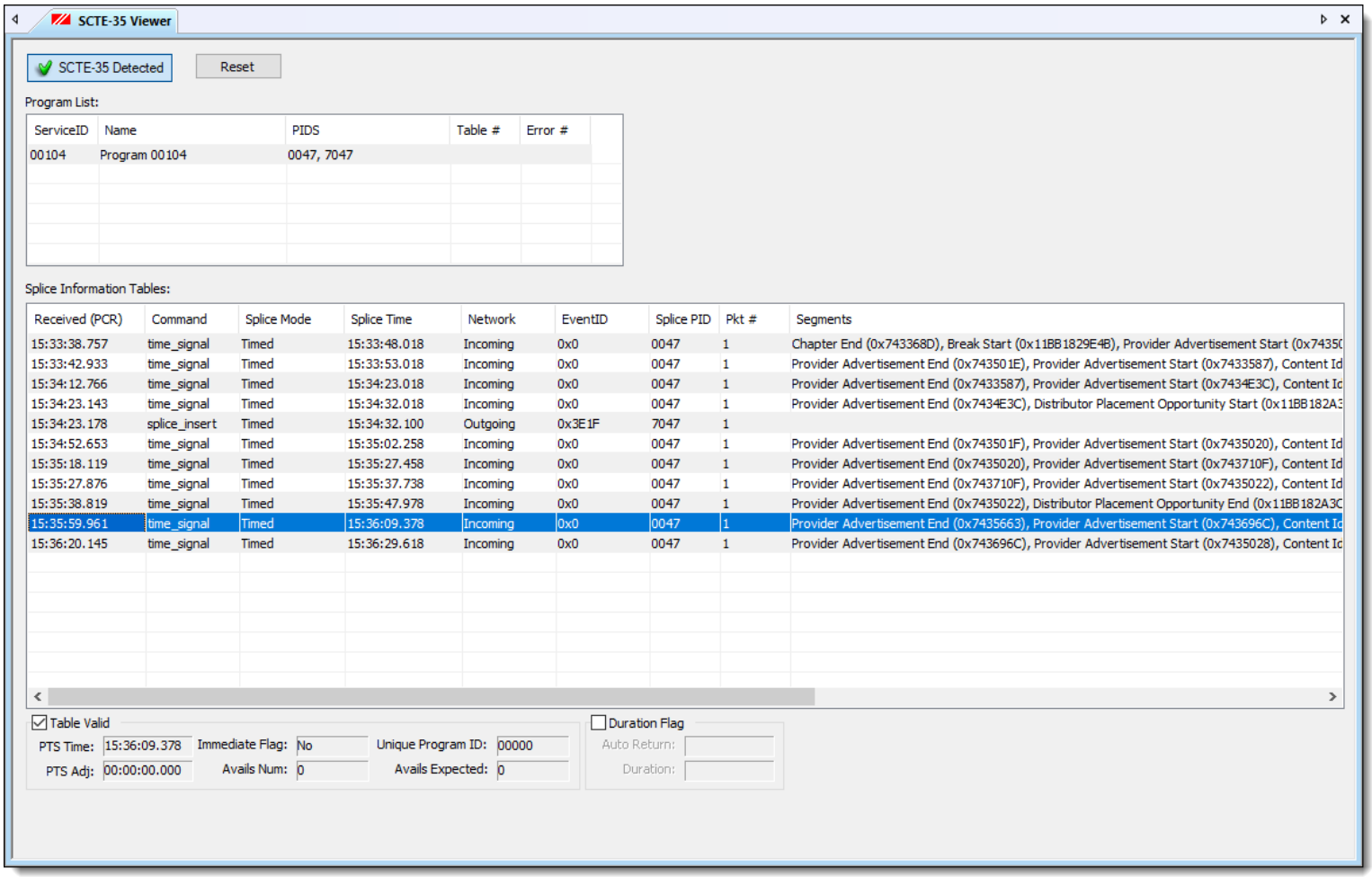
Shows all VBI-Cue details.



32 SCTE-35 Viewer

Ad-insertion analyzing

Overview of all broadcasted SCTE-35 events.

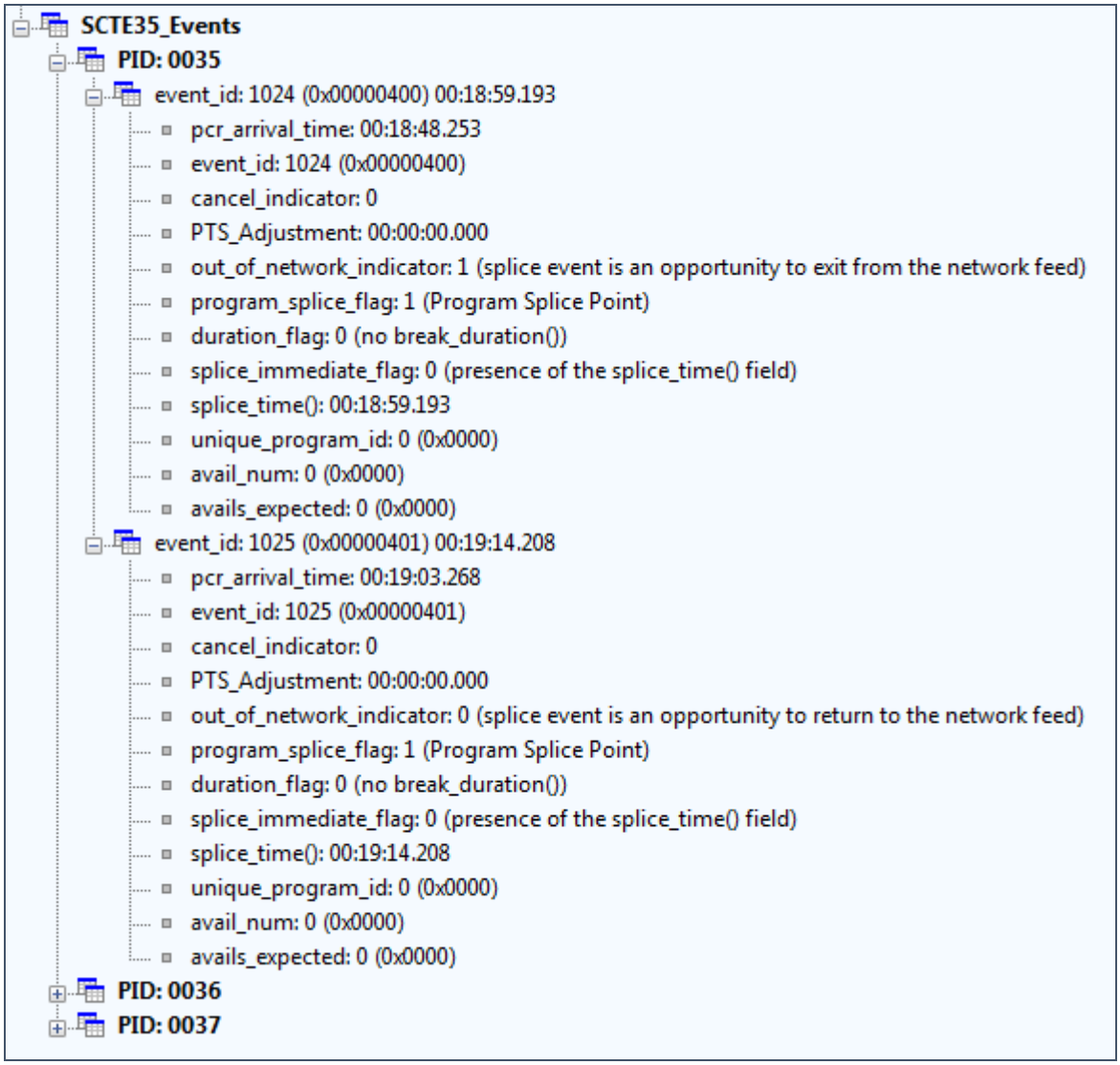


With the Reset button all cached events are cleared

32.1 Related Windows

- SI/PSI Bar
- Hex Viewer

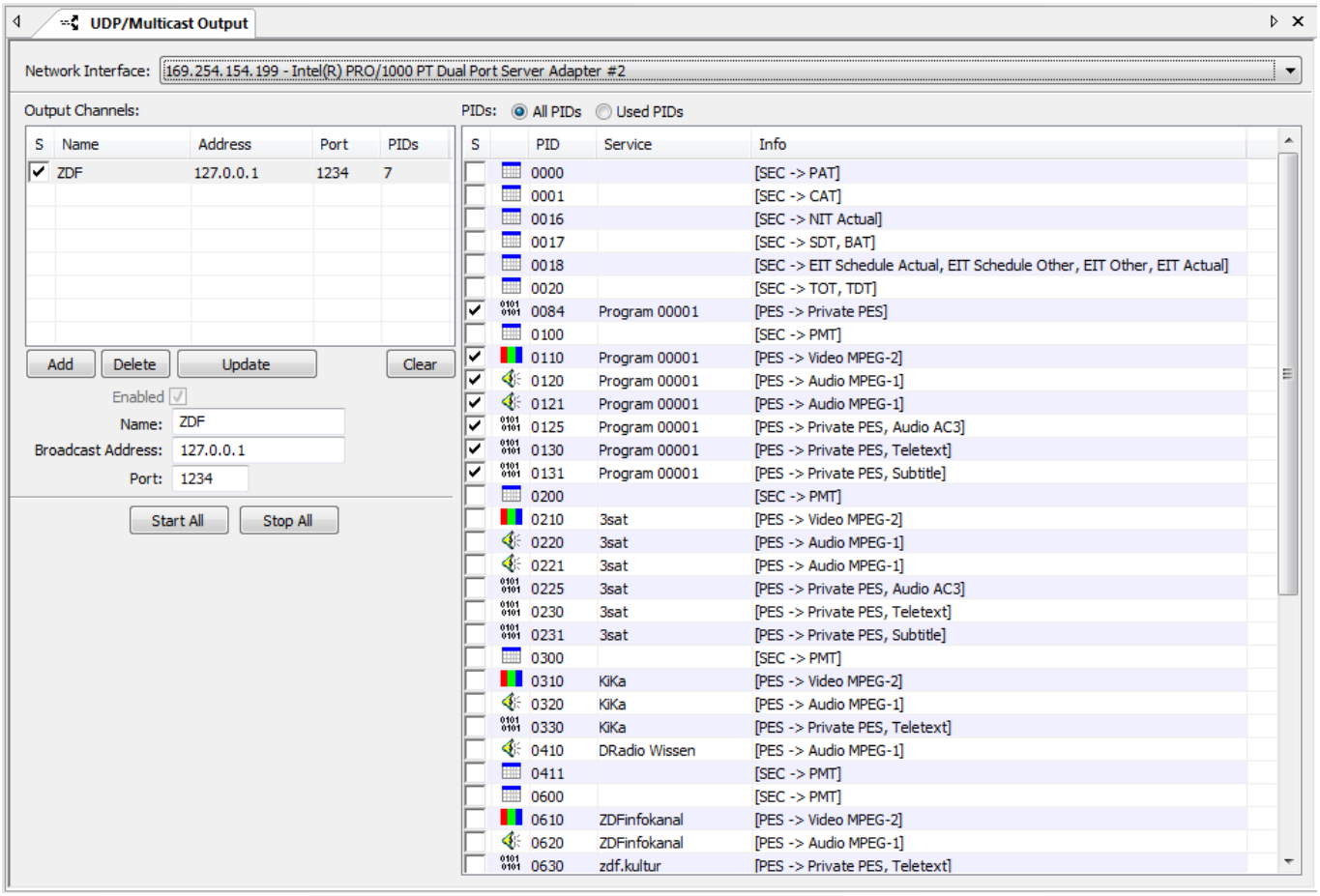
All SCTE-35 events are also listed in the SI/PSI bar tree.



33 UDP Multicast/Unicast Output

IP Output streaming

Besides analyzing Transport Streams in DVBAnalyzer, it is also possible to re-transmit a multiple Services via UDP Multicast/Unicast. This way a service can remotely be viewed.



Via a pull-down selection the desired Network Interface can be chosen.

Output Channels

S	Name	Address	Port	PIDs	MTU

S
Enable the multicast of this Service.

Name
Service name.

(Multicast/Unicast) Address
UDP Multicast/Unicast IP number.

(Multicast/Unicast) Port
UDP Multicast port number

The Output Channels list can be altered using different buttons:

Add
Add a new service to the multicast output list.

Delete
Delete selected service.

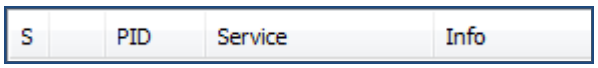
Update
Update selected service settings.

Clear
Clear the Ouput Channel list.

Start All
Start multicasting all services.

Stop All
Stop multicasting all services.

The right list shows all PIDs available or the used PIDs for a selected multicast output.



S
Enable this PID to be multiplexed in the selected multicast Service.

PID
PID number.

Service
Service name.

Info
Codec details (optional).

Option ‘DH’

- DVB-H Viewer
- DVB-T2 Viewer

34 DVB-H Viewer

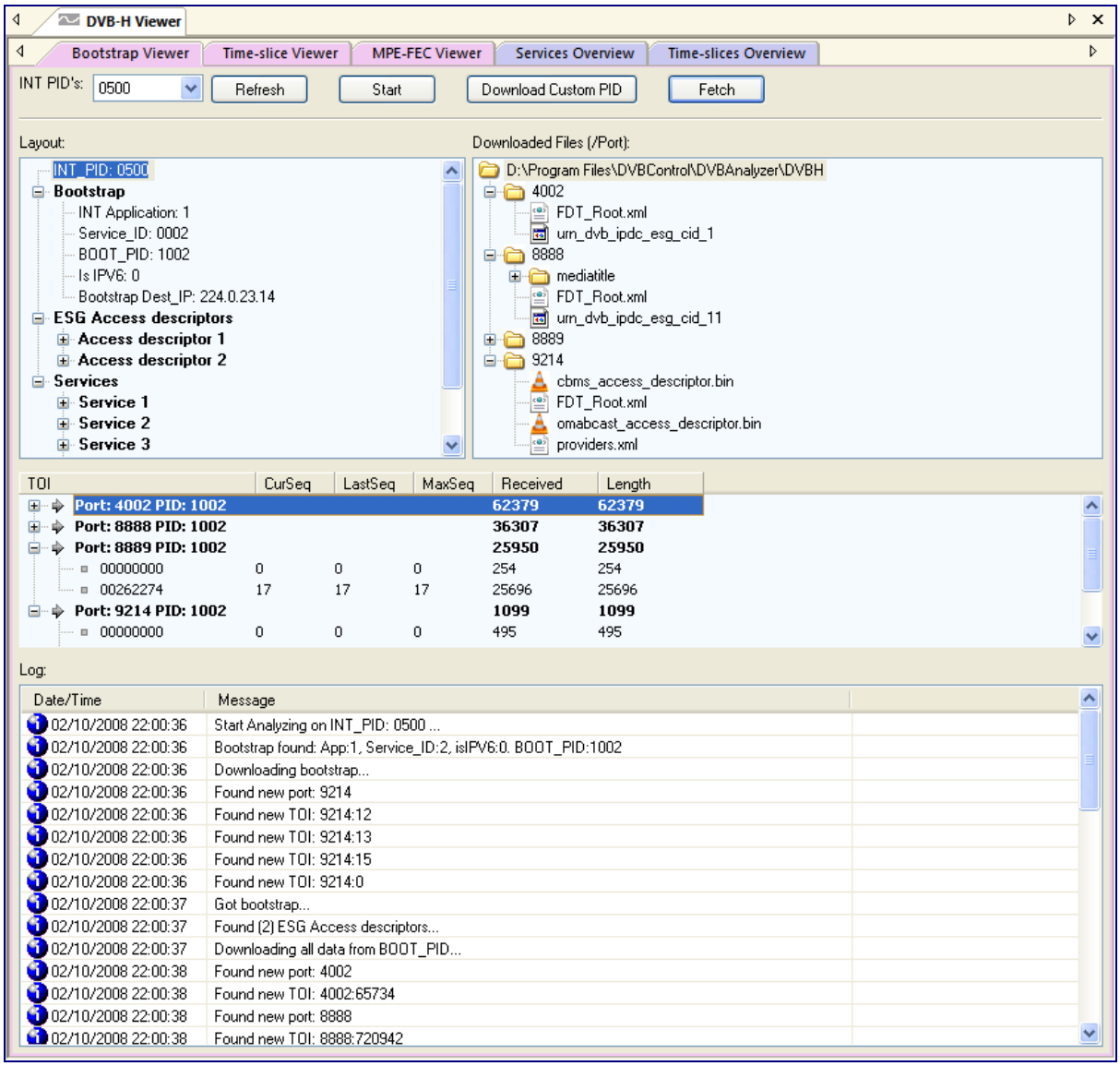
DVB-H analyzing

5 different sub views can be used for in-depth DVB-H analyzing:

- Bootstrap Viewer
- Time-slice Viewer
- MPE-FEC Viewer
- Services Overview
- Time-slices Overview

34.1 Bootstrap Viewer

The bootstrap Viewer gives information about the start-up of a (hypothetical) DVB-H decoder.



INT PIDs

After selecting an INT (IP/MAC Notification Table) PID via the pull-down menu, analyzing is started. Analyzing starts automatically for the first received INT PID.

Refresh
The INT PID pull-down list will be refreshed automatically during operation or by manually pushing the 'Refresh' button.

Start
All fields can be cleared by pushing the 'Start' button.

Download Custom PID
Downloading the FLUTE information from a custom PID can be useful if the INT is not correctly provided or if custom data PIDs are presented in the Transport stream.

Fetch
Fetch all collected data, even if not all Transport Objects are completely received on a port.

Layout
Displays the layout of the bootstrap, ESG Access descriptors, Services and applications.

Download Files (/Port)
Directory structure received from the FLUTE PIDs.

Received Objects:

Filter	Description
TOI	Transport Object Identifiers
CurSeq	Current Sequence
LastSeq	Last Sequence
MaxSeq	Maximum received Sequence
Received	Received amount of bytes
Length	Total length of object

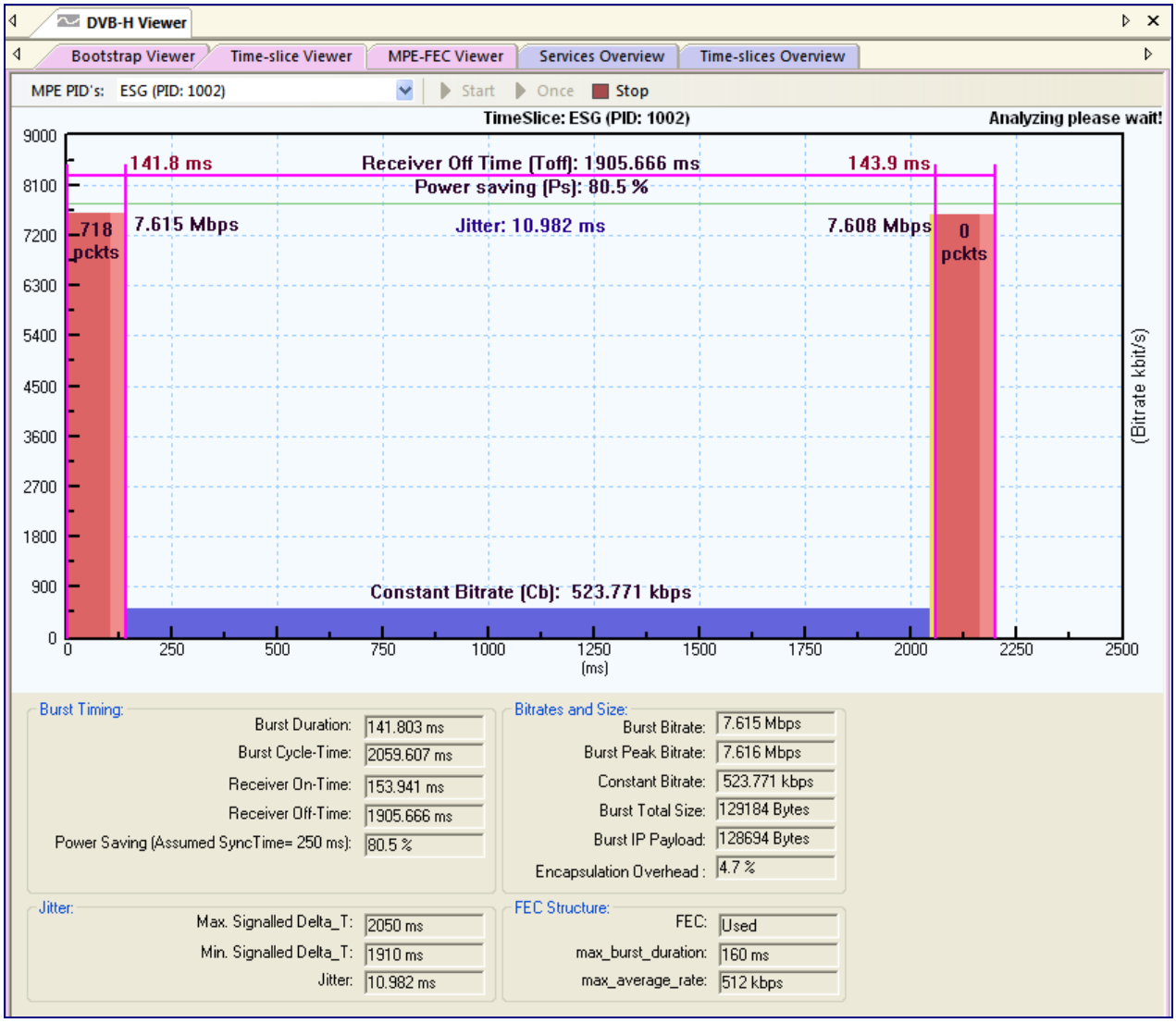
Log

Different columns show information in the log:

Filter	Description
Date/Time	The Date and Time the log message was generated
Message	The Message text

34.2 Time-slice Viewer

Time slicing is the transmission of data (for a specific DVB-H service) in a burst.

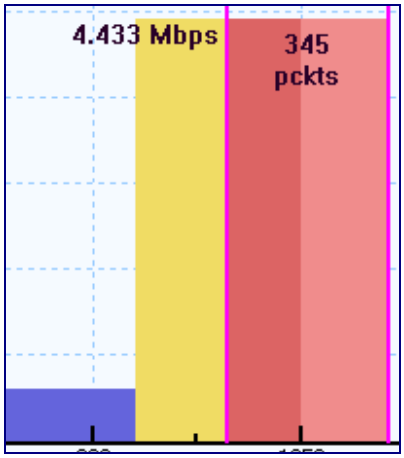


Besides the graphical representation of the burst time diagram, the actual data is given in different groups:

- Burst Timing
- Jitter
- Bitrates and Size
- FEC Structure

For the graphical representation 4 colors are used:

- MPE section packets
- FEC section packets
- Jitter
- Constant (average) bitrate



Burst Duration
Duration of the Time-slice burst.

Burst Cycle Time
The time interval between the starting points of two bursts.

Receiver On-Time
Derived from the Burst Duration and the current maximum delta_T_margin.

Receiver Off-Time
Derived from the Burst Cycle Time minus the Receiver On-Time.

Power Saving (Assumed Sync Time = 250 ms)
Power saving in percentage.

Max. Signaled Delta_T
The maximum signalled Delta_T in an MPE or MPE/FEC section.

Min. Signaled Delta_T
The minimum signaled Delta_T in an MPE or MPE/FEC section.

Jitter
Difference between the announced and the actual start of the next time-slice.

Burst Bitrate
Mean burst bit rate.

Burst Peak Bitrate
Peak bit rate within a 10ms interval.

Constant Bitrate
Mean bit rate.

Bust Total Size
Total burst size.

Burst IP Payload
Size of the IP Payload in the burst.

Encapsulation Overhead
Overhead in percentage from DVB-H encapsulation.

FEC
Indicates if FEC (Forward Error Correction) is Used or Not Used.

Max_burst_duration
The max_burst_duration coming from the time_slice_fec_identifier_descriptor in the INT section.

Max_average_rate
The max_avarage_rate coming from the time_slice_fec_identifier_descriptor in the INT section.

34.3 MPE-FEC Viewer

All MPE and FEC related information is combined in the MPE-FEC Viewer and gathered in 5 groups:

- FEC Structure
- Jitter
- Bitrates and Size
- Burst Timing
- Transmission

The Jitter, Bitrates and Size and Burst Time is already explained in the Time-slice Viewer chapter.

FEC
Indicates if FEC (Forward Error Correction) is Used or Not Used.

Frame Size
The amount of rows coming from the time_slice_fec_identifier_descriptor in the INT section.

Max_burst_duration
The max_burst_duration coming from the time_slice_fec_identifier_descriptor in the INT section.

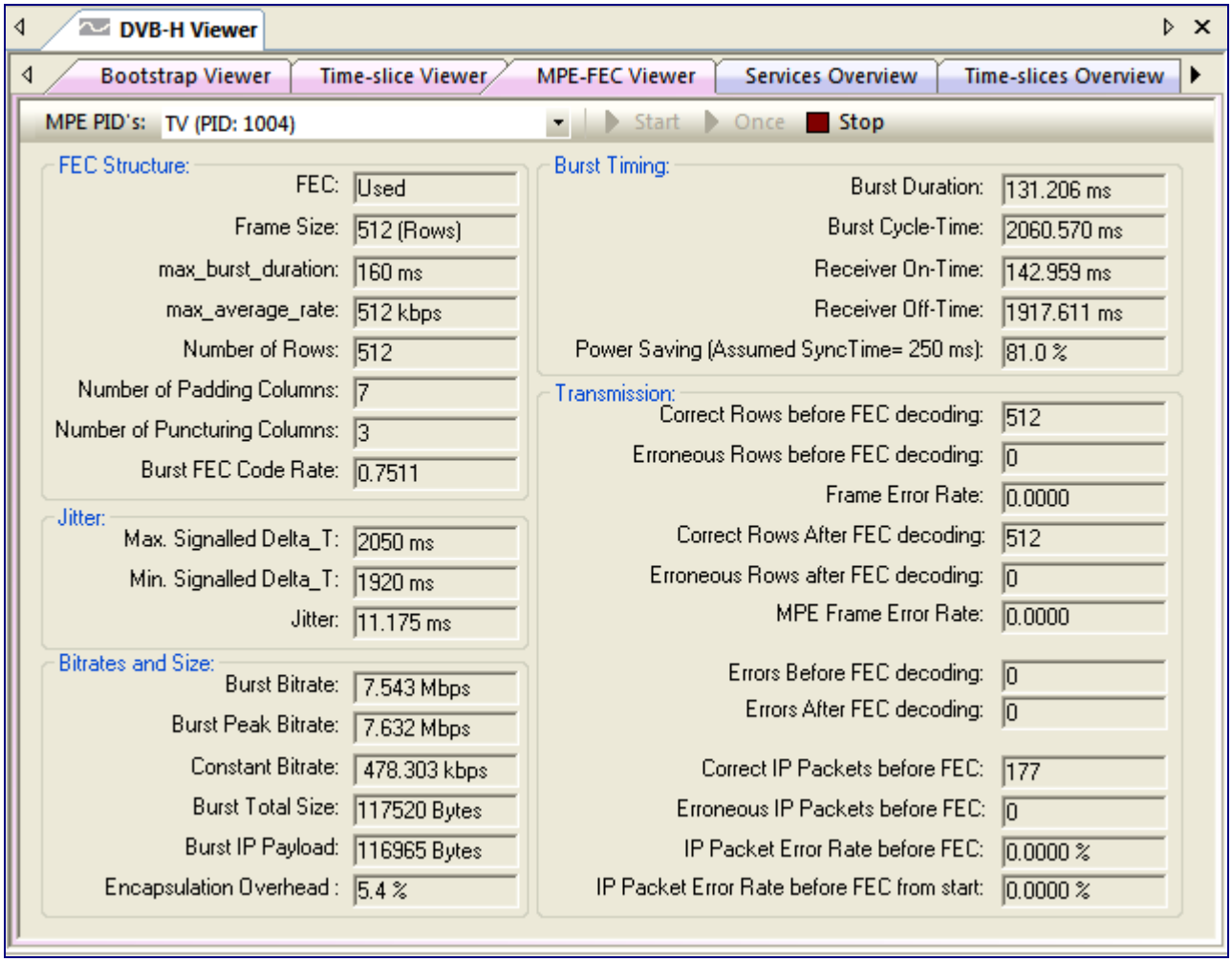
Max_average_rate
The max_avarage_rate coming from the time_slice_fec_identifier_descriptor in the INT section.

Number of Rows
The amount of rows coming from the FEC sections.

Number of Padding Columns
Number of Padding Columns in the MPE-FEC frames.

Number of Puncturing Columns
Number of Puncturing Columns in the MPE-FEC frames.

Burst FEC Code Rate
FEC Code Rate of each burst.



Correct Rows before FEC decoding
Number of error-free MPE-FEC Rows before FEC decoding.

Erroneous Rows before FEC decoding
Number of erroneous MPE-FEC Rows before FEC decoding.

Frame Error Rate
Frame error rate before FEC decoding.

Correct Rows after FEC decoding
Number of error-free MPE-FEC Rows after FEC decoding.

Erroneous Rows after FEC decoding
Number of erroneous MPE-FEC Rows after FEC decoding.

MPE Frame Error Rate
Frame error rate after FEC decoding.

Errors before FEC decoding
Amount of byte errors before FEC decoding.

Errors after FEC decoding

Amount of byte errors after FEC decoding.

Correct IP Packets before FEC
Number of error-free IP packets before FEC decoding.

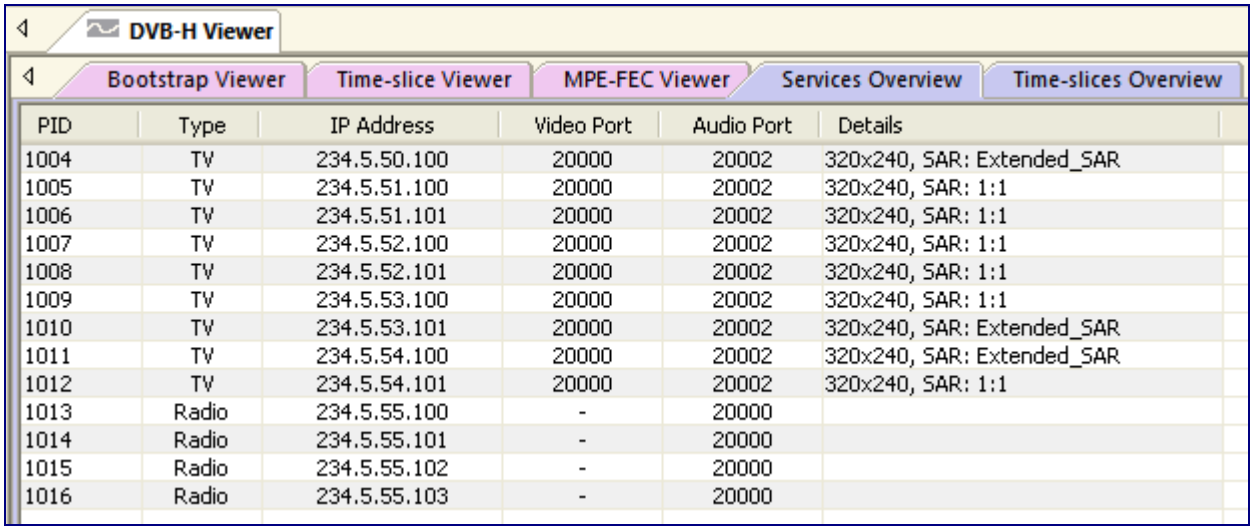
Erroneous IP Packets before FEC
Number of erroneous IP packets before FEC decoding.

IP Packet Error Rate before FEC
IP packet error rate before FEC decoding.

IP Packet Error Rate before FEC from start
IP packet error rate from the start of the measurement before FEC decoding.

34.4 Services Overview

All service related information is given in the Service Overview

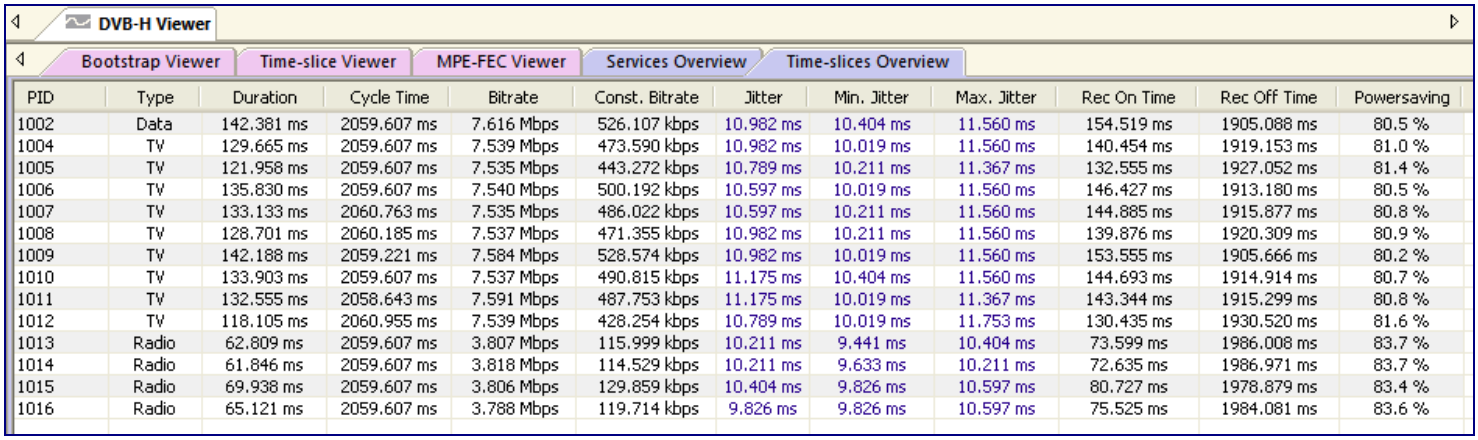


PID	Type	IP Address	Video Port	Audio Port	Details
1004	TV	234.5.50.100	20000	20002	320x240, SAR: Extended_SAR
1005	TV	234.5.51.100	20000	20002	320x240, SAR: 1:1
1006	TV	234.5.51.101	20000	20002	320x240, SAR: 1:1
1007	TV	234.5.52.100	20000	20002	320x240, SAR: 1:1
1008	TV	234.5.52.101	20000	20002	320x240, SAR: 1:1
1009	TV	234.5.53.100	20000	20002	320x240, SAR: 1:1
1010	TV	234.5.53.101	20000	20002	320x240, SAR: Extended_SAR
1011	TV	234.5.54.100	20000	20002	320x240, SAR: Extended_SAR
1012	TV	234.5.54.101	20000	20002	320x240, SAR: 1:1
1013	Radio	234.5.55.100	-	20000	
1014	Radio	234.5.55.101	-	20000	
1015	Radio	234.5.55.102	-	20000	
1016	Radio	234.5.55.103	-	20000	

Column	Description
PID	PID of the service
Type	Service type
IP Address	IP Address of the service
Video Port	Video port of the service
Audio Port	Audio port of the service
Details	Service component information

34.5 Time-slices Overview

The timing information off all time-slices are in summarized in the Time-slices Overview.



PID	Type	Duration	Cycle Time	Bitrate	Const. Bitrate	Jitter	Min. Jitter	Max. Jitter	Rec On Time	Rec Off Time	Powersaving
1002	Data	142.381 ms	2059.607 ms	7.616 Mbps	526.107 kbps	10.982 ms	10.404 ms	11.560 ms	154.519 ms	1905.088 ms	80.5 %
1004	TV	129.665 ms	2059.607 ms	7.539 Mbps	473.590 kbps	10.982 ms	10.019 ms	11.560 ms	140.454 ms	1919.153 ms	81.0 %
1005	TV	121.958 ms	2059.607 ms	7.535 Mbps	443.272 kbps	10.789 ms	10.211 ms	11.367 ms	132.555 ms	1927.052 ms	81.4 %
1006	TV	135.830 ms	2059.607 ms	7.540 Mbps	500.192 kbps	10.597 ms	10.019 ms	11.560 ms	146.427 ms	1913.180 ms	80.5 %
1007	TV	133.133 ms	2060.763 ms	7.535 Mbps	486.022 kbps	10.597 ms	10.211 ms	11.560 ms	144.885 ms	1915.877 ms	80.8 %
1008	TV	128.701 ms	2060.185 ms	7.537 Mbps	471.355 kbps	10.982 ms	10.211 ms	11.560 ms	139.876 ms	1920.309 ms	80.9 %
1009	TV	142.188 ms	2059.221 ms	7.584 Mbps	528.574 kbps	10.982 ms	10.019 ms	11.560 ms	153.555 ms	1905.666 ms	80.2 %
1010	TV	133.903 ms	2059.607 ms	7.537 Mbps	490.815 kbps	11.175 ms	10.404 ms	11.560 ms	144.693 ms	1914.914 ms	80.7 %
1011	TV	132.555 ms	2058.643 ms	7.591 Mbps	487.753 kbps	11.175 ms	10.019 ms	11.367 ms	143.344 ms	1915.299 ms	80.8 %
1012	TV	118.105 ms	2060.955 ms	7.539 Mbps	428.254 kbps	10.789 ms	10.019 ms	11.753 ms	130.435 ms	1930.520 ms	81.6 %
1013	Radio	62.809 ms	2059.607 ms	3.807 Mbps	115.999 kbps	10.211 ms	9.441 ms	10.404 ms	73.599 ms	1986.008 ms	83.7 %
1014	Radio	61.846 ms	2059.607 ms	3.818 Mbps	114.529 kbps	10.211 ms	9.633 ms	10.211 ms	72.635 ms	1986.971 ms	83.7 %
1015	Radio	69.938 ms	2059.607 ms	3.806 Mbps	129.859 kbps	10.404 ms	9.826 ms	10.597 ms	80.727 ms	1978.879 ms	83.4 %
1016	Radio	65.121 ms	2059.607 ms	3.788 Mbps	119.714 kbps	9.826 ms	9.826 ms	10.597 ms	75.525 ms	1984.081 ms	83.6 %

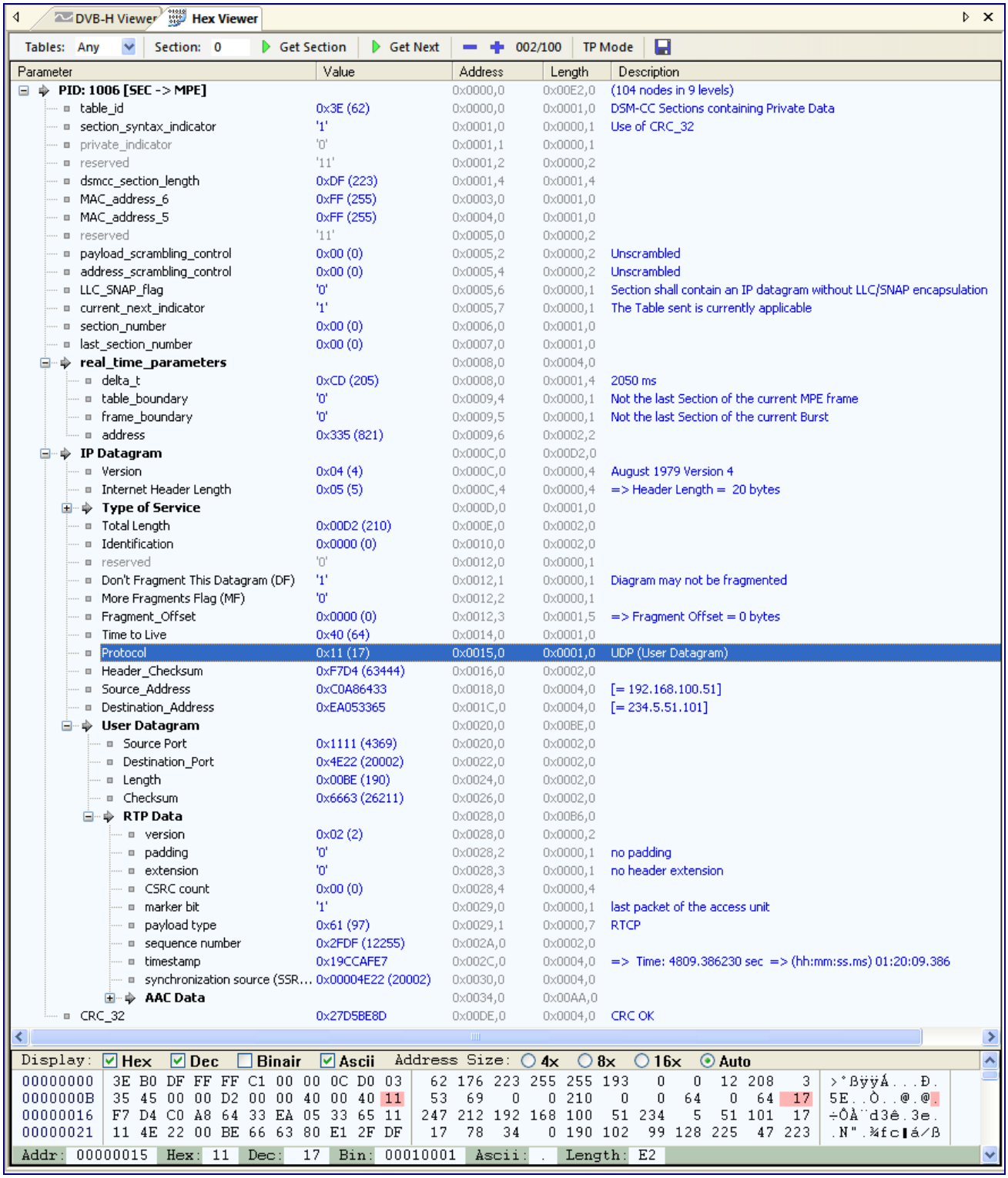
Column	Description
PID	PID of the service
Type	Service type
Duration	Burst duration
Cycle Time	Bust cycle time
Bitrate	Bust bitrate
Const. Bitrate	Average bitrate
Jitter	Difference between announced and the actual start of the next slice
Min. Jitter	Minimum jitter from start of measurement
Max. Jitter	Maximum jitter from start of measurement
Rec on Time	Receiver On-time
Rec Off Time	Receiver Off-time
Powersaving	Power Saving in %

34.6 Related Windows

- SI/PSI/PSI bar
- Hex Viewer
- Thumb Overview

In the SI/PSI/PSIP bar the INT specific details are displayed.

In Hex Viewer all byte/bit interpretations can be given of the MPE and FEC tables.

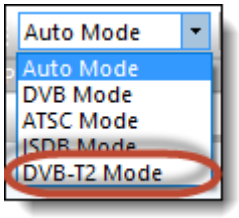

DVB-H Viewer
Hex Viewer
Tables: Any
Section: 0
Get Section
Get Next
002/100
TP Mode
Parameter
Value
Address
Length
Description
PID: 1006 [SEC -> MPE]
table_id
section_syntax_indicator
private_indicator
reserved
dsmcc_section_length
MAC_address_6
MAC_address_5
reserved
payload_scrambling_control
address_scrambling_control
LLC_SNAP_flag
current_next_indicator
section_number
last_section_number
real_time_parameters
delta_t
table_boundary
frame_boundary
address
IP Datagram
Version
Internet Header Length
Type of Service
Total Length
Identification
reserved
Don't Fragment This Datagram (DF)
More Fragments Flag (MF)
Fragment_Offset
Time to Live
Protocol
Header_Checksum
Source_Address
Destination_Address
User Datagram
Source Port
Destination_Port
Length
Checksum
RTP Data
version
padding
extension
CSRC count
marker bit
payload type
sequence number
timestamp
synchronization source (SSR...
AAC Data
CRC_32
Display: Hex Dec Binair Ascii
Address Size: 4x 8x 16x Auto
Addr: 00000015 Hex: 11 Dec: 17 Bin: 00010001 Ascii: . Length: E2

35 DVB-T2 Viewer

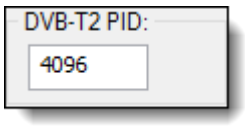
DVB-T2 analyzing

A T2-gateway Transport stream can be measured, using the DVB-T2 Viewer.

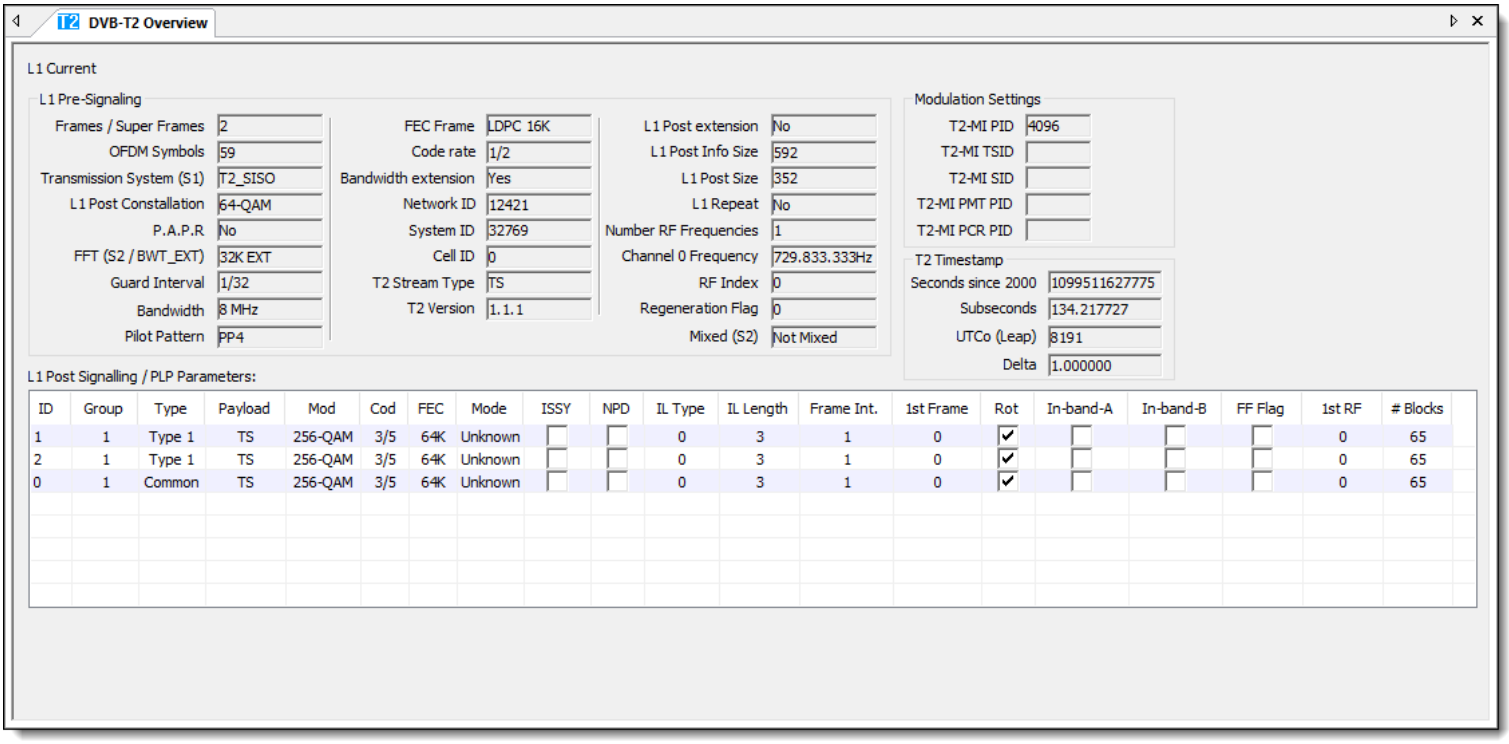
First, the DVB Mode Toolbar has to be selected on the ‘DVB-T2 Mode’.



In ‘Preferences > Tools’ the DVB-T2 PID has to be selected.

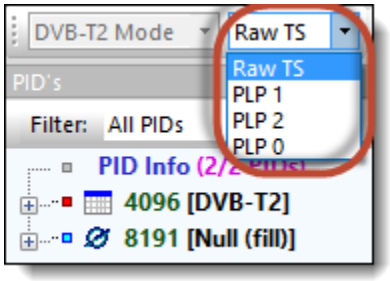


Now all Details are given in the DVB-T2 viewer.

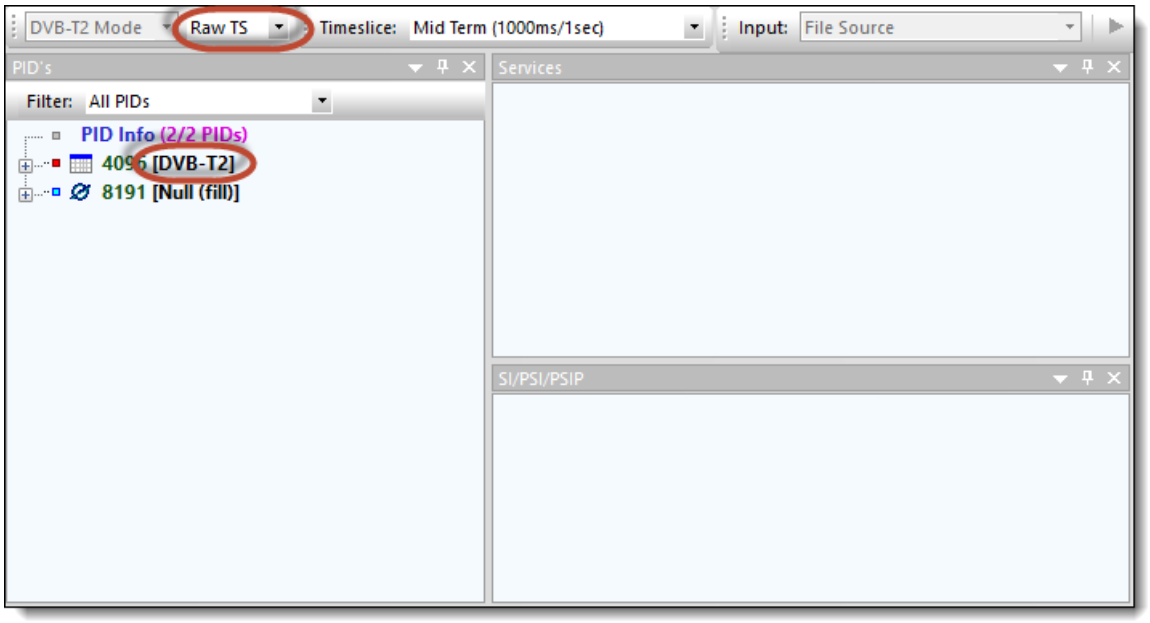


In this example there are 3 PLP’s in the stream.

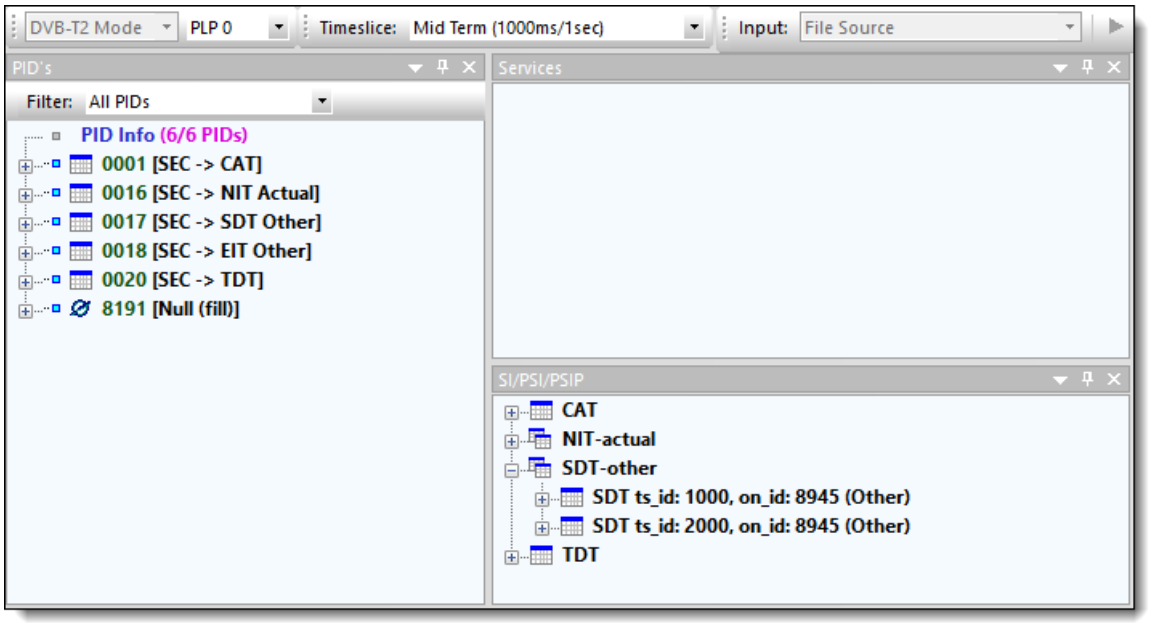
By using the pulldown, next to the ‘DVB Mode’ selector, the selected PLP TS will be shown in DVBAnalyzer.


DVB-T2 Mode
Raw TS
Raw TS
PLP 1
PLP 2
PLP 0
PID's
Filter: All PIDs
PID Info (2/2
4096 [DVB-T2]
8191 [Null (fill)]

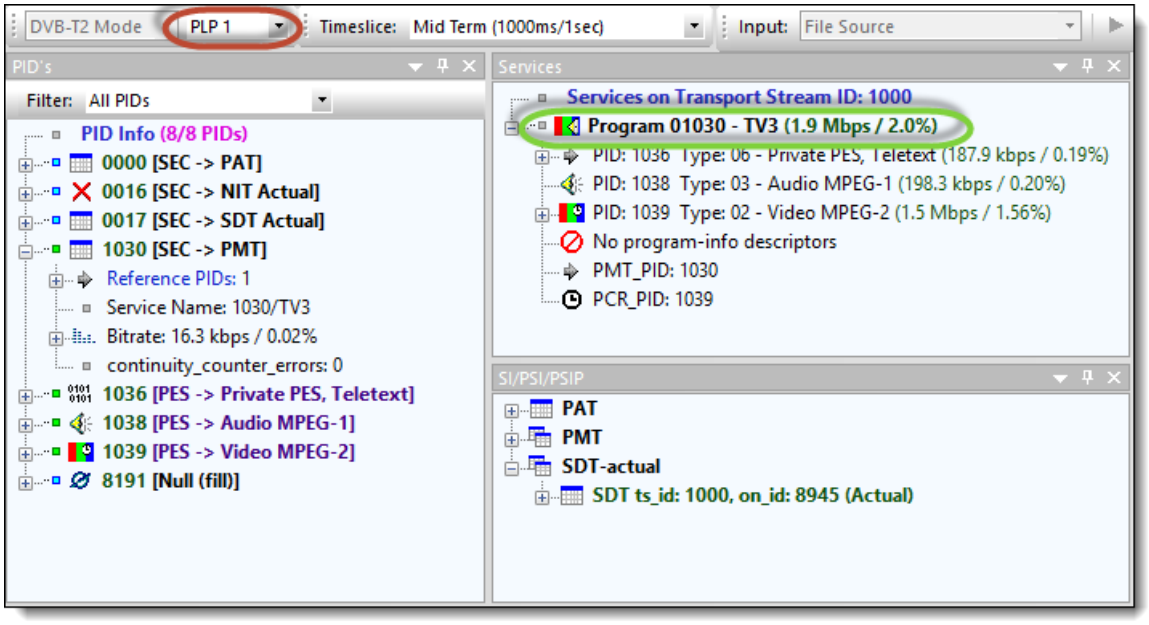
Raw TS


DVB-T2 Mode
Raw TS
Timeslice:
Mid Term (1000ms/1sec)
Input:
File Source
PID's
Filter: All PIDs
PID Info (2/2 PIDs)
4096 [DVB-T2]
8191 [Null (fill)]
Services
SI/PSI/PSIP

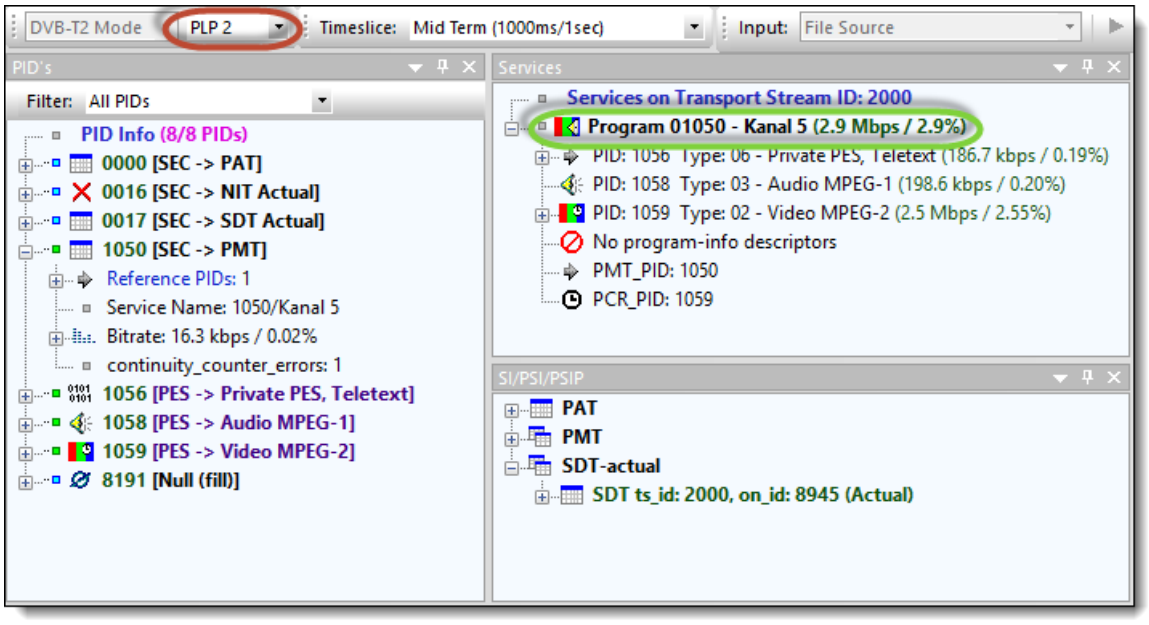
PLP 0


DVB-T2 Mode
PLP 0
Timeslice:
Mid Term (1000ms/1sec)
Input:
File Source
PID's
Filter: All PIDs
PID Info (6/6 PIDs)
0001 [SEC -> CAT]
0016 [SEC -> NIT Actual]
0017 [SEC -> SDT Other]
0018 [SEC -> EIT Other]
0020 [SEC -> TDT]
8191 [Null (fill)]
Services
SI/PSI/PSIP
CAT
NIT-actual
SDT-other
SDT ts_id: 1000, on_id: 8945 (Other)
SDT ts_id: 2000, on_id: 8945 (Other)
TDT

PLP 1


DVB-T2 Mode
PLP 1
Timeslice:
Mid Term (1000ms/1sec)
Input:
File Source
PID's
Filter:
All PIDs
PID Info (8/8 PIDs)
0000 [SEC -> PAT]
0016 [SEC -> NIT Actual]
0017 [SEC -> SDT Actual]
1030 [SEC -> PMT]
Reference PIDs: 1
Service Name: 1030/TV3
Bitrate: 16.3 kbps / 0.02%
continuity_counter_errors: 0
1036 [PES -> Private PES, Teletext]
1038 [PES -> Audio MPEG-1]
1039 [PES -> Video MPEG-2]
8191 [Null (fill)]
Services
Services on Transport Stream ID: 1000
Program 01030 - TV3 (1.9 Mbps / 2.0%)
PID: 1036 Type: 06 - Private PES, Teletext (187.9 kbps / 0.19%)
PID: 1038 Type: 03 - Audio MPEG-1 (198.3 kbps / 0.20%)
PID: 1039 Type: 02 - Video MPEG-2 (1.5 Mbps / 1.56%)
No program-info descriptors
PMT_PID: 1030
PCR_PID: 1039
SI/PSI/PSIP
PAT
PMT
SDT-actual
SDT ts_id: 1000, on_id: 8945 (Actual)

PLP 2


DVB-T2 Mode
PLP 2
Timeslice:
Mid Term (1000ms/1sec)
Input:
File Source
PID's
Filter:
All PIDs
PID Info (8/8 PIDs)
0000 [SEC -> PAT]
0016 [SEC -> NIT Actual]
0017 [SEC -> SDT Actual]
1050 [SEC -> PMT]
Reference PIDs: 1
Service Name: 1050/Kanal 5
Bitrate: 16.3 kbps / 0.02%
continuity_counter_errors: 1
1056 [PES -> Private PES, Teletext]
1058 [PES -> Audio MPEG-1]
1059 [PES -> Video MPEG-2]
8191 [Null (fill)]
Services
Services on Transport Stream ID: 2000
Program 01050 - Kanal 5 (2.9 Mbps / 2.9%)
PID: 1056 Type: 06 - Private PES, Teletext (186.7 kbps / 0.19%)
PID: 1058 Type: 03 - Audio MPEG-1 (198.6 kbps / 0.20%)
PID: 1059 Type: 02 - Video MPEG-2 (2.5 Mbps / 2.55%)
No program-info descriptors
PMT_PID: 1050
PCR_PID: 1059
SI/PSI/PSIP
PAT
PMT
SDT-actual
SDT ts_id: 2000, on_id: 8945 (Actual)

Option ‘AV’

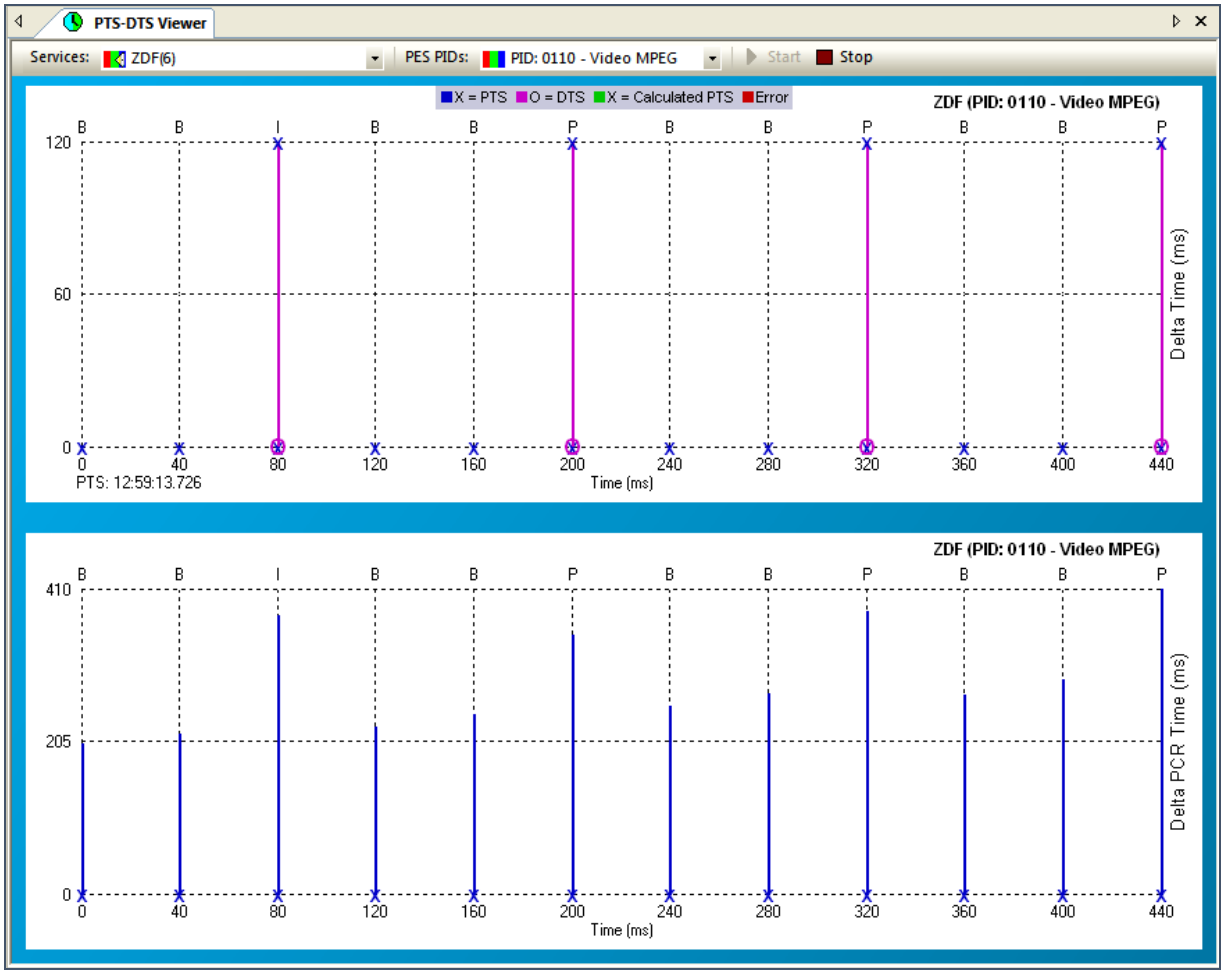
- PTS-DTS Viewer
- GOP Viewer
- Buffer Viewer

36 PTS-DTS Viewer

PTS-DTS distance and Picture arrival analyzing

Timing information about PTS and DTS timestamps are presented graphically.

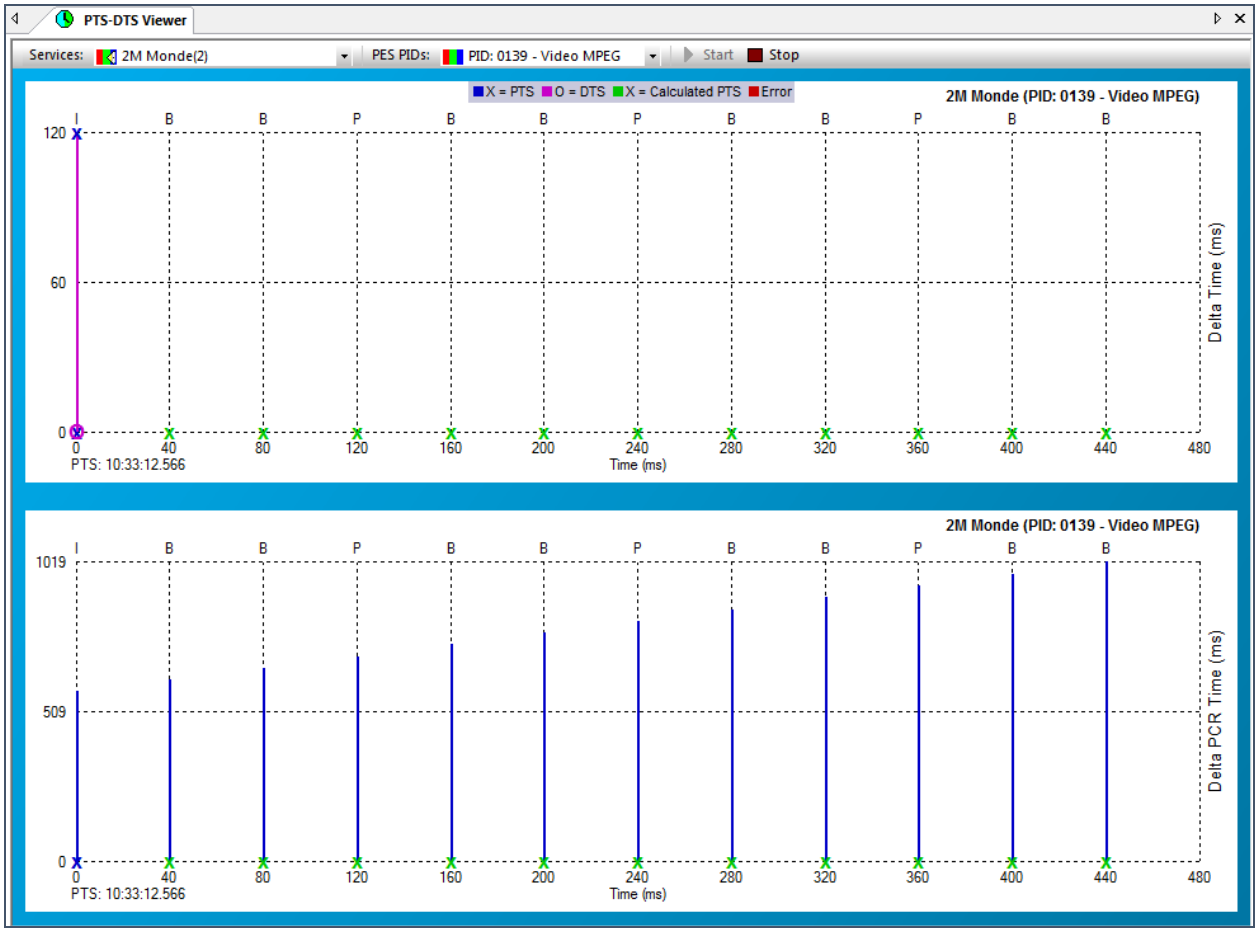
After selecting a service, either via the Pull down button or clicking the right mouse button, a PES component (e.q. Video, Audio, AC-3, Teletext, Subtitle) can be selected. The number behind the service name gives the amount of selectable components in this service. Default (if available) the Video component of the service is selected.



Horizontal the time is drawn, starting at the PTS time of the first Access Unit (AU).

A blue cross gives the Presentation Time Stamp (PTS) of each AU.

A green cross presents the calculated PTS timestamp. This occurs for pictures which do not have their own PTS, when is used when multiple pictures are packetized in one PES.



PTS-DTS distance (upper view)

The vertical purple line gives the difference between the DTS and PTS timestamp of a picture.
A purple circle gives the Decoding Time Stamp (DTS) on the timeline.

Reference pictures should have a DTS (decoding), which should be earlier than the PTS (Presentation).
Therefore only for reference pictures, both a PTS (blue or green cross) and DTS (purple circle) are shown.

Unreferenced pictures do not need a DTS. The Decoding and Presentation are on the same timestamp (PTS).

Picture arrival (lower view)

The vertical blue line gives the arrival time of each picture.

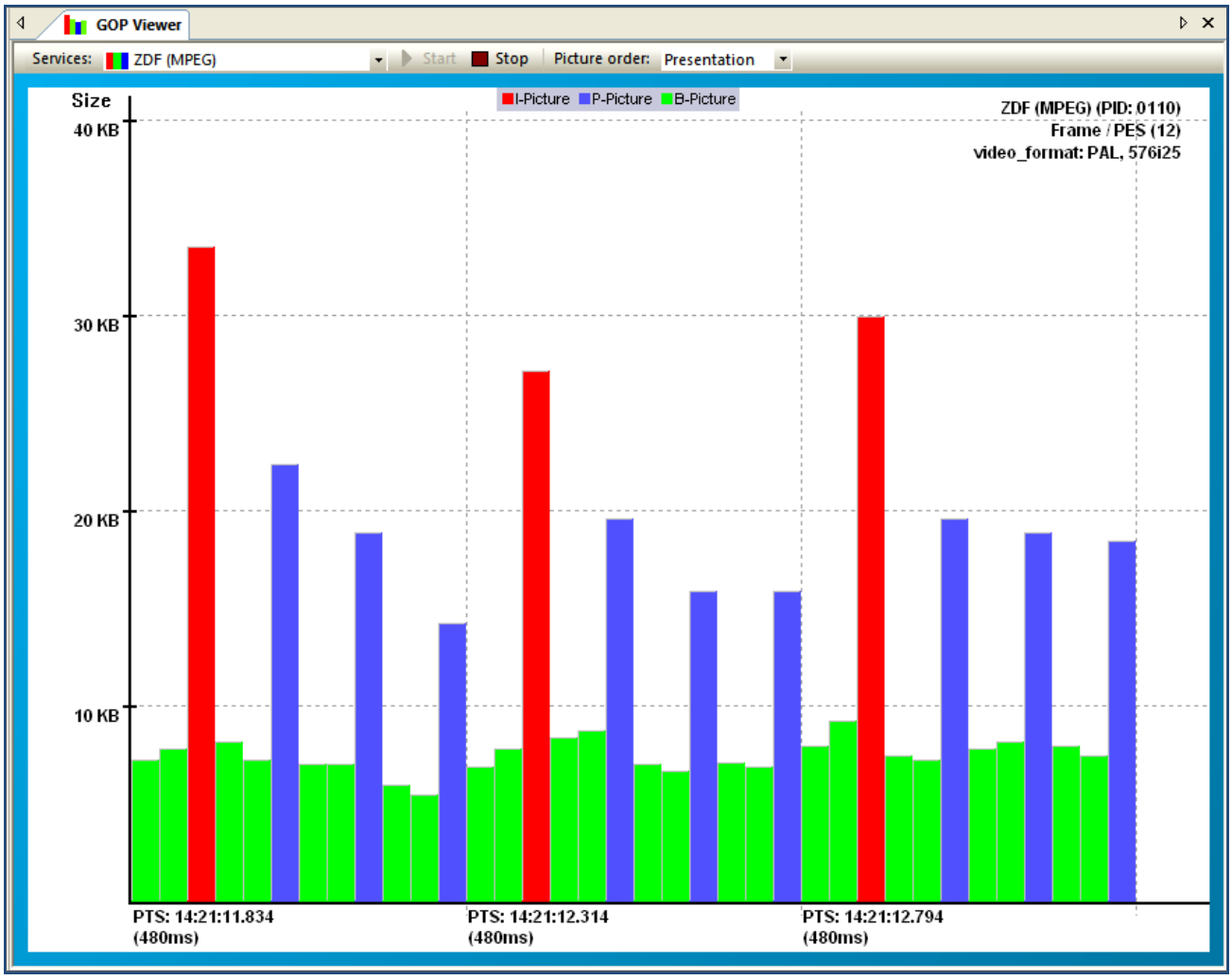
PTS-DTS Viewer can be opened more than once!

37 GOP Viewer

Group Of Pictures (GOP) structures

Graphical presentation of the picture order in GOP (Group of Pictures) structures of MPEG-2, AVC or HEVC Video components.

After selecting a TV service, either via the Pull-down button or clicking the right mouse button, the Video component is automatically selected.



Different PES usages can be displayed:

- Field / PES
- Fields / PES
- Frame / PES
- Multiple Frames / PES
- Multiple Fields / PES
- Multiple Frames/Fields / PES
- GOP (Fields) / PES
- GOP (Frames) / PES
- GOP (Fields/Frames) / PES
- Unknown / PES

Horizontal the time is drawn.
Vertical the Picture size is drawn.

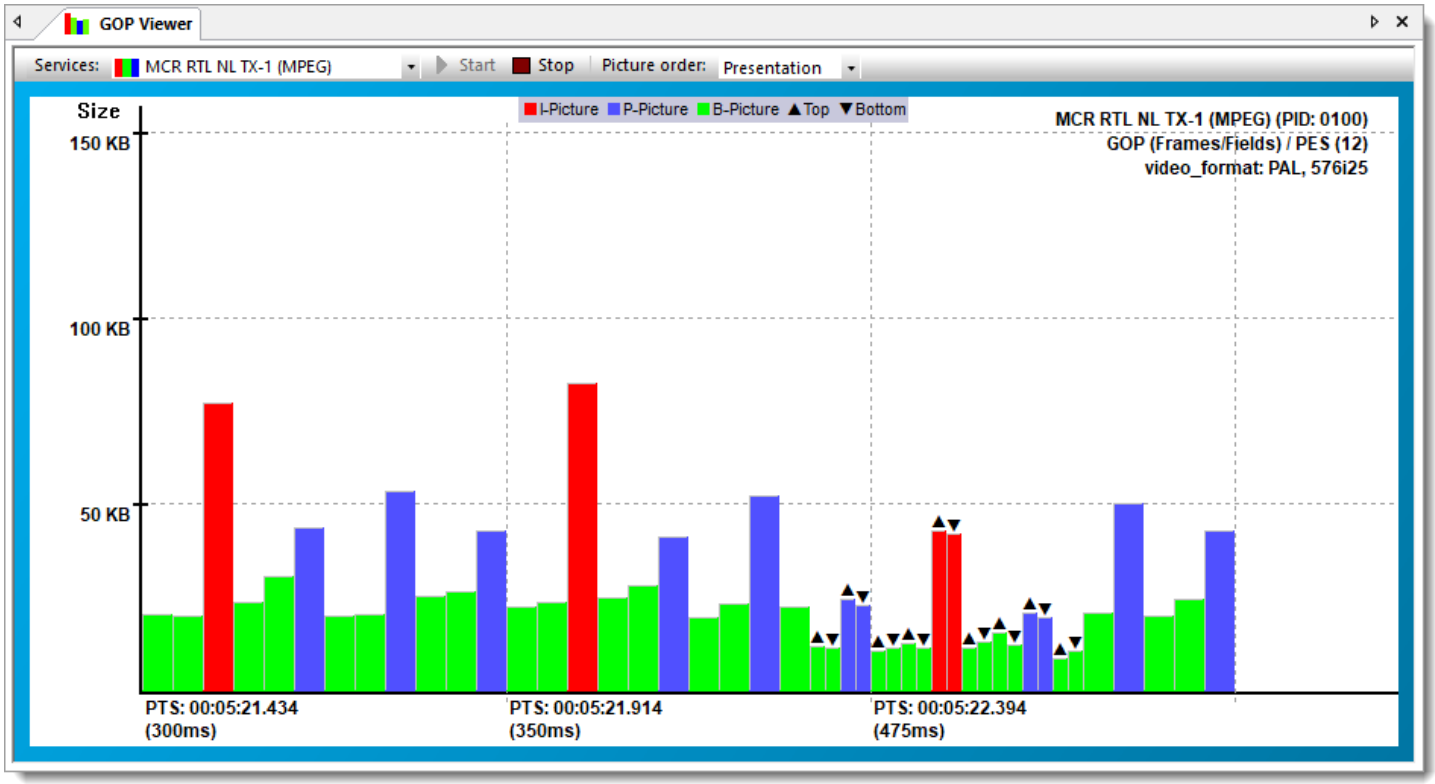
Picture order can be chosen between:

- Presentation (default)
- Transmission

GOP Viewer can be opened more than once!

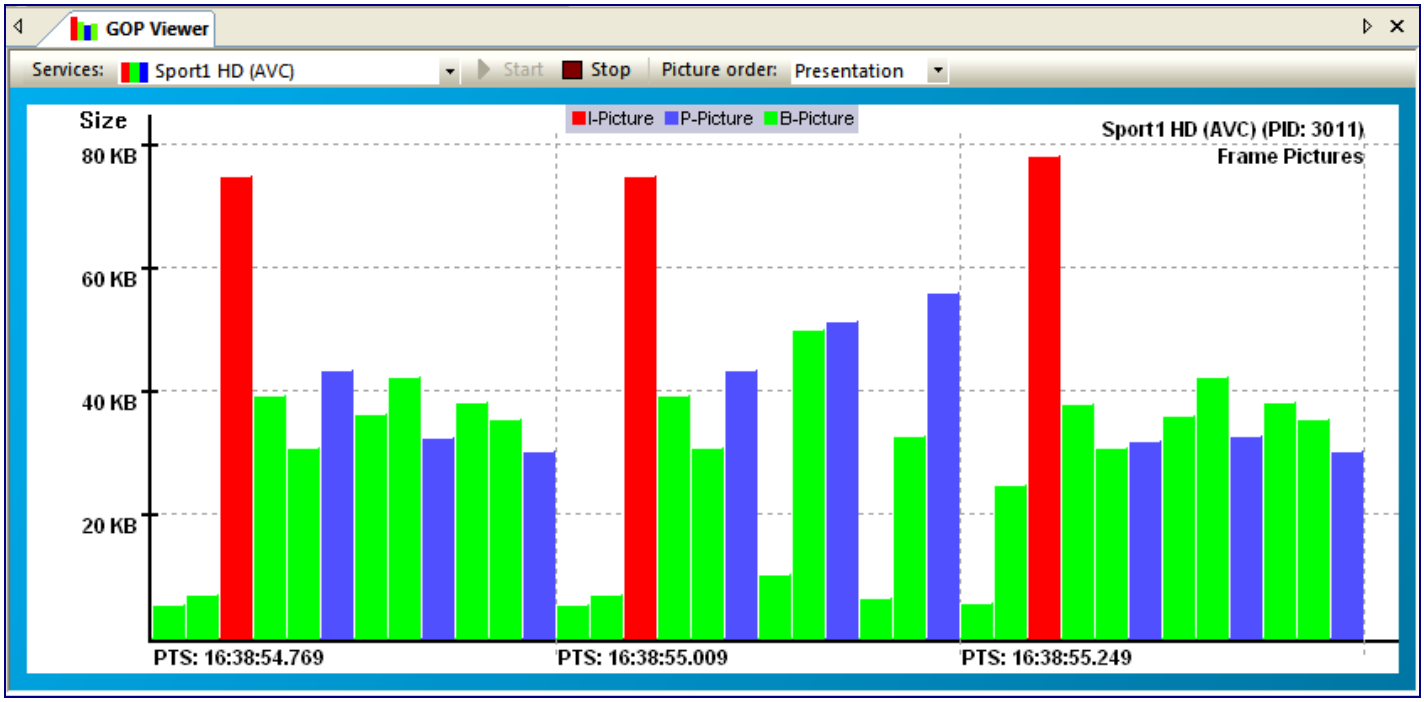
37.1 Examples

frame/field Pictures MPEG-2 Video



When showing field pictures, an arrow means Top or Bottom field.
▲Top ▼Bottom

AVC Video

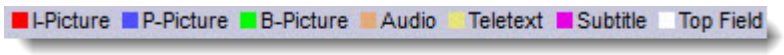

GOP Viewer
Services:
Sport1 HD (AVC)
Start
Stop
Picture order:
Presentation
Size
80 KB
60 KB
40 KB
20 KB
I-Picture
P-Picture
B-Picture
Sport1 HD (AVC) (PID: 3011)
Frame Pictures
PTS: 16:38:54.769
PTS: 16:38:55.009
PTS: 16:38:55.249

38 Buffer Viewer

Graphical presentation of the Decoder buffer behavior

The Buffer Viewer is a hypothetical decoder. The buffer increases when Access Units are received and decreases when Access Units are decoded and presented.

After selecting a Service, either via the Pull down button or clicking the right mouse button, a PES component (e.q. Video, Audio, AC-3, Teletext, Subtitle) can be selected. The number behind the service name indicates the amount of selectable components in this service. Default the Video component of the Service is selected.



Different colors are used for receiving, decoding and presenting Access Units (AU):

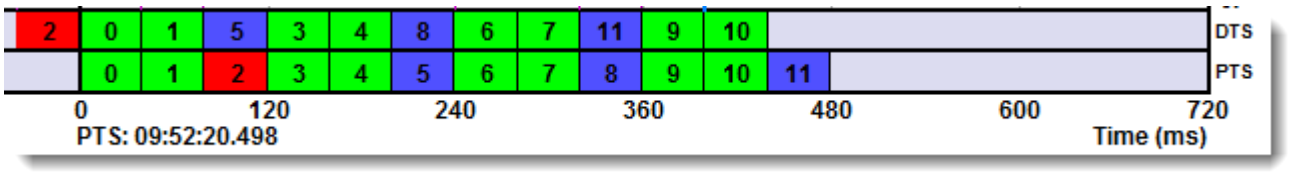
- I-Picture (Intra video picture)
- P-Picture (Prediction video picture)
- B-Picture (Bi-directional video picture)
- Audio
- Teletext
- Subtitle
- Top Field (for video top field pictures)

On the horizontal axis the (PCR) time is shown, as an offset to the PTS (Presentation Time Stamp) time.
The vertical axis shows the Buffer size.

On top, the decoder reception of Access Units is displayed.

They should arrive, earlier then the PTS/DTS time when they are needed.

The bottom shows the decoding (DTS) and presentation (PTS) times of the Access Units, coming from the buffer.



The bleu graphic shows the increase and decrease of the decoder buffer.
Increase of the buffer (Purple arrow) is the result of receiving bits, which are cached in the decoder buffer.
Decrease of the buffer (Green arrow) is the result of decoding Access Units. Bits are then no longer needed in the buffer.

Decoding (DTS) and presentation (PTS) times don't have to be on the same time moment. Especially video GOP (Group of Pictures) structures have for their non-reference pictures different times.

The blue dashed line gives the maximum buffer usage so far.

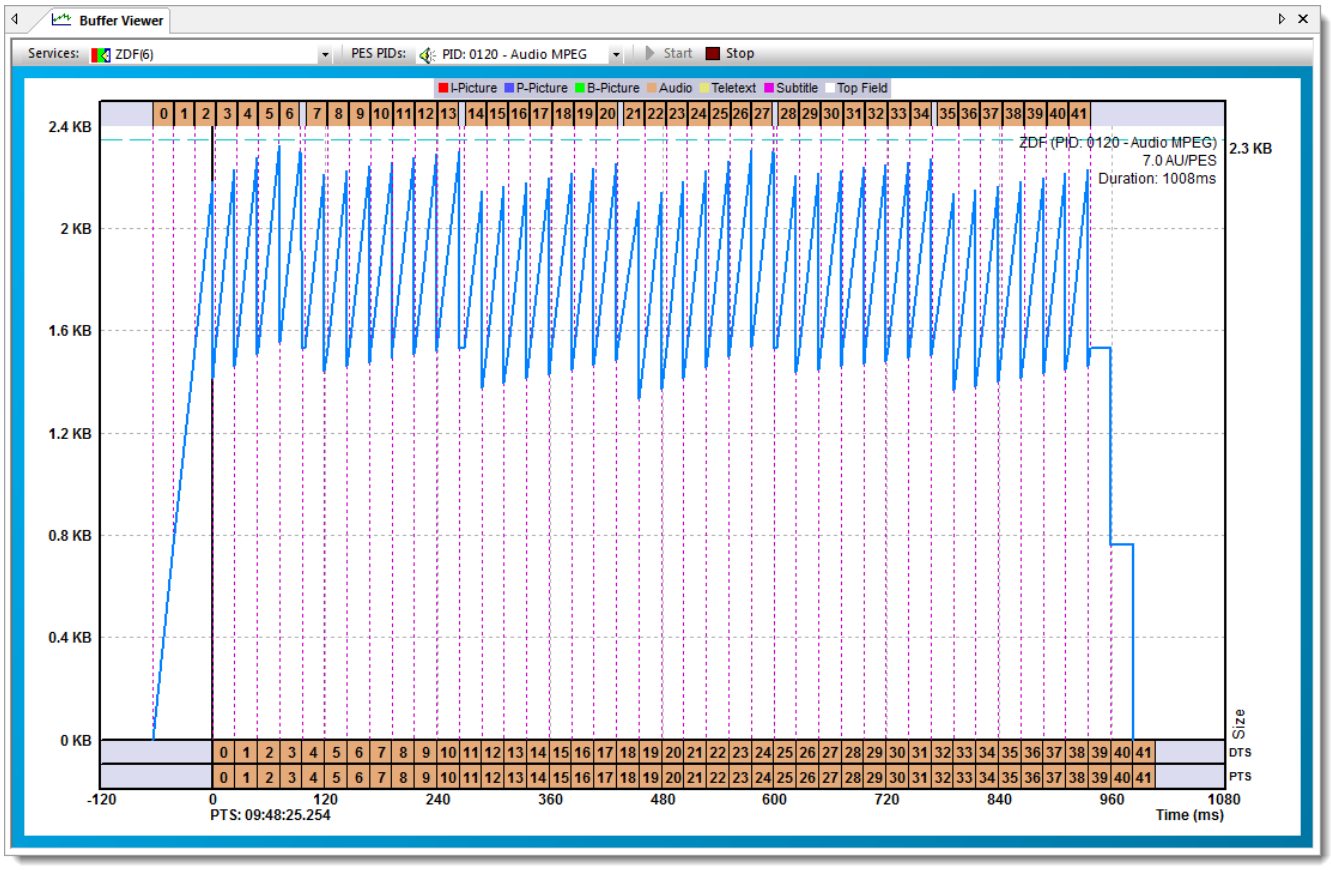
When there is a buffer under run this will be signaled.

Buffer Viewer can be opened more than once!

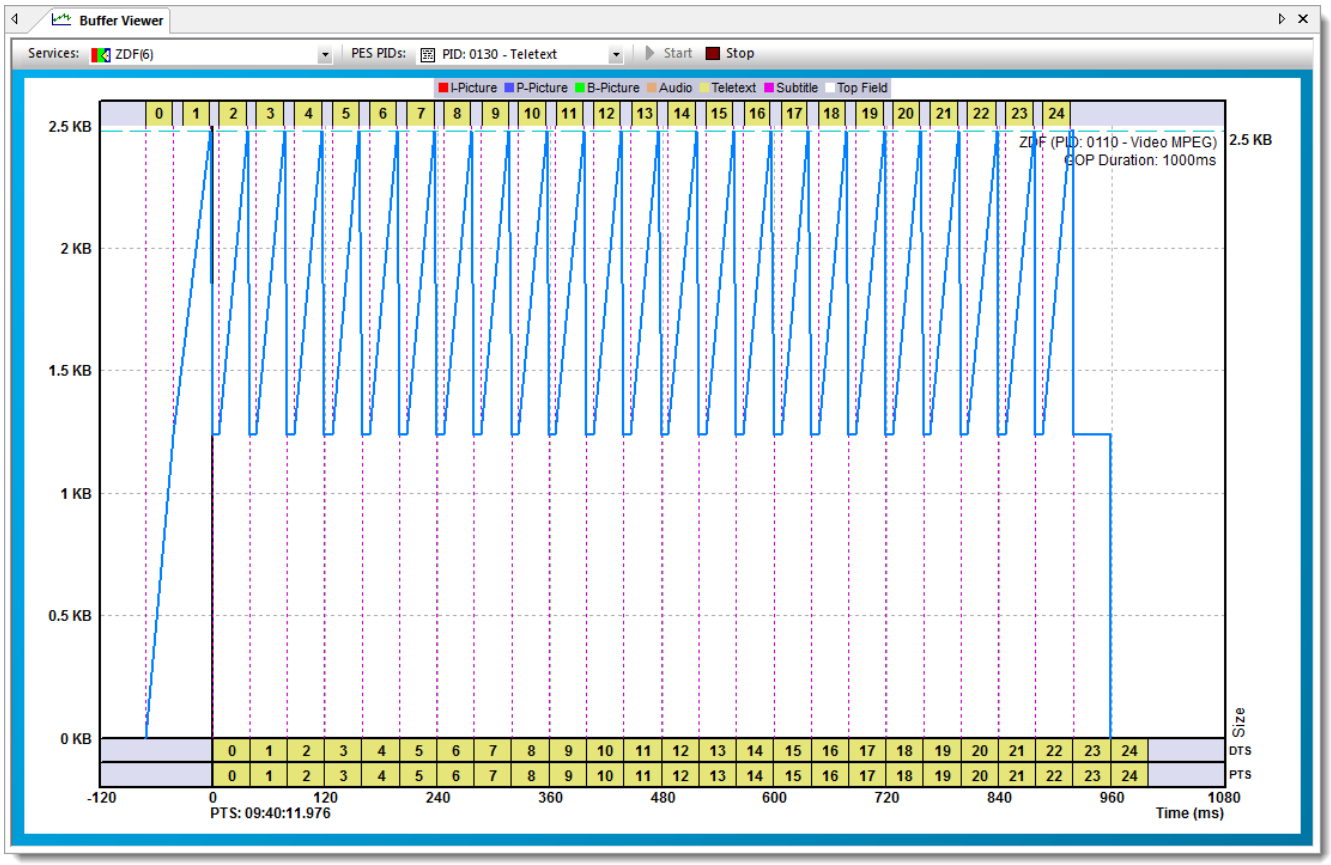
Video

The red dashed line gives the vbv_buffer_size which is sent in the video header.

Audio



Teletext


Buffer Viewer
Services: ZDF(6)
PES PIDs: PID: 0130 - Teletext
Start
Stop
I-Picture P-Picture B-Picture Audio Teletext Subtitle Top Field
ZDF (PID: 0110 - Video MPEG)
GOP Duration: 1000ms
2.5 KB
2 KB
1.5 KB
1 KB
0.5 KB
0 KB
Size
DTS
PTS
-120
0
120
240
360
480
600
720
840
960
1080
Time (ms)
PTS: 09:40:11.976

Option ‘VQ’

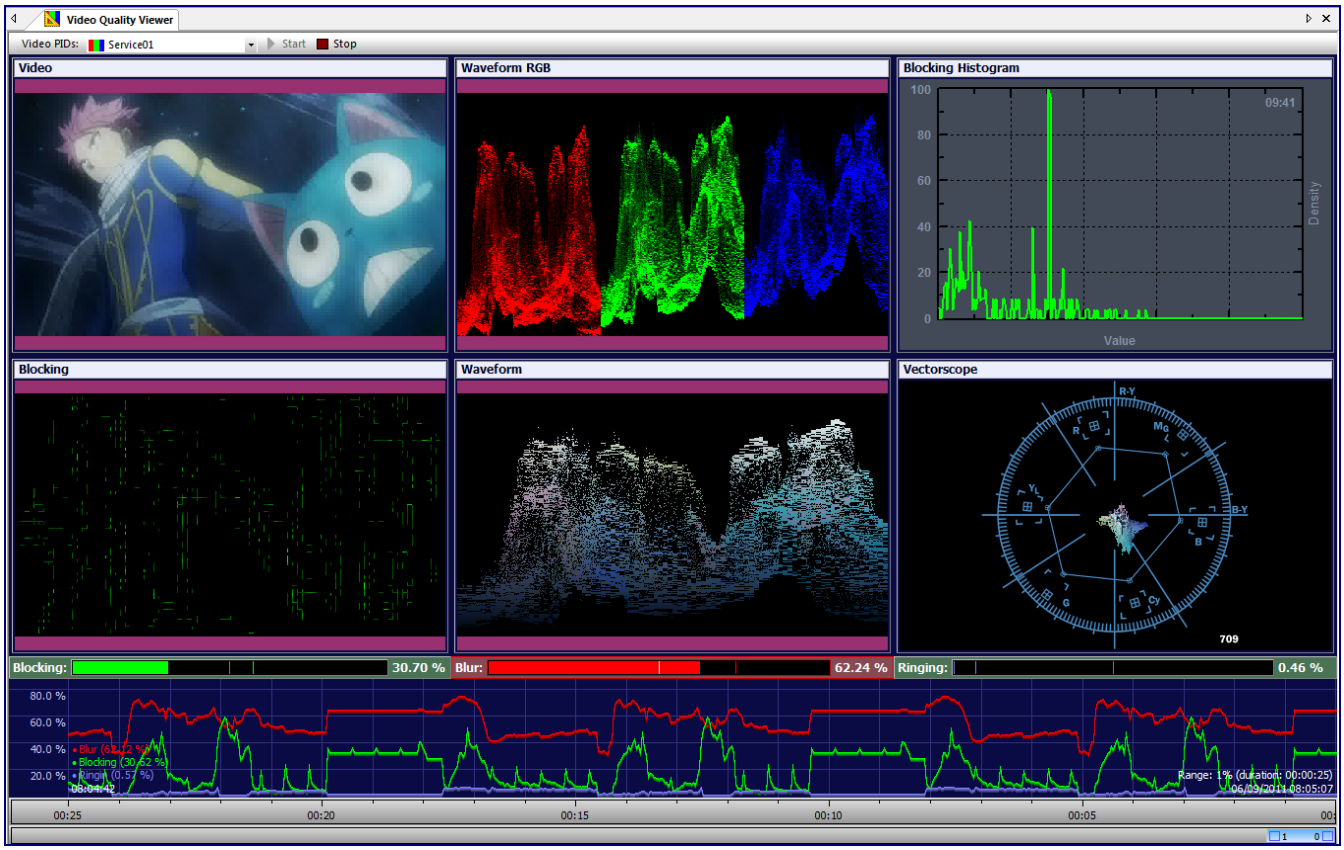
- Video Quality Viewer

39 Video Quality Viewer

Enhanced Video Quality measurements

Complete set of tools which enables in-depth video quality measurement:

- Waveform Color
- Waveform Luma
- Waveform RGB
- Vectorscope
- Histogram Luma
- Histogram Red
- Histogram Green
- Histogram Blue
- Blocking
- Blurring
- Ringing

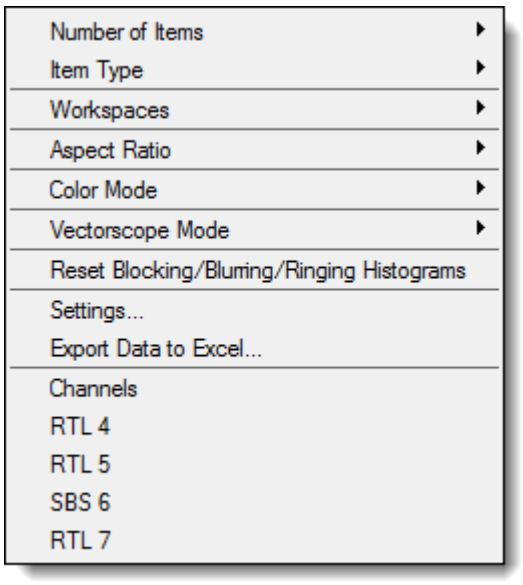


Multiple items can be shown in the Video Quality Viewer depended on users interests.
By using multiple workspaces different item configurations can be pre-configured.

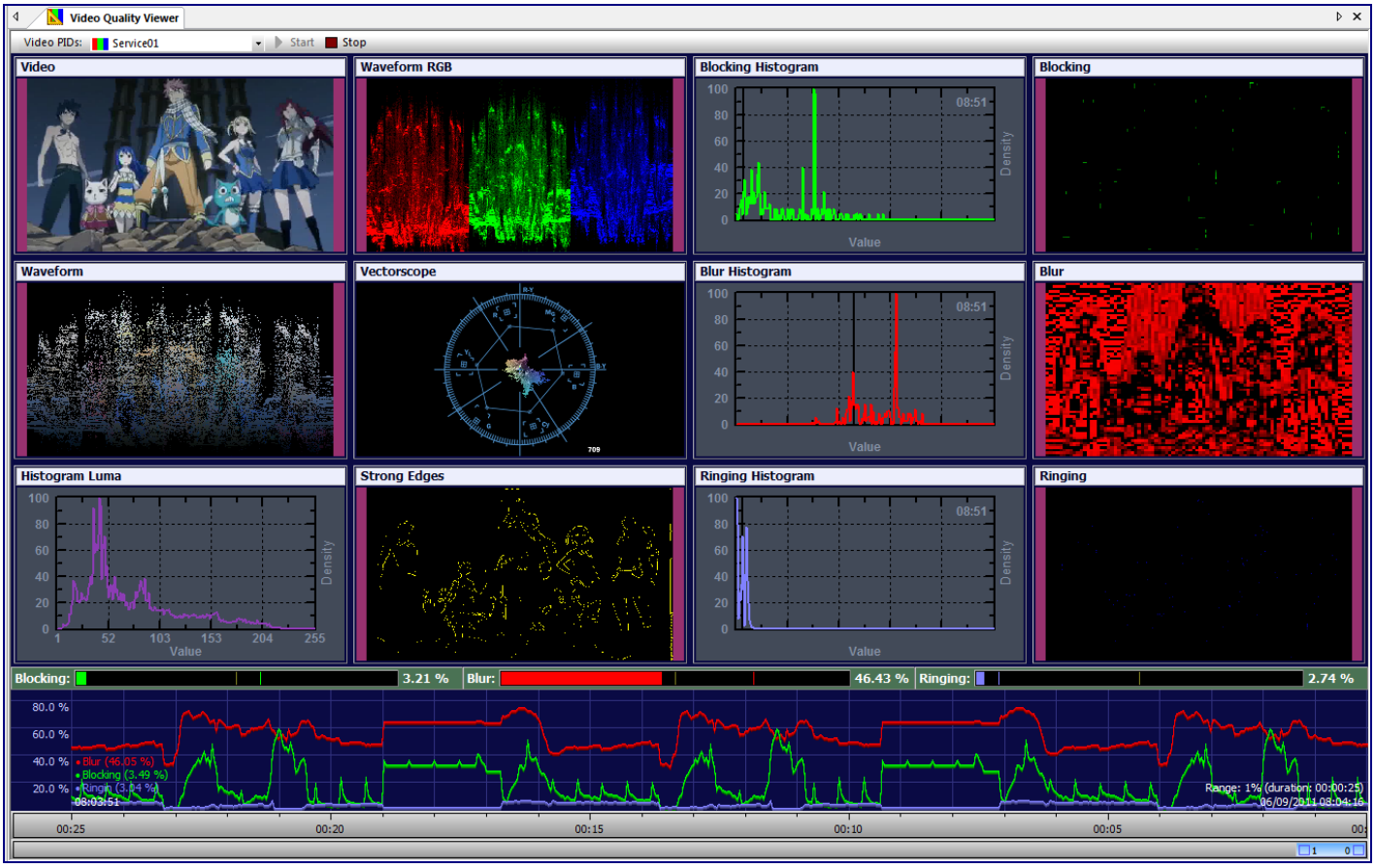
A Video PID pull-down selector can be used to choose the video which has to be analyzed.
Video Quality Analyzing can be stopped and started again, if the results have to be paused.

Besides using the Video PID pull-down selector, also using the right mouse button menu enables the possibility to select a video service component.

When using the right mouse button, the Video Quality menu can be selected.



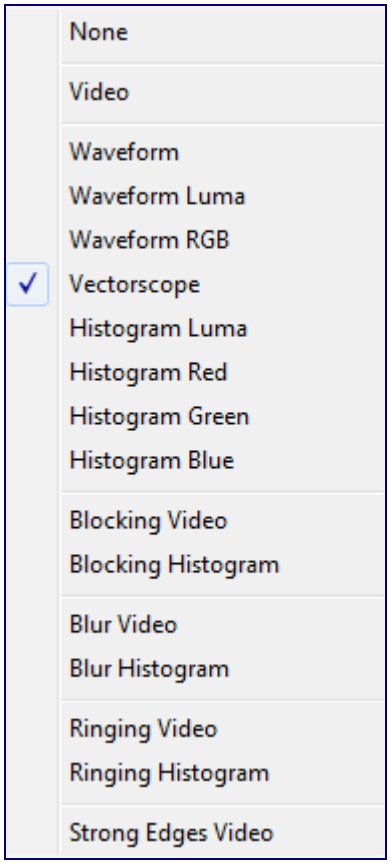
Bij dubbel clicking on an item, it will be shown fullscreen.



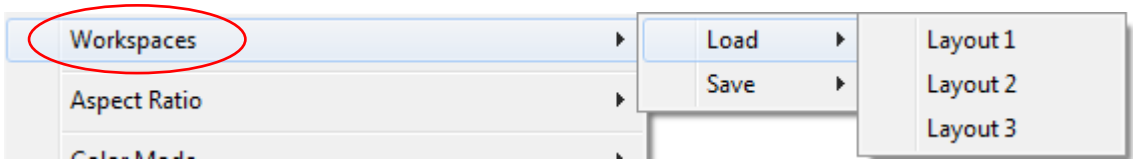
The number of items shown on a workspace can be selected:

- 1
- 2
- 4
- 6
- 8
- 9
- 12

For each item position a different measurement view can be selected:



3 different Workspaces can be used.



The preferred Aspect Ratio can be selected:

- Off
- Auto
- 1:1

The preferred Color Mode can be selected:

- ITU-R BT.601
- ITU-R BT.709

The preferred Vectorscope Mode can be selected:

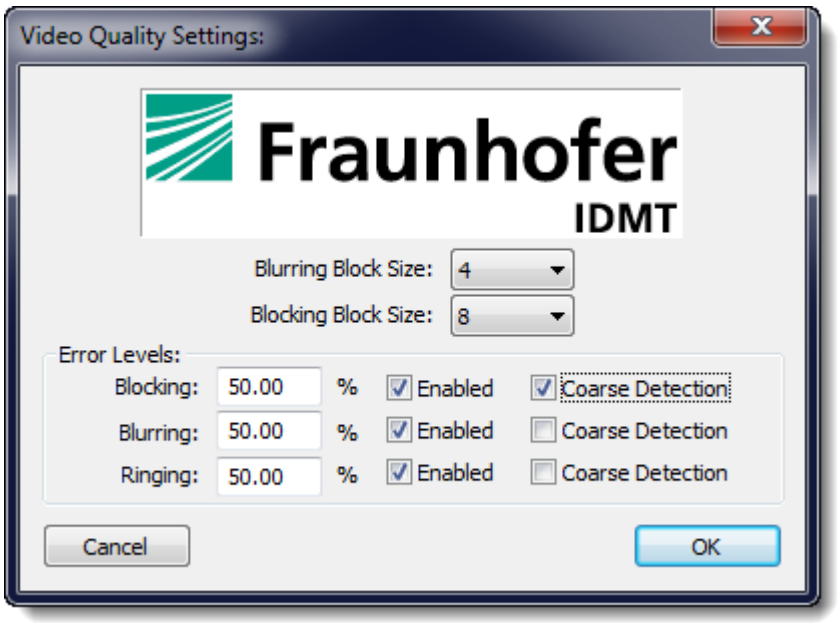
- Original Color
- Original Color Additive
- YUV
- Chroma
- Additive
- Line Mode

Reset Blocking/Blurring/Ringing Histograms.

Export data do Excel.

Settings

Blocking, Blurring and Ringing measurements are realized using the Fraunhofer IDMT Video Quality libraries.



The used Block Size can be setup voor the Blocking and Blurring mearuements algorithm.

For the Blocking Block size the values 4,8 or 16 can be choosen. Where 8 is the default.
For the Blurring Block size a value between 2 and 15 can be choosen. Where 5 is the default.

Also threshold Error levels can be setup for Blocking, Blurring and Ringing.

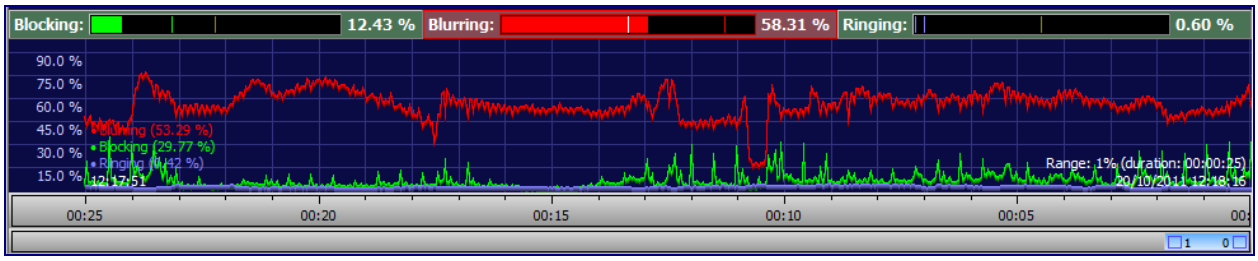
Enabling ‘Coarse detection’ will take less CPU.

When Blocking, Blurring or Ringing is measured above the error level different actions are taken:

- SNMP trap, if enabled
- Log line
- Bar color change

Blocking, Blurring and Ringing measurements

A Time visual representation is given of the Blocking, Blurring and Ringing measurements.

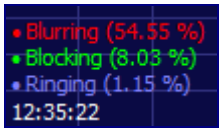


When a measurement is below the threshold error level the bar will be shown in green:

When a measurement is above the threshold error level the bar will be shown in red:

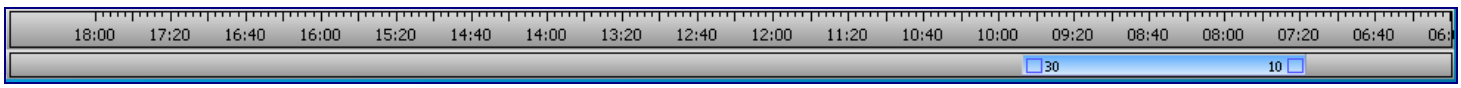
The white line in the bar represents the threshold value.

In the lower left corner a legend of all actual measurements is giving. Also the time of the left part of the time axis is given.



On the lower right corner, the zoom factor (percentage and time-duration) is given.
Below the date and time is given of the right part of the time axis.

1 hour of Blocking, Blurring and Ringing measurements be cached.



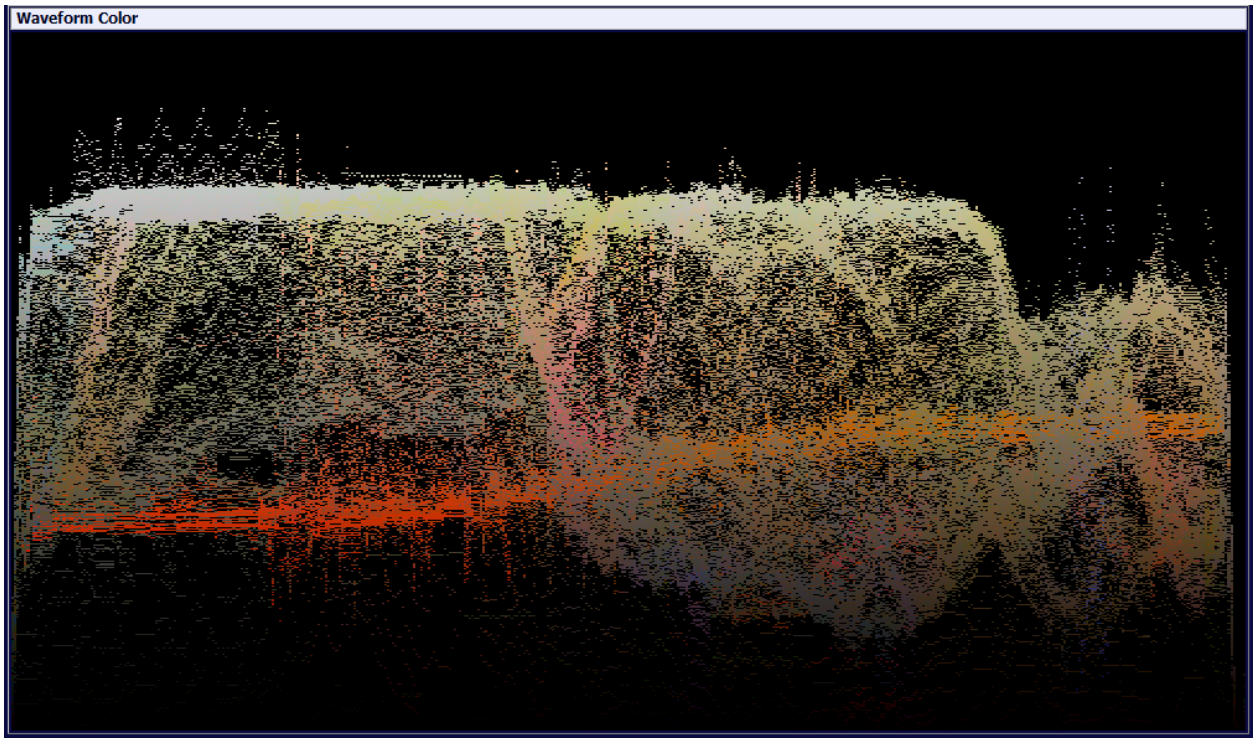
The maximum time graph is 60 minutes and the minimum time graph is 36 seconds.
With the zoom control the position and zoom factor can be altered.

39.1 Waveform

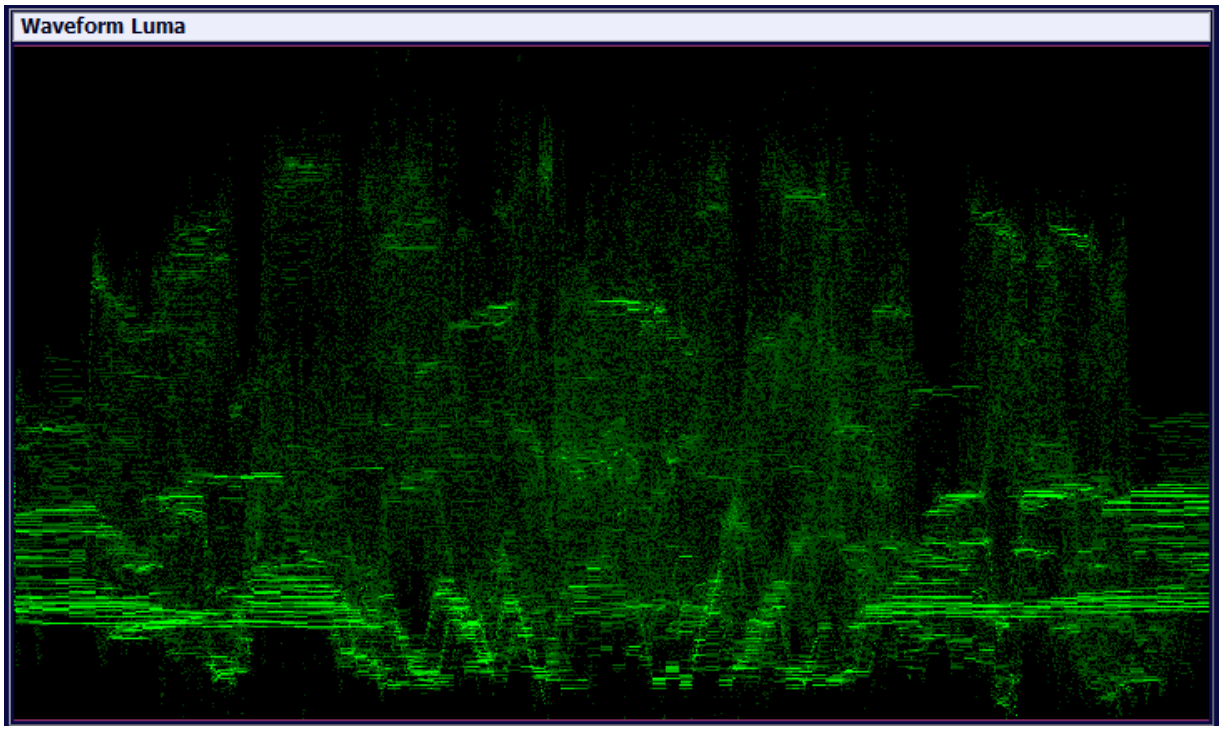
Waveform Color

Measurement for color hot-spots.

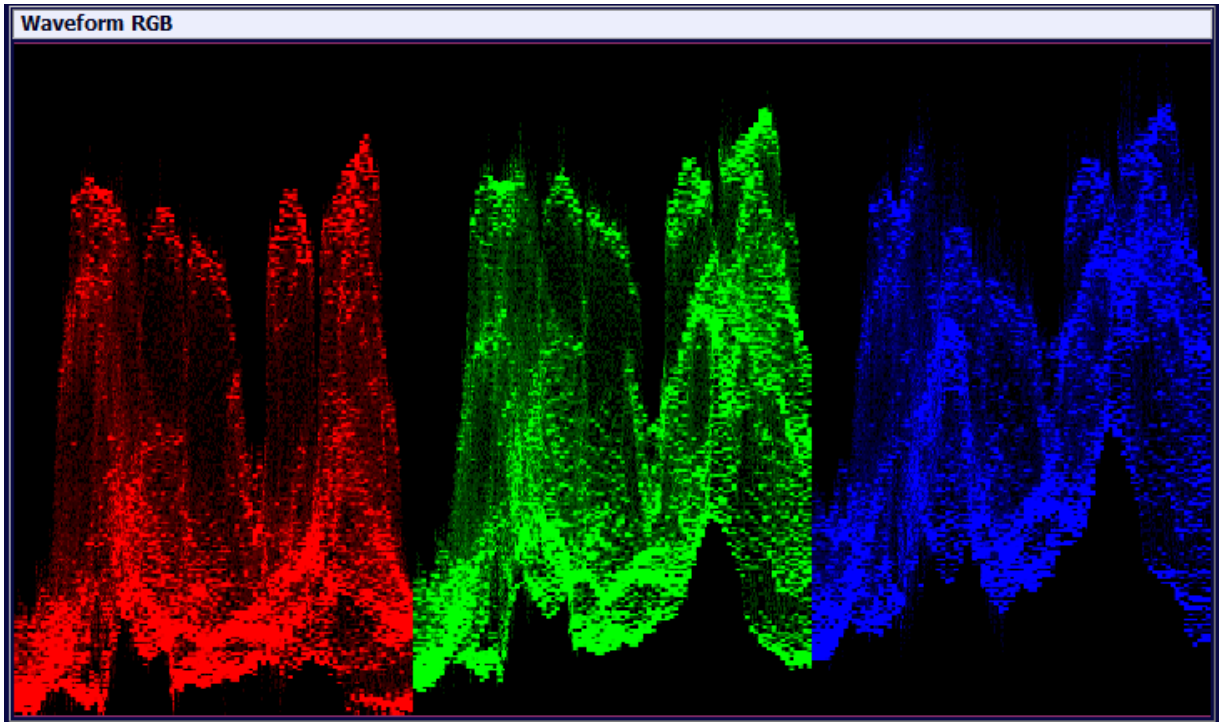
3 dimensions:
1) Dark pixels are shown at the bottom of the Waveform, bright pixels are shown at the top of the Waveform.
2) The horizontal position in a Waveform position is identical with the horizontal position in the image.
3) The brightness of a pixel in the Waveform stands for the amount of occurring pixels are in a column.



Waveform Luma



Waveform RGB

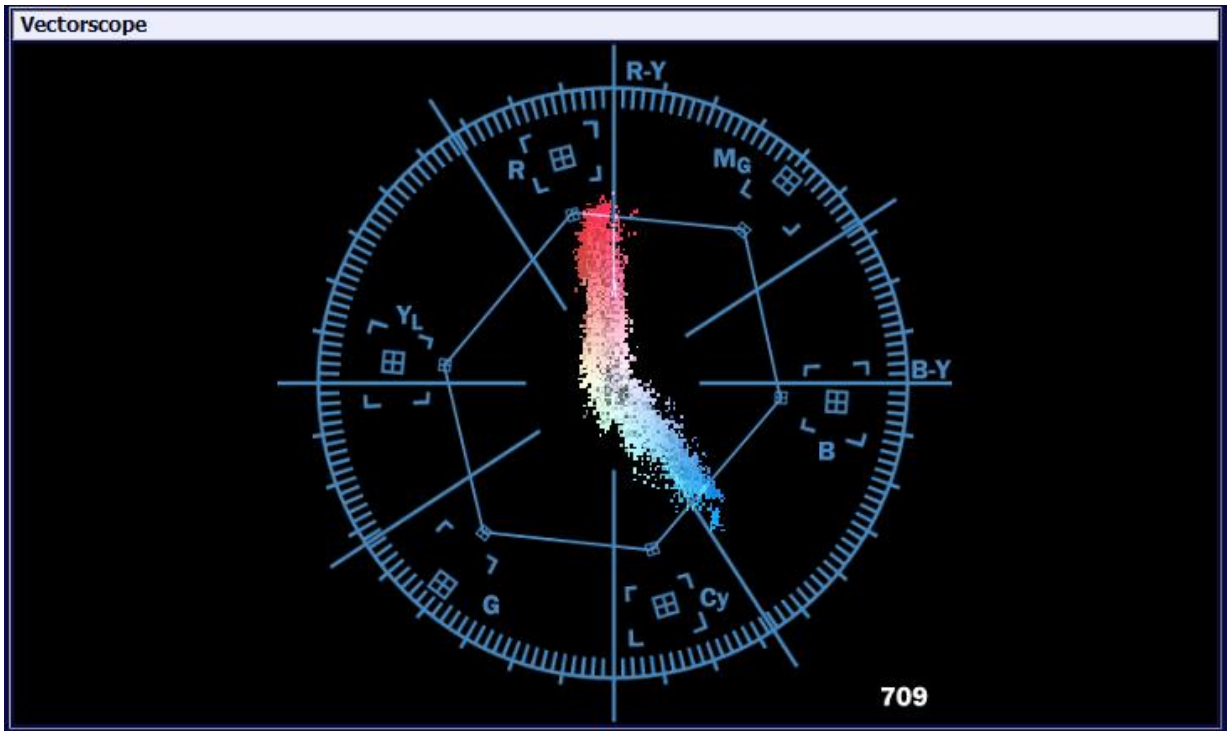


39.2 Vectorscope

Displays information about the chrominance (coloring) of an image.
Two dimensions: U and V.

Vectorscope mode
Different modes can be selected:

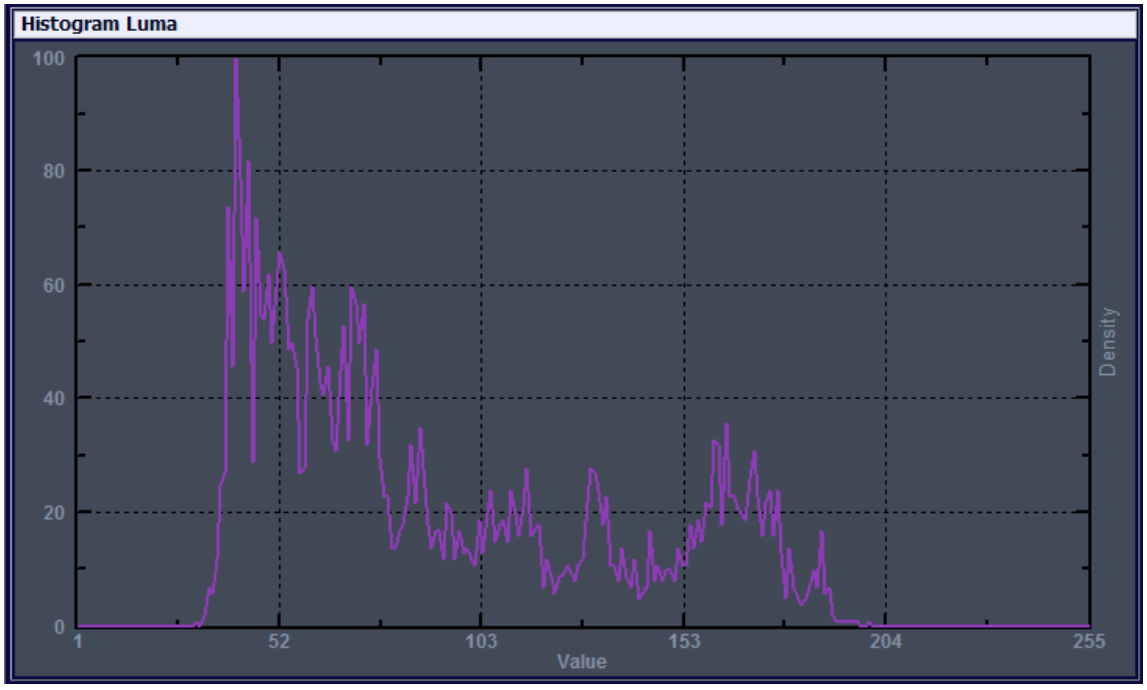
- Original Color
- Original Color Additive
- YUV
- Chroma
- Additive
- Line mode



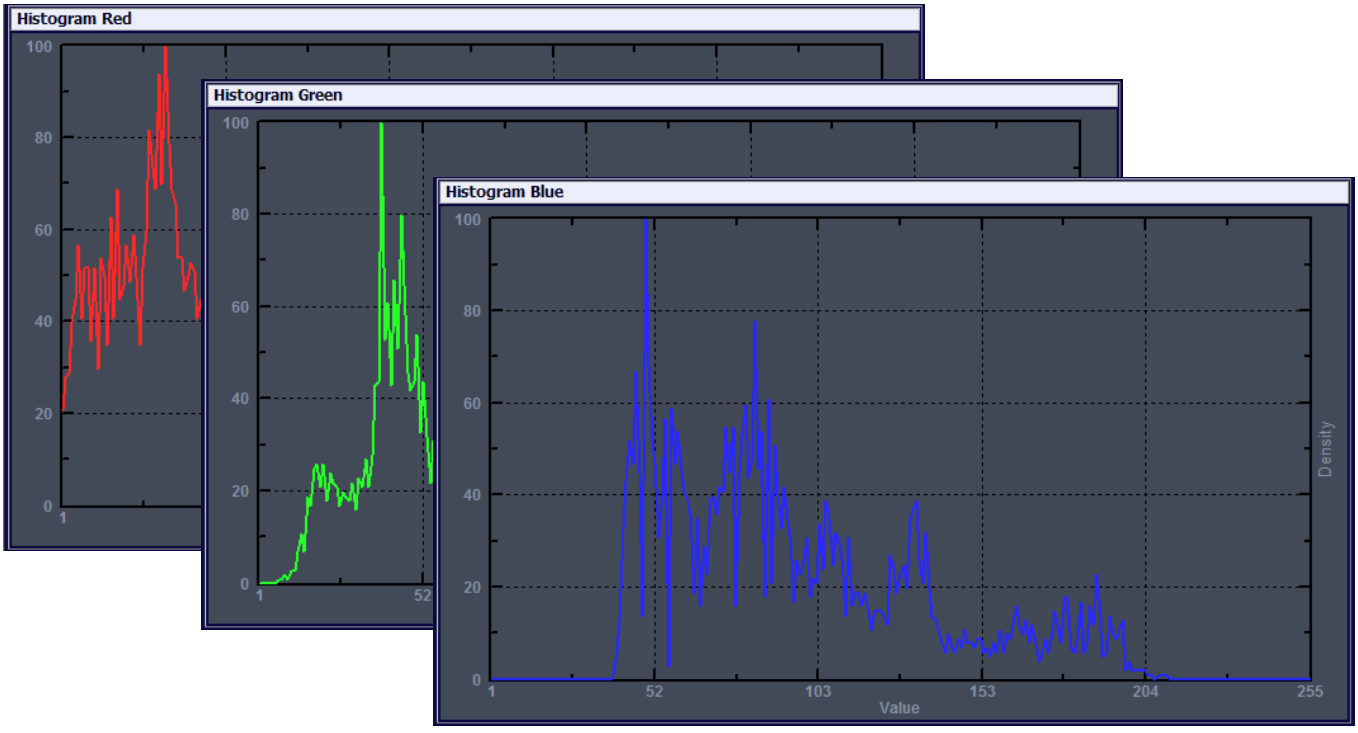
39.3 Histograms

Statistics, showing how often Luma/Red/Green/Blue pixels occur in an image.

Luma

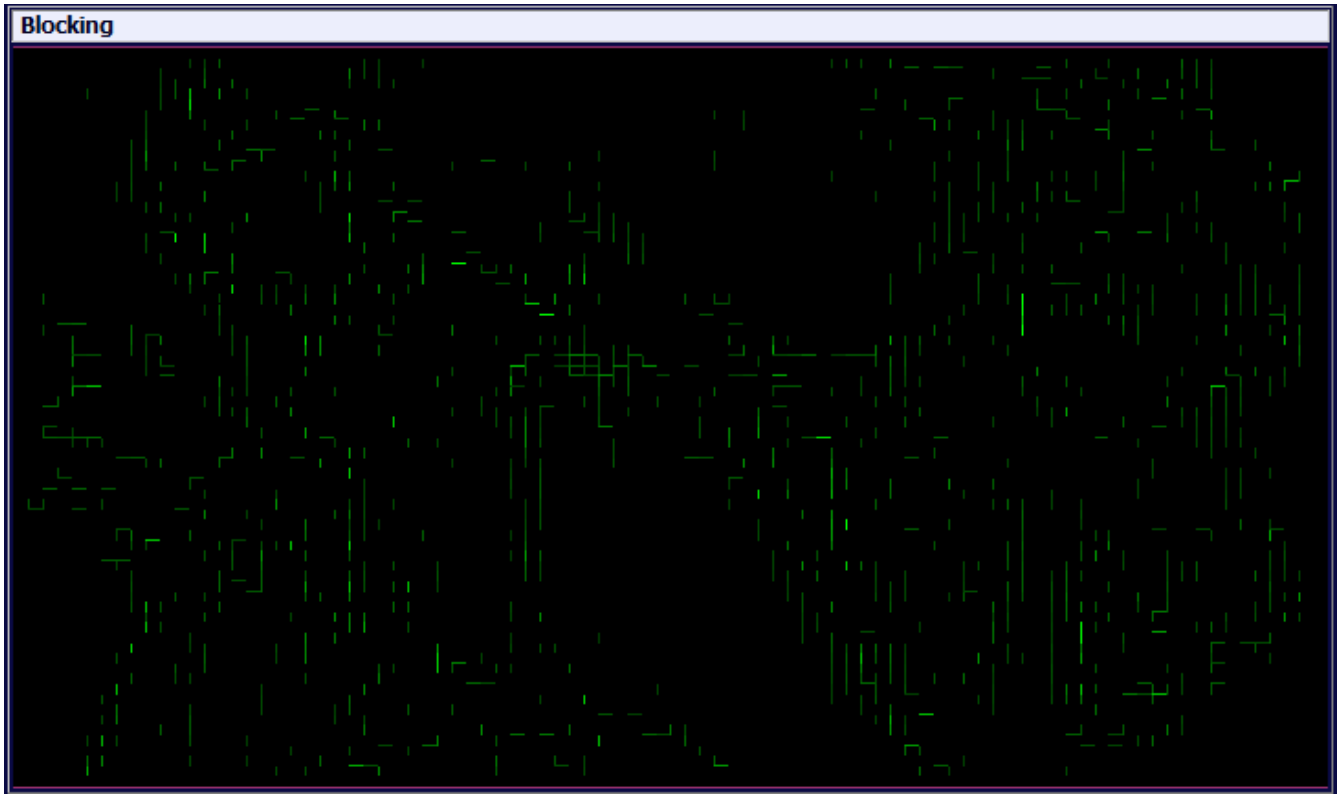


Red, Green and Blue



39.4 Blocking

Measurement of image distortion characterized by the appearance of an underlying block encoding structure.



Appearance
Blocks, commonly 8x8 pixels

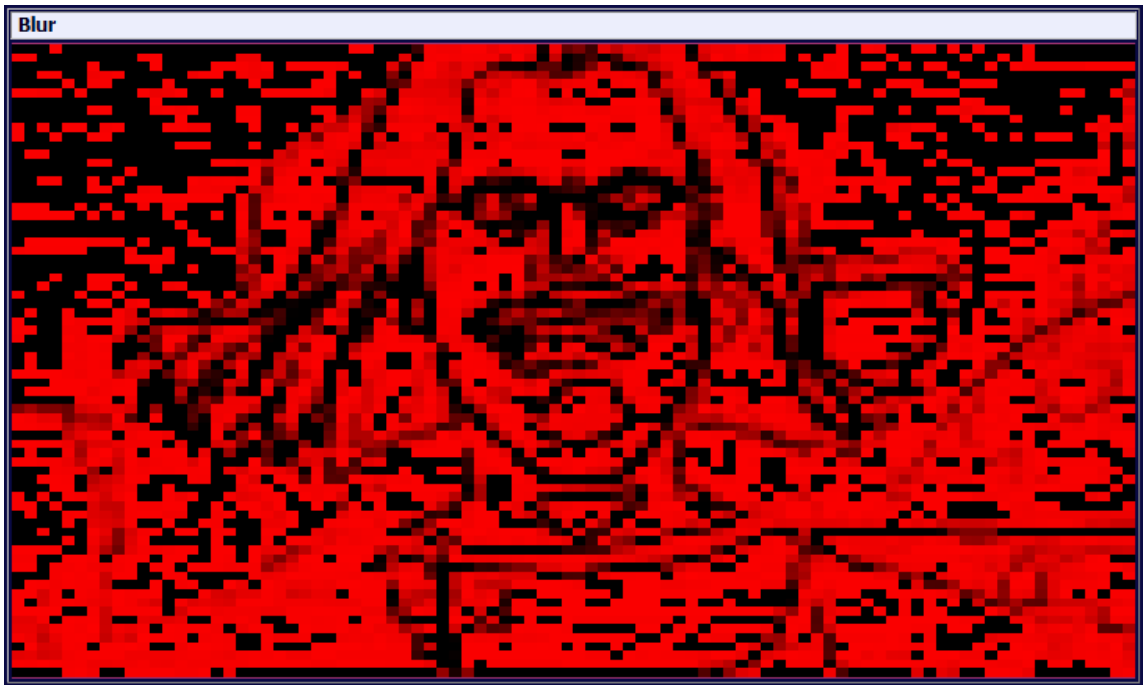
Cause
E.g. coarse quantization of DCT coefficients

Principle effects
The higher the compression degree, the more artifacts appear

According to the fix n*n processing block size (e.g. n=8), the blocking visualization has the same n*n grid, with local values between 0...255. The estimation of a global measurement is between 0...100.
By definition, n*n blocking artefacts only occurs on borders of an n*n grid. Thus, a global result can be estimated referring to an n*n grid.
The local results are compared with the reference grid, which is set to a maximum value of 255. Consequently, a 'theoretical' maximum blocking detection result (100%) would be reached if the error visualization is coincident with the reference grid.

39.5 Blurring

Measures the sharpness of an image. Less sharp means higher blurring.



Appearance
Loss of spatial details in regions with high spatial activity (e.g., textures)

Cause
E.g., rejection of AC coefficients of higher order while coarse quantization

Principle effects
Smoothing of spatial details

The Blur detection is performed on a local region of n by n pixel; the default size is 5x5 pixels and can be adapted by setting the parameter BLUR_RESOLUTION. The size can depend on the spatial resolution of a video frame. Thus, it is recommended to use a larger size for high definition than for standard definitions. 100% Blur would mean a complete white visualization image, a 0% Blur would mean a total black resulting image with the reference grid.

39.6 Ringing

Measures in strong edge areas for ringing behavior.

Appearance
On high-contrast edges

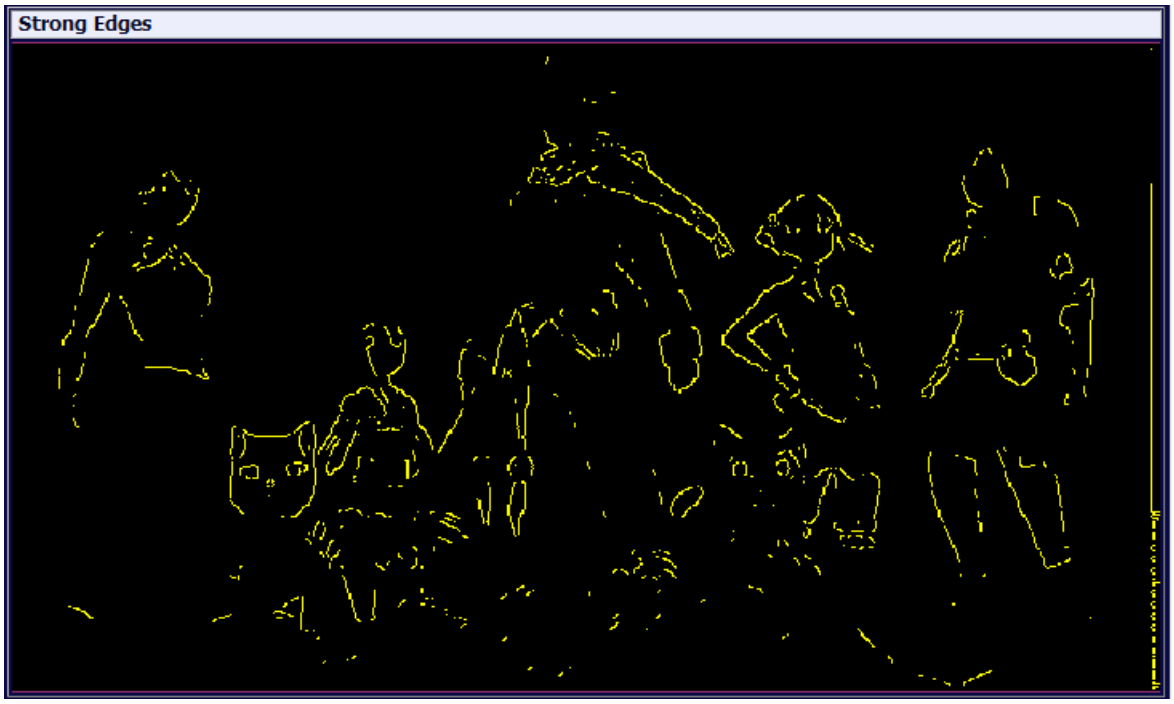
Cause
Waves or oscillations around the edges, quantization errors

Principle effects
Cancellation of high-frequent transform coefficients

Ringing is defined by the Gibb phenomenon. Since ringing occurs only on strong edges, the detection for ringing is only performed on such gradients. The result concerns the occurrence of ringing along strong edges. The highest value to be measured (100) would be the same occurrence of strong edges, which were detected in a previous processing step. Similar to the blocking measurement behavior, the result could lead to a low measurement value even though the human perception of ringing is significant higher. By definition Ringing occurs on strong edges, caused by high contrast between neighboring pixels. Similar to blocking, the local results shown in the error visualization are compared with a reference frame containing strong edges. with the reference grid.

39.7 Strong edges

Potential areas where ringing could occur.



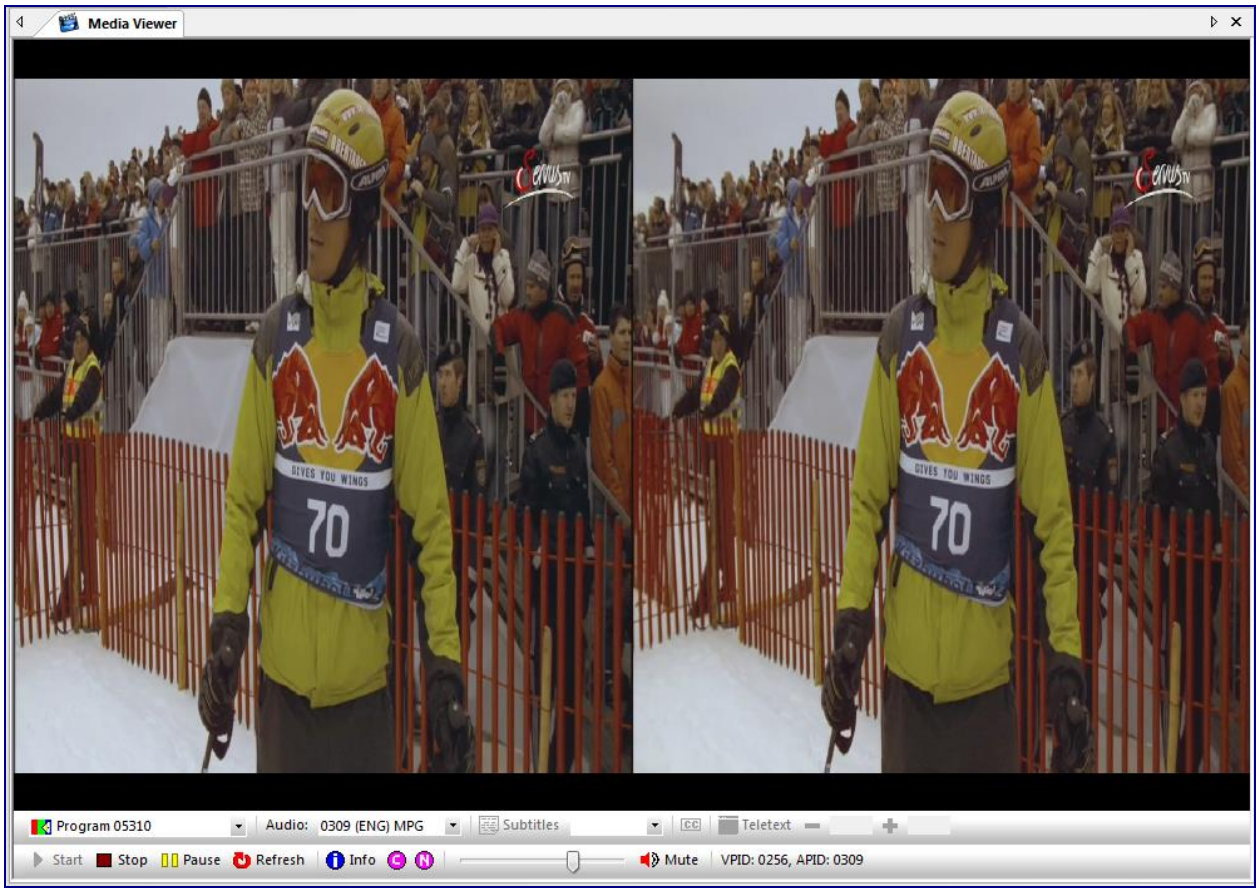
Option ‘3D’

- 3D Media Viewer support

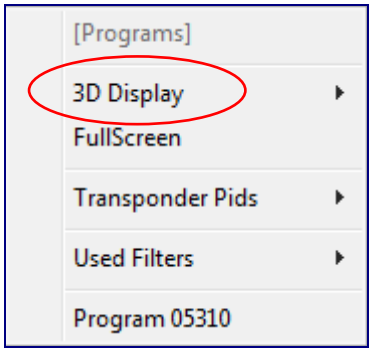
40 3D Media Viewer support

3D viewing

When the 3D option is enabled, Media Viewer can show a ‘Side By Side’ (SbS) or ‘Top and Bottom’ (TaB) 3D video in Anaglyph 3D.



When using the right mouse button, the 3D Display menu can be selected.

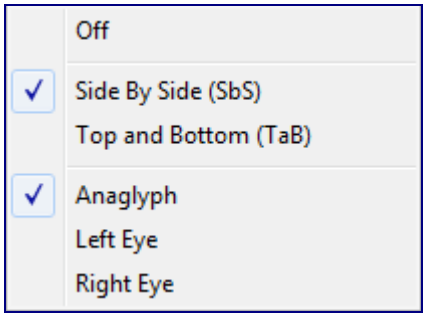


The type of 3D content can be selected

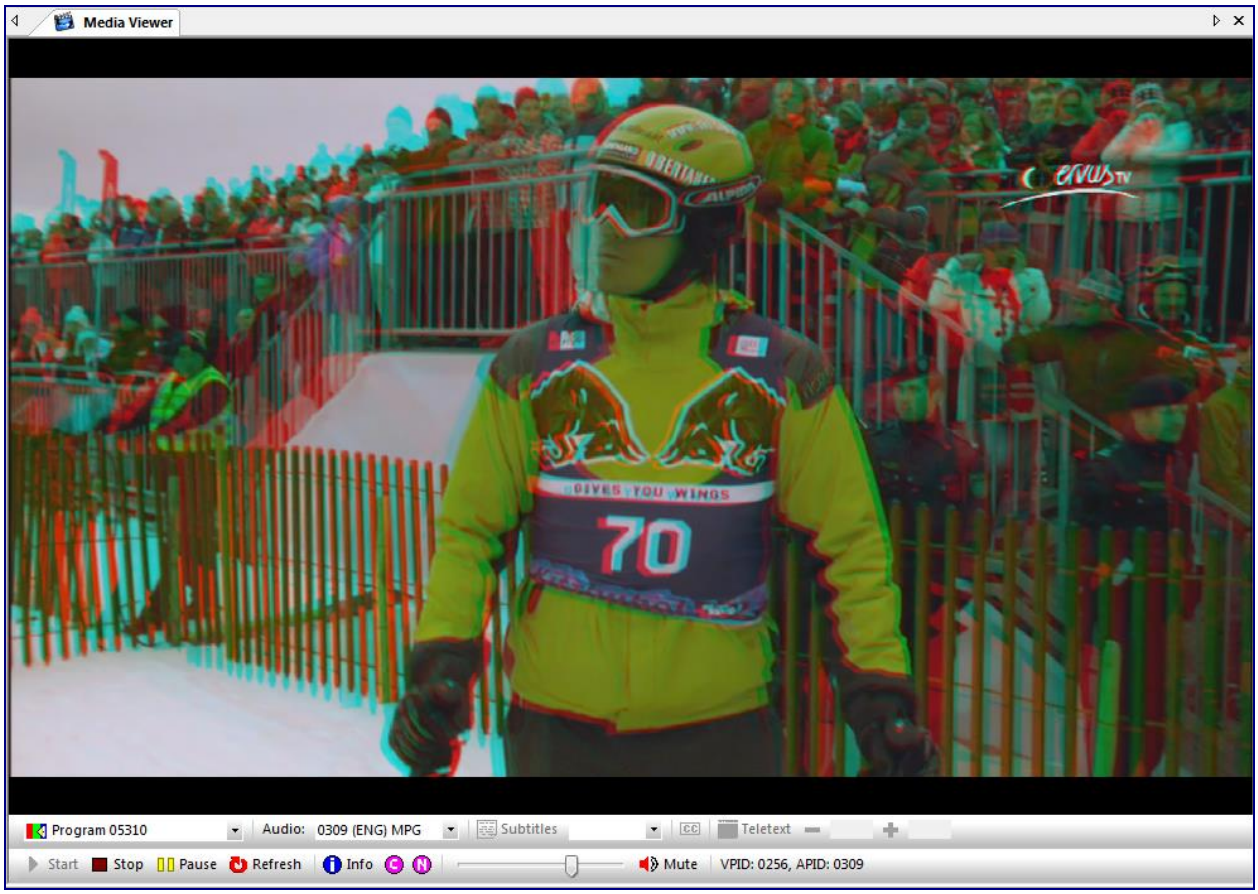
- Side By Side (SbS)
- Top and Bottom (TaB)

Video can be displayed in:

- Anaglyph
- Left Eye
- Right Eye



After selecting Anaglyph the video can be watch, using 3D glasses.



Full Screen

There are 2 possibilities to show the video full screen:

- Double click on the video
- Use the right mouse button and select Full Screen

Option ‘AA’

- Audio Viewer
- Loudness Viewer
- Audio Metadata Viewer
- RDS Viewer

41 Audio Viewer

Audio viewing

5 different display types can be used for in-depth audio analyzing:

- Samples
- Equalizer Bars
- Frequency Spectrum
- Spectrograph
- Goniometer

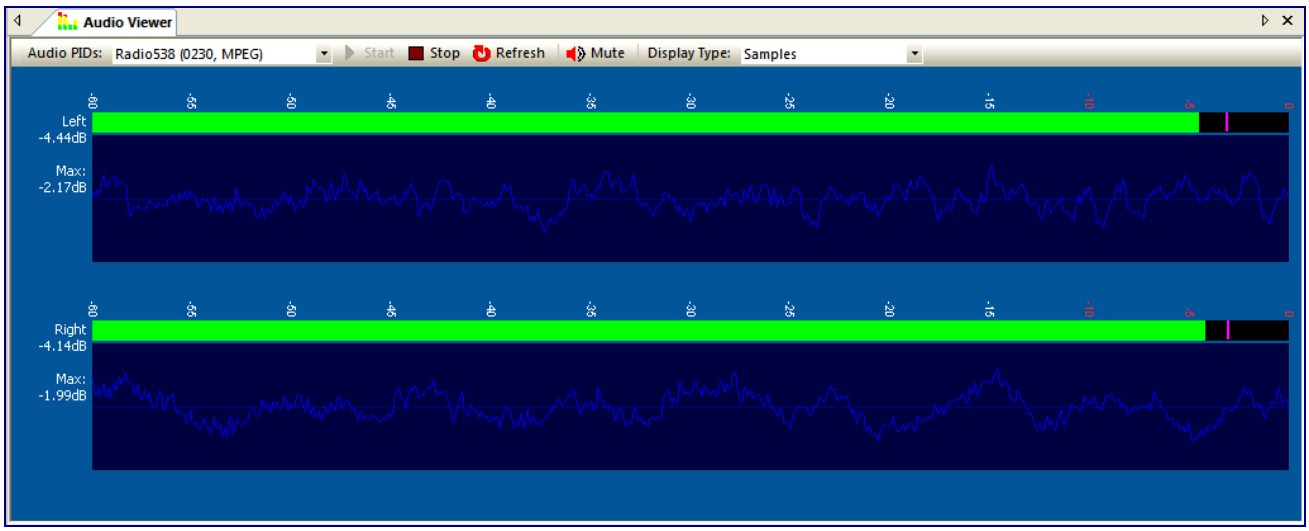
All (not scrambled) audio components can be listened to.

It is possible to mute/select a specific audio track, by clicking on it.
When holding down the <ALT> button multiple audio tracks can be selected.

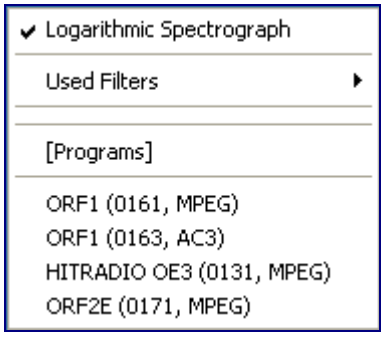
Audio Viewer can be opened more than once!

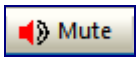
41.1 Samples

Visualization of Peak and audio sample measurements. On the Left of the view, the actual and maximum value (till latest measurement) of the peak value is given.



An audio component can be selected either via the pull down button or via clicking the right mouse button.



Audio can be muted easily on/off, either via the 

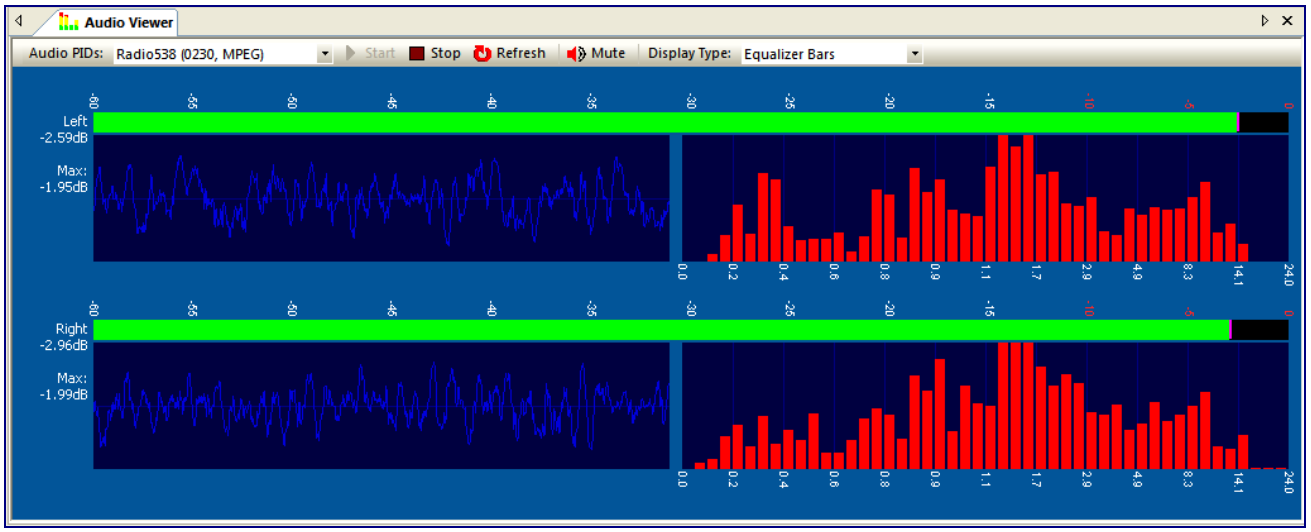
button or typing “m” on the keyboard.

Different short keys can be used:

Key	Description
+	Next channel
-	Previous channel

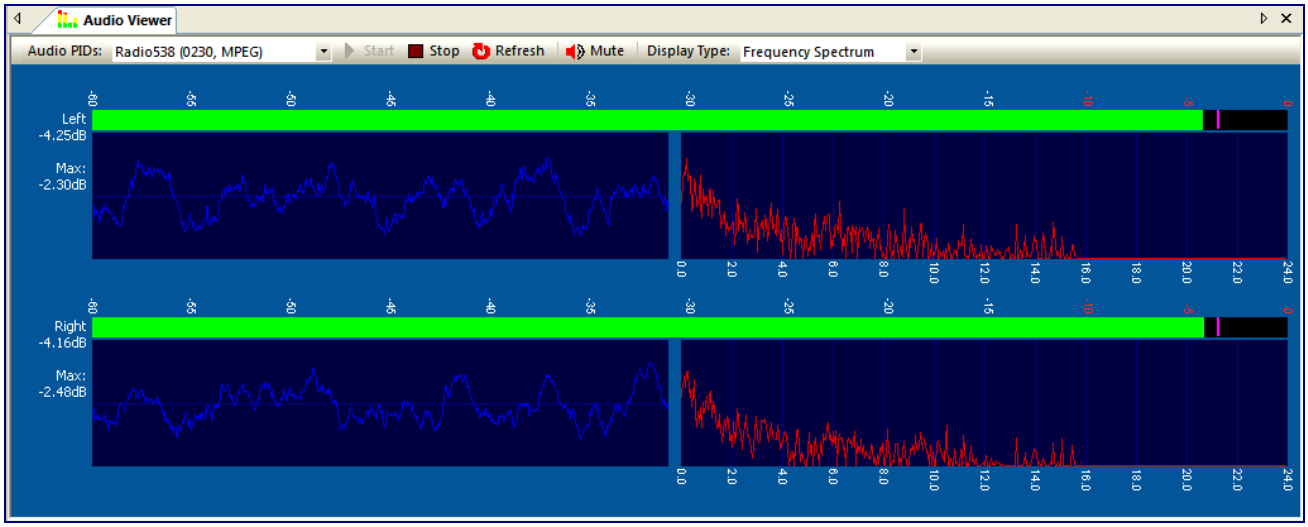
41.2 Equalizer Bars

Besides the samples and peak measurement, also the Equalizer bars of the audio spectrum are displayed. Different types of audio (mono, stereo, surround) can be displayed.



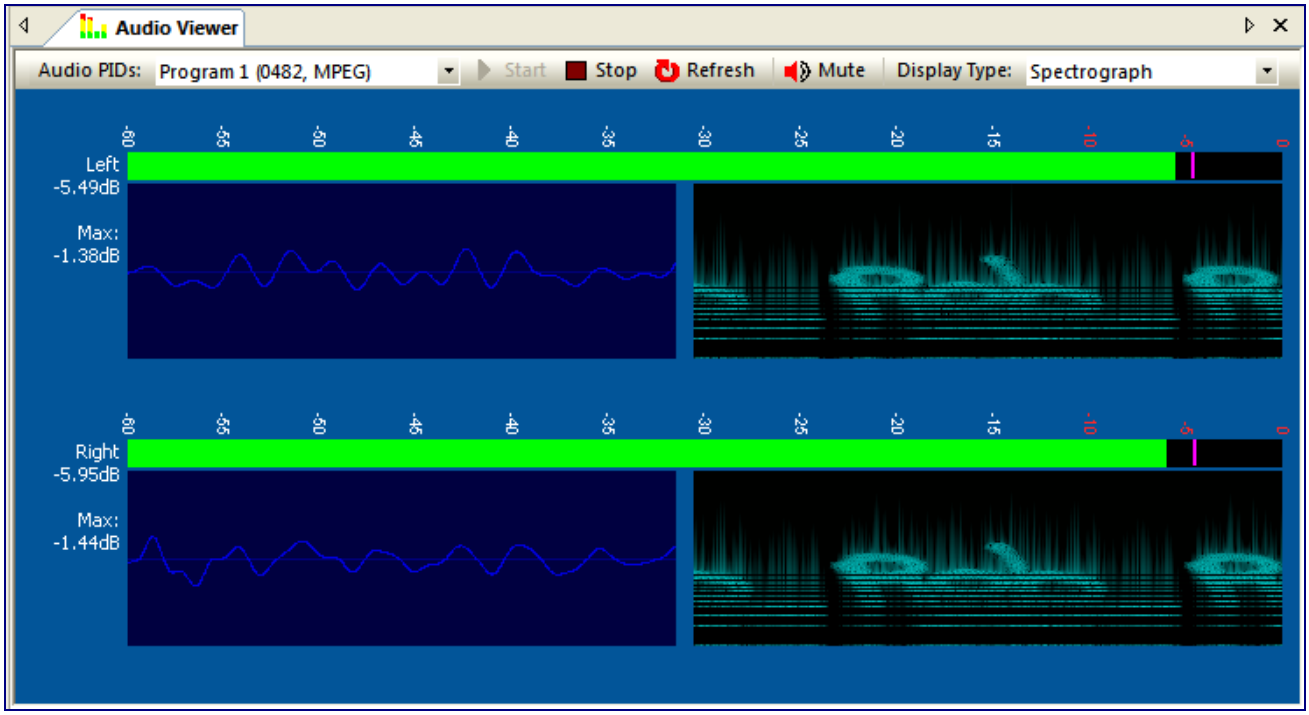
41.3 Frequency Spectrum

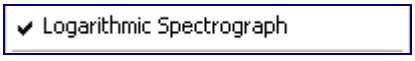
Besides the samples and peak measurement, also the Frequency Spectrum of the audio is displayed.



41.4 Spectrograph

Besides the samples and peak measurement, also the Spectrograph of the audio is displayed.

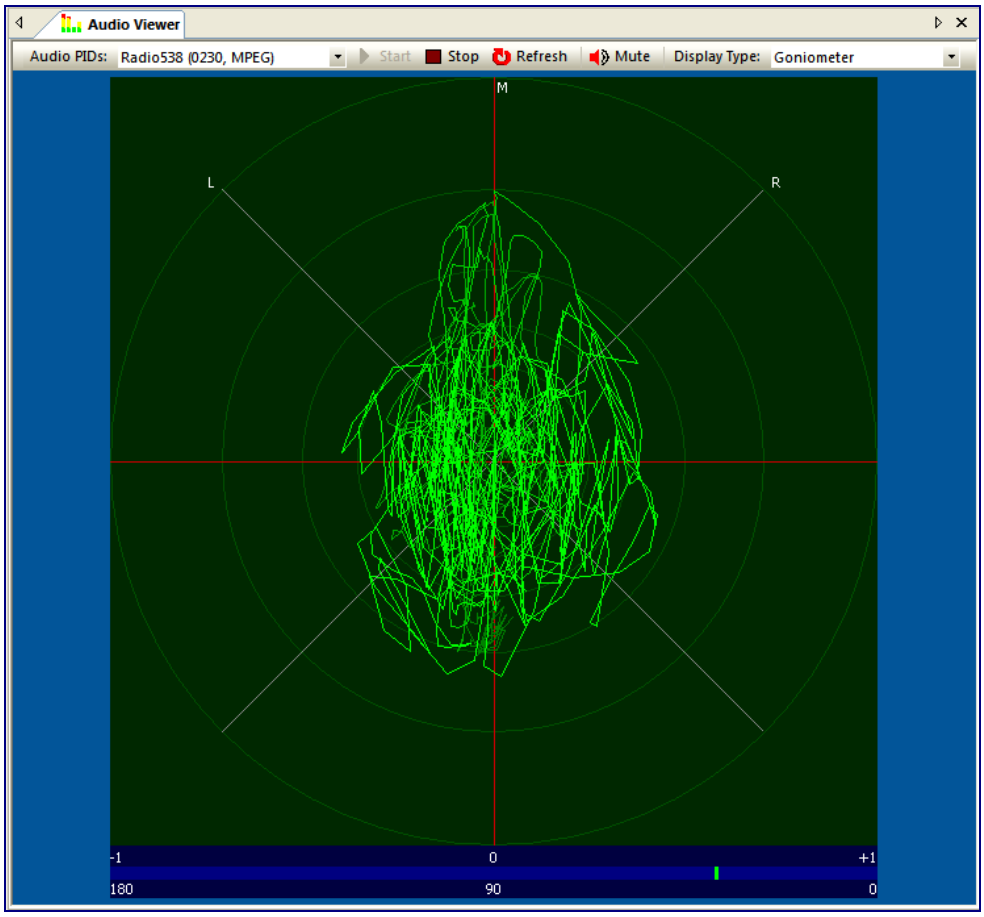


Via the right mouse button, a selection can be made for 

41.5 Goniometer

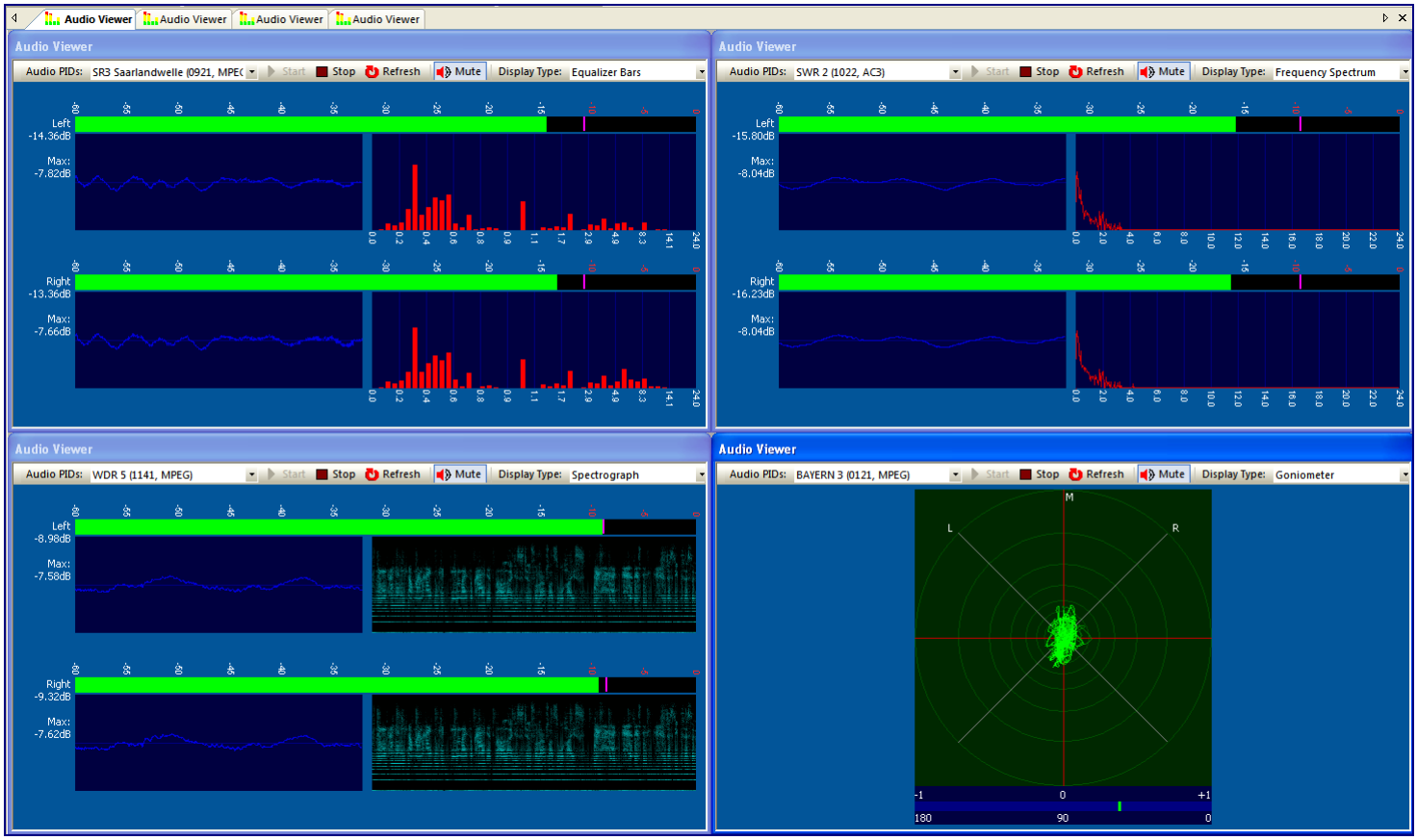
Analyzing the amount of stereo (phase differences) in dual-channel audio signals.
This kind of measurement is also known as a audio phase meter.

On the bottom the Phase correlation display is given.



41.6 Examples

4 different channels, using different display types



3 Audio Viewers, analyzing 3 different channels

42 Loudness Viewer

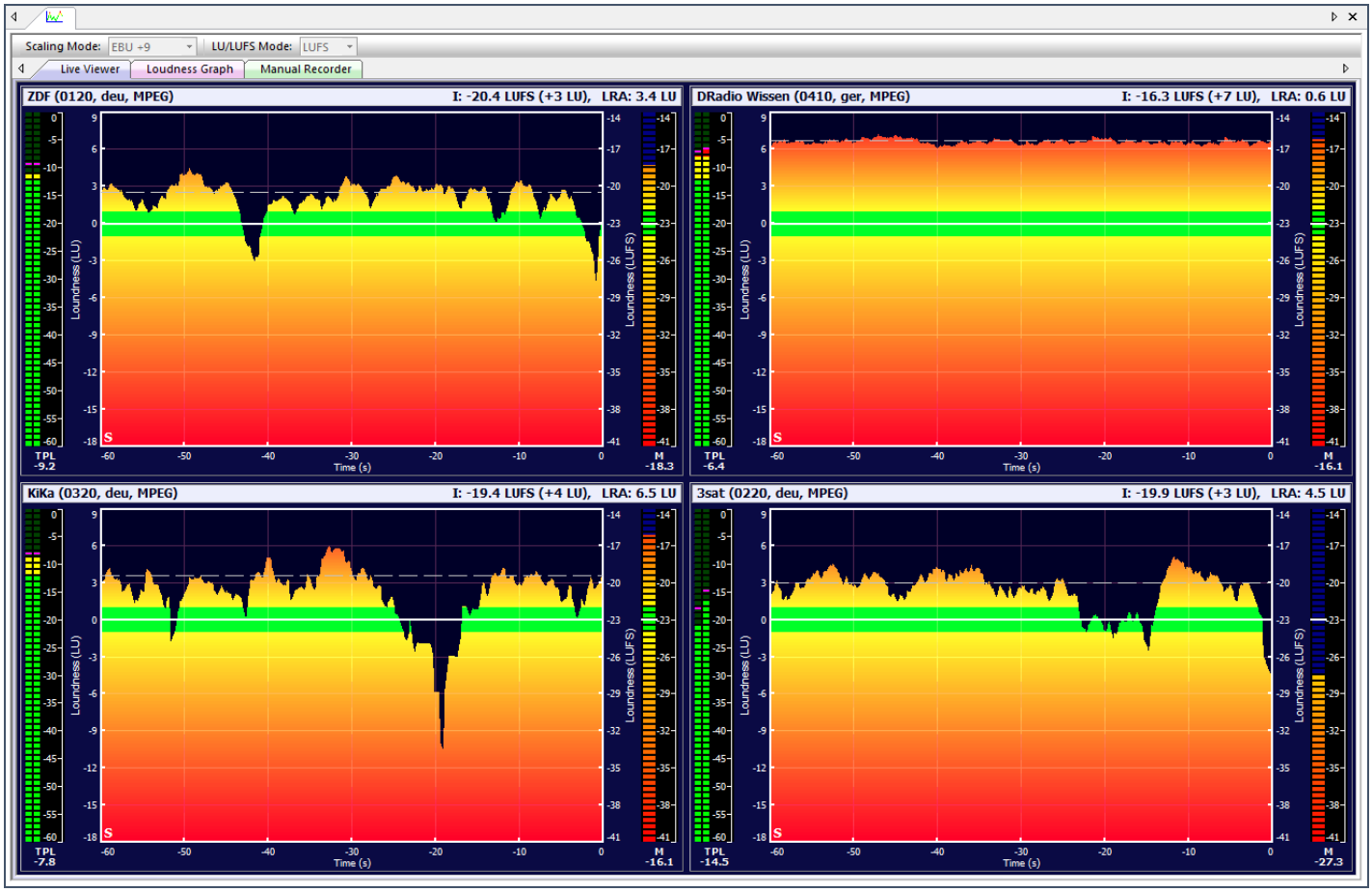
Loudness Viewer measures Loudness according to the ITU-R BS.1770-4 standard and EBU R-128 recommendations.

Different views can be chosen to get maximum information:

- Live Viewer
- Loudness Graph
- Manual Recorder

42.1 Live Viewer

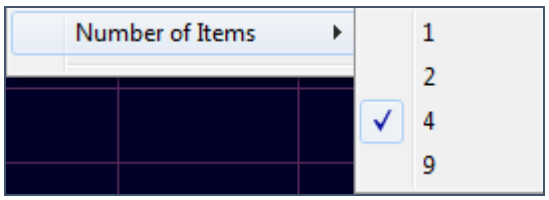
Up to 9 Live Loudness meters.



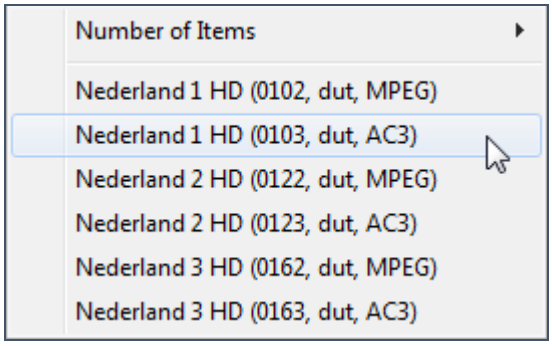
Presentation of:

- Short Term Loudness measurements over 60 seconds:
  - Color scaling (red, yellow) showing the difference with the target level
  - White line showing Target Loudness level
  - Green showing the ± 1 LU tolerance
  - Dashed line showing the Integrated Loudness value of the last 60 seconds
- Momentary Loudness
- True Peak Level
- Integrated Loudness over last 60 seconds
- Loudness Range (LRA) over last 60 seconds

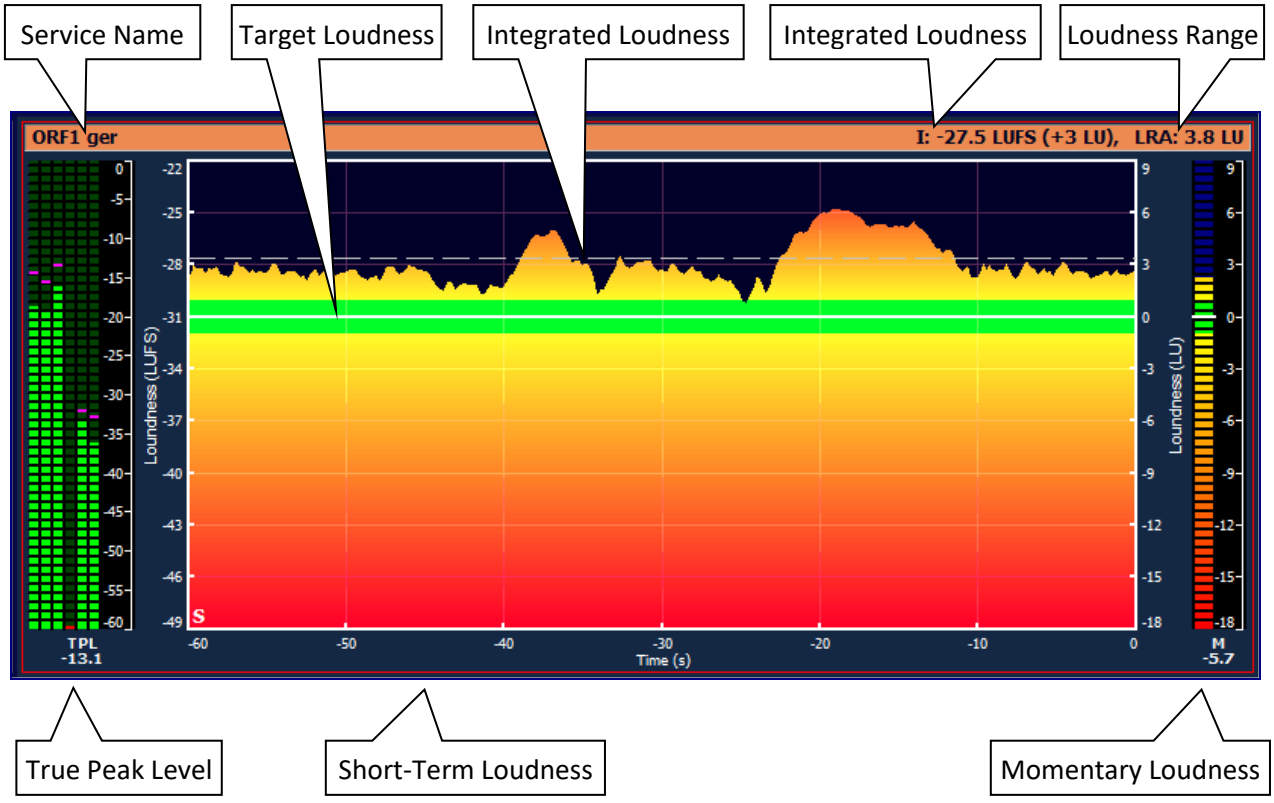
When pressing the right mouse button the number of Viewers can be selected



When pressing the right mouse button for each Viewer an specific audio component can be selected.



Pressing the left mouse button on a Viewer, this audio is selected (braun top and red border).
When selected the audio can be listened to.



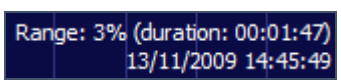
42.2 Loudness Graph

Momentary loudness metering (ITU BS.1770-4) of multiple audio signals, using 400ms integration time.

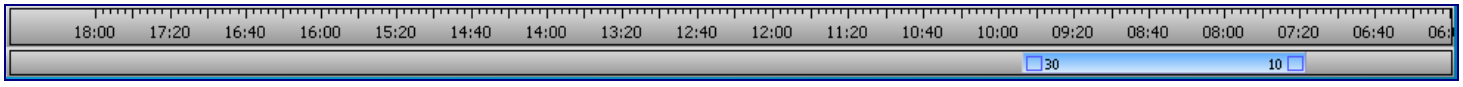
Audio PIDs can be selected via manual selection, by clicking the boxes behind the service names.
When selecting an audio component, which gets bold, it can be listened to.

In the lower left corner a legend of all selected PIDs is giving. Also the time of the left part of the time axis is given.

On the lower right corner, the range factor (percentage and time-duration) is given.
Below the date and time is given of the right part of the time axis.



1 hour of Loudness information off all audio PIDs will be cached. So after selecting audio PIDs the begin and end time of the measurement can be selected.

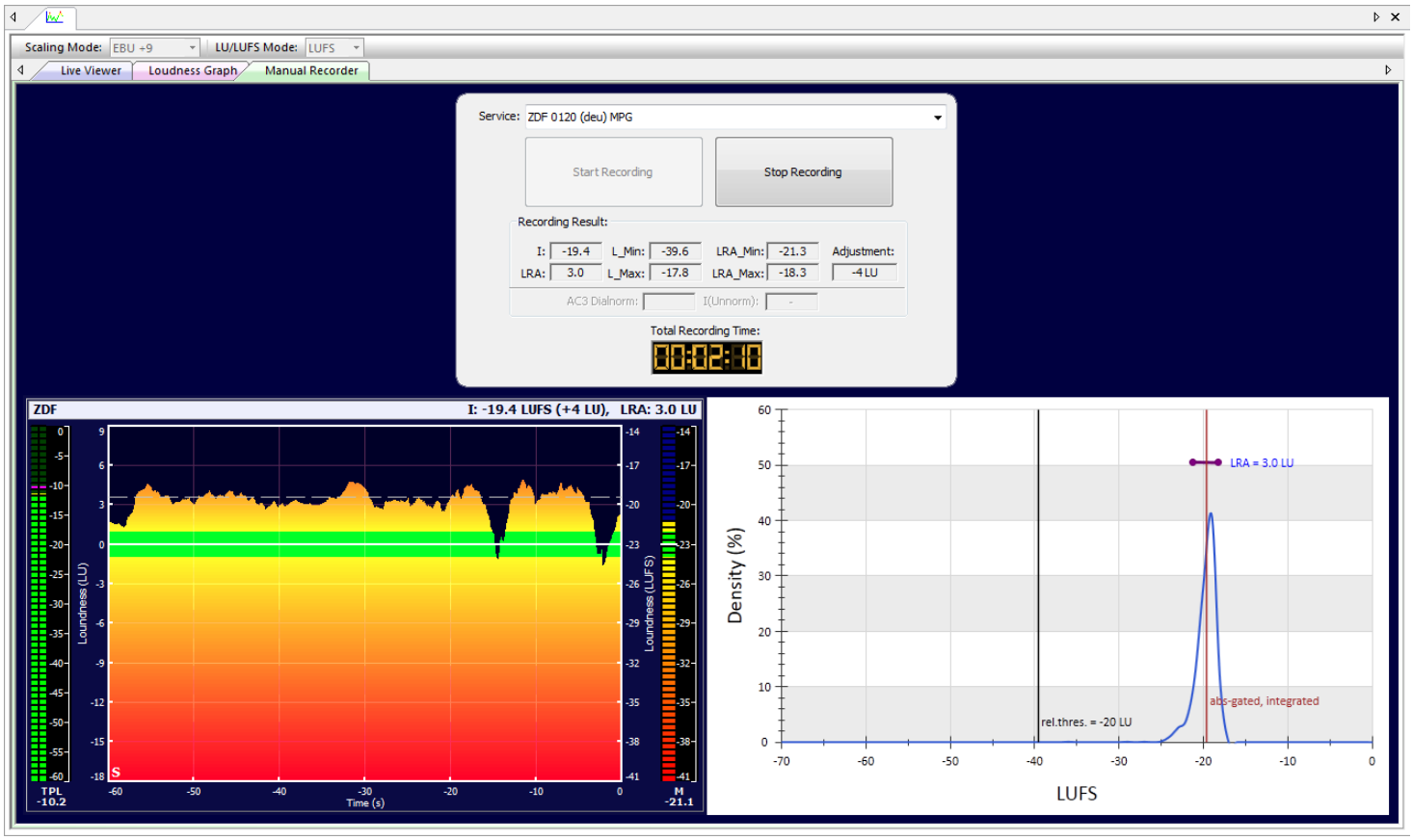


The maximum time graph is 60 minutes and the minimum time graph is 36 seconds.
With the zoom control the position and zoom factor can be altered.

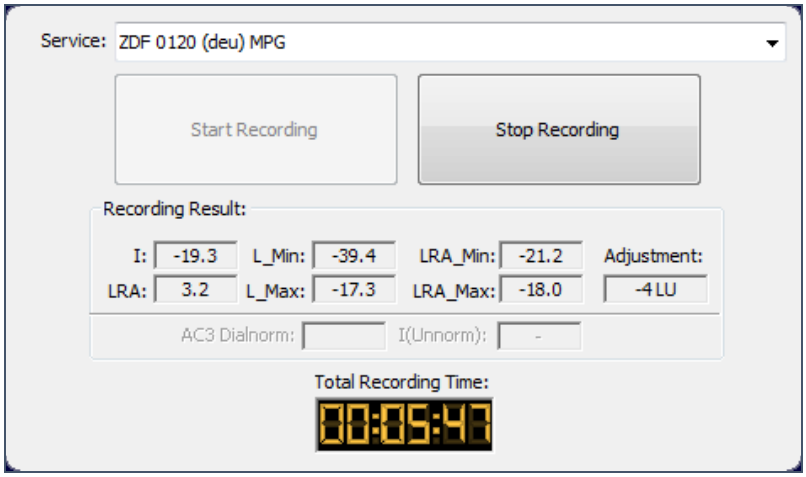
A red line is given on the time axis, if a time (PCR) discontinuity is measured.

42.3 Manual Recorder

Loudness measurement based on a Manual recording.



Recording dialog



Service
Service Selection

Start Recording
Button, to start recording

Stop Recording
Button, to stop recording and calculate measurement values

I
Integrated Loudness value of recorded event

LRA
Loudness Range of recorded event

L_Min
L_Min Loudness value of recorded event

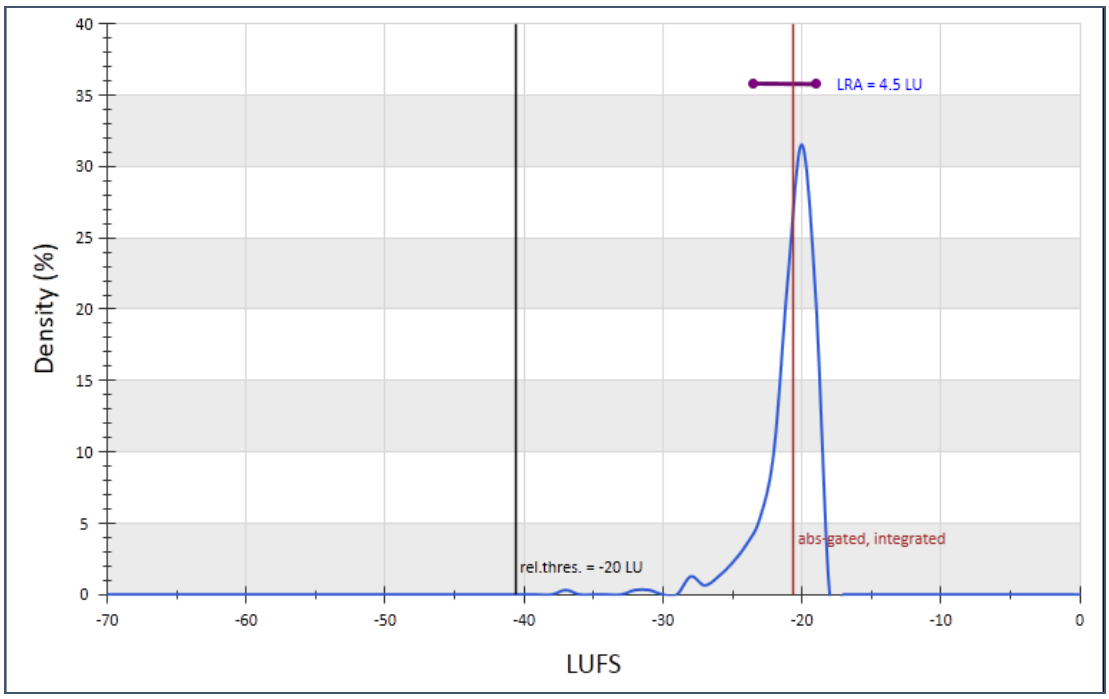
L_Max
L_Max Loudness value of recorded event

LRA_Min
LRA_Min Loudness value of recorded event

LRA_Max
LRA_Max Loudness value of recorded event

Adjustment
Audio Level Control adjustment

Loudness Density

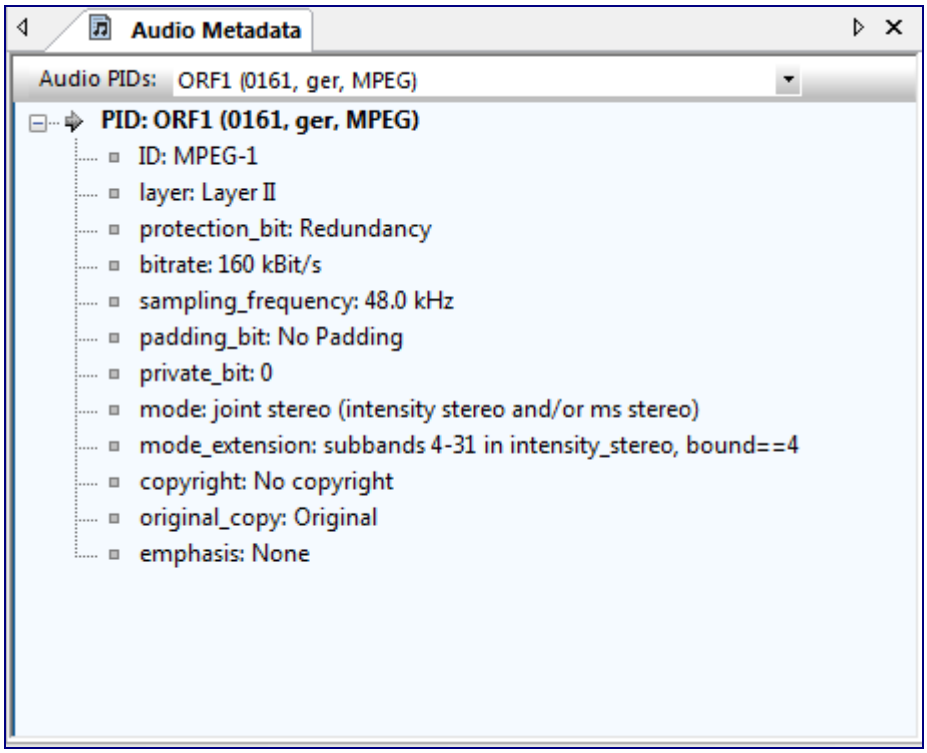


43 Audio Metadata Viewer

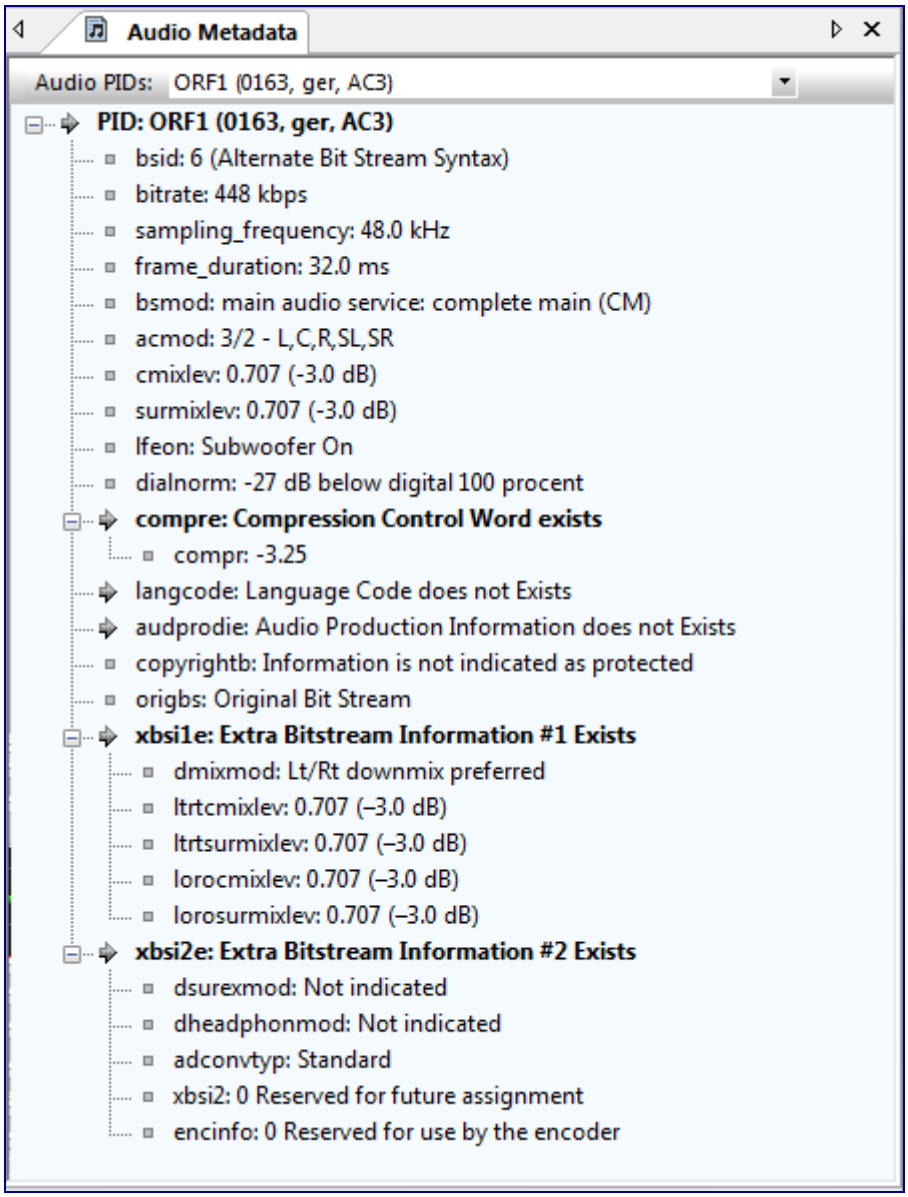
Audio Metadata

All audio metadata is displayed for the selected audio PID.

MPEG-1, Layer II example



Dolby Digital example



Dolby-E example

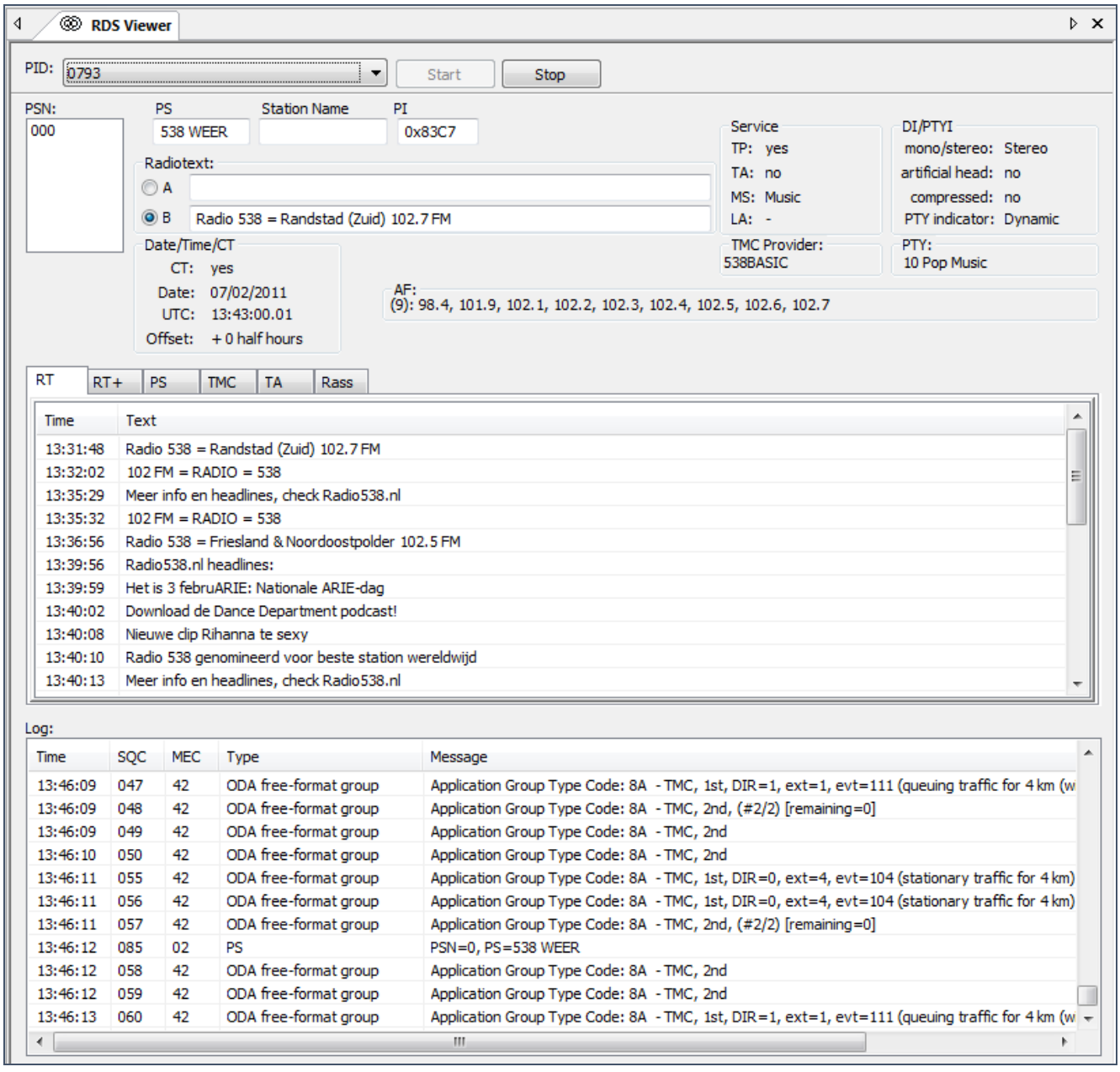
44 RDS Viewer

Radio Data System (RDS) viewing

RDS Viewer measures the RDS (Radio Data System) communication protocol standard, which is used for embedding small amount of digital information in conventional radio broadcasts. The RDS system standardizes several types of information transmitted, including time, station identification and program information.

RDS can be received from:

- MPEG audio, Aux section
- Private PES PID

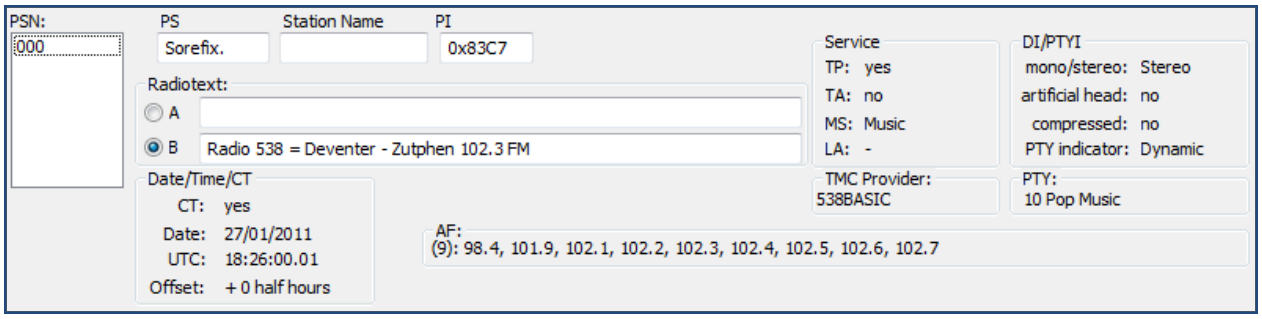


See appendix D for all abbreviations and classes.

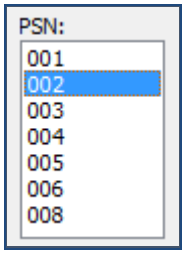
PID
Selection of the PID, with RDS information.

Start
Start RDS measurement.

Stop
Stop RDS measurement.



PSN
Selection of the Program Service Number (PSN), which should be analyzed.



PS
Program Service name.

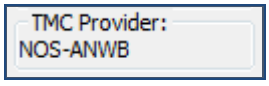
Station Name
Station Name

PI
Program identification

Service
TP Traffic-program identification
TA Traffic-announcement identification
M/S Music/speech switch
LA Linkage Actuator

DI Decoder identification
PTYI Program type indicator (static/dynamic)

TMC Traffic message channel



PTY Program type

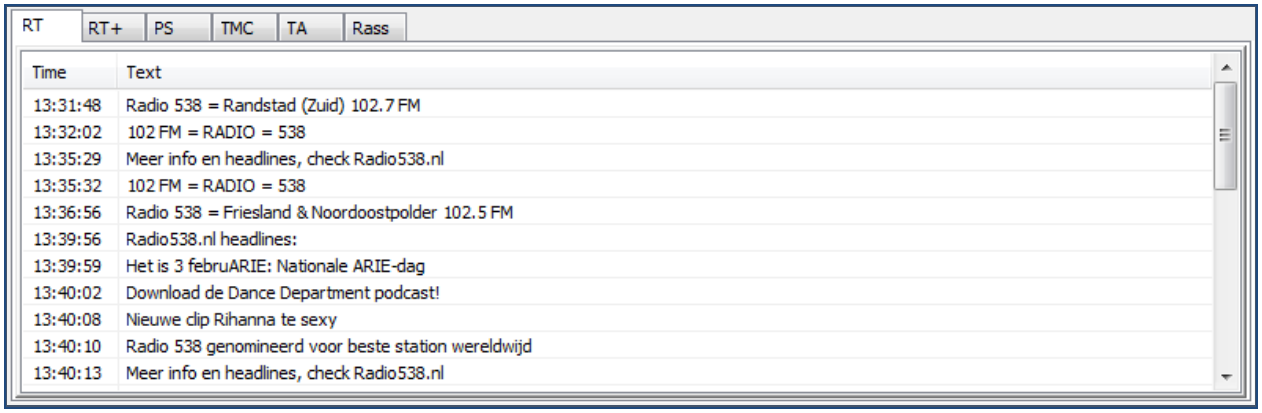
CT Clock time and date

AF List of alternative frequencies

Different tabs are used for more specific details:

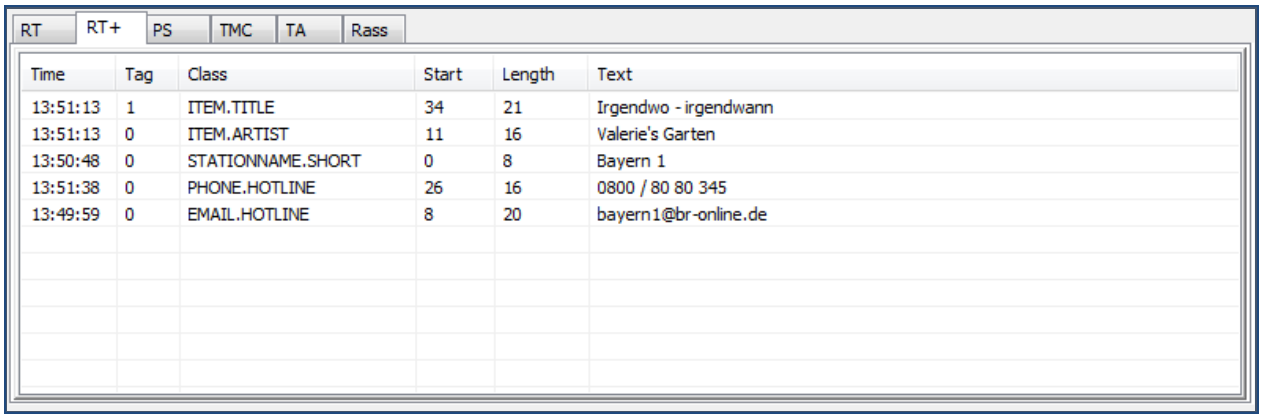
- RT (Radio Text)
- RT+ (Radio Text Plus)
- PS (Program Service Name)
- TMC (Traffic Message Channel)
- TA (Traffic Announcement)
- Rass (Radio Screen Show)

44.1 RT (Radio Text)



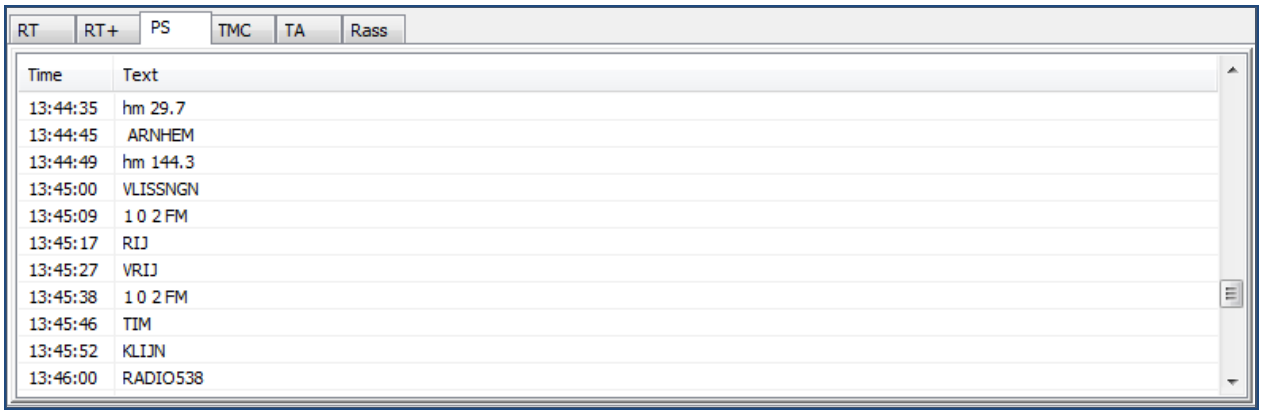
RT (Radio Text) history.

44.2 RT+ (Radio Text +)



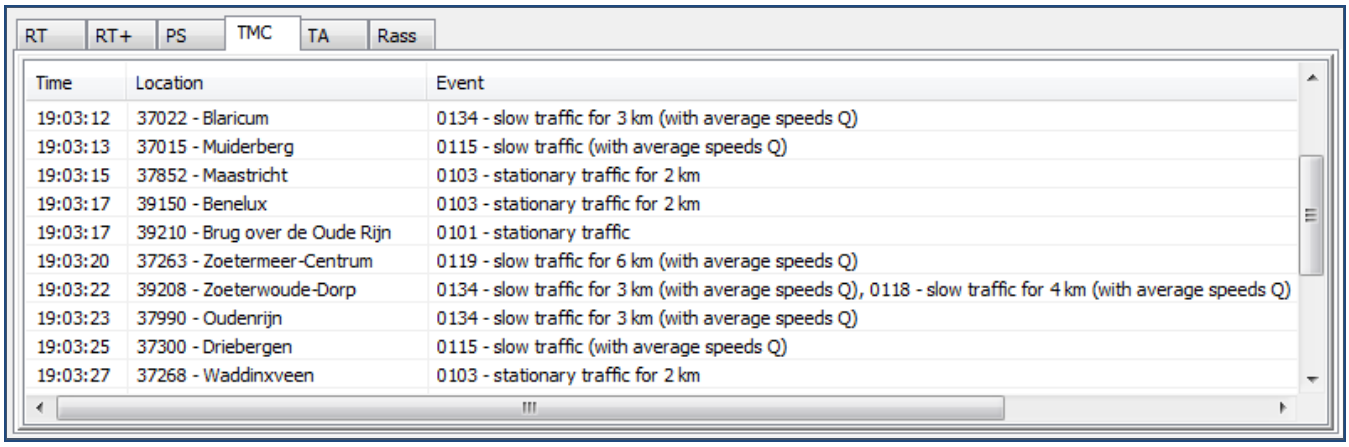
TR+ (Radio Text Plus) history.

44.3 PS (Program Service Name)

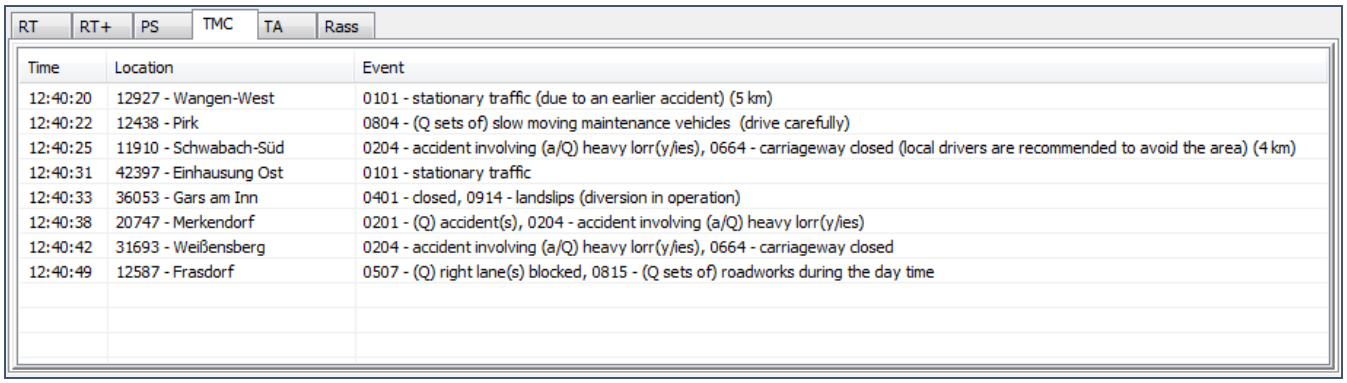


PS (Program Service Name) history.

44.4 TMC (Traffic Message Channel)

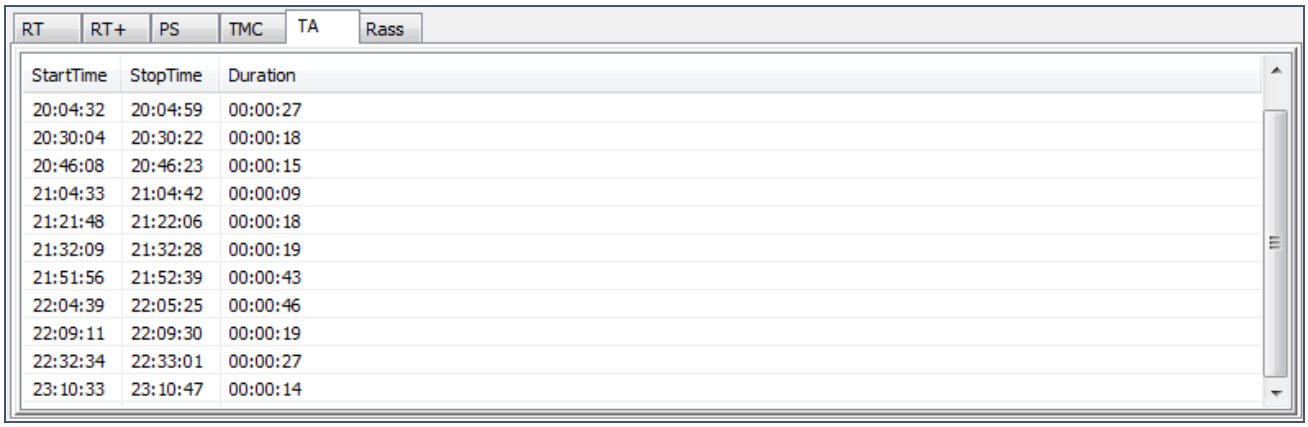


TMC (Traffic Message Channel) history, for RDS in the Netherlands.



TMC (Traffic Message Channel) history, for RDS in Germany.

44.5 TA (Traffic Anouncement)



TA (Traffic Anouncement) history.

44.6 Rass (Radio Screen Show)

Presentation of Rass (Radio Screen Show) information, which can be used with DVB-S radio.

The slides are classified into 9 categories. Each category may contain up to 4 slides.
An index slide is added.
The categories and the numbers to be used for the slides are shown in the table below.

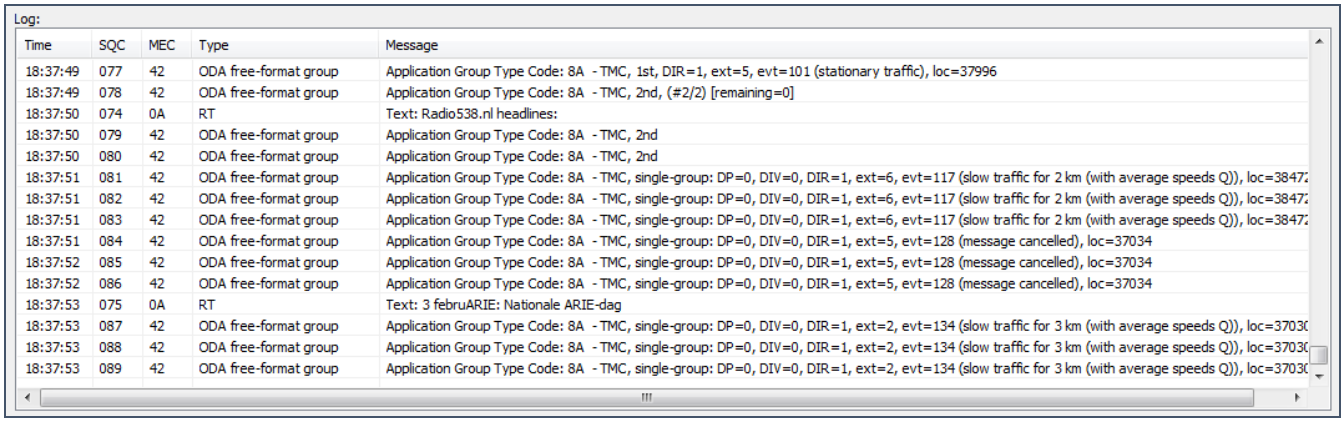
If the user is in interactive mode and presses the key “0” then the index slide (0000) is displayed.
If the user presses the key “4” then (if already stored) the first slide of category 4 (slide number 4000) is displayed. If the user continues to press key “4” then the next slide of category 4 (if stored) is displayed (first 4400, then 4440 and at last 4444).
If there is no further slide in the category the first slide (4000) is displayed.

Slide-Nr	Category	Content of the slides
0	0 Index	Overview of the provided categories

1 – 99	Publisher's claim	Claim, image (shall not be stored I the receiver)
100 – 199	Gallery	Pictures nice to look at
200 – 299	Mood 1	Pictures expressing a certain sentiment
300 – 399	Mood 2	Pictures expressing a certain sentiment
400 – 499	Mood 3	Pictures expressing a certain sentiment
500 – 599	Mood 4	Pictures expressing a certain sentiment
600 – 699	Not assigned	
1000, 1100, 1110, 1111	1 On air now	Photos of the announcer or artists, cover, studio, webcam, etc
2000, 2200, 2220, 2222	2 On air before	Photos of the announcer or artists, cover, studio, webcam, etc
3000, 3300, 3330, 3333	3 On air next	Photos of the announcer or artists, cover, studio, webcam, etc
4000, 4400, 4440, 4444	4 Service provider defined	
5000, 5500, 5550, 5555	4 Service provider defined	
6000, 6600, 6660, 6666	4 Service provider defined	
7000, 7700, 7770, 7777	4 Service provider defined	
8000, 8800, 8880, 8888	4 Service provider defined	
9000, 9900, 9990, 9999	9 Publisher's details	(impressum)

44.7 Log

RDS logging.



SQC Sequence Counter
MEC Message Element Code

Type is a text representation of the MEC.

If SQC is not used a 0 is displayed.

Option ‘DD’

- **Dolby Digital & Dolby Digital+ support**

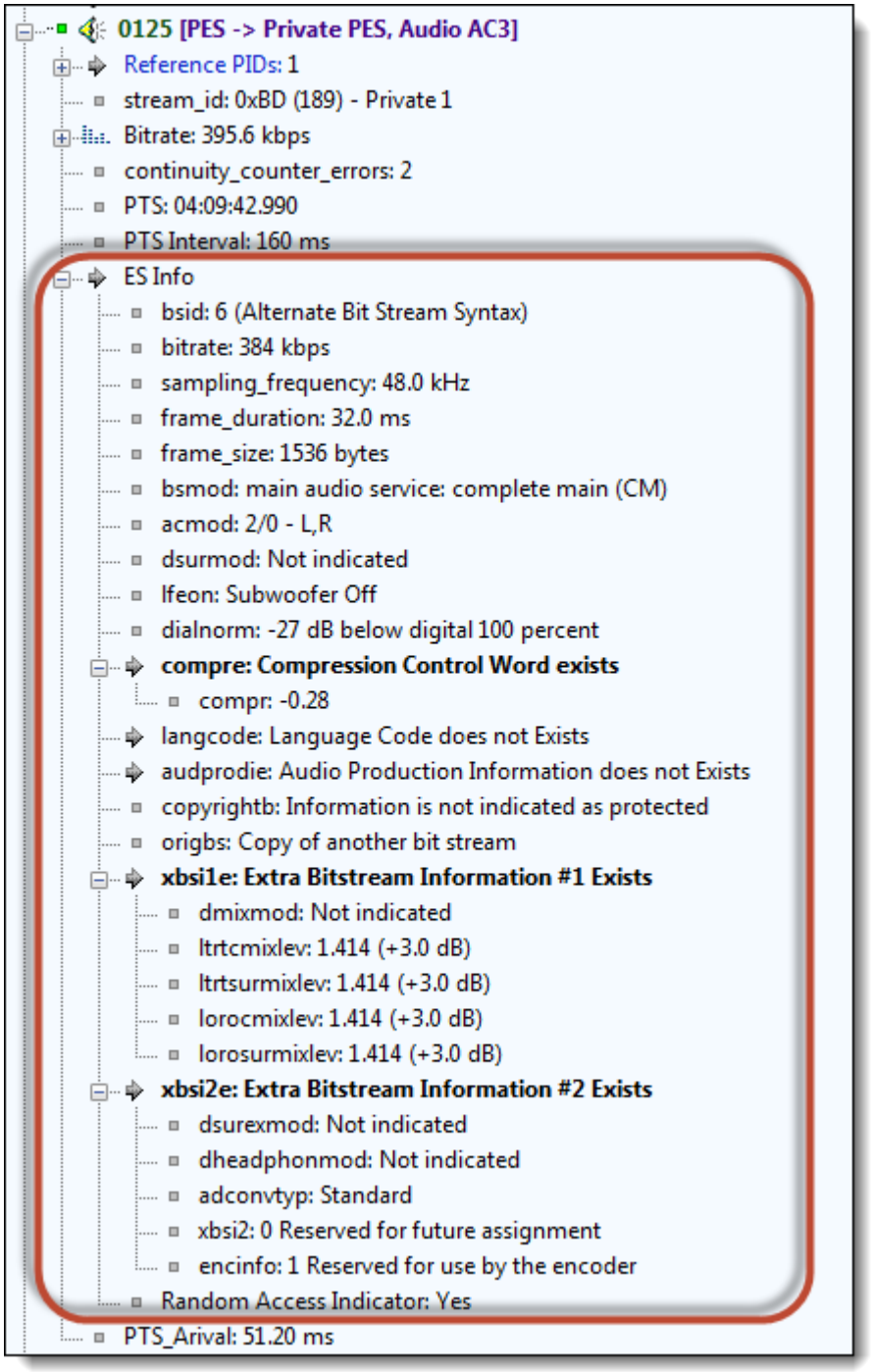
45 Dolby Digital & Dolby Digital+ support

Enable Dolby Digital & Dolby Digital Plus audio

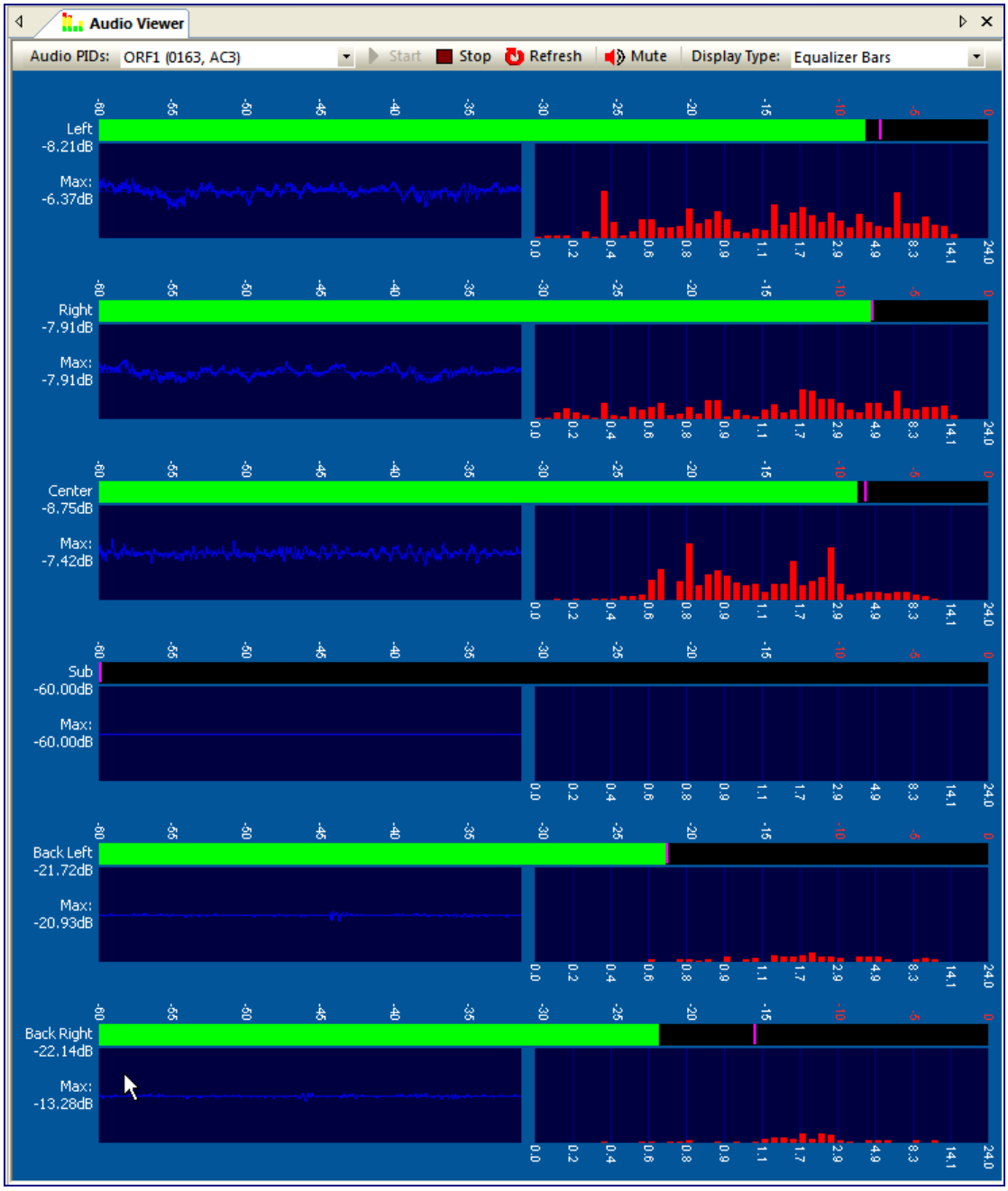
When the DD (Dolby® Digital Plus) option is enabled, audio related viewers will support Dolby® Digital Plus related functionality:

- 'PID structures' (part of DA-Base, see also chapter 3), will also show ES (Elementary Stream) information for Dolby® Digital Plus audio components.
- 'Media Viewer' (part of DA-Base, see also chapter 19) is enabled for listening to Dolby® Digital Plus audio.
- 'Audio Viewer' (part of AA option, see also chapter 35), will be enabled to show Dolby® Digital Plus graphs.
- 'Audio Metadata Viewer' (part of AA option, see also chapter 37) will show ES (Elementary Stream) information for Dolby® Digital Plus audio components

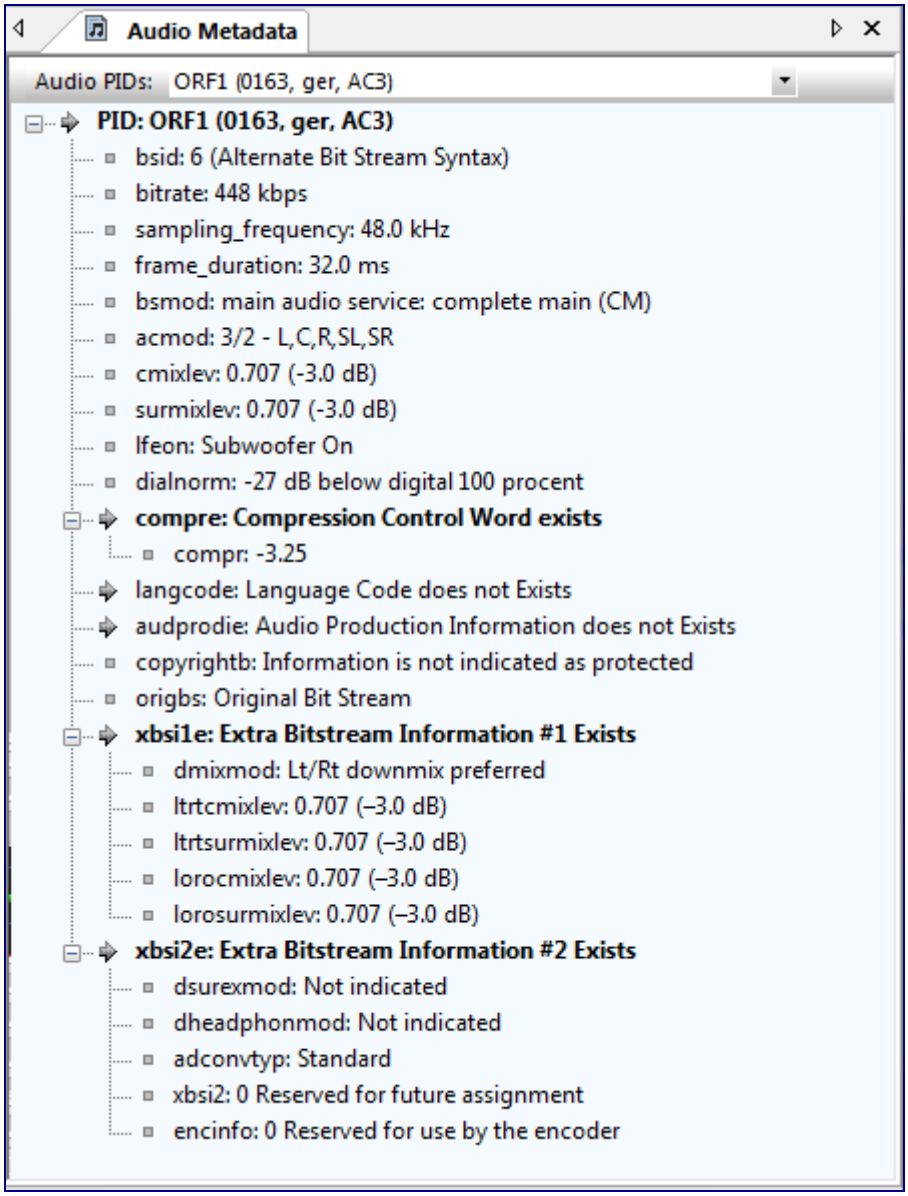
PID structure, ES (Elementary Stream) Dolby Digital metadata example



Audio Viewer, Dolby Digital 5.1 example



Audio Metadata Viewer, Dolby Digital example



Option ‘DE’

- **Dolby-E support**

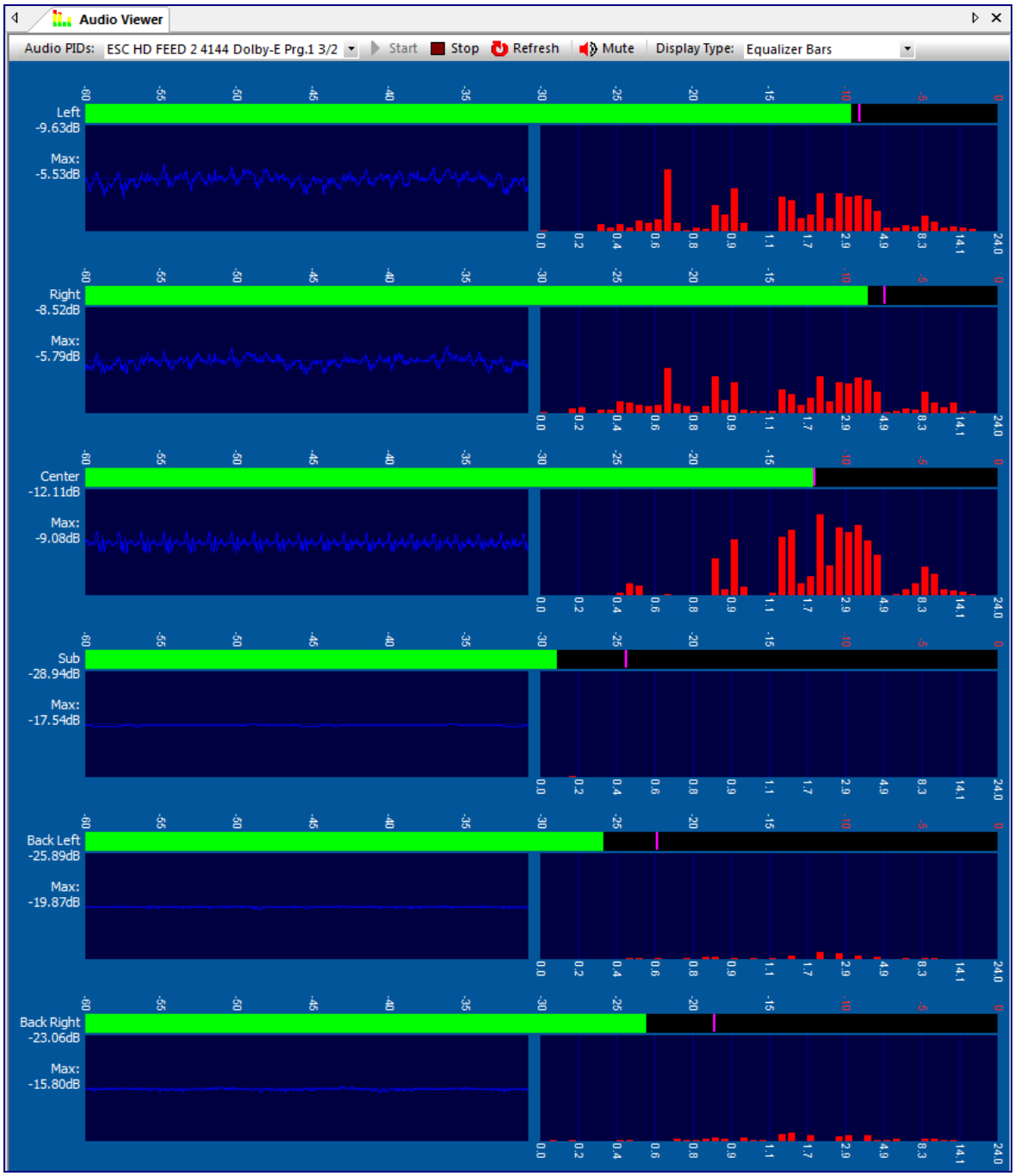
46 Dolby-E support

Enable Dolby-E audio

When the DE (Dolby®-E) option is enabled, audio related viewers will support Dolby®-E related functionality:

- 'PID structures' (part of DA-Base, see also chapter 3), will also show ES (Elementary Stream) information for Dolby®-E audio components.
- 'Media Viewer' (part of DA-Base, see also chapter 19) is enabled for listening to Dolby®-E audio.
- 'Audio Viewer' (part of AA option, see also chapter 35), will be enabled to show Dolby®-E graphs.
- 'Audio Metadata Viewer' (part of AA option, see also chapter 37) will show ES (Elementary Stream) information for Dolby®-E audio components

Audio Viewer, Dolby-E example



Audio Metadata Viewer, Dolby-E example

Appendices

- Hotkeys & Shortcuts
- Installation
- License
- Troubleshooting
- Input adapters
- Command Line Parameters
- Tools
- Legal Notes
- Contact

A Hotkeys & Shortcuts

A.1 Introduction

This appendix gives some overview information on hotkeys and keyboard shortcuts and lists all the hotkeys available.

What is a Hotkey?

A hotkey, also called a keyboard shortcut, shortcut key, or keystroke combination, is a key or set of keys that perform a defined function in a software application or computer operating system.
Reducing application tasks and processes to a hotkey often saves the user time and makes software usage easier for those with disabilities.

Windows Sticky Keys

When a keyboard shortcut includes the Shift, Ctrl, Alt keys, or the Windows key, the Windows Sticky Keys feature lets you press that key and it remains active until another key is pressed.

This is especially useful for those who might have a difficult time holding down two or more keys at one time.

For example, the keyboard shortcut for Copy is to press and hold the Ctrl key and then press the C key.
When Sticky Keys is turned on, press the Ctrl key, and then press the C key.

To **Turn On** Windows Sticky Keys:
1. Press the keyboard's Shift key five times. You will hear a beep.
2. A dialog box appears with instructions on how to set up the Sticky Keys feature.

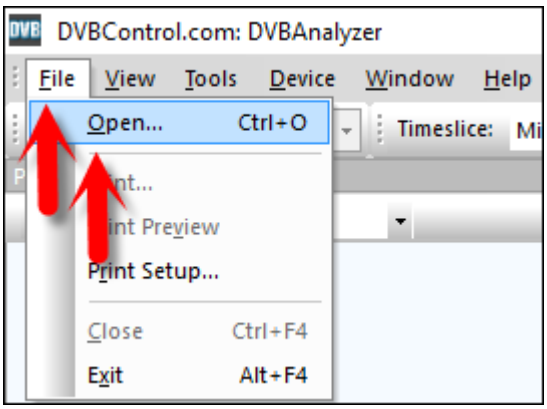
To **Turn Off** Windows Sticky Keys:
Press both of the keyboard's Shift keys simultaneously.

Windows Application Mnemonics/Accelerators

A mnemonic or accelerator is an underlined character found in an application's title bar, menu item, text of a button, and more.

To activate the mnemonic command:
1. Press Alt and the first letter of the menu command.
   For example, press Alt+F to open the File menu.
   The accelerator letters appear.

2. While still holding the Alt key,
   Press the underlined letter on the keyboard.



A.2 Tools

Tools menu	Hot key	Principal functions
PID Overview	F5	Enable PID Overview window
Service Overview	Ctrl + F5	Enable Service Overview window
Grid Overview	F6	Enable Grid Overview window
Bitrate Overview	F7 *	Enable Bitrate Overview window
Thumb Overview	F8	Enable Thumb Overview window
Table Overview	Ctrl + 7	Enable Table Overview window
Descriptor Overview	Ctrl + 8	Enable Descriptor Overview window
MIP Overview	Ctrl + 9	Enable Descriptor Overview window
AIT Overview	Ctrl + Shift + A	Enable AIT Overview window
Logical Channel Overview	Ctrl + Shift + L	Enable Logical Channel Overview window
ETR290 Viewer	Ctrl + 2	Enable ETR290 Viewer window
Media Viewer	Ctrl + M *	Enable Media Viewer window
PCR Timing Viewer	Ctrl + R *	Enable PCR Timing Viewer window
EPG Viewer	Ctrl + E *	Enable EPG Viewer window
Teletext Viewer	Ctrl + T *	Enable Teletext Viewer window
Subtitle Viewer	Ctrl + S *	Enable DVB Subtitle Viewer window
Hex Viewer	Ctrl + H	Enable Hex Viewer window
Burst Viewer	Ctrl + B	Enable Burst Viewer window
DSMCC Viewer	Ctrl + Shift + S	Enable Data/Object Carousel (DSMCC) Viewer window
IP Traffic Viewer	Ctrl + I *	Enable IP Traffic Viewer window
VBI-Cue Viewer	Ctrl + Shift + C	Enable IP Traffic Viewer window
SCTE-35 Viewer	Ctrl + Shift + S	Enable IP Traffic Viewer window
PTS-DTS Viewer	Ctrl + 4 *	Enable PTS-DTS Viewer window
GOP Viewer	Ctrl + 5 *	Enable GOP Viewer window
Buffer Viewer	Ctrl + 6 *	Enable Buffer Viewer window
Video Quality Viewer	Ctrl + Shift + V	Enable Video Quality Viewer window
Audio Viewer	Ctrl + A *	Enable Audio Viewer window
Loudness Viewer	Ctrl + L	Enable Loudness Viewer window
Audio Metadata Viewer	Ctrl + Shift + M	Enable Audio Metadata Viewer window
RDS Viewer	Ctrl + Shift + R *	Enable RDS Viewer window
DVB-H Viewer	Ctrl + 3	Enable DVB-H Viewer window
DVB-T2 Viewer	Ctrl + Shift + T	Enable DVB-T2 Viewer window
Multicast Output	Ctrl + Shift + O	Enable UDP Multicast Output window
Preferences	Ctrl + P	Open Preferences edit window

* These Tools can be opened more than once.

A.3 Device

Main menu item	Hot Key	Principal functions/sub-options
Start Input Device	F3	Open Input Device window
Stop Input Device	F4	Stop Input Device
Restart Input Device	F9	Restart analyzing

A.4 Toolbar

Toolbar menu	Hot key	Principal functions
Favorite toolbar	Ctrl + F	Open/closes Favorite Toolbar

A.5 Windows

Main menu item	Hot key	Principal functions/sub-options
File	Alt + F	Close, Exit
View	Alt + V	Toolbars, Status Bar, Application Look
Tools	Alt + T	DVBAnalyzer Tools, Properties
Device	Alt + D	Control input Device
Windows	Alt + W	Cascade, Tile, Close Windows
Help	Alt + H	License Manager, Updates, Manual, About DVBAnalyzer

File menu	Hot key	Principal functions
Open	Ctrl + O	Open File input
Close	Ctrl + F4	This option closes the focused windows Tool
Quit	Alt + F4	This option exits DVBAnalyzer

View menu	Hot key	Principal functions
Toggle Full Screen	F12	Toggles current view between Full Screen and Normal display

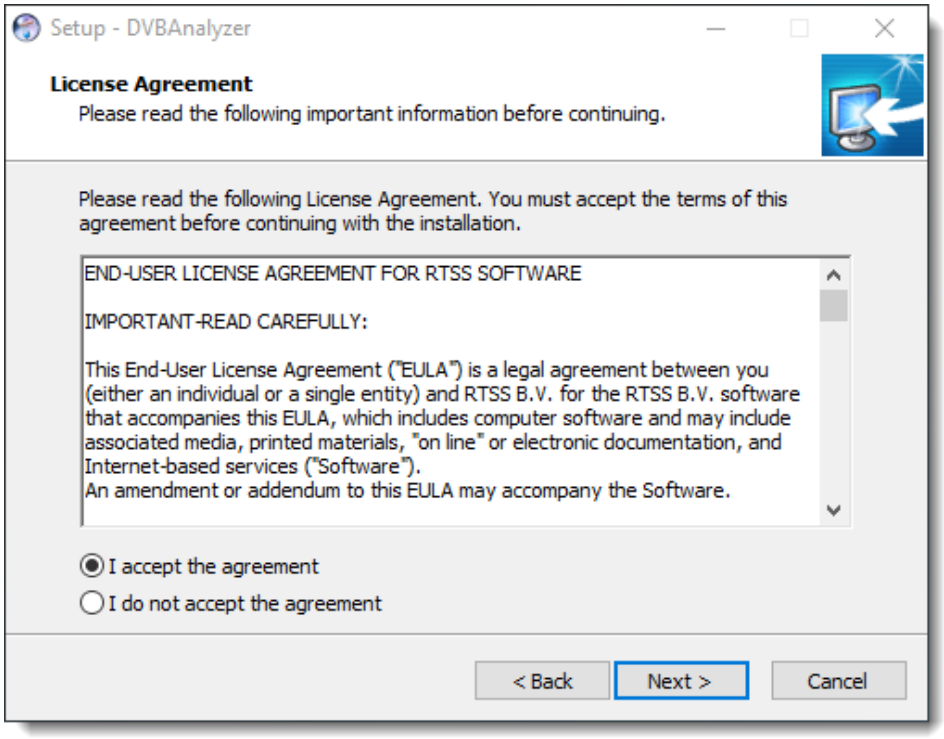
Window menu	Hot key	Principal functions
Next Tool	Ctrl + Tab	Focus on next Tool
Previous Tool	Ctrl + Shift + Tab	Focus on previous Tool

Help menu	Hot key	Principal functions
Manual	F1	Open the DVBAnalyzer Manual
License Manager	F2	Open the License Manager

B Installation

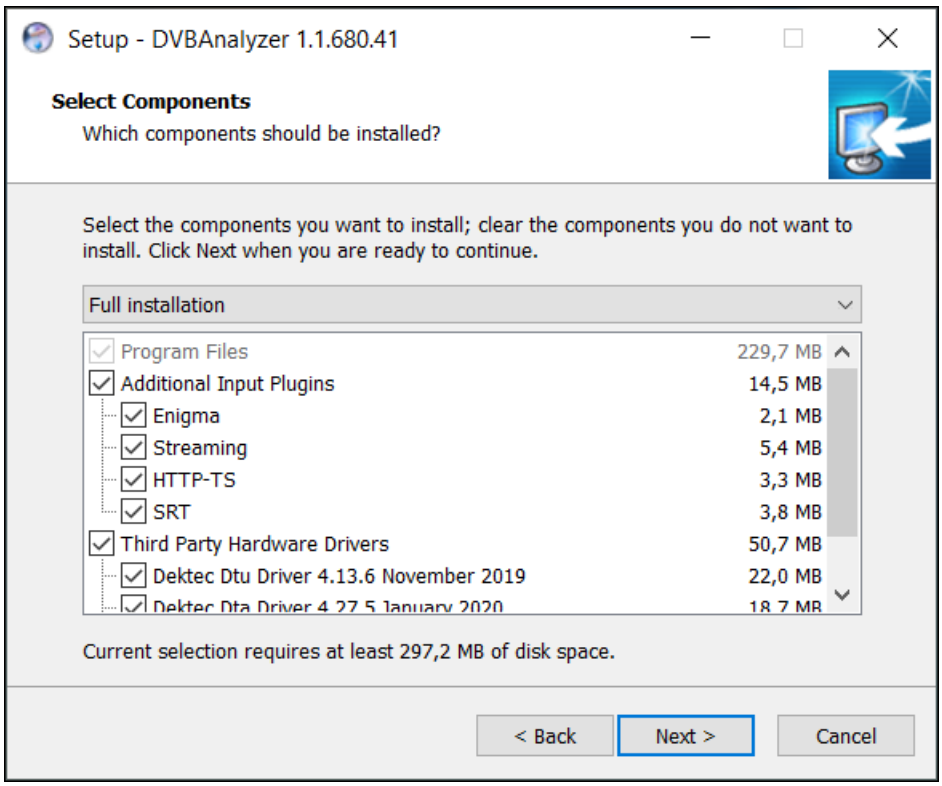
For installation of DVBAnalyzer the installer application should be used.

License agreement



Installation can only be proceeded, when the EULA is accepted.

Select Components



There are 3 levels of installation possible:

- Compact installation
- Full installation
- Custom installation

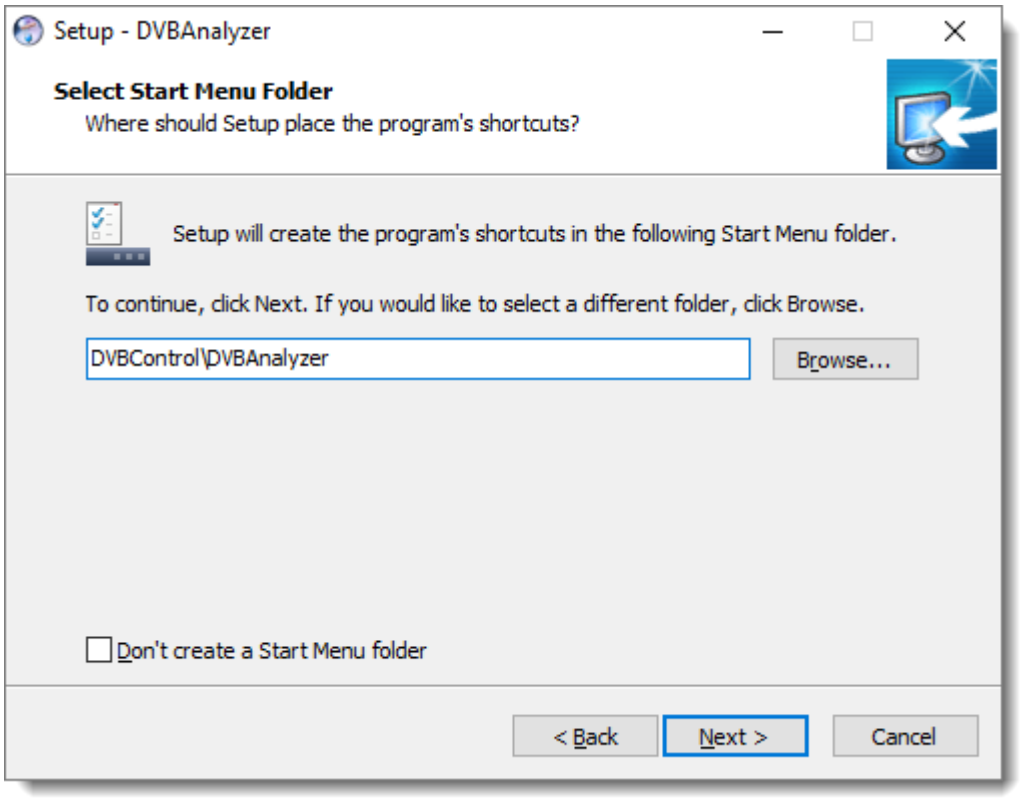
Plugins are available for:

- Enigma
- Streaming: RTP, RTSP, RTMP, HTTP-Live (Cupertino HLS)
- HTTP-TS: TS over HTTP
- SRT

Third Party Hardware Drivers:

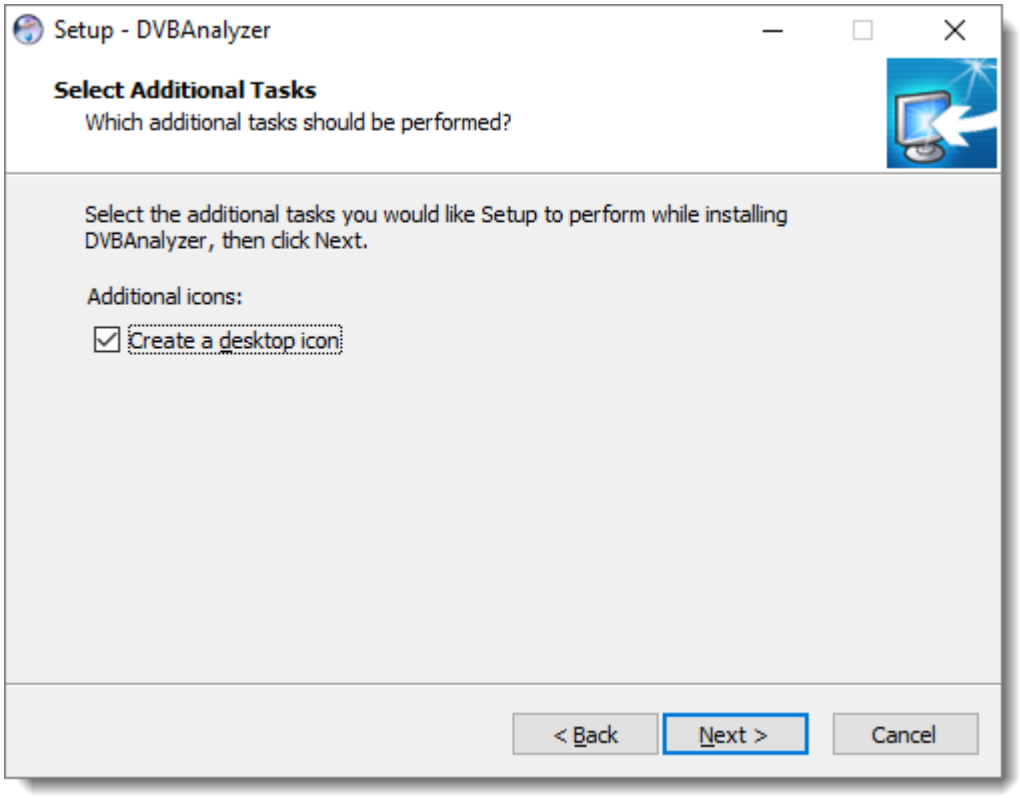
- Dektec Dtu Driver
- Dektec Dta Driver
- Dektec DtPCI Driver

Select Start Menu Folder

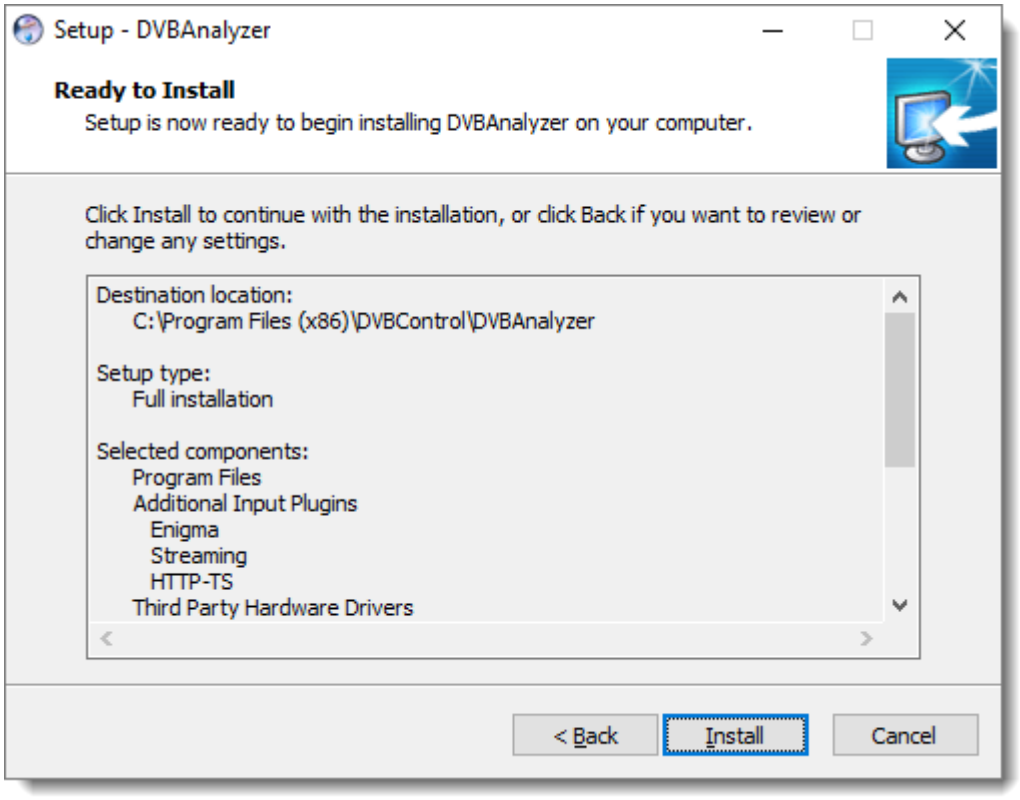


Option, to create a Start Menu Folder

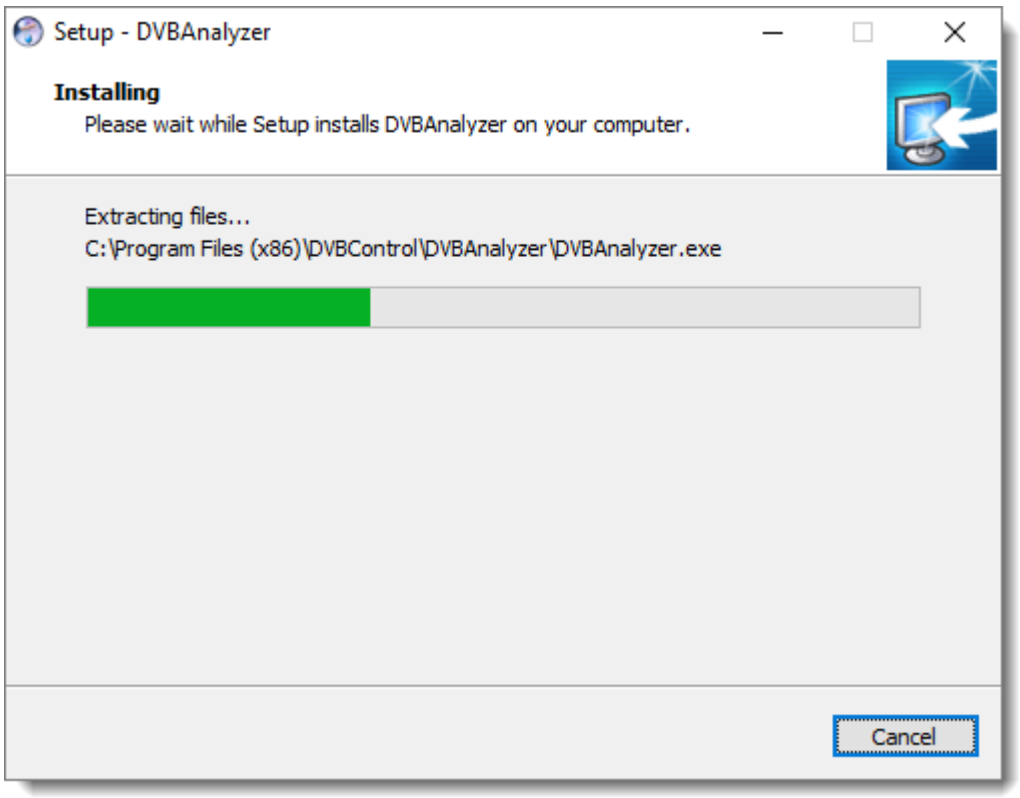
Select Additional Tasks



Ready to Install

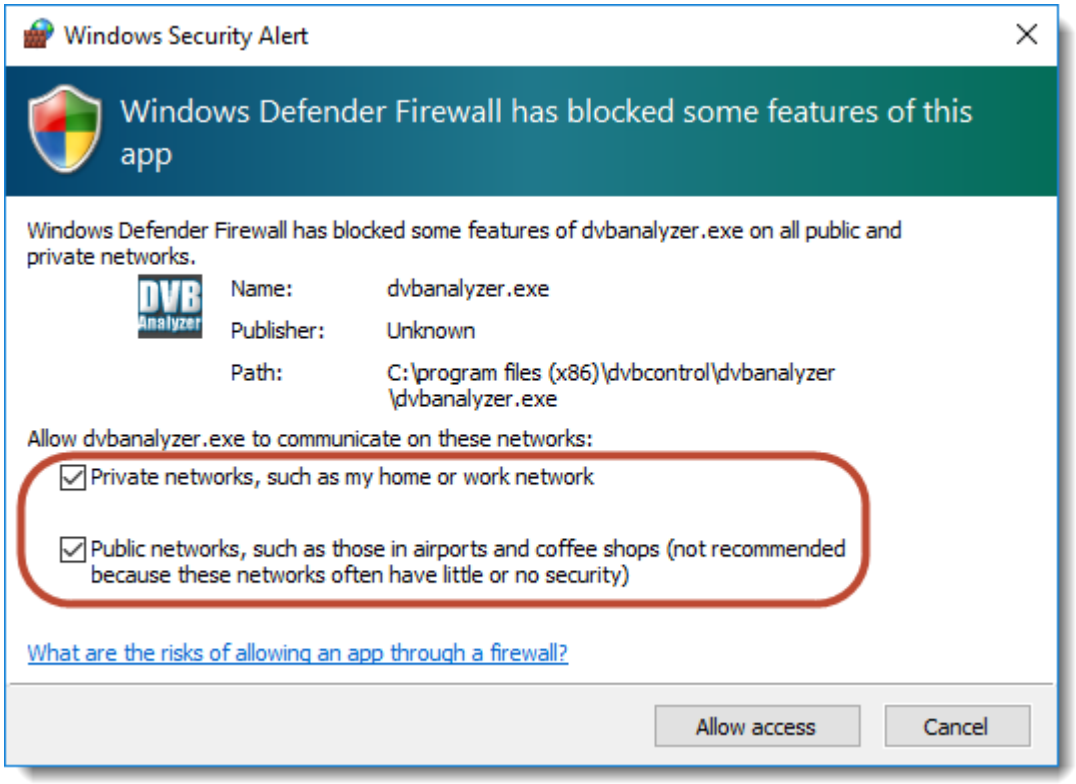


Installing



Finished Installing

UDP / Multicast source



C License

C.1 License details

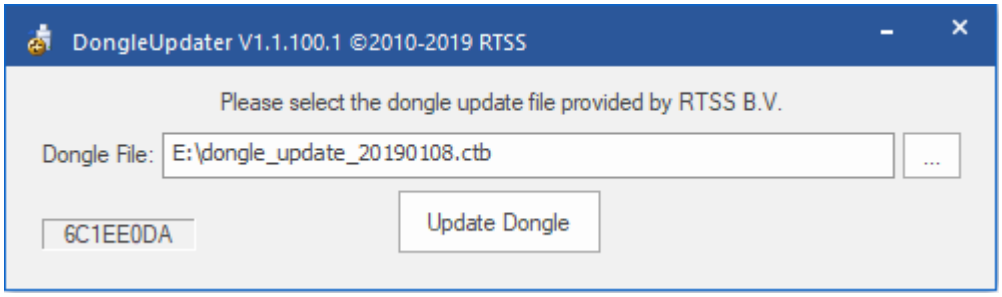
The License Manager will give information about:

- Name of the user
- Application version
- Purchase Date
- Expiration Date (when the application stops running)
- Update Expiration (until which date new versions can be installed)
- Dongle Hardware Serial
- Available license options

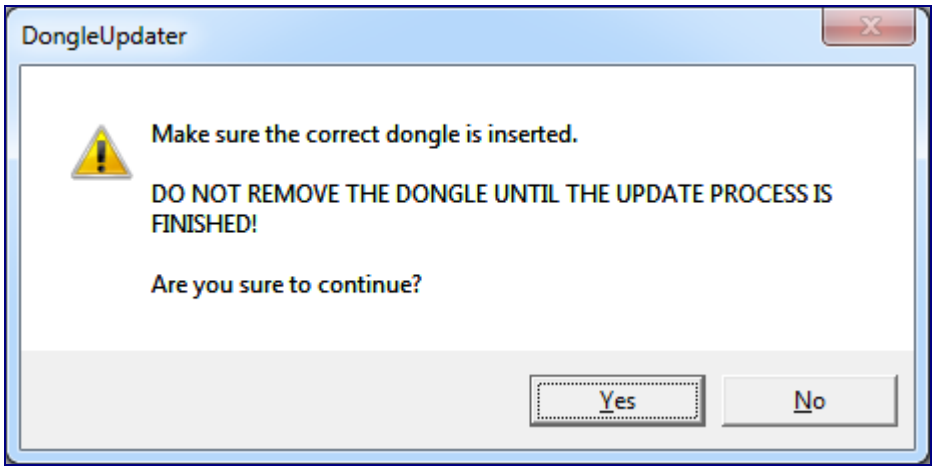
C.2 Dongle Updater

Remotely a license update can be realized. Via the DongleUpdater application the new license file can be selected.

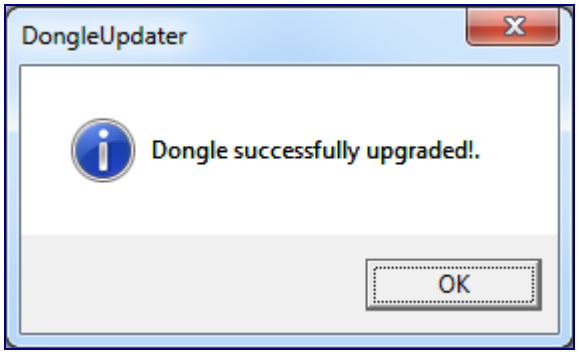
The DongleUpdater application can be found on this weblink:
http://www.dvbcontrol.com/download/DongleUpdater.zip



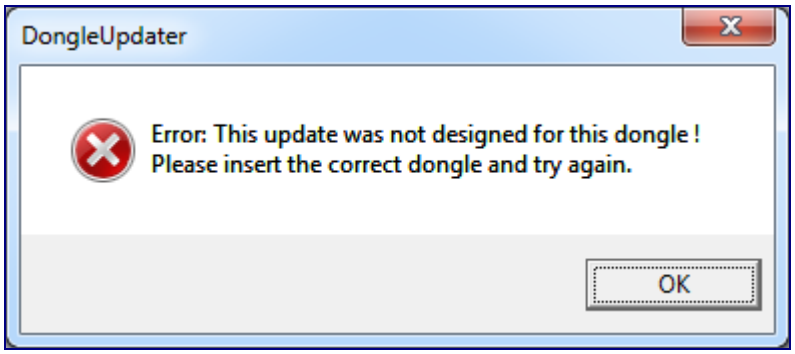
After pressing “Update Dongle” instructions are given.



A successful dongle upgrade will give the following pop-up window:



A faulty dongle upgrade will give the following pop-up window:



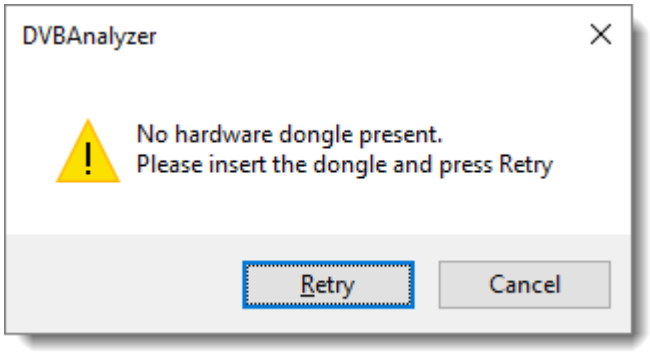
D Troubleshooting

D.1 License

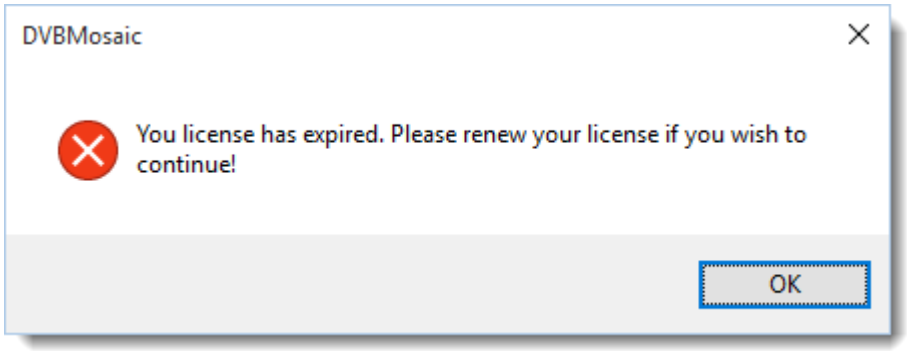
Each application will only operate having a valid correct license/dongle.

DVBAnalyzer will only run, if a dongle with a valid DVBAnalyzer license in the machine.

No Dongle Present

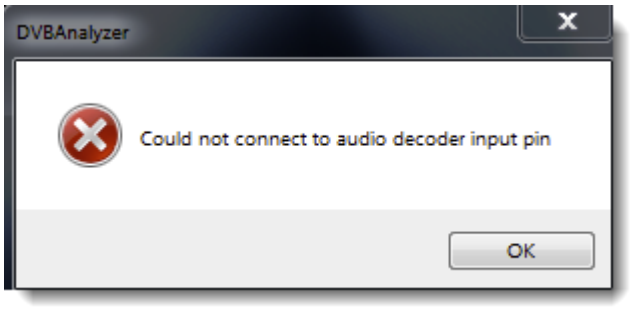


No Valid licens



Not able to play Audio

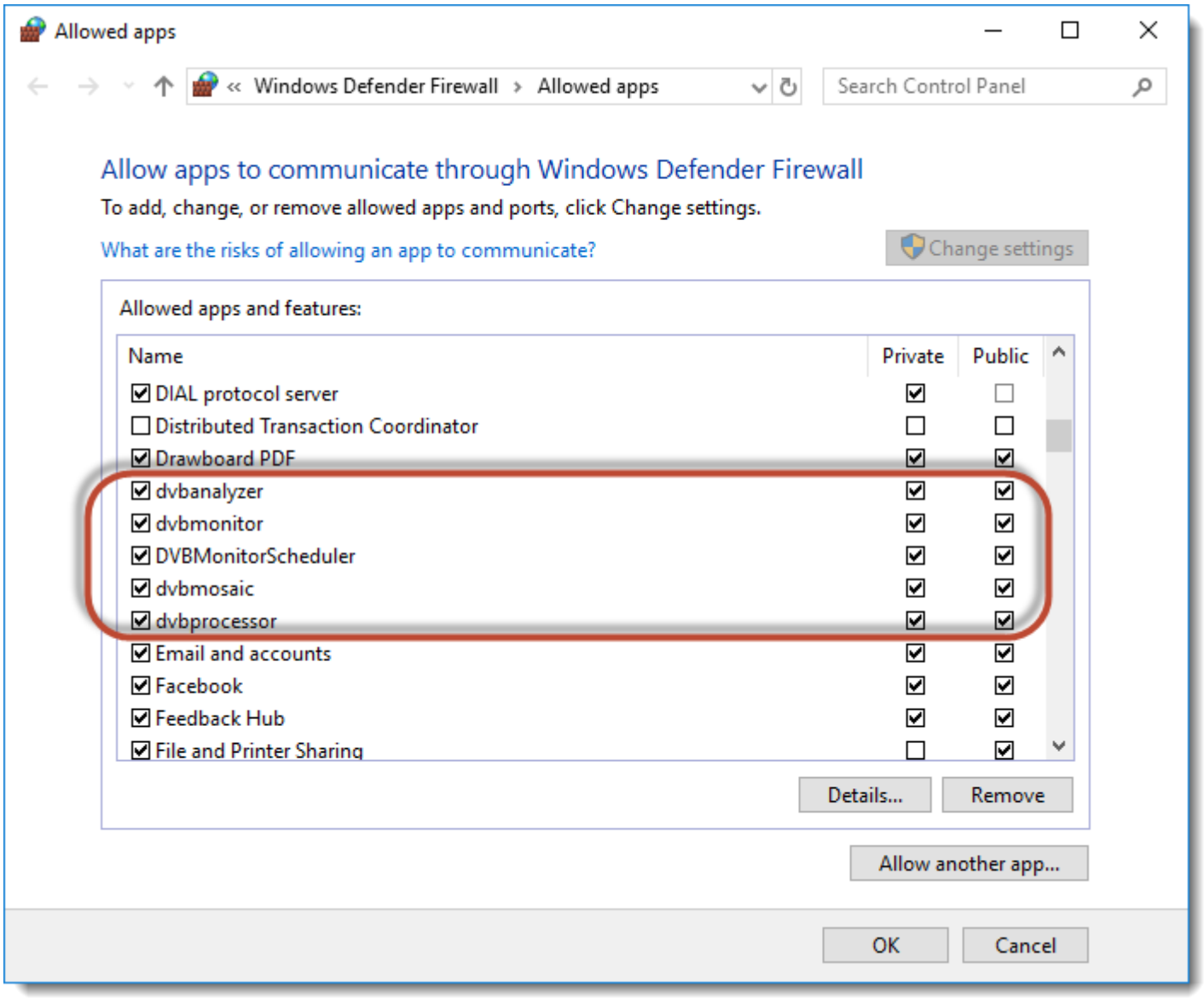
DVBAnalyzer will give an Error when there is no Audio card available/found in the system.



A reason could be, that the codecs used by DVBAnalyzer are overwritten by installations done after installing DVBAnalyzer. Therefore please check the Media Viewer preferences.

D.2 Windows Firewall

When using a UDP/Multicast source and no signals are received, please check the Windows Firewall rules for DVBAnalyzer. Both for the private and public network for DVBAnalyzer should be enabled.



D.3 Administrator rights

Please be aware that DVBAnalyzer needs administrator access rights to communicate with the hardware dongle.

D.4 No Audio card

You can install a virtual audio card, if you do not have a physical audio card in your machine.
This is needed for Media Viewer.

https://www.vb-audio.com/Cable/

E Input adapters

E.1 Overview

DVBControl applications

- DVBAnalyzer
- DVBMonitor
- DVBMosaic

can use different kind of inputs:

Source	Description
File	Transport Stream File
UDP/Multicast	Input via UDP/Multicast packets
Streaming	RTP, RTSP, RTMP, HTTP Live (Cupertino)
HTTP-TS	TS over HTTP
DVB-ASI	Input via ASI input board
DVB-S	Input via Satellite receiver board
DVB-C	Input via Cable receiver board
DVB-T	Input via Terrestrial receiver board
SD/HD SDI	SD/HD SDI input via an SD/HD SDI receiver board
Analog	Analog input via an analogue receiver board

E.2 Network card

UDP and UDP Multicast sources are received via the network connection.

We recommend to use the Intel Pro/1000 PT Server Adapter network card.

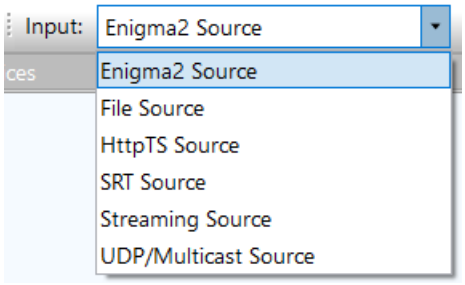
E.3 Overview

For usage of ASI, DVB-S, DVB-S2, DVB-C and DVB-T front-ends we support the following input adapters:

Manufacturer	Description	URL
Blackmagic	SD/HD SDI, HDMI, Analog	www.blackmagic-design.com
Dektec	ASI/IP/DVB-C/T/S/S2	www.Dektec.com
Deltacast	ASI (PCI)	www.Deltacast.com
Digital Devices	DVB-C, DVB-S, DVB-S2, DVB-T	www.DigitalDevices.de
DVEO	ASI (PCI/PIC-E)	www.DVEO.com
Lumantek	ASI	www.Lumantek.com
Stream Labs	ASI, SD/HD SDI, Analog	www.Stream-Labs.com
TBS	DVB-S, DVB-C, DVB-T, ISDB-T, ATSC (USB2.0/PCI/PCI-E)	www.TBSdtv.com
Technisat	DVB-S, DVB-C, DVB-T (PCI) DVB-S2	www.Technisat.com
Technotrend	DVB-S (CI/USB2.0), DVB-S2 (CI/USB2.0), DVB-C (CI/USB2.0), DVB-T (CI/USB2.0)	www.Technotrend.eu
Digital Devices TBS DVBCsky Hauppauge	Microsoft BDA DVB-C/T/S/S2	www.digitaldevices.de www.TBSdtv.com www.dvbsky.net www.hauppauge.com

E.4 Input Selector

The Input Selector enables selection of the source.



The requested input type can be selected via a pull-down menu.

Sources can be:

- BDA (when BDA drivers are installed)
- Dektec (when Dektec drivers are installed)
- File
- Enigma
- HttpTS
- SRT
- Streaming
- UDP/Multicast

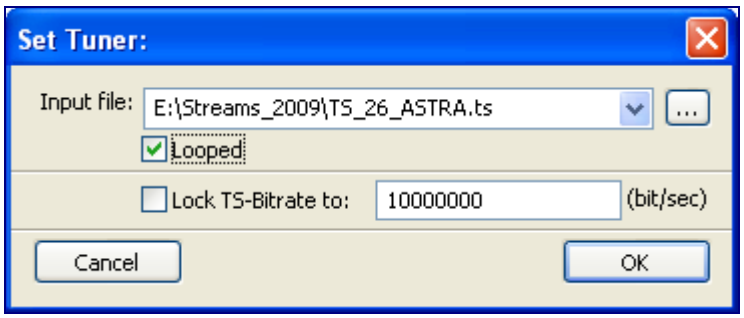
BDA (Broadcast Driver Architecture) is a Microsoft standard, which is supported by multiple manufacturers (e.q. TBS, Technisat, Technotrend).

E.5 File Input

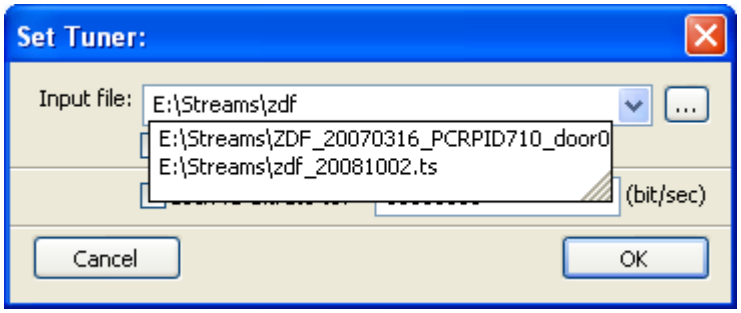
After selecting “File Source” in the Input Selector, the Set Tuner window appears. Besides being able to select a Transport Stream file, it is also possible to play the Transport Stream in a continuous loop.

When the TS- Bitrate cannot be calculated from PCR timestamps, a NIT Delivery Descriptor or the MIP packages, a maximum TS-Bitrate can be given.

Set Tuner - File



Selecting a file can be done via browsing the directories, or start typing the path in the “Input file” box. Suggestions about possible directories/files are presented directly.



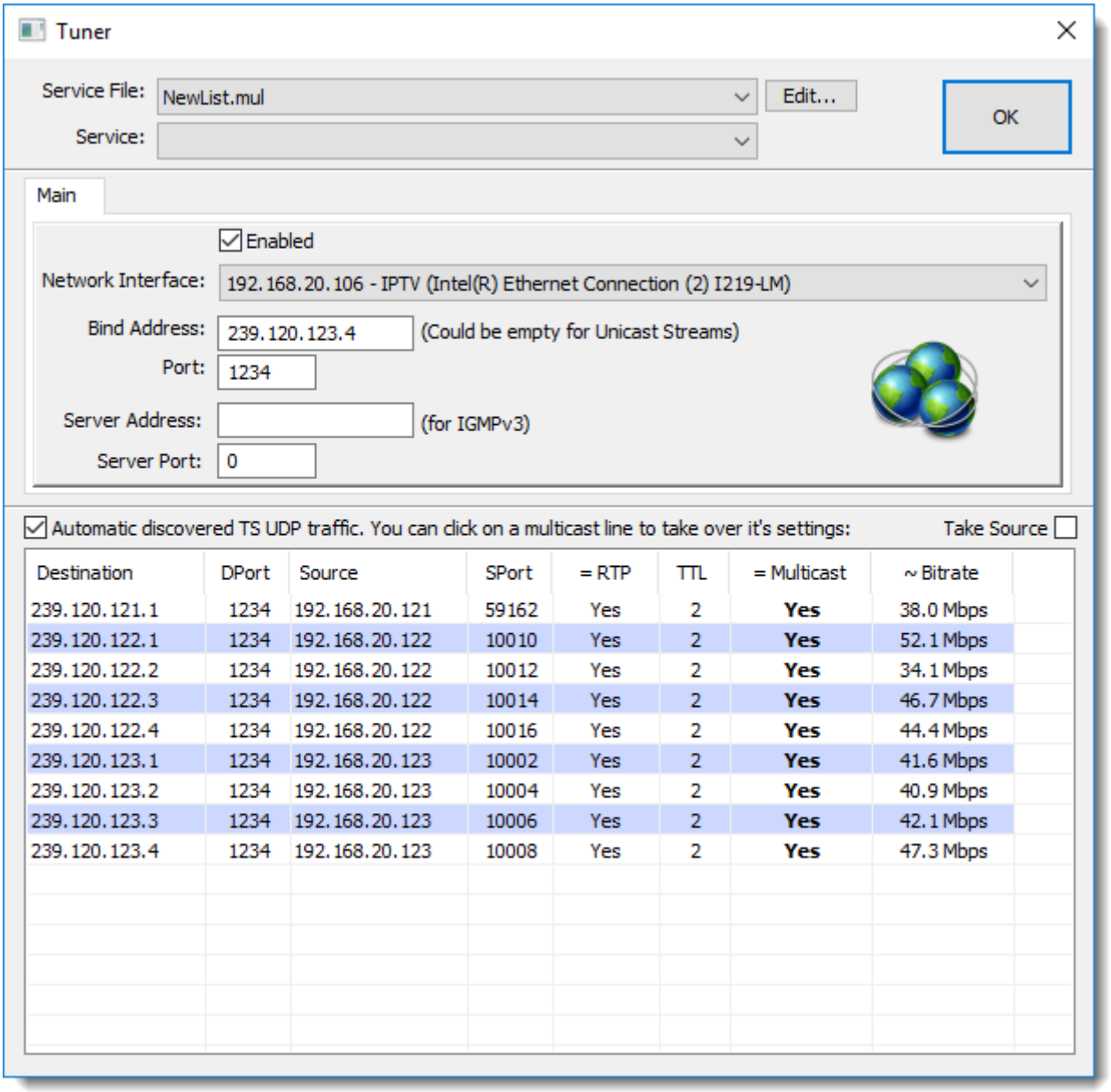
Tuning parameters

Parameter	Description
Input File	Transport Stream (TS) Filename
Looped	Option to continuous loop the Transport Stream file
Lock TS-Bitrate to	Option to lock TS-Bitrate

E.6 UDP/Multicast Input

After selecting “UDP/Multicast Source” in the Input Selector, the Set Tuner window appears.

Set Tuner – UDP/Multicast



There are three ways to set the tuner parameters.

- Service File input
- Manual input
- Manual input via selecting from automatic discovered UPD traffic

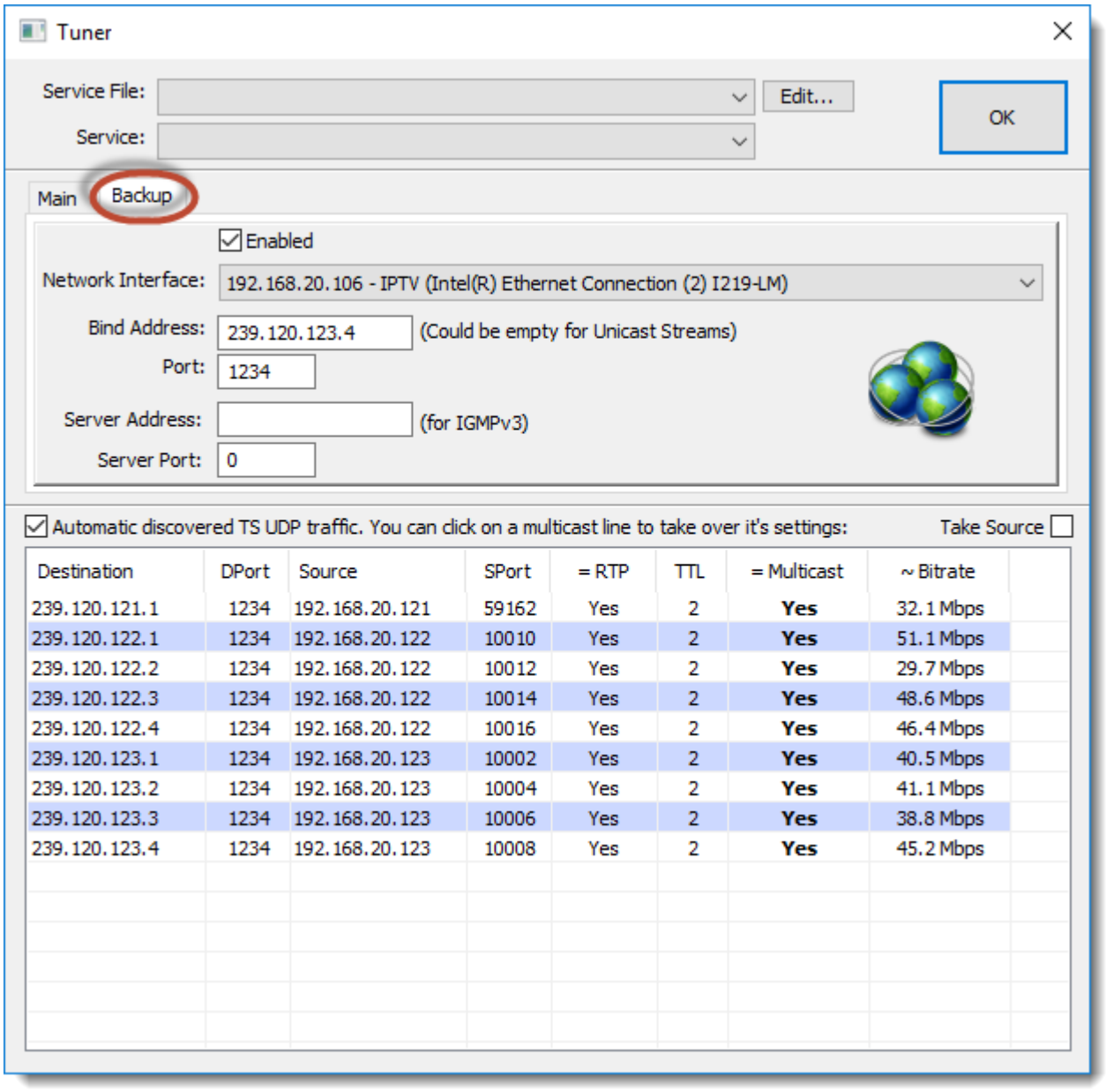
Tuning parameters

Parameter	Description
Network Interface	Selection of UDP Multicast interface
Bind address	UDP Multicast Bind address (Could be empty for Unicast Streams)
Port	UDP Multicast port number
Server address	UDP Server address (for IGMPv3)
Server port	UDP Server port number (for IGMPv3)

Multicast Backup

For DVBMosaic and DVBMonitor, a multicast backup input can be configured.

When the Main input is Lost, the tuner will use the Backup input.

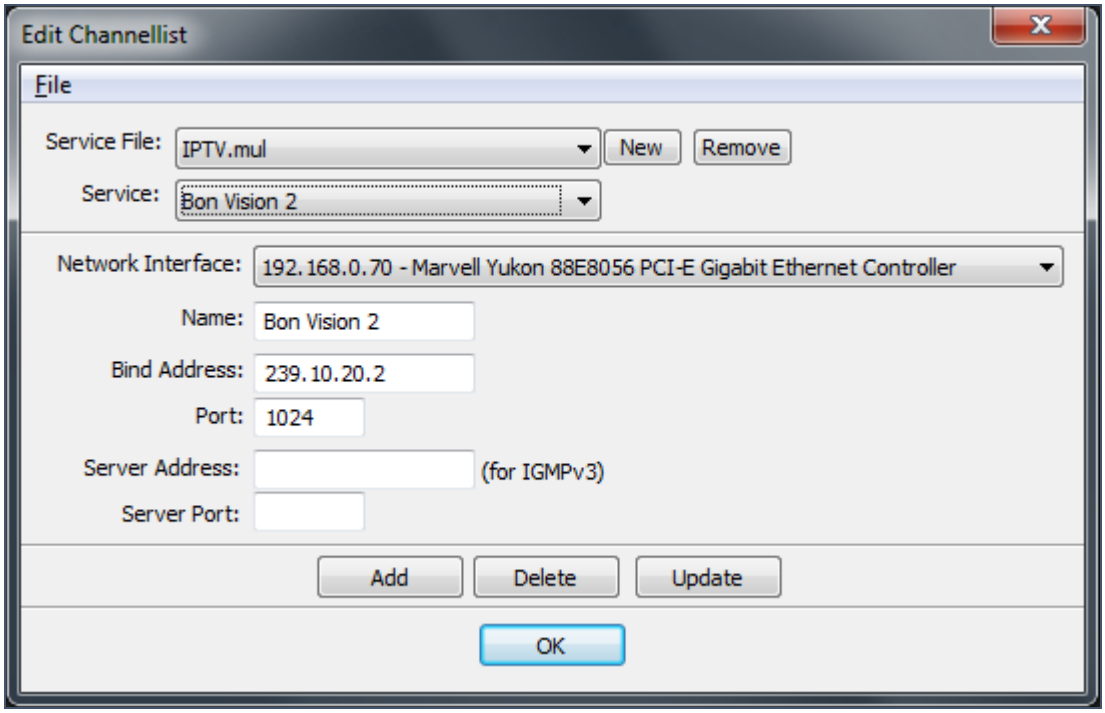


To be able to use the Multicast Backup feature, you need to set in Windows Register, the TotalBackups key (REG_DWORD) with value 2.

Regedit path: Computer\HKEY_CURRENT_USER\Software\DVBControl\DVBAnalyzer\Sources\UDPMulticast
Default Value: 1 (No backup)

Service File

A Service File can be made instead of manually typing the tuner parameters.
In the Set Tuner window click Edit.



The Edit ChannelLists Window enables the creation of a new Service File.
By selecting New, a new Service File can be created.
Multiple Channel Name/Port entries can be added to the Service File.

The Saved Service File gets the extension .mul and should be placed in:
"C:\Program Files\Common Files\DVBControl\Devices\Input\ChannelLists" or on 64bit systems:
"C:\Program Files (x86)\Common Files\DVBControl\Devices\Input\ChannelLists"

Users can also edit the Service File, using the syntax:
[Multicast]
IP_number<TAB>Port_number<TAB>Channel_name_1
IP_number<TAB>Port_number<TAB>Channel_name_2
….

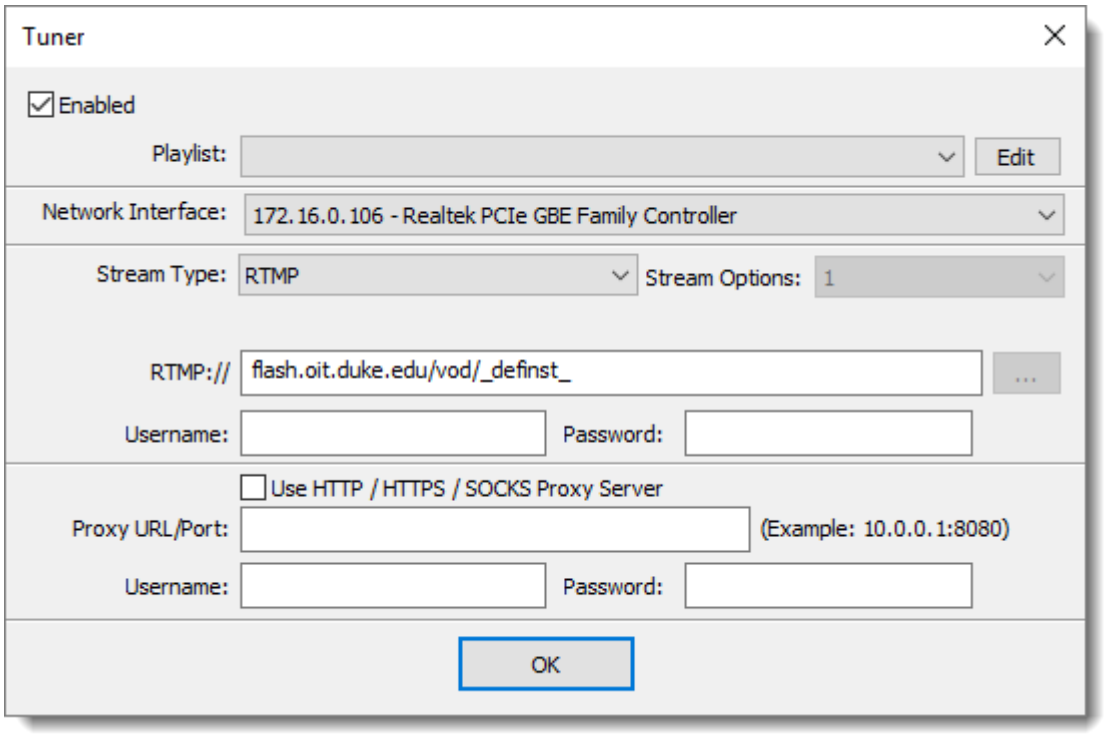
Where:

IP_number	= UDP Multicast IP number
Port_number	= UDP Multicast port number
Service_name	= Service name

Importing a M3U/VLC Service list file is possible via File → Import M3U/VLC Service list

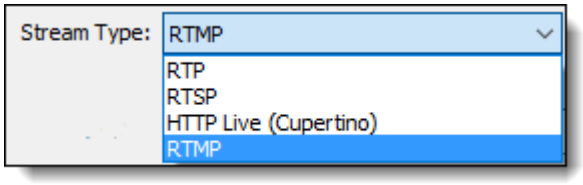
E.7 Streaming Input

After selecting “Streaming Source” in the Input Selector, the Set Tuner window appears.



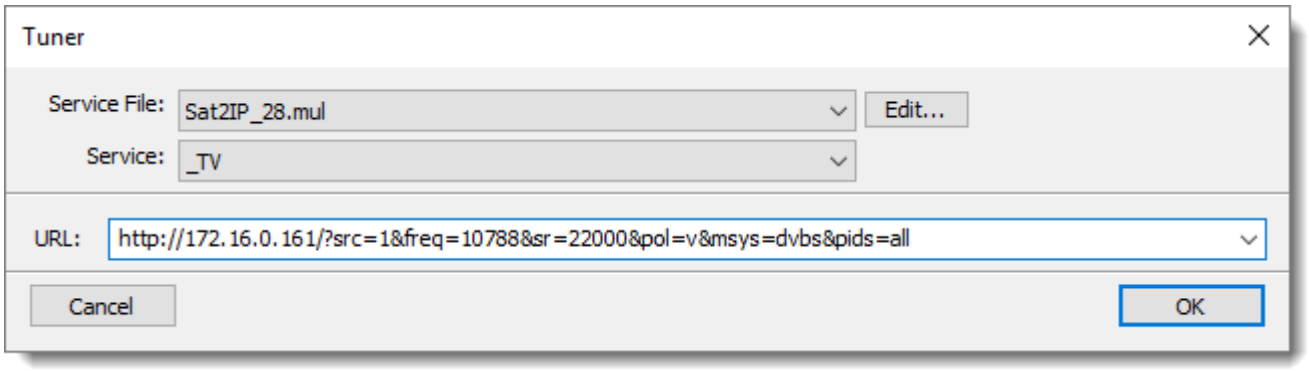
The Stream Type can be:

- RTP
- RTSP
- RTMP
- HTTP Live (Cupertino HLS)



E.8 HTTP-TS Input

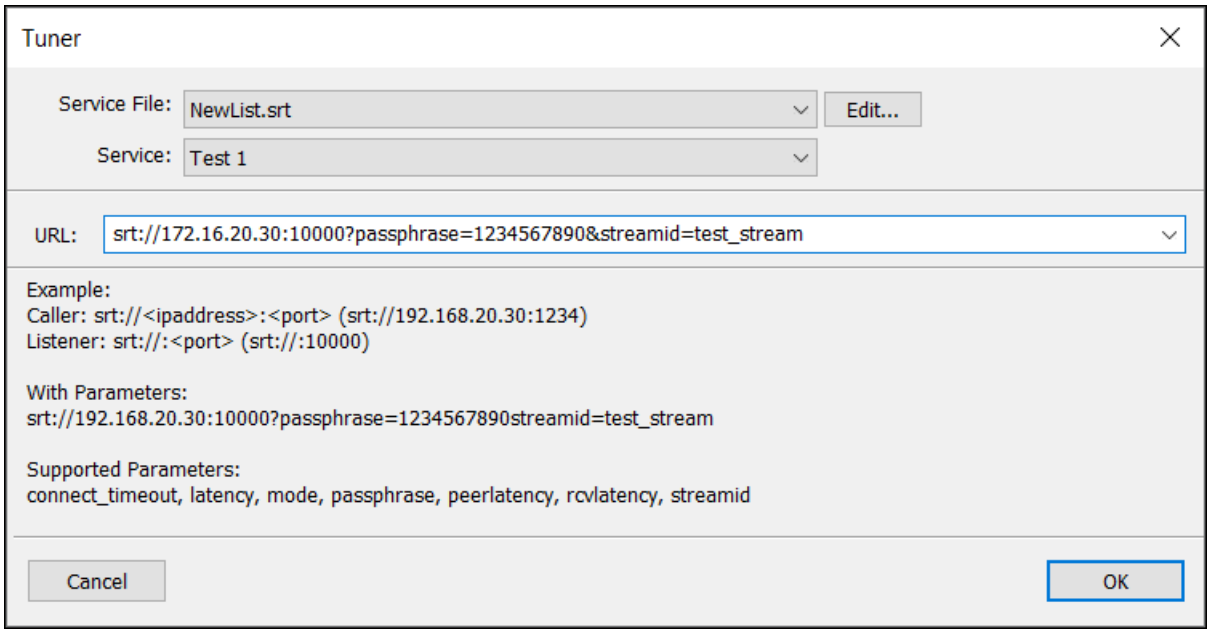
After selecting “Http-TS Source” in the Input Selector, the Set Tuner window appears.



HTTP-TS is a TS over HTTP source.

E.9 SRT Input

After selecting “SRT Source” in the Input Selector, the SRT Tuner dialog appears.



upported parameters:

connect_timeout=milliseconds
Connection timeout; SRT cannot connect for RTT > 1500 msec (2 handshake exchanges) with the default connect timeout of 3 seconds.
This option applies to the caller and rendezvous connection modes.
The connect timeout is 10 times the value set for the rendezvous mode.

latency=microseconds
Timestamp-based Packet Delivery Delay.
Used to absorb bursts of missed packet retransmissions.
This flag sets both rcvlatency and peerlatency to the same value.
(This is effectively equivalent to setting peerlatency and rcvlatency)

mode=caller|listener|rendezvous
Connection mode.
caller opens client connection.
listener starts server to listen for incoming connections.
rendezvous use Rendez-Vous connection mode.
(Default value is caller)

passphrase=string
HaiCrypt Encryption/Decryption Passphrase string, length from 10 to 79 characters.
The passphrase is the shared secret between the sender and the receiver.
It is used to generate the Key Encrypting Key using PBKDF2 (Password-Based Key Derivation Function).
It is used only if pbkeylen is non-zero. It is used on the receiver only if the received data is encrypted.

peerlatency=microseconds
The latency value (as described in rcvlatency) that is set by the sender side as a minimum value for the receiver.

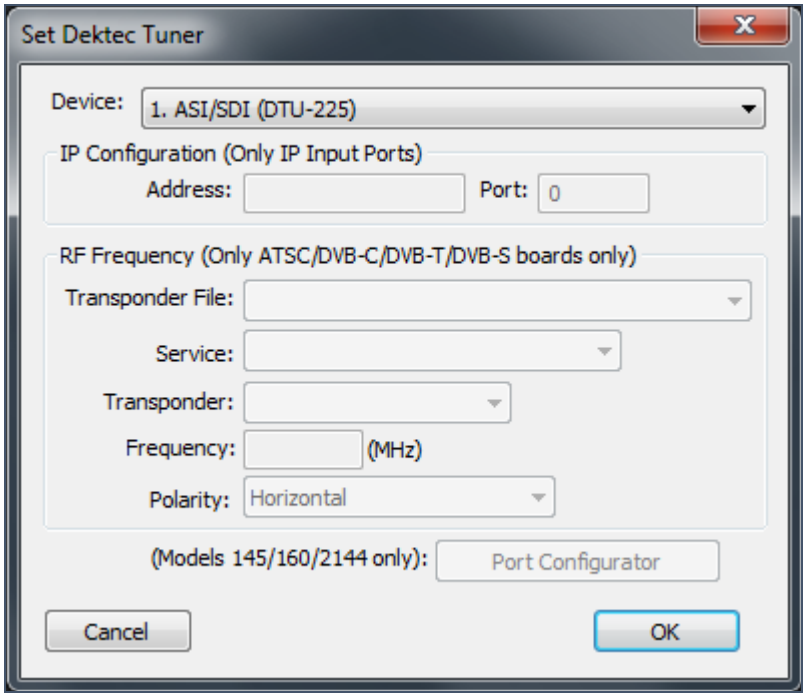
rcvlatency=microseconds
The time that should elapse since the moment when the packet was sent and the moment when it's delivered to the receiver application in the receiving function.
This time should be a buffer time large enough to cover the time spent for sending, unexpectedly extended RTT time, and the time needed to retransmit the lost UDP packet.
The effective latency value will be the maximum of this options' value and the value of peerlatency set by the peer side.

streamid=string
A string limited to 512 characters that can be set on the socket prior to connecting.
This stream ID will be able to be retrieved by the listener side from the socket that is returned from srt_accept and was connected by a socket with that set stream ID.
SRT does not enforce any special interpretation of the contents of this string.
This option doesn't make sense in Rendezvous connection; the result might be that simply one side will override the value from the other side and it's the matter of luck which one would win

E.10 DVB-ASI Input

After selecting the appropriate input source in the Input Selector, the Set Tuner window appears. Drivers, which are already installed, can be chosen via the pull-down menu.

Set Tuner - Dektec

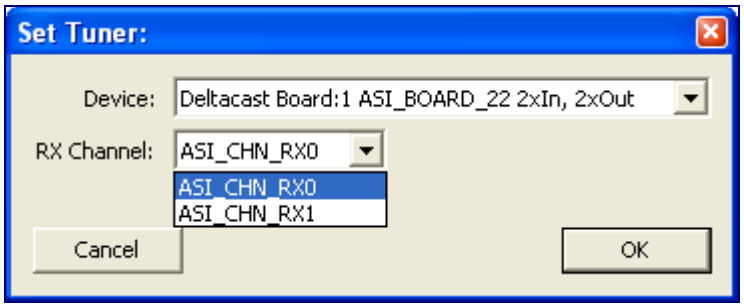


Tuning parameters

Parameter	Description
Device	Select the ASI input device

For the DTA 145/160 devices, Port Configuration is available.

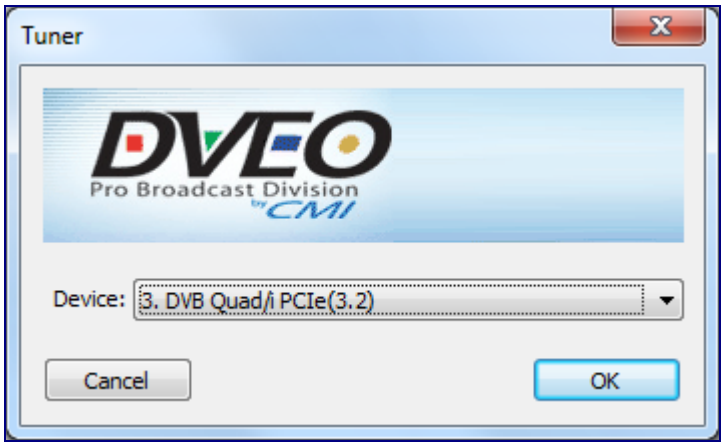
Set Tuner - Deltacast



Tuning parameters

Parameter	Description
Device	Select the ASI input device
RX Channel	Select the preferred input (multi-inputs)

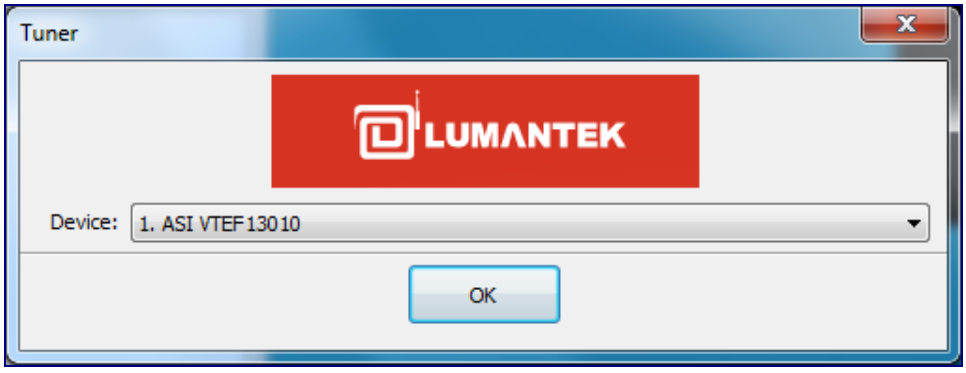
Set Tuner - DVEO



Tuning parameters

Parameter	Description
Device	Select the ASI input device

Set Tuner - Lumantek



Tuning parameters

Parameter	Description
Device	Select the ASI input device

Set Tuner - StreamLabs

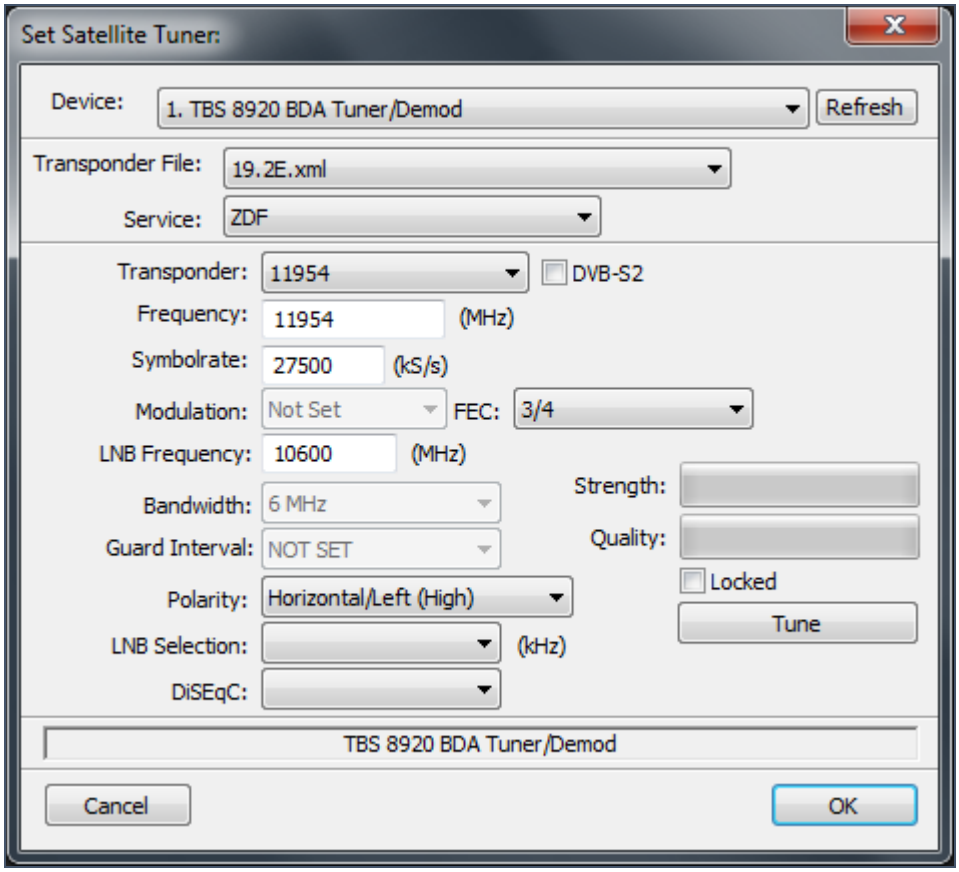
Tuning parameters

Parameter	Description
Device	Select the ASI input device

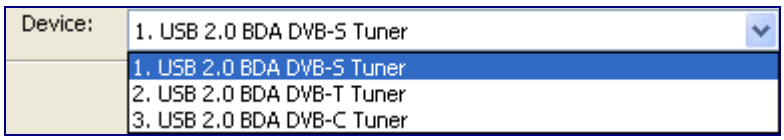
E.11 DVB-S Input

Set Tuner - BDS

After selecting “BDA Source” in the Input Selector, the Set Satellite Tuner window appears if a Satellite device is installed.



When multiple BDA driver adapters are installed, they can be selected via de Device pull-down menu.



Set Tuner - Satellite

There are two ways to set the tuner parameters.

- Manual input
- Transponder File input

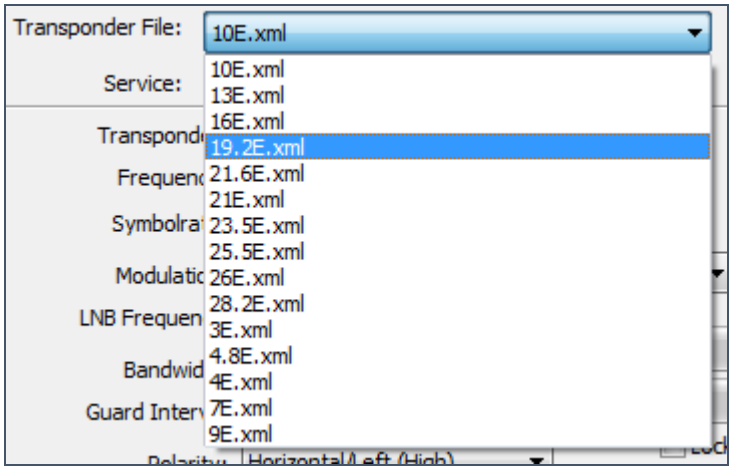
Tuning parameters

Parameter	Description
Frequency	10700 - 12750 MHz
Symbol Rate	2000 - 45000 kS/s
FEC	1/2, 2/3, 3/4, 5/6, 7,8, Auto sense
LNB frequency (MHz)	Universal LNB's mostly use 10600
Polarity	Horizontal/Left (High), Vertical/Right (Low)
LNB selection	None, 22/33/44 kHz
DiSEqC	None, Simple A, Simple B, Pos A - Opt A, Pos B - Opt B

When pressing the Tune button, the Signal Strength en Quality is given.
If a DVB signal is received it gets locked.

Transponder File

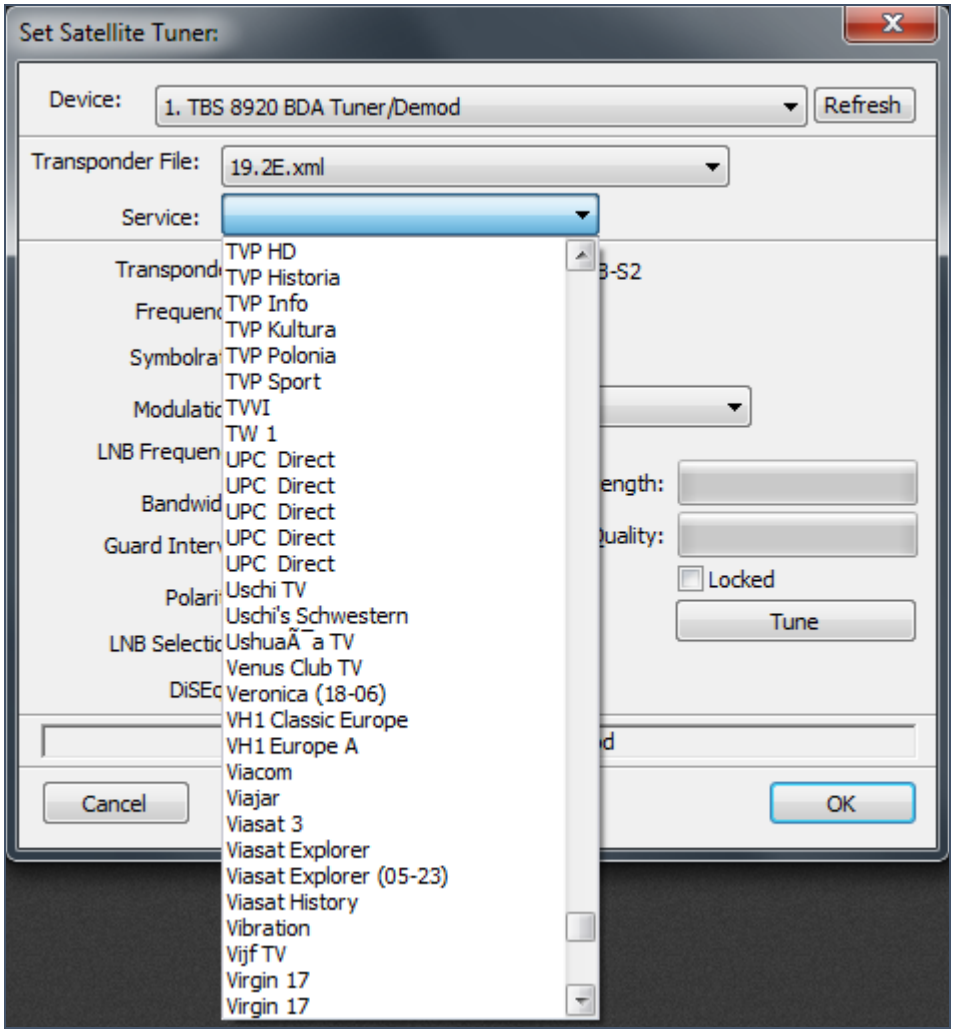
A Transponder File can be used, instead of manually typing tuner parameters.
In the “C:\Program Files\Common Files\DVBControl\Devices\Input\ChannelLists” directory, there are already Transponder Files available, which can be edited.



Users can edit the Transponder File, using the syntax:

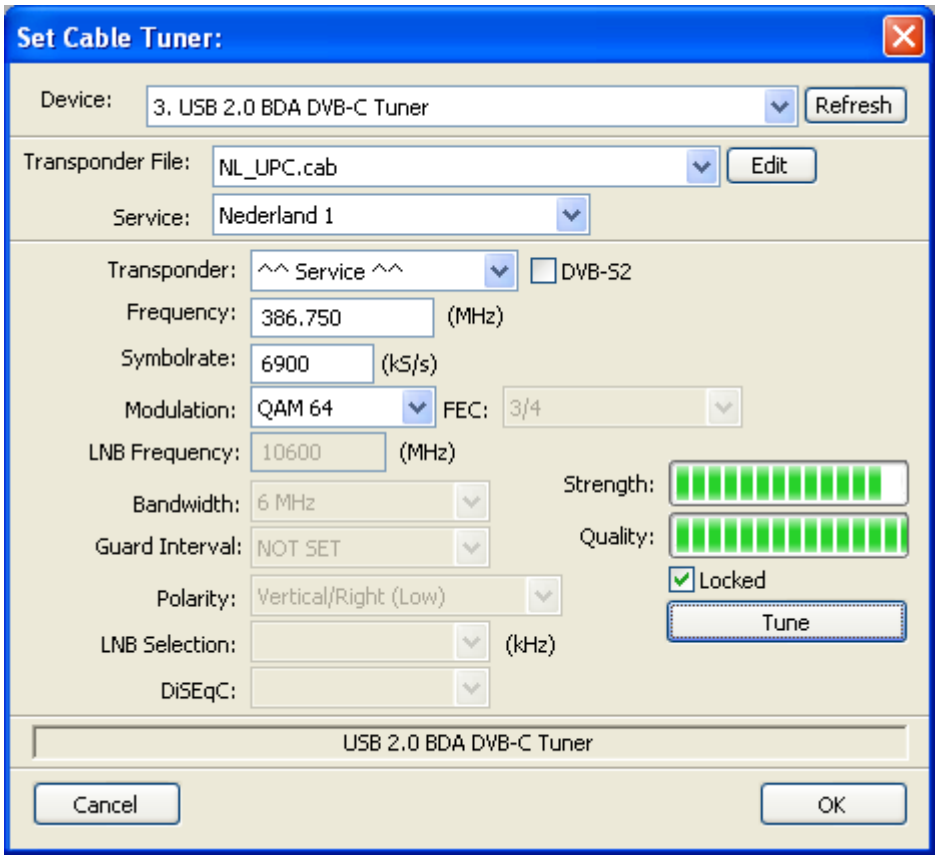
```
<?xml version="1.0"?>
<SatChannelList>
  <ChannelList>
    <SatChannel>
      <Frequency>10876</Frequency>
      <SatID>30</SatID>
      <TransponderID />
      <Position>V</Position>
      <SR>22000</SR>
      <FEC>5/6</FEC>
      <SID>30605</SID>
      <Name>National Geographic Channel Europe</Name>
    </SatChannel>
  </ChannelList>
</SatChannelList>
```

The Services list then can be used to quickly get all tuning parameters.



E.12 DVB-C Input

After selecting “BDA Source” in the Input Selector, the Set Cable Tuner window appears if a Cable device is installed.



Set Tuner - Cable

There are two ways to set the tuner parameters.

- Manual input
- Transponder File input

Tuning parameters

Parameter	Description
Frequency	50 - 860 MHz
Symbol Rate	1 - 7 MS/s
Modulation	QAM4, QAM16, QAM32, QAM64, QAM128, QAM256

Transponder File

A Transponder File can be made instead of manually typing the tuner parameters.
After tuning (manually) to a Transponder, the Transponder File can be created via “Tools > Make Transponder File”. The Services and Transponder information in the Transponder File is created by interpretation of the Service and Transponder descriptions in the tuned Transponder. The Saved Transponder File should have the extension .cab and should be placed in the
C:\Program Files\Common Files\DVBControl\Devices\Input\ChannelLists directory.

Users can edit the Transponder File, using the syntax:

[Cable]
TS_ID<TAB>Freq<TAB> QAM<TAB>SR<TAB>Service_name_x1<TAB>Service_name_x2 ..
TS_ID<TAB>Freq<TAB> QAM<TAB>SR<TAB>Service_name_y1<TAB>Service_name_y2 ..

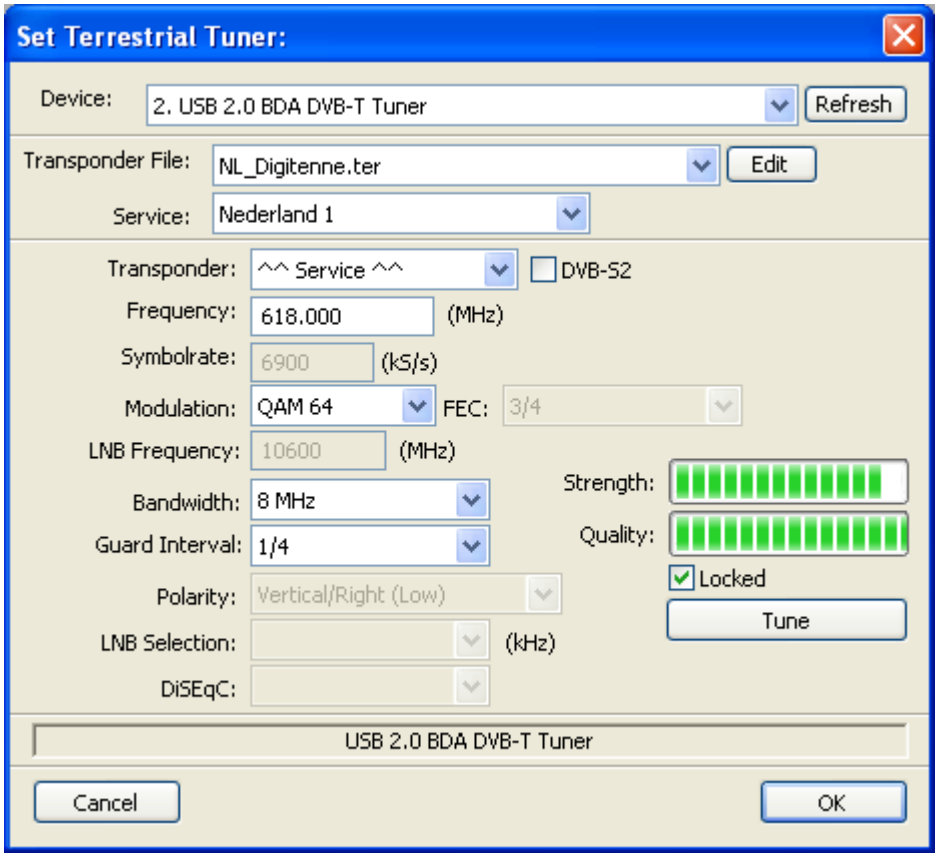
Where:

TS_ID	= Transponder_id
Freq	= Frequency (kHz)
QAM	= QAM16:1, QAM32:2, QAM64:3, QAM128:4, QAM256:5
SR	= Symbol Rate (kS/s)
Service_name_x	= Service name (can be extended by <TAB>)

E.13 DVB-T Input

After Selecting the Technosat or AirStar DVB-T board the Set Tuner window will look like this:

Set Tuner - Terrestrial



There are two ways to set the tuner parameters.

- Manual input
- Transponder File input

Tuning parameters

Parameter	Description
Frequency	171 - 230 MHz, 474 - 858 MHz
Bandwidth	7, 8 MHz
Guard Interval	1/4, 1/8, 1/16, 1/32. Auto sense

Transponder File

A Transponder File can be made instead of manually typing the tuner parameters.
After tuning (manually) to a Transponder, the Transponder File can be created via “Tools > Make Transponder File”. The Services and Transponder information in the Transponder File is created by interpretation of the Service and Transponder descriptions in the tuned Transponder. The Saved Transponder File should have the extension .ter and should be placed in the
C:\Program Files\Common Files\DVBControl\Devices\Input\ChannelLists directory.

Users can edit the Transponder File, using the syntax:

[Terrestrial]
TS_ID<TAB>Freq<TAB>BW<TAB>GI<TAB> Service_name_x1<TAB>Service_name_x2 ..
TS_ID<TAB>Freq<TAB>BW<TAB>GI<TAB> Service_name_y1<TAB>Service_name_y2 ..

Where:

TS_ID	= Transponder_id
Freq	= Frequency (kHz)
BW	= Bandwidth, 8MHz:0, 7MHz:1, 6MHz:2
GI	= Guard Interval, 1/32:0, 1/16:1, 1/8:2, 1/4:3
Service_name_x	= Service name (can be extended by <TAB>)

F Identifiers

F.1 PID identifiers

MPEG - Program Specific Information (PSI)

PID	PID name	Description
0x0000	PAT	Program Association Table (PAT)
0x0020 .. 0x1FFE	PMT	Program Map Table (PMT)
0x0001	CAT	Conditional Access Table (CAT)
0x0002	TSDT	TS Description Table (TSDT)
0x1FFFF	NULL	Null packet

DVB - Service Information (SI)

PID	PID name	Description
0x0010	NIT ST	Network Information Table Stuffing Table
0x0011	SDT BAT ST	Service Description Table Bouquet Association Table Stuffing Table
0x0012	EIT ST	Event Information Table Stuffing Table
0x0013	RST ST	Running Status Table Stuffing Table
0x0014	TDT TOT ST	Time and Data Table Time Offset Table Stuffing Table
0x0015	MIP	Mega-frame Initialization Packet
0x001E	DIT	Discontinuity Information Table
0x001F	SIT	Selection Information Table
0x0020 .. 0x1FFE	AIT	Application Information Table

ATSC - Program and System Information Protocol (PSIP)

PID	PID name	Description
0x1FFB	MGT TVCT CVCT RTT	Master Guide Table Terrestrial Virtual Channel Table Cable Virtual Channel Table Rating Region Table
0x0020 .. 0x1FFE	EIT	Event Information Table
0x0020 .. 0x1FFE	ETT	Extended Text Table

ISDB - Service Information (SI)

PID	PID name	Description
0x0024	BIT	Broadcaster Information Table

F.2 Table identifiers

MPEG

Table_id	Table name	Description
0x00	PAT	Program Association Table
0x01	CAT	Conditional Access Table
0x02	PMT	Program Map Table
0x03	TSDT	TS Description Table

DVB

Table_id	Table name	Description
0x40	NIT (Actual)	Network Information Table (Actual Network)
0x41	NIT (Other)	Network Information Table (Other Network)
0x42	SDT (Actual)	Service Description Table (Actual TS)
0x46	SDT (Other)	Service Description Table (Other TS)
0x4A	BAT	Bouquet Association Table
0x4B	UNT	Update Notification Table
0x4C	INT	IP/MAC Notification Table
0x4E	EIT p/f (Actual)	Event Information Table (Actual TS, present/following)
0x4F	EIT p/f (Other)	Event Information Table (Other TS, present/following)
0x50	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 0 - 3)
0x51	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 4 - 7)
0x52	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 8 - 11)
0x53	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 12 - 15)
0x54	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 16 - 19)
0x55	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 20 - 23)
0x56	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 24 - 27)
0x57	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 28 - 31)
0x58	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 32 - 35)
0x59	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 36 - 39)
0x5A	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 40 - 43)
0x5B	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 44 - 47)
0x5C	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 48 - 51)
0x5D	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 52 - 55)
0x5E	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 56 - 59)
0x5F	EIT schedule (Actual)	Event Information Table (Actual TS, schedule, day 60 - 63)
0x60	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 0 - 3)
0x61	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 4 - 7)

0x62	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 8 - 11)
0x63	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 12 - 15)
0x64	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 16 - 19)
0x65	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 20 - 23)
0x66	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 24 - 27)
0x67	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 28 - 31)
0x68	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 32 - 35)
0x69	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 36 - 39)
0x6A	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 40 - 43)
0x6B	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 44 - 47)
0x6C	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 48 - 51)
0x6D	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 52 - 55)
0x6E	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 56 - 59)
0x6F	EIT schedule (Other)	Event Information Table (Other TS, schedule, day 60 - 63)
0x70	TDT	Time and Data Table
0x71	RST	Running Status Table
0x72	ST	Stuffing Table
0x73	TOT	Time Offset Table
0x74	AIT	Application Information Table
0x78	MPE-FEC	MPE-FEC Section
0x7E	DIT	Discontinuity Information Table
0x7F	SID	Selection Information Table

ATSC

Table_id	Table name	Description
0xC7	MGT	Master Guide Table
0xC8	TVCT	Terrestrial Virtual Channel Table
0xC9	CVCT	Cable Virtual Channel Table
0xC9	L-VCT	Long-form Virtual Channel Table
0xCA	RTT	Rating Region Table
0xCB	EIT	Event Information Table
0xCC	ETT	Extended Text Table
0xCD	STT	System Time Table

ISDB

Table_id	Table name	Description
0xC4	BIT	Broadcaster Information Table

F.3 Descriptor identifiers

MPEG

Descriptor_tag	Usage
0x02	Video Stream
0x03	Audio Stream
0x04	Hierarchy
0x05	Registration
0x06	Data Stream Alignment
0x07	Target Background Grid
0x08	Video Window
0x09	Conditional Access
0x0A	ISO 639 Language
0x0B	System Clock
0x0C	Multiplex Buffer Utilization
0x0D	Copyright
0x0E	Maximum Bitrate
0x0F	Private Data Indicator
0x10	Smoothing Buffer
0x11	STD
0x12	IBP
0x14	DSM-CC Association Tag
0x1B	MPEG-4 Video
0x1C	MPEG-4 Audio
0x25	Metadata_Pointer_Descriptor
0X26	Metadata_Descriptor
0x28	AVC Video
0x2A	AVC timing HRD
0x2B	MPEG-2 AAC Audio
0x38	HEVC Video

DVB

Descriptor_tag	Usage
0x40	Network Name
0x41	Service List
0x42	Stuffing
0x43	Satellite Delivery
0x44	Cable Delivery
0x45	VBI Data
0x46	VBI Teletext
0x47	Bouquet Name
0x48	Service
0x49	Country Availability
0x4A	Linkage
0x4B	NVOD Reference
0x4C	Time Shifted Service
0x4D	Short Event
0x4E	Extended Event
0x4F	Time Shifted Event
0x50	Component
0x51	Mosaic
0x52	Stream Identifier
0x53	Conditional Access Identifier
0x54	Content
0x55	Parental Rating
0x56	Teletext
0x57	Telephone
0x58	Local Time Offset
0x59	Subtitling
0x5A	Terrestrial Delivery
0x5B	Multilingual Network Name
0x5C	Multilingual Bouquet Name
0x5D	Multilingual Service Name
0x5E	Multilingual Component Name
0x5F	Private Data Specifier
0x60	Service Move
0x61	Short Smoothing Buffer
0x62	Frequency List
0x63	Partial Transport Stream
0x64	Data Broadcast
0x65	Scrambling
0x66	Data Broadcast ID
0x67	Transport Stream
0x68	DSNG
0x69	PDC
0x6A	AC-3
0x6B	Ancillary Data
0x6C	Cell List
0x6D	Cell Frequency Link

0x6E	Announcement Support
0x6F	Application Signaling
0x70	Application Field Data
0x73	Default Authority
0X74	Related Content
0x76	Content ID
0x77	Time FEC ID
0x78	ECM Repetition Rate
0x79	S2 Satellite Delivery
0x7A	Enhanced AC-3
0x7C	AAC
0x7F	Extension
0x80	Logical Channel Descriptor Version 1
0x82	Channel ID
0x83	Logical Channel Descriptor Version 2
0x88	HD Simulcast Logical Channel
0x89	OpenTV Private
0x8A	SCTE 35 Cue Identifier
0x90	OpenTV Module
0x91	Logical Channel Number
0xA0	Content Protection
0xA1	Telephone Number
0xCE	CI Protection
0xFD	OpenTV track attributes
0xFE	OpenTV tag

DVB Extended descriptor (0x7F) identifications

Descriptor_tag	Usage
0x00	Image Icon
0x01	CPCM Delivery Signaling
0x02	CP
0x03	CP Identifier
0x04	T2 Delivery System
0x06	Supplementary Audio
0x07	Network Change Notification
0x08	Message
0x09	Target Region
0x0A	Target Region Name
0x0B	Service Relocated
0x11	T2 MI

ATSC

Descriptor_tag	Usage
0x81	AC-3 Audio
0x83	Extended Video
0x86	Caption Service
0x88	ATSC Conditional Access
0xA0	Extended Channel Name
0xA1	Service Location
0xA2	Time Shifted Service
0xA3	Component Name
0xA8	DCC Departing Request
0xA9	DCC Arriving Request
0xAA	Redistribution Control
0xAB	Genre
0xCC	Enhanced AC-3
0xE9	Encoder Boundary Point

ISDB

Descriptor_tag	Usage
0xC1	Digital Copy Control
0xC8	Video Decode Control
0xC4	Audio Component
0xC7	Data Content
0xCD	TS Information
0xCE	Extended Broadcast
0xCF	Logo Transmission Type
0xD5	Series
0xD6	Event Group
0xD7	SI Parameter
0xDE	Content Availability
0xFA	Terrestrial Delivery System
0xFB	Partial Reception
0xFD	Data Component
0xFE	System Management

MHP

Descriptor_tag	Usage
0x00	Application
0x01	Application Name
0x02	Transport Protocol
0x03	DVB-J Application
0x04	DVB-J Application Location
0x05	External Application Authorization
0x06	Routing IPv4
0x07	Routing IPv6
0x08	DVB-HTML Application
0x09	DVB-HTML Application Location
0x0A	DVB-HTML Application Boundary
0x0B	Application Icons
0x0C	Pre-fetch
0x0D	DII Signaling
0x0E	Delegated Application
0x0F	Plug-in
0x10	Application Storage
0x11	IP Signaling
0x12	Provider Export
0x13	Provider Usage
0x14	Graphics Constraints
0x5F	Private Data Specifier

DSM-CC

Descriptor_tag	Usage
0x01	Type
0x02	Name
0x03	Info
0x04	Module Link
0x05	CRC32
0x06	Location
0x07	Estimated Download Time
0x08	Group Link
0x09	Compressed Module
0x70	Label
0x71	Caching Priority
0x72	Content Type

MIP

Descriptor_tag	Usage
0x00	TX Time Offset
0x01	TX Frequency Offset
0x02	TX Power
0x03	Private Data
0x04	Cell ID
0x05	Enable
0x06	Bandwidth

INT / UNT

Descriptor_tag	Usage
0x01	Scheduling
0x02	Update
0x03	SSU Location
0x04	Message
0x05	SSU Event Name
0x06	Target Smartcard
0x07	Target MAC Address
0x08	Target Serial Number
0x09	Target IP Address
0x0A	Target IPv6 Address
0x0B	SSU Subgroup Association
0x0C	IP/MAC Platform Name
0x0D	IP/MAC Platform Provider Name
0x0E	Target MAC Address Range
0x0F	Target IP Slash
0x10	Target IP Source Slash
0x11	Target IPv6 Slash
0x12	Target IPv6 Source Slash
0x13	IP/MAC Stream Location
0x14	ISP Access Mode
0x57	Telephone
0x5F	Private Data Specifier

G RDS

G.1 Abbreviations

RDS abbreviations

Abbreviation	Usage
AF	List of alternative frequencies
CT	Clock time and date
DI	Decoder identification
EON	Enhanced information on other networks
eRT	Enhanced Radiotext
EWS	Emergency warning systems
I H	In-house application
M/S	Music/speech switch
MEC	Message Element Code
ODA	Open data application
PI	Program identification
PIN	Program-item number
PS	Program service name
PSN	Program Service Number
PTY	Program type
PTYI	Program type indicator (static/dynamic)
PTYN	Program type name
RDS	Radio Data System
RP	Radio paging
RT	Radiotext
RT+	Radiotext Plus
SQC	Sequence Counter
TA	Traffic-announcement identification
TDC	Transparent data channel
TMC	Traffic message channel
TP	Traffic-program identification

Other abbreviations

Abbreviation	Usage
AID	Application identification for Open data (see 6.1.5.4 of IEC 62106 Ed2:2009)
ARI	Identification system for broadcasts to motorists (Annex H of IEC 62106 Ed2:2009)
CI	Country identifier (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
ECC	Extended country code (see Annex D of IEC 62106 Ed2:2009)
EG	Extended Generic indicator (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
DL	Dynamic Label (DAB)
ILS	International Linkage Set indicator (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
LA	Linkage Actuator (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
LI	Linkage Identifier (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
LSN	Linkage Set Number (see 6.2.1.8.3 of IEC 62106 Ed2:2009)
Rass	Radio screen show (DVB-S radio)
UECP	Universal Encoder Communications Protocol

RDS Paging abbreviations

Abbreviation	Usage
CCF	Current Carrier Frequency
CS	Cycle
EPP	Enhanced Paging Protocol
IT	Paging interval
OPC	Operator Code
PAC	Paging Area Code
SI	System Information
STY	Sub-type of type 13A group

G.2 RT+ Classes

Abbreviation	Usage
DUMMY_CLASS	To assign a class if the RadioText contains no RT+ information
ITEM.TITLE	Title of item; e.g. track title of an album
ITEM.ALBUM	The collection name to which this track belongs
ITEM.TRACKNUMBER	The track number of the item on the album on which it was originally released.
ITEM.ARTIST	A person or band/collective generally considered responsible for the work
ITEM.COMPOSITION	A complete composition (Classical Music broadcasters should use this item to identify the composition)
ITEM.MOVEMENT	A movement is a large division of a composition or musical form (Classical Music broadcasters should use this item to identify the movement)
ITEM.CONDUCTOR	The artist(s) who performed the work. In classical music this would be the conductor
ITEM.COMPOSER	Name of the original composer/author
ITEM.BAND	Band/orchestra/accompaniment/musician
ITEM.COMMENT	Any comment related to the content
ITEM.GENRE	The main genre of the audio, e.g. 'classical', 'hip-hop', 'jazz', 'oldies', 'drama', etc
INFO.NEWS	Message / headline
INFO.NEWS.LOCAL	Local news
INFO.STOCKMARKET	Quote information; either as one part or as several distinct parts
INFO.SPORT	Result of a game; either as one part or as several distinct parts
INFO.LOTTERY	Raffle / lottery
INFO.HOROSCOPE	Horoscope; either as one part or as two distinct parts
INFO.DAILY_DIVERSION	Daily tip / diversion / joke ..."
INFO.HEALTH	Information about health
INFO.EVENT	Info about an event
INFO.SZENE	"Information about scene (hot locations to be, ...)
INFO.CINEMA	Information about movies in cinema
INFO.TV	Information about TV-movies
INFO.DATE_TIME	Information about date and time (receiver to choose between date and time). Not CT (Clock Time); shall not be used to set the internal clock of a device
INFO.WEATHER	Information about weather; either as one part or as two distinct parts
INFO.TRAFFIC	Information about traffic. This shall not replace TMC but rather alert users in case of exceptional traffic news
INFO.ALARM	Alarm information
INFO.ADVERTISEMENT	Info about an advertisement. May be in parallel to an audio advertisement
INFO.URL	Link to url; either as one part or as two distinct parts
INFO.OTHER	Other information, not especially specified
STATIONNAME.SHORT	Name describing the radio station (call letters)"
STATIONNAME.LONG	Name describing the radio station
PROGRAMME.NOW	EPG info program now

PROGRAMME.NEXT	EPG info program next
PROGRAMME.PART	Part of the current radio show; e.g. one or more part of the PROGRAMME.NOW
PROGRAMME.HOST	Name of the host of the radio show
PROGRAMME.EDITORIAL_STAFF	Name of the editorial staff; e.g. name of editorial journalist
PROGRAMME.FREQUENCY	Information about radio shows. A link towards another frequency with other content (not AF list). May be one part or two distinct parts
PROGRAMME.HOMEPAGE	Link to radio station homepage
PROGRAMME.SUBCHANNEL	For so-called multicasting applications; may be one part or two distinct parts
PHONE.HOTLINE	The telephone number of the radio station's hotline
PHONE.STUDIO	The telephone number of the radio station's studio
PHONE.OTHER	Name and telephone number; either as one part or as two distinct parts
SMS.STUDIO	The SMS number of the radio stations studio (to send directly a SMS to the studio)
SMS.OTHER	Name and SMS number; either as one part or as two distinct parts
EMAIL.HOTLINE	The email address of the radio stations hotline
EMAIL.STUDIO	The email address of the radio stations studio
EMAIL.OTHER	Name and email address; either as one part or as two distinct parts
MMS.OTHER	Name and mms number; either as one part or as two distinct parts
CHAT	chat content: sent by users to a specific address and broadcasted by the radio station
CHAT.CENTER	Address, where replies to the chat shall be sent (may be URL or SMS)
VOTE.QUESTION	A question (typically binary) which can be answered by 'yes' or 'no' or '1' or '2'
VOTE.CENTER	URL or SMS number to send the answer to
Feature	Classes are reserved for future usage
PLACE	Adds info about a location
APPOINTMENT	Adds info about date and time
IDENTIFIER	For music it is the International Standard Recording Code (http://www.ifpi.org/isrc/)
PURCHASE	Address where item can be purchased, can be an URL or a SMS-number
GET_DATA	Retrieves either via an sms or url-link more data about the other RT+ information element of the same RadioText message. (Info request via point to point - unicast)

H Command Line Parameters

It is possible to start DVBAnalyzer with command line parameters. This can be used to automatically start analyzing on a specific input.

Supported commandos:
-device [File|UDP]

UDP:
Parameters:
-adapterindex (Network Adapter Index)
-bindaddress
-bindport
-igmpaddress (optional)
-igmpport (optional)
Example UDP Input:
-device UDP -adapterindex 2 -bindaddress=239.10.20.30 -bindport 2000

File:
Parameters:
-filename
-looped (optional)
-fixedbitrate (optional)

Example File Input:
-device File -filename E:\Test.ts -looped 1 -fixedbitate 1000000

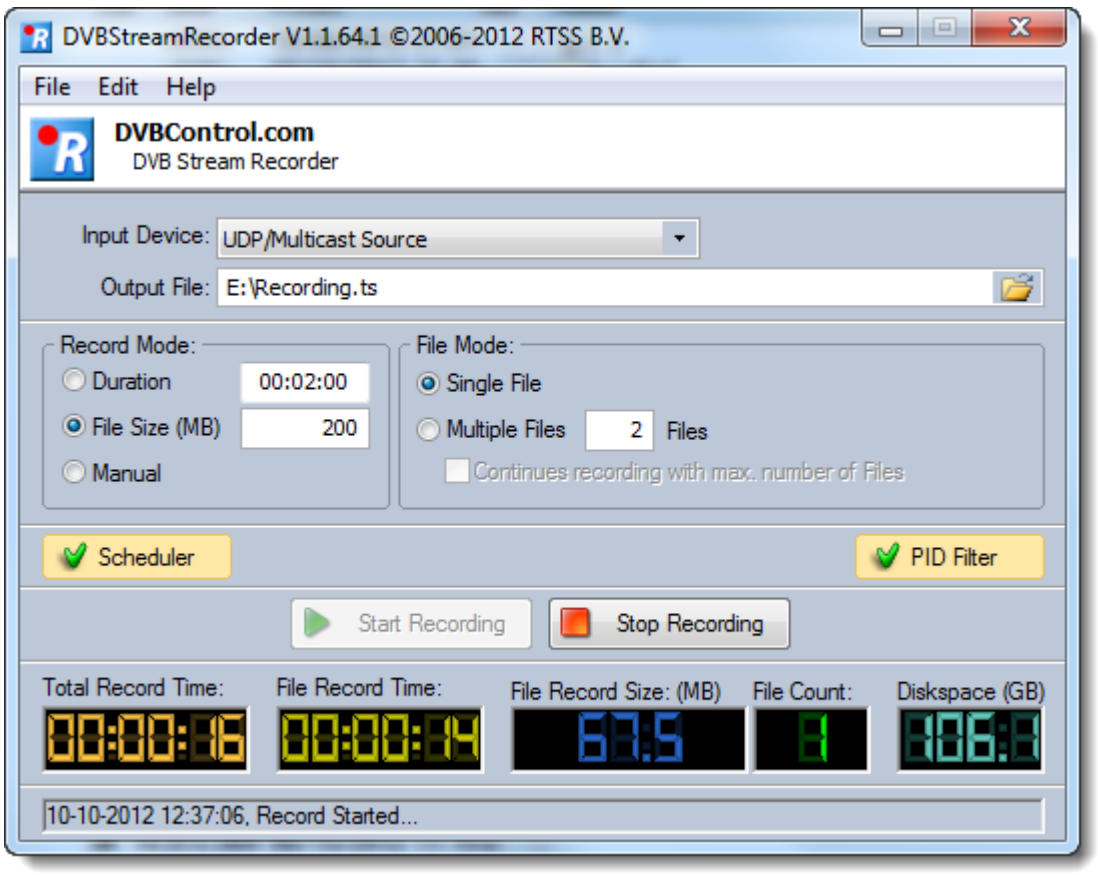
I Tools

Different tools are available:

- DVBStreamRecorder
- TSReConverter
- TSSplitter
- DVBPlayer

I.1 DVBStreamRecorder

Instant and scheduled Stream recording.

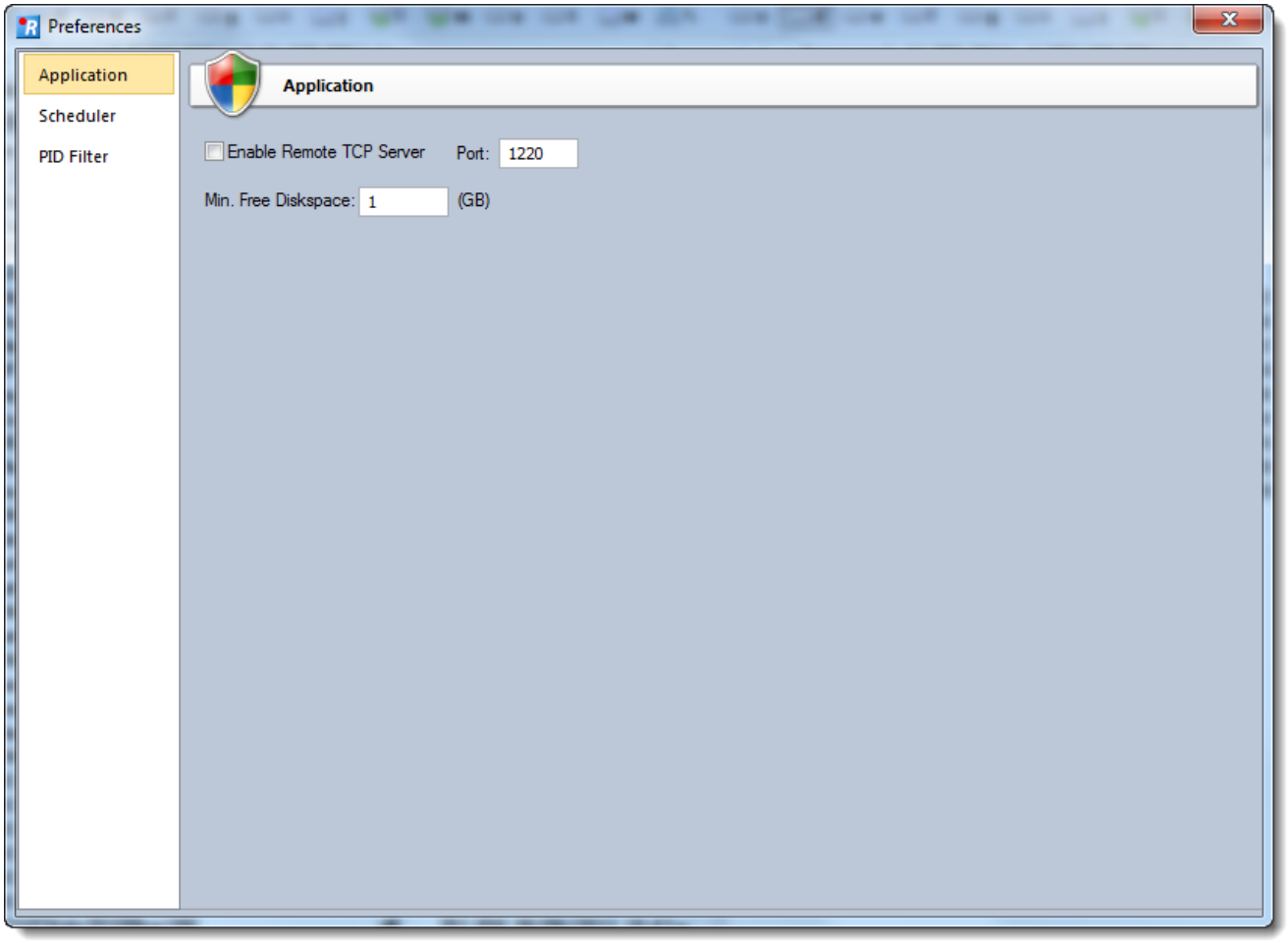


Records can stop recording depending on:

- Duration
- File Size
- Manual stop of recording

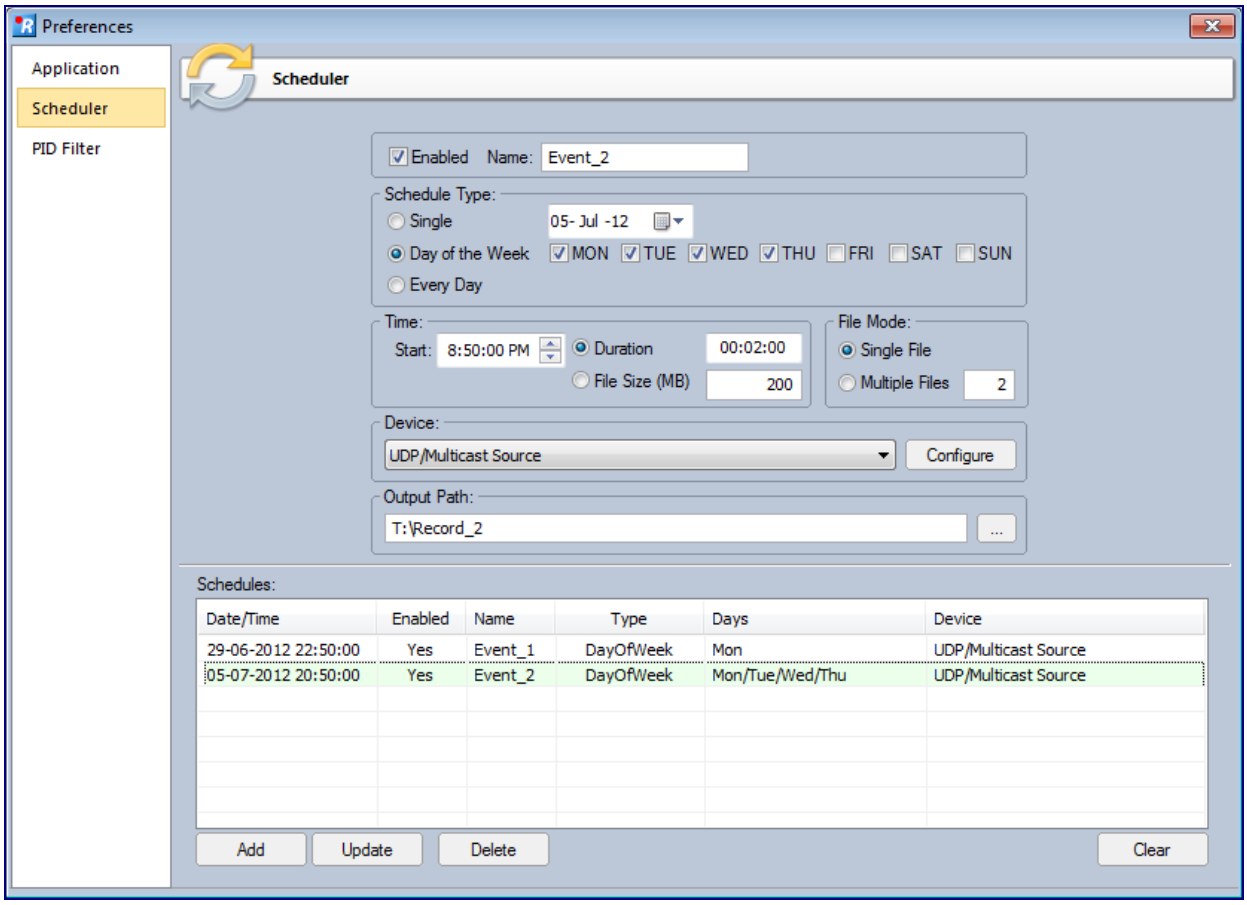
Multiple records can be scheduled.
In situation where not all PIDs are of interest and storage is limited, PID filtering can be used during recording.

Preferences – Application

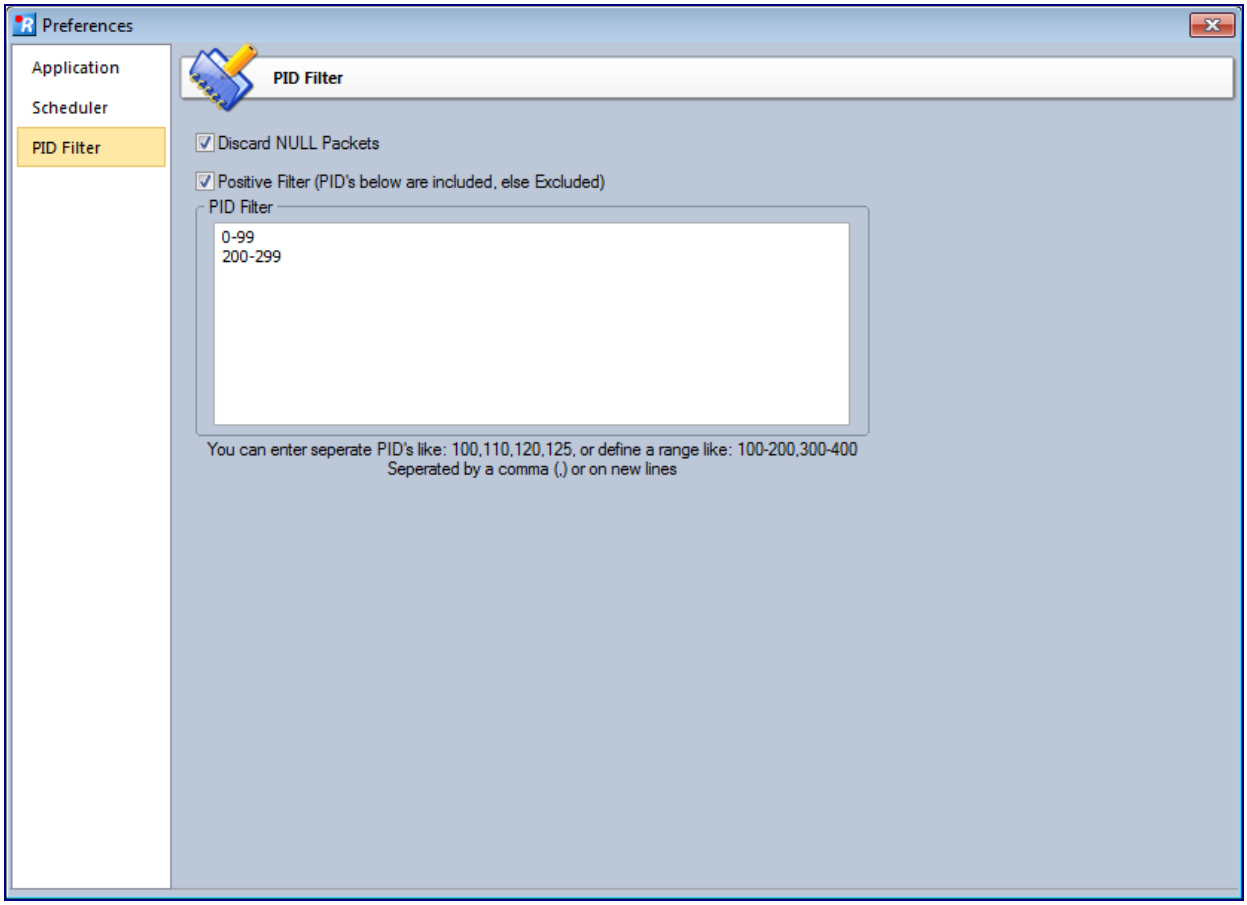


In the directory Help directory an example for remote TCP control is available.

Preferences – Scheduler



Preferences – PID Filter



Keyboard Shortcuts:
Ctrl-P – Preferences
Shift-Start Recording button – Quick start of recording with previous paramters
Ctrl-Shift- Start Recording button - Quick start of recording with previous paramters on all running instances
Ctrl-Shift -Stop Recording button - Quick stop recording on all running instances

Command Line Parameters

It is possible to start the recorder with command line parameters.

Supported commandos:

-device [UDP]
-outputfile
-recordmode [duration (xx:xx:xx)|size (xx MB)|manual]
-filemode [single|multi (xx [on/off])]
-scheduler [on/off]
-pidfilter [on/off]

UDP:
Parameters:

-adapterindex (Network Adapter Index)
-bindaddress
-bindport
-igmpaddress (optional)
-igmpport (optional)

Filemode:
Single =Record Single File
Multi = Record Multiple Files

Parameters:

- Number of files
- Optional: Continues Recording On/Off

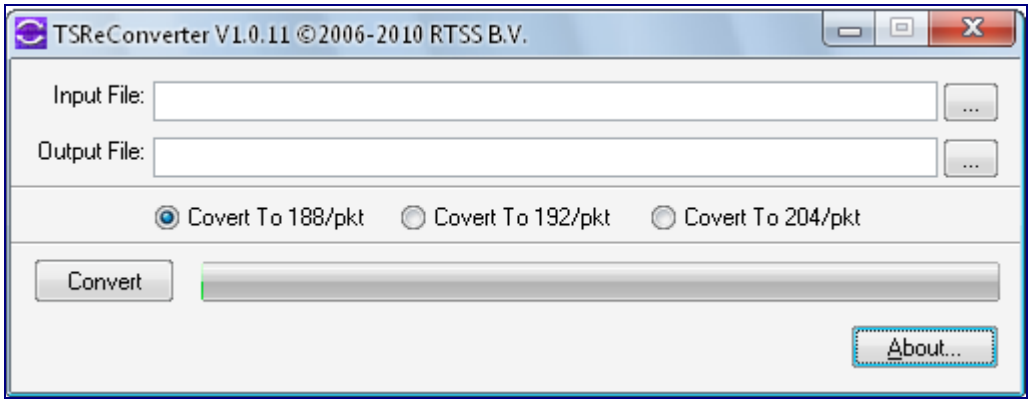
Example:

multi 4 on (continues recording with max. number of files 4)

Example UDP Input:
-device UDP -adapterindex 2 -bindaddress 239.10.20.30 -bindport 2000 -outputfile E:\Test.ts -recordmode duration 00:01:00 -filemode multi 4 -scheduler off -pidfilter on

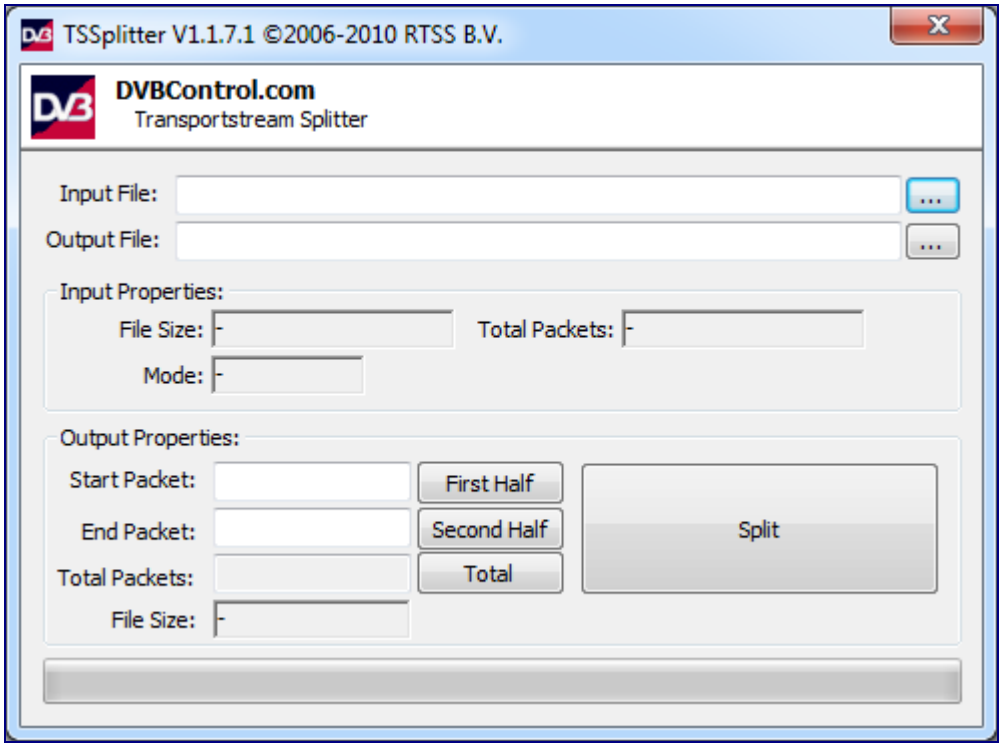
I.2 TSReConverter

Easy conversion of 204, 192 and 188 byte TS-packet files.



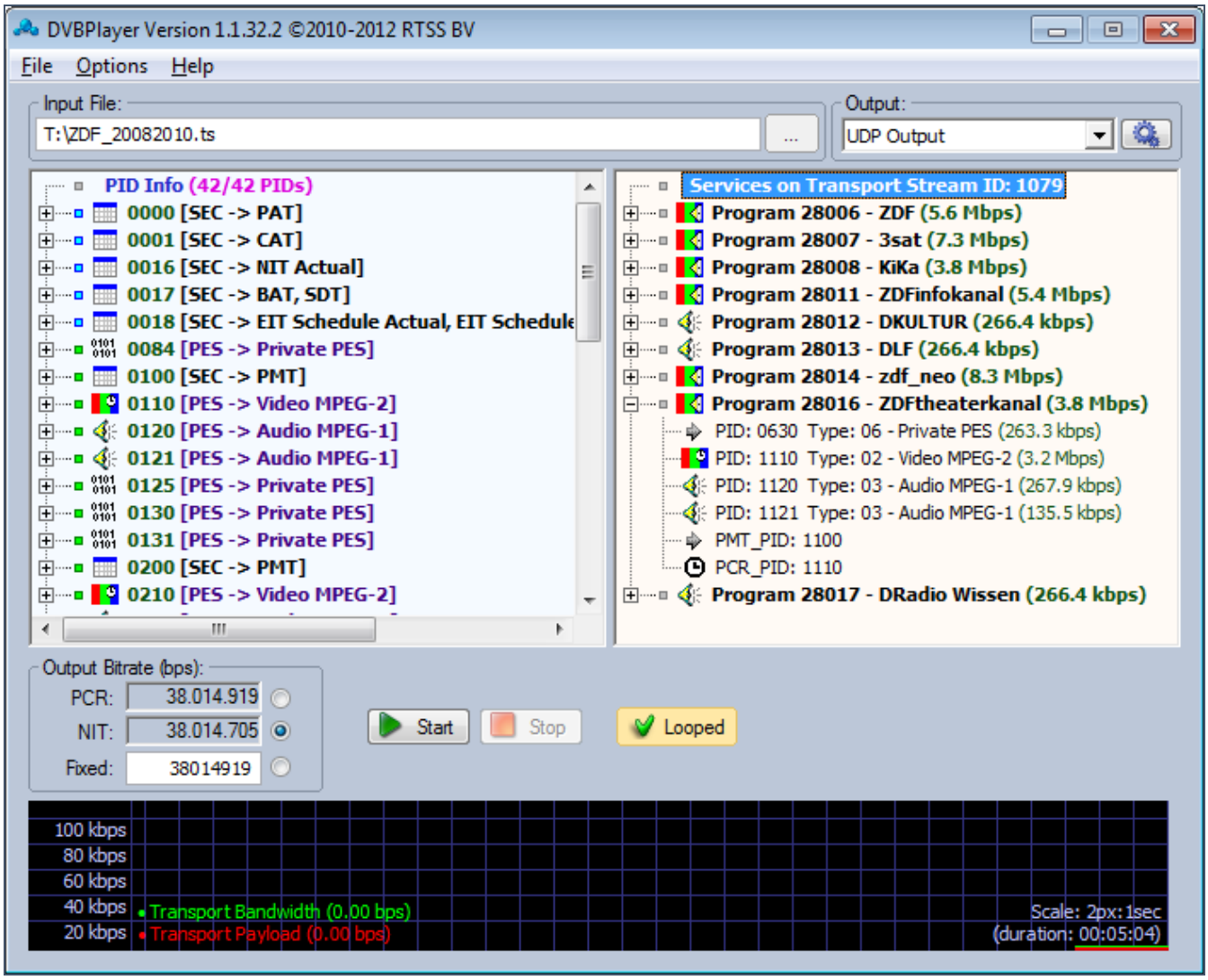
I.3 TSSplitter

Easy splitting of Transport Stream files.

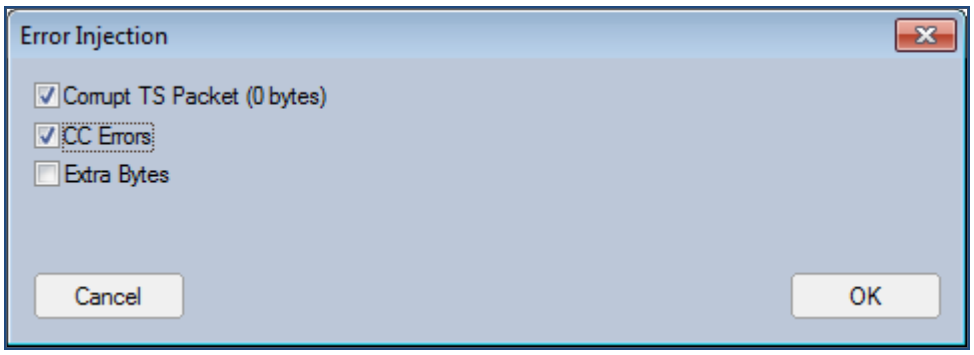


I.4 DVBPlayer

Easy player for TS files.
Output can be file, UDP Unicast/Multicast and ASI.



Via Options, the possibility exists to insert errors.



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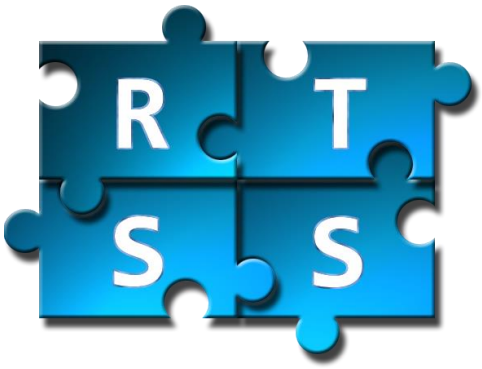

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