Dualz

SMART DVB

Probe operation manual

PROBE OPERATION MANUAL

SMART DVB LITE & PRO

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WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE

● ALWAYS disconnect your entire system from the AC mains before cleaning any component. The product frame must be terminated with three-conductor AC mains power cord that includes an earth ground connection. To prevent shock hazard, all three connections must always be used.
● NEVER use flammable or combustible chemicals for cleaning components.
● NEVER operate this product if any cover is removed.
● NEVER wet the inside of this product with any liquid.
● NEVER pour or spill liquids directly onto this unit.
● NEVER block airflow through ventilation slots.
● NEVER bypass any fuse.
● NEVER replace any fuse with a value or type other than those specified.
● NEVER attempt to repair this product. If a problem occurs, contact your local Dualz Solutions distributor.
● NEVER expose this product to extremely high or low temperatures.
● NEVER operate this product in an explosive atmosphere.

Warranty: Dualz Solutions warrants their products according to the warranty policy as described in the general terms. That means that Dualz Solutions BV can only warrant the products as long as the serial numbers are not removed.

Date created: 07-10-2014
Date last revised: 08-02-2020

This product complies with the requirements of the product family standards for audio, video, audio-visual entertainment lighting control apparatus for professional use as mentioned below.

CE

EN60950	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

Dualz Solutions Tested To Comply With FCC Standards FOR HOME OR OFFICE USE	This device complies with part 15 of the FCC Rules Operation is subject to the following two conditions: (1) This device may cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Table of Contents

Preface

Manual information

Purpose

This manual details operation of the SMART DVB probe:

- SMART DVB Light (Software Only base version)
- SMART DVB 10 Pro
- SMART DVB 25 Pro
- SMART DVB 50 Pro
- SMART DVB 80 Pro
- SMART DVB 90 Pro
- SMART DVB XL Pro
- SMART DVB 100 Pro

Note: Depending of the Type the function/feature will be appear in the GUI.

Audience

This manual is written for the engineers and technicians that are responsible for the proper installation and use of SMART DVB.

Revision history

Edition	Date	Revision
1	7-7-2015	First draft
2016	21-11-2016	Version 2.4
2017	14-07-2017	Version 2.6
2017	27-11-2017	Version 2.7
2019	24-07-2019	Version 2.9
2020	08-02-2020	Version 3.1

Writing styles

To make this document easier to understand, this manual contains the following text styles:

Style	Description
Bold	Chapter titles, paragraph titles, table headers.
Italic bold	Special words that need emphasis
CAPS	Indicates a keystroke on the keyboard, such as ENTER, CTRL, SHIFT or ALT.
>	Indicates the direction of navigation through a menu structure.
`Display`	Indicates a setting and setting value
 **Note**	Indicates important information that helps to avoid problems.

Documentation

The following documentatation is published:

- SMART Familiarization guide V3.0
- SMART Probe Manual V3.0
- SMART SDC Operations Manual V3.0
- SMART Gateway ACC Operations Manual V3.0
- SMART SoloControl manual V3.0
- SMART Performance V3.0

*PDF copy is available please request smartsupport@dualz-solutions.nl

1. Introduction

To be able to provide good quality of service for program delivery to end users in the digital broadcast domain, it is important to receive early warning indication in case of problems during provisioning or run of these programs. The SMART DVB probe is a system which serves as such an early warning system.

The SMART DVB probe is comprehensive product designed to provide real-time analysis and monitoring of DVB compliant Transport Streams. The probe provides Table, Service, PID, and bit rate analysis for a complete overview of the incoming Transport Stream. The probe provides PCR and TR 101.290 (ETR-290) analysis to assist in identifying problems in the transport stream. These features, along with real-time decoding of the incoming digital video and audio, provide a powerful and portable analysis and monitoring solution.

SMART DVB Pro versus Lite

The SMART DVB suite has from software version 3 and on an extra license option. This license option is SMART DVB Lite. SMART DVB Lite is available as an software only solution and also used as free Demo version. The Lite version has all the base features. This manual will appoint the Pro features in (Pro Only) message.
The free demo Lite version will run only for 5 minutes. After the time limit you need to restart. The demo is also file based only.

SMART DVB probe and gateway

The SMART DVB system is divided into two functional blocks; the first block is the Probe and the second block is the Gateway. The Probe is the device which performs all necessary measurements selected by the operator. One probe system can handle multiple transport streams. Depending on the amount of transport streams, one or more probes shall be applied to the system design. Each SMART DVB Probe can forward alarms and status (MIB) via SNMP to an overall customer management system.

The Gateway server collects all alarms initiated by one or more probes. The Gateway server enables the operator to view and publish reports of all parameters monitored by the probes.

Note

Important note: If other applications are installed or running on the probe server, they can have serious impact on the probe measurements. Please be aware that no other applications should be run on the probe, other than the installed Probe/Gateway software itself.

2. Unpacking and Placement

(Pro Only)

Unpacking

Dualz Solutions has carefully inspected this product before shipment.

Upon reception, please perform the following steps:

1- Check products for any visible damage that may have occurred during transit.
2- Confirm receipt of all products listed on the packing list.
3- Contact your Dualz Solutions dealer if any product on the packing list is missing.
4- Contact the carrier if any item is damaged.
5- Remove all packing material from the products before you install them, in an ***anti-static environment***.

Shipping

Keep at least one set of original SMART DVB packaging in case a product needs to be returned for servicing or replacement.

3. The SMART DVB probe

Key Features

- Real time monitoring solution for traditional broadcast systems and IP TV systems
- PSI / SI completeness checking
- Threshold definition of measurements
- Video: MPEG-2 SD/HD, MPEG4 part 10/AVC/H264 SD/HD and HEVC H265 SD/HD support
- Audio: MPEG1 L2, MPEG2, AAC, He-AAC (1), He-AAC (2), AC3 and EAC3 support
- Live video channel matrix including UMD, Status, DVB-TXT–CC Subtitling, and User information(Pro Only)
- Easy to integrate with overall network managements systems
- Black frame detection
- Freeze frame detection
- SCTE 35 Views, Logging, Alarms and reports (Pro Only)
- TR 100.290 measurement
- Report generation(Pro Only)

Monitoring

- The system can monitor different inputs like ASI, RF and MPEGoIP
- Supports offline TS analysis
- Monitoring of all components available in a transport stream (e.g. Video, Audio, Teletext, Data and ECM components)
- Snapshot functionality on existing components
- Snapshot for min/max bit rates per component
- Data freeze detection
- Burst measurements
- Scheduled measurements

PSI/SI checking

- Snapshot measurement for PAT, PMT, CAT, BAT, NIT actual, NIT others, SDT actual and SDT other, TDT and TOT table
- MPE / DSMCC component recognition
- Snapshot measurement per table for descriptors in the first and second loop
- EIT actual P/F content check with respect to the current time or UTC
- EIT actual scheduled content check with respect to the current time or UTC
- Minimum gap definition which is allowable within the EIT information
- EIT actual p/f and EIT actual schedule check on the availability of the maturity rating descriptor
- Version number checking per table as part of the snapshot check

- XML export of all PSI/SI tables (Pro Only)
- Repetition rates definition per table with lower and upper thresholds
- XML table & descriptor definition of (private) tables/descriptors

Decoding

- I frame only decoding
- Full frame decoding
- Freeze frame detection (including threshold)
- Black frame detection (including threshold)
- Audio silence detection
- Audio amplitude check (Low and High level)
- Full Loudness checks based on ITU 1770 BS and EBU 128 standard(Pro Only)

Front end

- ASI
- TSoIP (UDP, RTP, RTP+FEC)
- Satellite, DVB-S / DVB-S2
- Terrestrial, DVB-T/DVB-T2
- Cable DVB-C
- File based

Reporting (Pro Only)

- Creates report per transport stream. Standard template generation, including time, date, duration, alarm level, transport stream
- Reporting functions for alarm history, service information, PID plan information, bit rate information, Availability, SCTE 35 and system configuration
- The reports can be generated either in the screen mode, PDF, CSV or XLS format

Views

- PCR Views (Accuracy, Repetition and Frequency Offset)
- Several bit rate Views (Actual, Last hour, Week & Month)
- Bit rate history
- EPG Views
- Several alarm views on different levels
- Monitor View, with alarm indication
- Modulation View
- Packet View
- Section View
- MIP section View
- INT View
- MPE View,

- IP statistics
- Availability System, TS and Service graph
- SCTE 35 at Transport Stream, Service and Component level (Pro Only)

Licensing options

The following features in the probe are licensed via its license key:

- Type of Device
- Number of additional input transport streams (MPTS)
- Number of additional SPTSs
- Triggered recording function (Pro Only)
- Gateway (ACC) functionality (Probe data aggregation and publish in dedicated application) (Pro Only)
- Gateway (SDC) functionality (user accessible database for data publishing on internal and or external Websites) (Pro Only)
- HEVC / H265 option Decoding
- Loudness Monitoring functionality (Pro Only)
- Audio AC3 / DD EAC3/DD+ (Dolby Digital/Dolby Digital Plus)
- AVC 4:2:2 decoding support (Pro Only)
- SCTE 35 Reporting support (Pro Only)

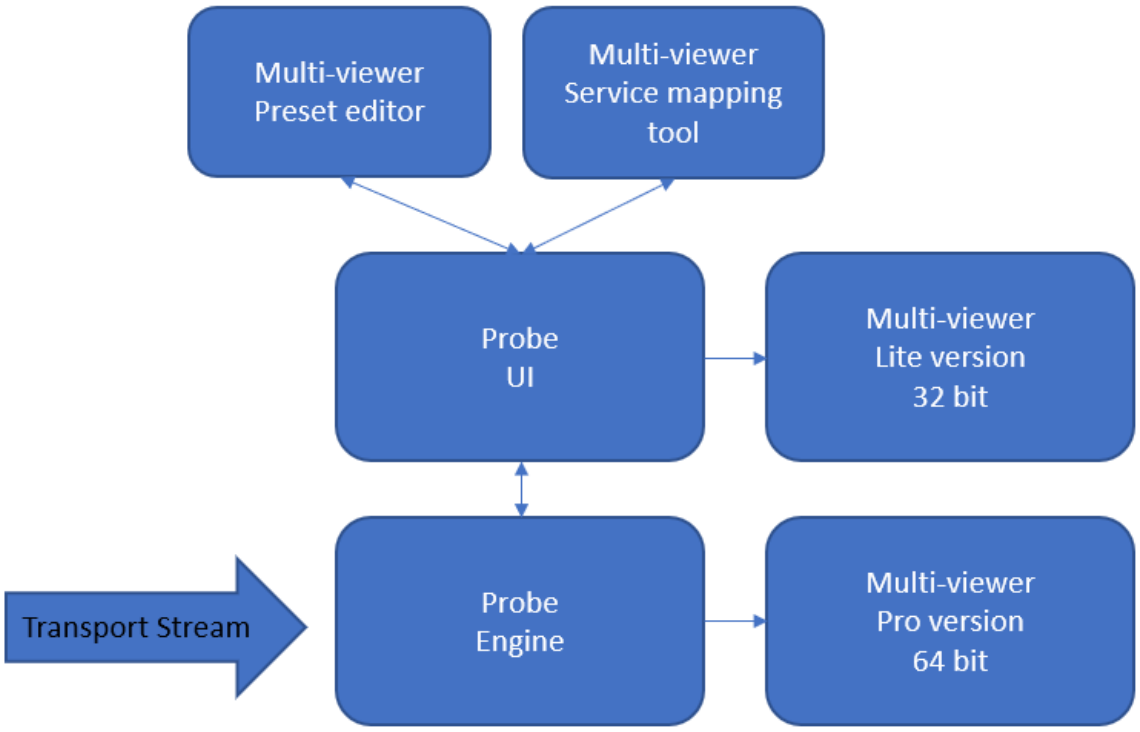
Building blocks and interfaces

The transport stream probe consists of a number of building blocks:

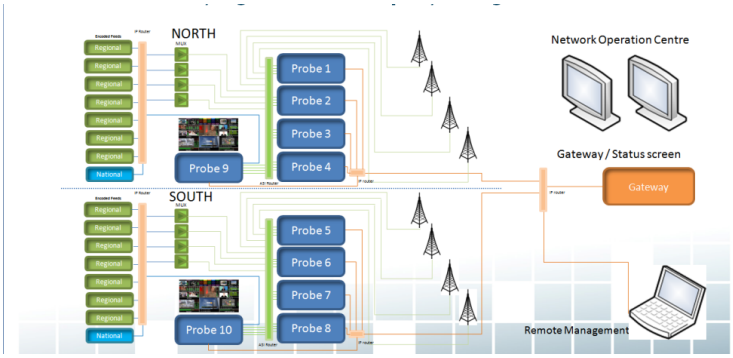
- Probe engine, background process that runs all the measurements
- Probe UI, foreground application for control and visualisation of the measurements
- Multi-viewer, application closely coupled to the probe UI, rendering a mosaic display of services. The Multi-viewer is configurable from the probe UI using the pre-set configurator and service mapping tool.
- In the SMART DVB Pro version the Multi-viewer is a separate exe and is not limited by shared CPU and Memory. SMART DVB Pro is using the GPU to decode the video tiles. User definable selection for each Tile for decoding by CPU or GPU. Using the GPU doubles almost the Multi-viewer capacity. Having the separate Multiviewer opens up multiple features. (Pro Only)
- Probe tray icon utilities, for separate log inspection, interface h/w configuration.
- Probe watchdog, application that monitors the probe application for proper operation and in case a fault situation is detected it will relaunch the probe program components.

- Gateway (typically on separate machine), overall alarm aggregation, configuration and reporting tool, able to cater for multiple TS probes. (Pro Only)

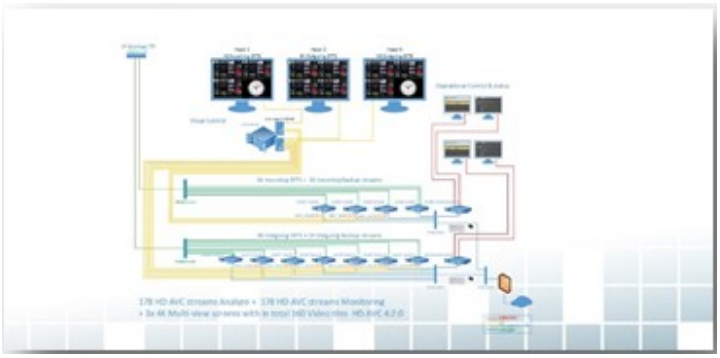
See next graphic for visualisation the building blocks.



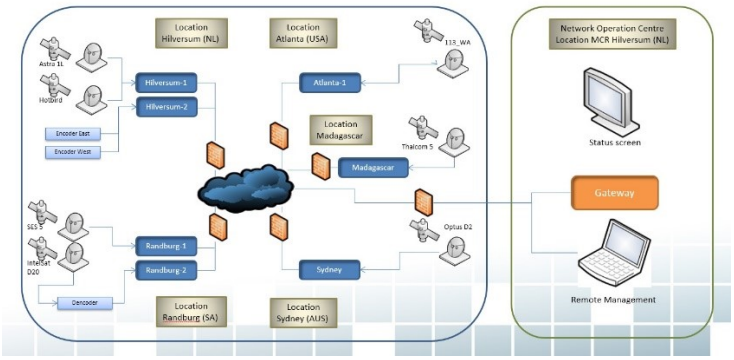
Example Multi Probe setup ***(Pro Only)***



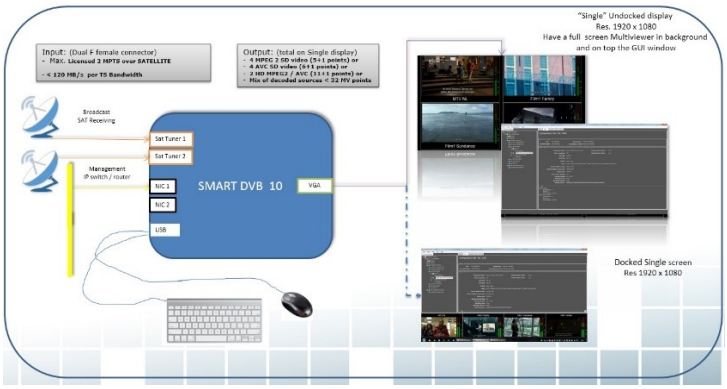
178 HD AVC 720p 4:2:0 @ 12 Mbps ***(Pro Only)***



World Broadcaster setup ***(Pro Only)***



Smallest SMART DVB 10 Setup ***(Pro Only)***



4. Usage concepts

Analyzed services, analyzed components and reconfiguration

The probe will automatically try to find services and PIDs when a transport stream has been added. However, it will not run any checks against services contained in the transport stream unless being told to do so by moving a service to the analyzed services or moving a PID to the analyzed components.

None analyzed services will not contribute to TR101.290 statuses in the TR290 view. When service properties change (e.g. service components are added or dropped) then the analyzer for this service has to be ***reconfigured***.

Bitrate measurements in the probe

The bitrates in the probe are measured and averages are calculated over 8 sec intervals. These values are used in:

- PID overview
- Service overview
- TS bitrate in tree
- Min/Max Bitrate Alarm triggers

The Bitrate details views show more (burst) detail in these bitrates. The min/max burst measurements can detect burst peaks.

The bitrate reports store an one minute samples per PID. These are one minute averages over 8 sec integration interval measurements. (Pro Only)

Note: The stored bitrate can be retrieved in the Gateway for a period of 1 Year. (Pro Only)

Bitrate calibration

The probe can be calibrated to memorize current PID bitrates. The actual bitrates will be converted in minimum bitrate and maximum bitrate alarm settings based on a configurable percentage (Menu bar > Tools > Settings > Advanced > Bitrate threshold).

PSI/SI Snapshot equation

The Probe can create a file of the PSI/SI of a stream and compare this against a live stream. This is a very powerful feature and is easy to operate.
Each difference in the PSI/SI will be detected and logged.

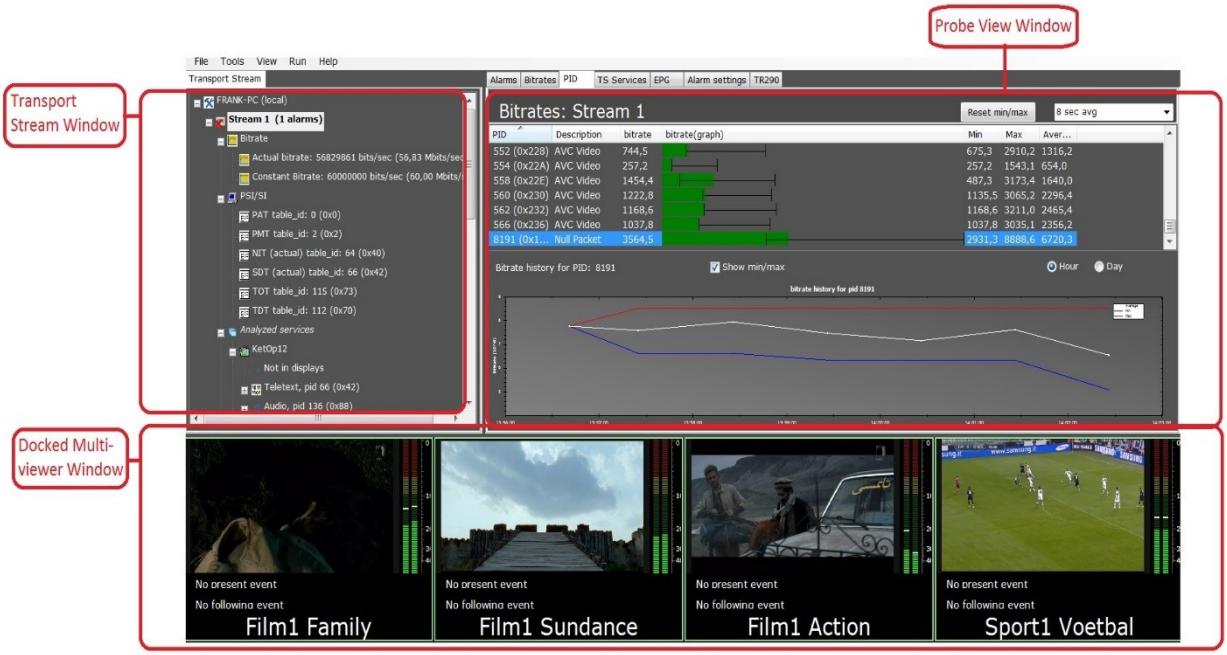
5. GUI elements and menu bar description

Probe GUI

The Probe interface is as shown below. The screen is divided into three main sections.

First is Transport Stream window which has information about the Transport Streams added to the Probe for analysing. On the right hand side is the Probe view which has detailed information like Bit rates, Alarms, PID etc. about the selected transport stream. The content on the left hand side the view on the right hand side will vary. This window can be undocked (single view), for example to be placed on an external video wall. The multi viewer window shows the decoded services in separate configurable displays.

This window can also be undocked, for example in order to be sent to a video wall. In this case via extended windows video adapter via DVI-I / DISPLAYPORT / HDMI.



Note

Important note: The docked multi-viewer window is not supported in the Pro version.

Transport stream windows

The Transport View Window lists all the TS added to the Probe. For each TS a PSI/SI View and list of analyzed and non-analyzed service is listed. The tree view is divided into four sections:

PSI/SI Node
In the PSI/SI Node all the tables present in the transport stream are shown PAT, PMT, SDT, NIT, EIT p/f, EIT scheduled, BAT, TOT, TDT and CAT.

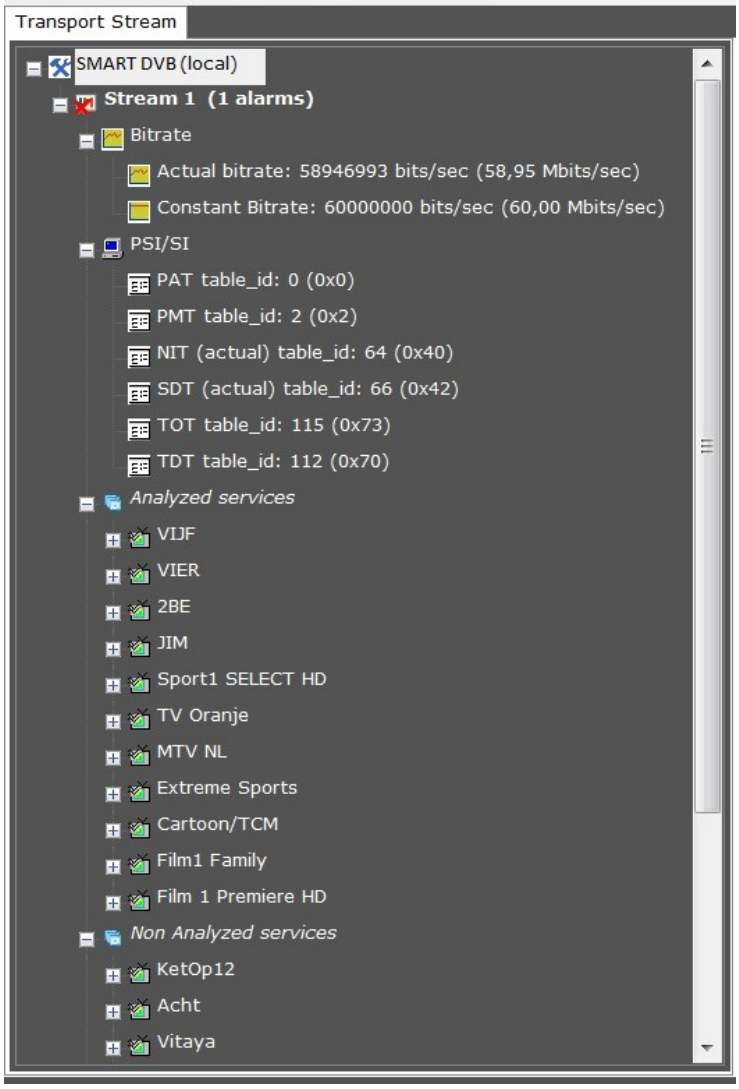
Analyzed Services
In this node all analyzed services are shown. With each service the Alarm settings are also mentioned and all the components are also shown.

Non Analyzed Services
In this node all Non-analyzed services are shown. Initially when the TS are added to the Probe all the services are present in to the Non-

analyzed Services. The service is moved to the Analyzed services when the Analyzing on the service is started.

Analyzed Components
A specific component can also be analyzed separately, for example ghost components that do not belong to a service.

The image below is an example of what the transport stream windows could look like:



TS window icons

The icons that appear in the Transport Stream window are:

TS level icons

 : Multiple Program Transport Stream.
 : Single Program Transport Stream.
 : (Variable) Bitrate
 : Constant Bitrate
 : PSI/SI
 : Analyzed or non analyzed services

Service level icons

 : TV service
 : Data service
 : Component based scrambled service, containing at least one component with CA descriptor in 2nd loop of PMT.
 : Radio service
 : Service based scrambling, CA descriptor in 1st PMT loop
 : EIT pf info

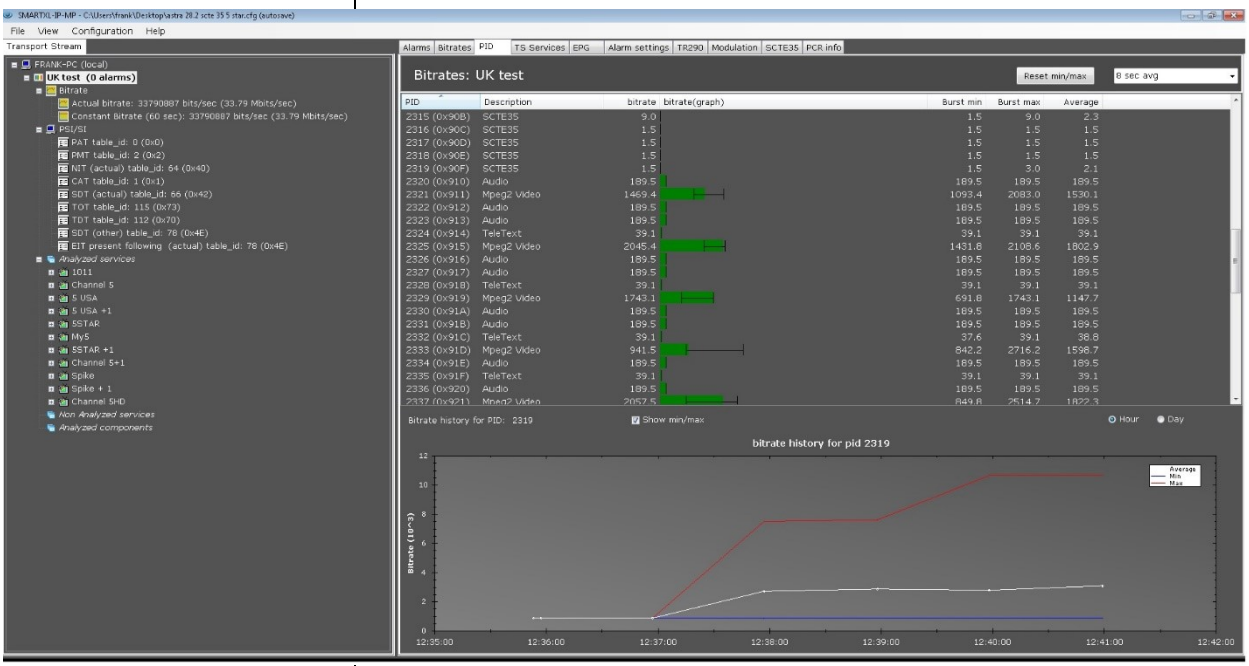
Component level icons

 : Video component
 : Audio component
 : Data component
 : ECM component
 : (Combined icon) Scrambled component containing PCR
 : Scrambled component
 : Component containing PCR
 : Component containing SCTE 35

Probe views

This window gives information about the selected node from the Transport stream. Based on the selection the window will show the relevant information about the Transport Stream, Services, and Components etc.

For e.g. the following screen is displayed when the transport stream level is selected from the node.



Multi-viewer window

This window gives the user a facility to decode a specific service from the transport stream. Multiple services can be simultaneously decoded.

In advanced display function, the display window layout can be configured according to an XML definition. Panel, clocks displays can be placed on the output canvas. Sizes of each item can be configured.

The probe provides window undocking features (Menu Bar, configuration mode, Tools/Settings/Monitors/Separate Window tick box), which allows for the Multi-viewer display to run separately and to be displayed on a separate video output (if available on the hardware platform).

Please refer to a separate document, “SMART familiarization guide” for detailed information regarding the set-up of the Multi-viewer display.

Note

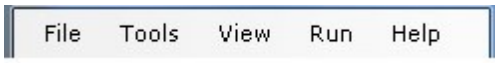
Important note:

- The docked multi-viewer window is not supported in the Pro version.
- The Pro version has separate controls and features

6. Menu Bar

Operation modes

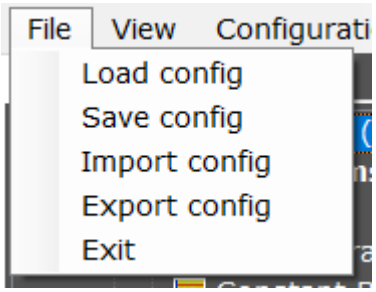
The probe has two operational modes. `Configuration` and `Run` mode. The mode can be switched from the menu bar. The button is state dependent. Toggling the button will switch the probe between the two modes of operation.



`Configuration` mode allows performing of configuration tasks, such as adding new transports, configuring alarm levels and templates editing. While in this mode monitoring is reduced and automatic updates are no longer set to the Multi-viewer. This mode has password protection (disabled by default). When enabled the Probe will prompt for a password, the password is “samadmin”. To enable/disable (remember) password protection See ‘**Remember password for maintenance “Advanced Menu” at page 40.**

`Run` mode locks the probe down to operational monitoring mode. No monitoring processes are restricted. Multi-viewer is fully active.

File menu



`Load config`
Load a saved configuration.

Note: The loaded “config” will also include the multi-viewer layout.

`Save config`
Saves the existing configuration to a configuration file. A configuration consists of a list of transport streams and their settings, a list of analyzed services and their measurement settings.

Note: This will save also the active multi-viewer layout.

`Import config`
Import a configuration from local file system. A standard windows explorer will open, allowing you to navigate on your computer to the correct location, and selecting the correct configuration to import. You can use this for example to import a configuration from a backup system.

Note: The imported “config” will also include the multi-viewer layout.

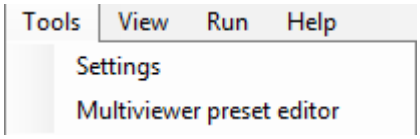
`Export config`
Exports the current configuration to a file on your local file system. A standard windows explorer will open, allowing you to navigate on your computer to the correct location, and give it the correct filename. You can use this for example to store the configuration in your backup system.

Note: The exported “config” will also include the multi-viewer layout.

`Exit`
Closes the Probe application

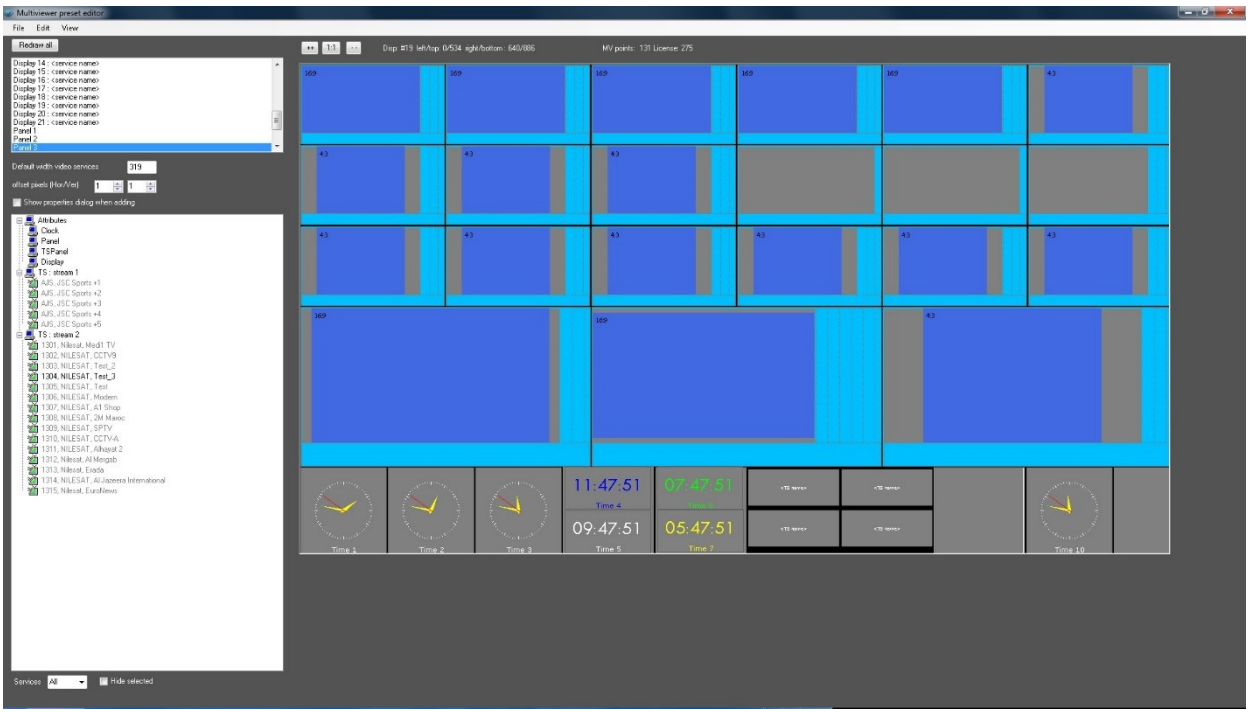
Tools menu

In configuration mode, the Tools menu is shown, looking like this:



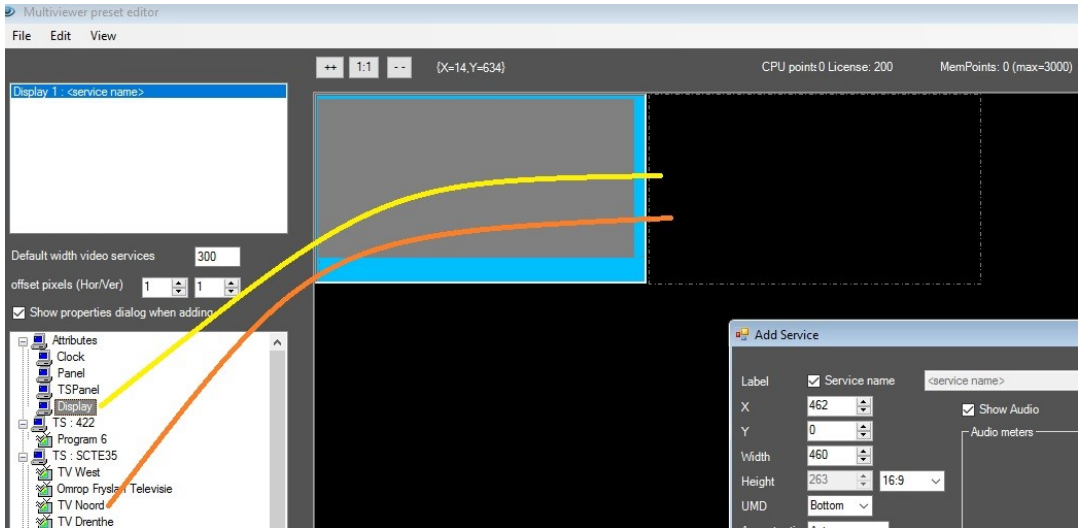
`Settings`
The Settings menu can be used for defining the probe settings.

`Multi-viewer pre-set editor`
The Multi-viewer pre-set editor menu can be used for defining or manage Multi-viewer pre-sets. Creating a multi-view pre-set can be done in three ways: by hand, automatic or a mix of both. By hand you are able to select from the attributes tree, drag and drop an attribute and position it on your screen.
In the properties and setting windows you can set your preferences. By double left mouse clicking you will get the properties of the Tile. Clicking right mouse you will get several other management options



TIP: When manual creating a Multiviewer lay-out start always at the left top corner of the canvas. The right and below neighbour tile can heritage the propeties settings of the parent tile by dragging and hoover the selected Display or Service over existing neighbour and drop the

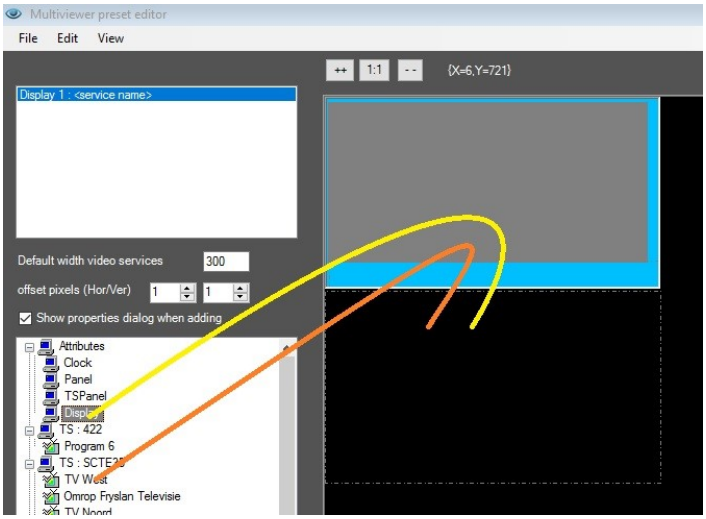
new tile at least 5 pixels agianst the left or below the neighbour tile. (the five pixel distance will indicated by a popping up box (see example below)



The yellow line indicates the hoover traject of a “Display” copied and stiched from too the left tile.

The orange line indicates the hoover traject of a “Service” copied from and aligned too the left tile.

If you hoover and drop the tile below the existing tile it looks like this

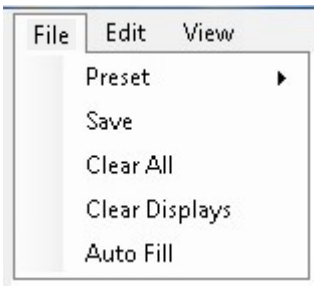


Note

Note:

- Display is an unmaped tile (empty)
- Service is a tile mapped with the assioated video

File menu Multi-viewer Pre-set Editor



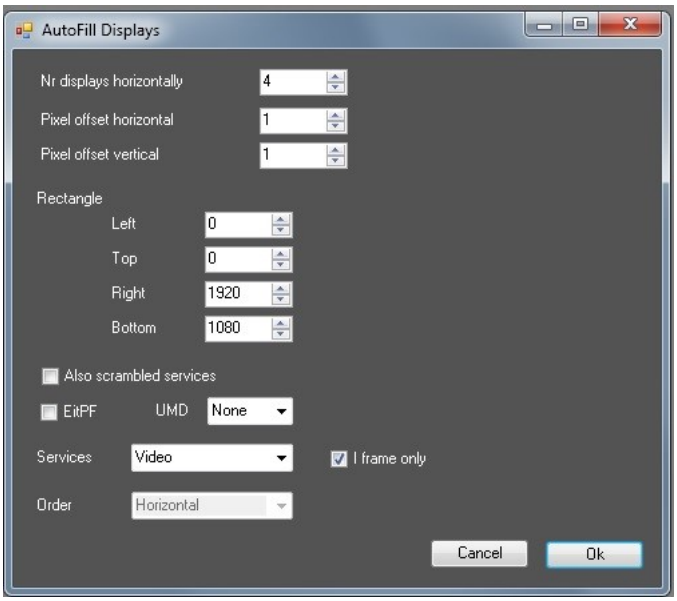
`Preset`
Load: This functions opens a dialog to recall a saved pre-set
Save: This function opens a dialog to save a pre-set

`Save`
This function is transferring the actual Pre-set to the Multi-viewer and save the setting in to the Multi-viewer without leaving the Multi-viewer Pre-set Editor

`Clear All`
This function will delete all attributes in the Multi-viewer Pre-set Editor

`Clear Displays`
This function will delete all displays in the Multi-viewer Pre-set Editor without touching the other attributes

`Auto Fill`
This function will allow you to setup fast a Multi-viewer for **analyzed** video or audio services



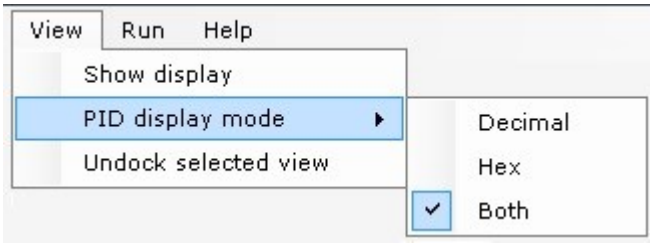
NOTE:

Note

More details on how to operate the Multi-viewer pre-set editor can be found in the separate SMART DVB Familiarization guide.

View menu

The "View" menu is shown below.



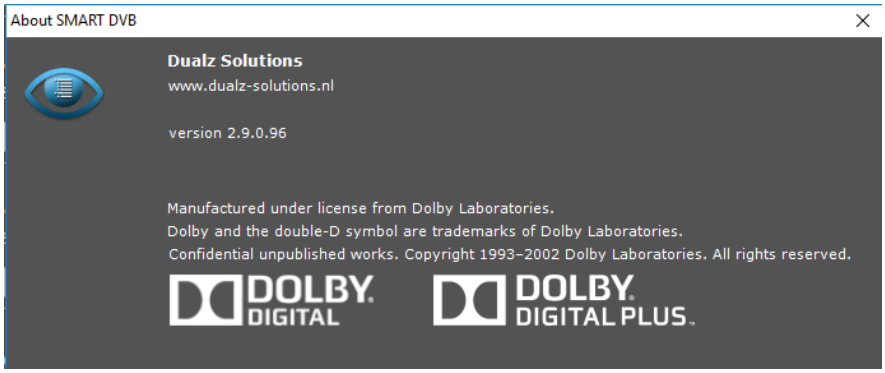
`Show display`
This function opens the "Display" screen. One service can be decoded and shown in a separate undocked window which can be dragged anywhere on the available screen real estate.

`PID display mode`
The Mode setting determines how to display PID and service identifiers (in hex, decimal or both)

`Undock selected view`
This function undocks the selected view (tab view). This undocked form can be placed anywhere on the screen, for example on an extended desktop (video wall).

Help menu

This menu contains the About option. The Probe about box provides information on the product version.



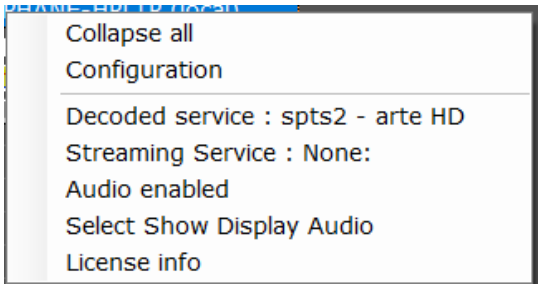
7. Context menus

With Context Menu's we define the menu's that are available depending on Probe status (run or configuration) and selected window (Transport Stream window / Probe view / Multi-viewer View)

Transport stream window context menus

Probe node run mode options

Clicking on the right mouse button on the Analyzer window in run mode, while root of the tree is selected, shows the following context menu:



`Collapse all`
The menu collapses all the expanded nodes

`Configuration`
The menu toggles between run and configuration mode.

`Decoded Service`
Indicates if any/which service is currently decoded in the ShowDisplay window

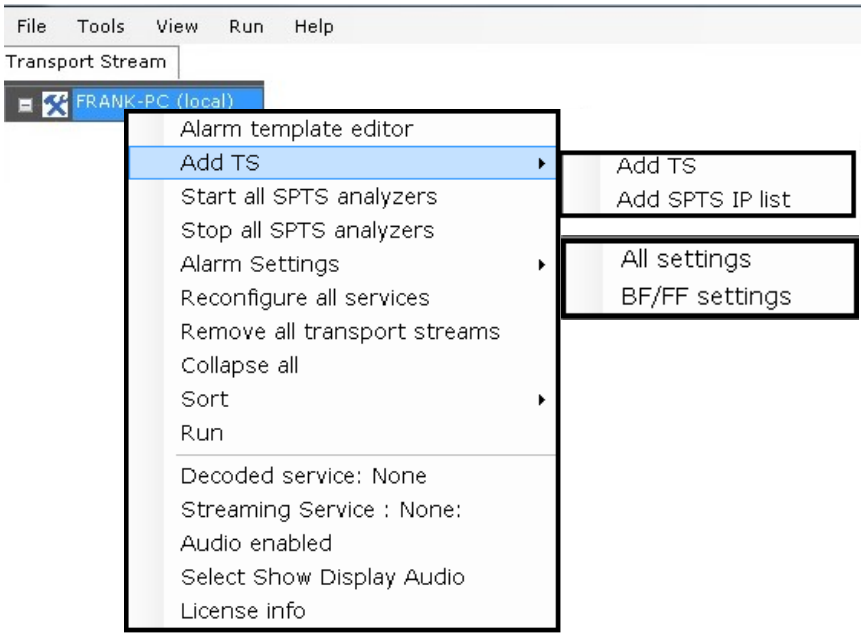
`Audio enabled`
This menu toggles between audio on/off. This feature enables or disables the Audio belonging to the service in the ShowDisplay active window. The Audio signal is available on the HDMI or DVI-I port

`Select Show Display Audio`

`License info`
Translates the installed key into readable information.

Probe node Configuration mode options

Clicking on the right mouse button on Probe level at the transport stream window in configuration mode shows the following context menu:



`Alarm template editor`
The menu opens the editor for alarm templates, the templates can created in upfront and selected when a Transport Stream, Service or Component analyse is started. Also the templates can be selected when the TS, Service of Component (PID) is edited.

`Add TS`
The menu lets the user add a transport stream for analyzing and monitoring.

`Add SPTS IP list`
The menu lets the user add a list of Single Program Transport Streams for analyzing and monitoring

`Start all SPTS analyzers`
This function will switch all SPTS to the analyzing and monitoring mode

`Stop all SPTS analyzers`
This function will switch all SPTS to the non analyzing and monitoring mode

`Alarm Settings ➔ All settings`
This function will open a spreadsheet view of all the Alarm values set of the Analyzed transport streams, Services and components on Probe base. The spreadsheet view will give a direct relation to the other set Values. In the spreadsheet view, the user is able to edit the values.

`Alarm Settings ➔ BF/FF settings`
This function will open a spreadsheet view of all the Alarm Black / Freeze Frame values set of the Analyzed transport streams, All Video components on Probe base. The spreadsheet view will give an extraction for the video component only in direct relation to the other set Values. In the spreadsheet view, the user is able to edit the values.

`Reconfigure all services`
This function reconfigures all analyzed services. This means, reconfiguration according to the information currently in the PMT, if there are changes in this service, the components are adapted. New components are added with default parameters; old components are removed from the services. If the service is not available any more in the PMT, the service is removed.

`Remove all transport streams`
The menu lets the user remove all the transport streams added to the probe.

`Collapse all`
The menu collapses all the expanded nodes.

`Run/Configuration`
The menu toggles between run and configuration mode.

`Decoded Service`
Indicates if any/which service is currently decoded in the ShowDisplay window.

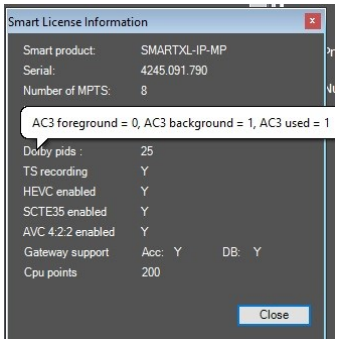
`Streaming Service` `(Pro Only)`
Indicates if any/which service is currently streaming at the user definable network port

`Audio enabled`
This toggles the Probe audio on/off (mute).

`Select Show Display Audio`
Shows the selected Audio PID and opens up the selection of available Audio PIDs

`License info`
Translates the installed key into readable information.

SMART License Info



View Used (E)-AC3 license points

(E)-AC3 Info, Hoover over Dolby PIDs label to see used License Points

Foreground: Number of used AC3 or E-AC3 decoders (PIDs) in Multi-viewer

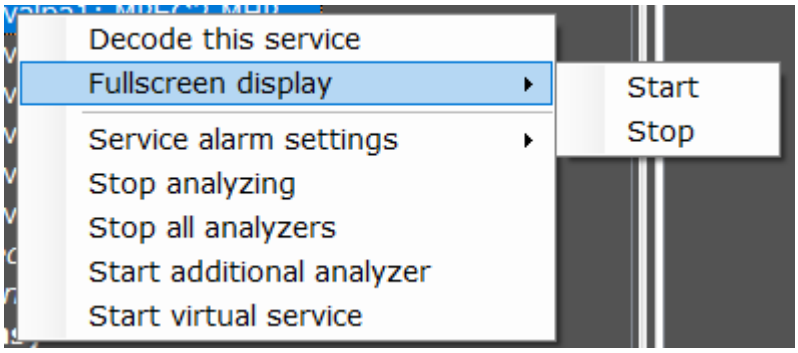
Background: Number of used AC3 or E-AC3 decoders (PIDs) in decoder used for Audio Silence/Level Alarms

Used: Number of used AC3 or E-AC3 decoders (PIDs) in decoder used for Audio Silence/Level Alarms + Multi-viewer.

Note: In **Used** the Number is PID/PMT based. This is meaning that the PID per PMT are the only ones counted. E.g. Having audio PID in Multi-viewer and in Silence Alarm, the system will count this as one.

Analyzed service node Configuration mode

Right Click on any of the Analyzed service shows the following context menu:



`Decode this service`
Selects current service for ShowDisplay decoding. This service is shown in the display form, which needs to be brought forward using <View><Show display> in the toolbar. To enable audio right click the top of the probe tree and toggle 'audio enable' and activate ShowDisplay.

`Fullscreen Display` `(Pro Only)`
Selects the service and starts or stops it full screen without UMD or Audio bars at the screen where it is selected. (Local or Extended screen)
Double left mouse click or Escape (ESC) button will stop full screen displaying.

Note:
- This feature is also available within the "show view" and Multi-viewer by double left mouse click at video tile.
- This feature will display the DVB or TXT Subtitling in real performance. According the ETSI/ITU standard. TXT page can also be displayed. The selection of Subtitling or TXT can be done by right mouse click at maximized video window.

When using the TXT subtitling automatic, the Subtitle page will be selected, according to the stream information. If no stream information is available, a small window will pop up to enter the page number. (Pro Only)

By right mouse clicking at the full screen video tile, without having DVB or TXT subtitling you will get the same page request number window. This opens the possibility to watch the normal TXT information in OSD. (Pro Only)

Note

Note;
- There is no audio accomplished with this full size video.
- This feature is not supported in the SMART DVB 25 and 50.

`Audio selection`
Select the audio PID for ShowDisplay decoding.

`Service alarm settings`
The menu shows the service alarm settings menu.

`Alarm settings`
The menu shows the current service alarm settings for the selected service

`Load service alarm settings`
This function imports previously stored service alarm settings (.xml format)

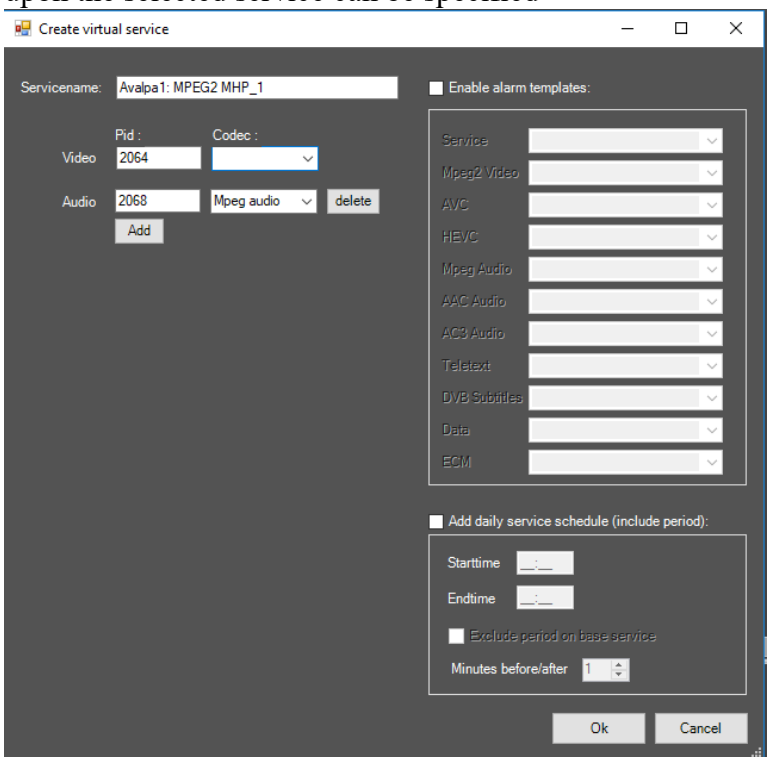
`Save service alarm settings`
This function stores service alarm settings (.xml format)

`Stop analyzing`
The menu removes the specific service from the analyzed services list, so this service is not analyzed any more.

`Stop all analyzers`
The menu stops all services from the analyzed services list, so no service is analyzed any more.

`Start additional analyzer`
The menu starts an additional analyzer for the selected service. The application will create a virtual copy of the selected services to which a dedicated set of alarms can be applied.
The virtual service can also be used at the multi-viewer as a separate video or audio tile.

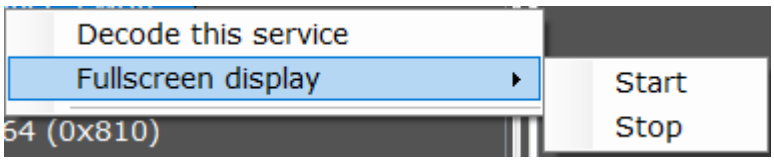
`Start virtual service`
A new dialog will open, where details for a Virtual Service, based upon the selected service can be specified



(See for more info Start Virtual Service in Chapter 11, Start Analyzing)

Analyzed service node run mode

Right Click on any of the Analyzed service shows the following context menu:

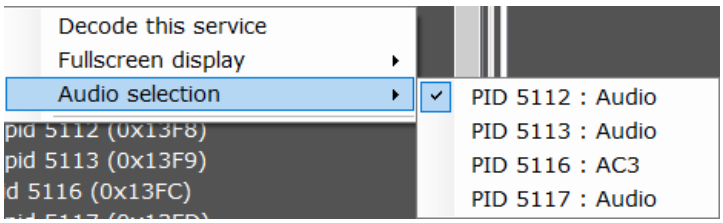


`Decode this service`
Selects current service for ShowDisplay decoding. This service is shown in the display form, which needs to be brought forward using <View><Show display> in the toolbar. Audio enabled or not needs to be selected by right clicking the probe node in the tree view.

`Stream this service` (Pro Only)
Selects current service for Streaming to an IP address. The full PSI/SI information will be joining the Audio and Video PIDs. The created

SPTS stream will be a valid MPEG-2 TS. The stream is not re-multiplexed so the PCR timing will be as in the original stream.

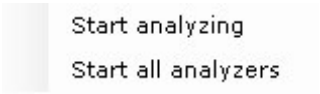
`Fullscreen Display, Start,Stop` (Pro Only)
Starts of stops the display of the selected service in Fullscreen Mode at the screen where it is selected. (Local or Extended screen)
Double left mouse click or Escape (ESC) button will also stop full screen displaying.



`Audio selection`
Select the audio PID for ShowDisplay decoding.
This selection will only appear when selected at the decoded service.

Non Analyzed service level
Configuration mode

Clicking on the right mouse button on any of the Non Analyzed service shows the following context menu:

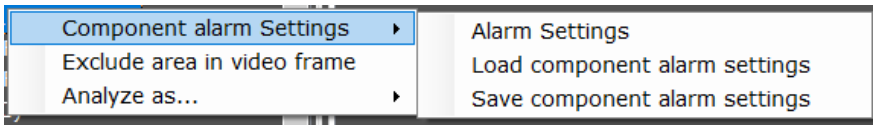


`Start analyzing`
The menu shows the current service alarm settings for the selected service.

`Start all analyzers`
The menu starts all MPTS services from the non analyzed services list.

Analyzed component level

Clicking on the right mouse button on any of the Analyzed components (as part of analyzed service) shows the following context menu:



`Component alarm settings`
This menu shows the component alarm settings menu.

`Alarm settings`
This function shows the current component alarm settings for the selected component.

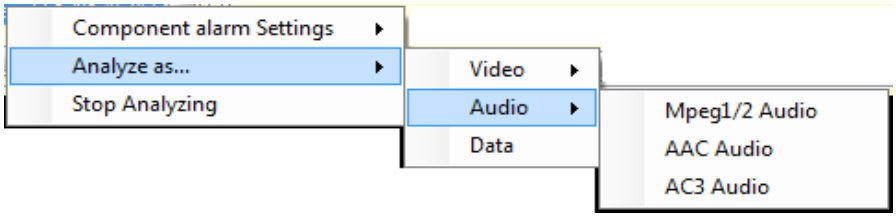
`Load component alarm Settings`
This function imports previously stored component alarm settings

`Save component alarm Settings`
This function stores component alarm settings

`Exclude area in video frame`
Specify an area in the video display which is not checked for BB/BF (logo)

`Analyze as…`

Components can be analyzed as specific component types, different than specified in the PMT. This menu shows the "Analyze as…" menu:



When a specific component type has been selected, the component info in the tree will change, and corresponding settings can be configured. The type configuration will also reflect the displays. For example, analyzing a data service as "MPEG4 video" will support decoding and displaying of the video picture. If a component is detected as a specific video or audio type, it is only possible to first change analyzing to 'data'.

Note

***Note**:* Referenced PCR must be present for Analyze to function. This function can also be used to disable specific components from being analyzed / decoded, for example for performance reasons.

The supported types are: MPEG2 video, MPEG4/AVC/H264 and HEVC/H265 video, MPEG1/2 audio, AAC audio, AC3 audio and data.

System tray

Clicking on the right mouse button on the system try icon shows the following context menu:

`Logging`
Logging will show the alarm logging for the probe (engine log). This log includes the counter alarms and their timestamps.

`Device Configuration`
Config opens the interface board hardware configuration installed on this system.

`Shutdown`
This function shuts down the engine. The user interface will keep running.

Note

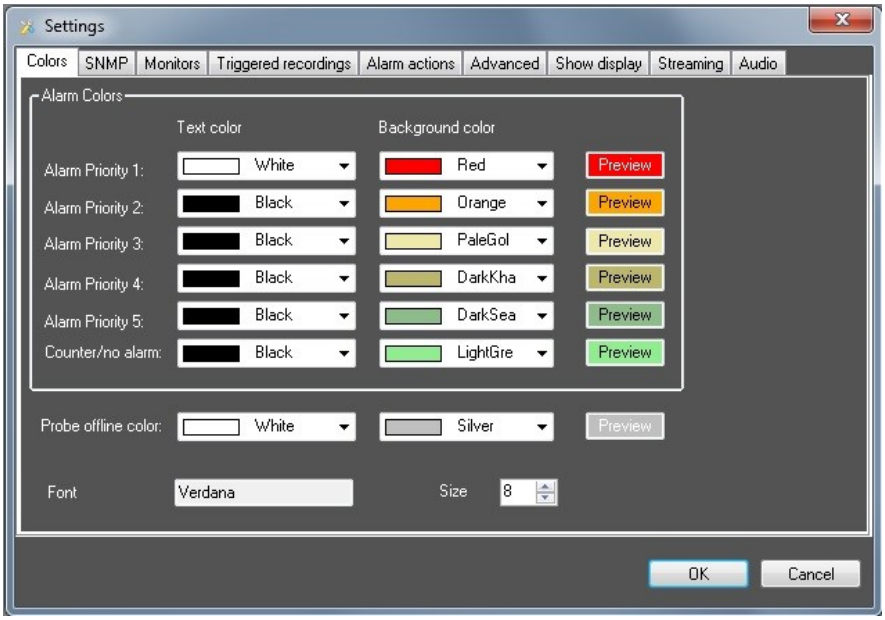
Note:
- This function only needs to be performed in case of problems. In normal operation, closing the user interface will automatically shut down the engine.
- Closing down the Multi-viewer is in dependent of the engine. Closing the Multi-viewer application can be done at the sys icon at right below corner of the taskbar (press the windows key to get the task bar)

8. Probe Configuration

Introduction

The parameters are defined in different sections. The screen can be accessed by selecting *Tools->Settings.* This form shows the general settings for the probe application.

Colors

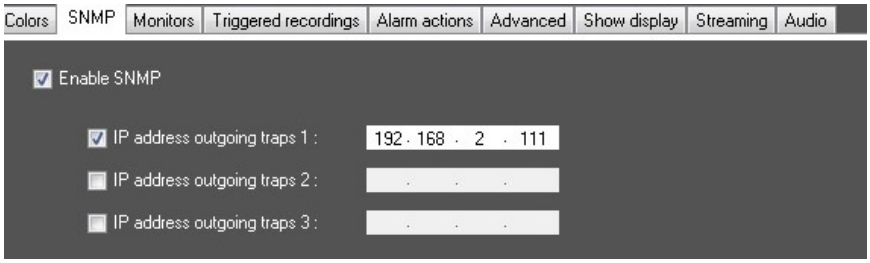


For each alarm level and Counter alarm, the user can define the way the alarms are shown in the alarm log view and service monitor log (tray icon). Alarm level 1 is the most severe alarm level while the alarm 5 is informative alarm.

`Logging Font Color:` Represents the font color of the logging of the corresponding alarm category

`Logging Background Color:` Represents the background color of the logging of the corresponding alarm category.

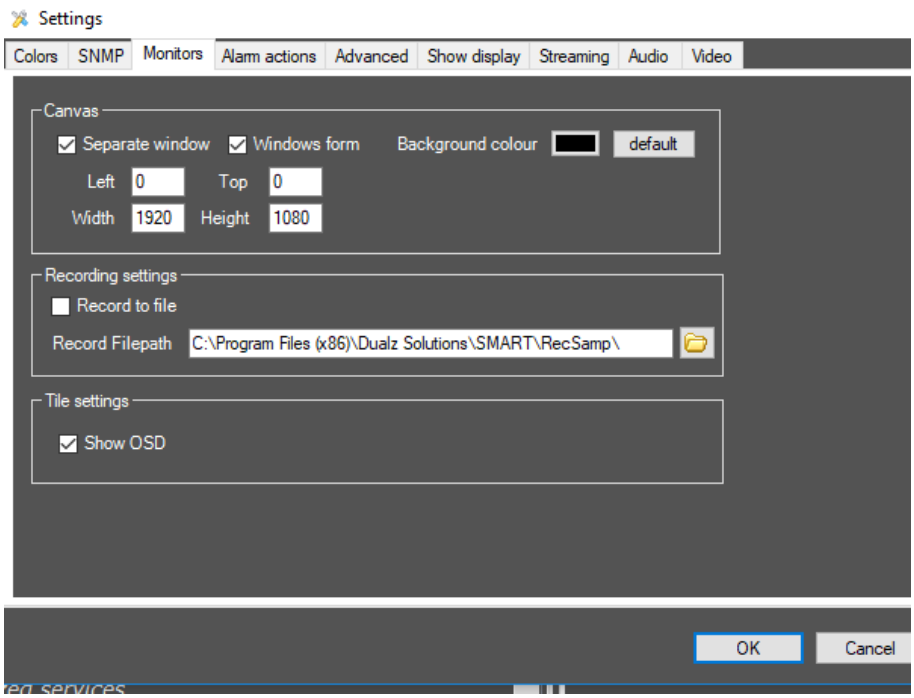
SNMP



The check “Enable SNMP” indicates whether SNMP is enabled globally or not. The fields” IP address outgoing SNMP traps x” indicate the IP address of the SNMP manager, to which the traps are sent. Three different SNMP managers are supported.

Monitors

The tab ‘Monitors” allows specification of the Multiview displays



`Separate Window:` Specifies whether the displays are docked in the Probe UI, or shown in a separate (undocked) window. (not supported in Pro)

`Windows form:` In case the displays are shown in a separate window, these parameters specifies whether, a windows form is used (title bar, movable, sizable, etc.), or fixed size is used (preferable when a dedicated display us used for the Multi-viewer display) (not supported in Pro)

`Background colour:`
The background color of the canvas where the displays are shown. (not supported in Pro)

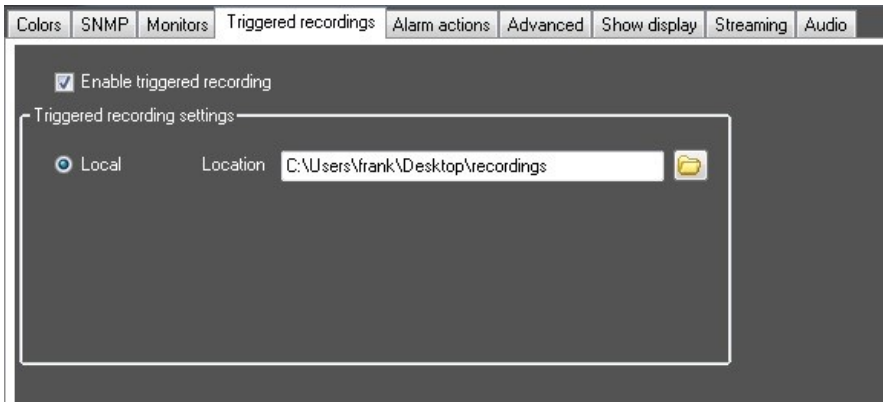
`Left, Top, Width, Height:` These values specify the rectangle (location and size) of the display window. Negative values are accepted. (Is left side or above of mean display)

`Record to file:` Enabling the single service recording option, which is accessible from a Multi-viewer or showdisplay tile (right click). Files will be stored in .mpg file container, with file name composed of tile name_datestamp_timestampt.mpg

`Record Filepath:` The location where the recorded files are to be saved.

`Show OSD:` The selection shows the Aspect ratio and Video codec on top of the video tile in the right bottom corner at the Multi-viewer. This a general setting.
(not supported in Pro)

Triggered recordings
Pro only



This tab contains parameters that are related to triggered TS sample storage. The TS samples are stored as full MPEG-2 TS samples. The probe will automatically create a subdirectory in the specified location per analyzed stream (provided triggered recording is enabled globally and on TS level). The folder will be populated with .ts files of 6 second length, along with an XML file indicating the alarm that triggered the recording, example contents below:

```
<AlarmInfo
  Alarm= "ETR290: PCR Accuracy error on PID 514, PCR
accuracy = 42037 ns"
  alarmID="108"
  logID="181"
  PID="514"
  timestamp="20130813 163626"
  srvID="100"
  par1="0"
  par2="0"
  par3="0"
  par4="0"
  par5="0"
  lpar1="514"
  lpar2="42037"
  lpar3=""
```

```
  lpar4=""
  lpar5=""
/>
```

The .ts files are named according to configured TS name, along with data and timestamp. The trigger XML is named according to data and timestamp.

`Enable triggered recording`: Enables/Disables triggered recording globally. ***Note:*** This setting is only enabled in case this function is provided in the license key.

`Local`: If Triggered recording is enabled, this option indicates that sample storage should be done within the probe itself. Buffer length is 3 seconds, (samples 6 seconds).

`Location`: The path where the TS samples are stored.

Alarm Actions

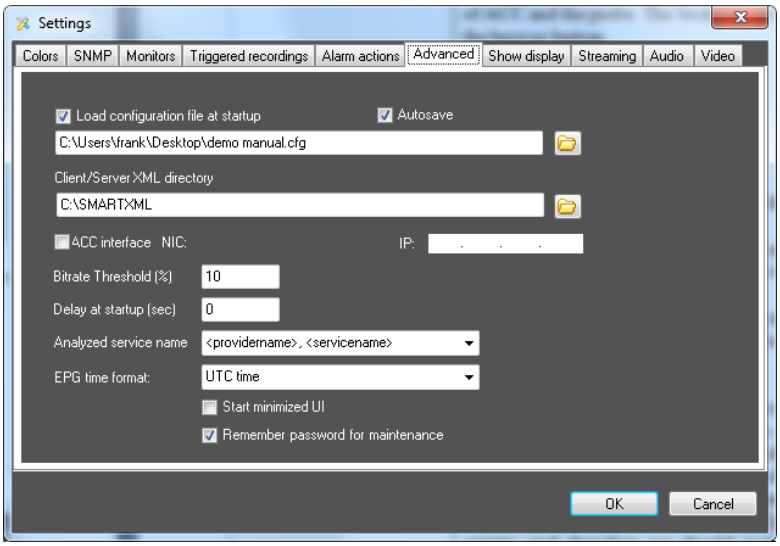
The tab "Alarm actions" allows selection of alarm type versus trap destination.

For each alarm level, category and counter alarm the user can define whether the actions SNMP and Triggered Recording are enabled or not.

SNMP: When an alarm of the specified category is triggered an SNMP trap is sent. Three SNMP trap destinations are supported.

`Triggered Recording`: When an alarm of the specified category is triggered, a TS Sample is stored. Pro only

Advanced



`Load Config file at Startup`: This setting defines if config file needs to be loaded at startup. If this option enabled, a default config file need to be selected.

`Autosave`: The settings enable the autosave functionality. The changes in the measurement can be saved automatically by enabling this functionality.

`Client/Server XML Directory`: The directory where the XML files are stored, that serves as an interface between Gateway of ACC and the probe. The location can be selected by clicking on the browse button.

Note

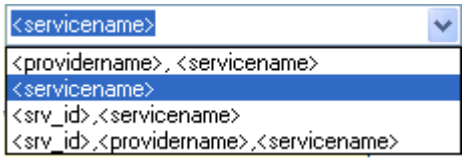
Note: A probe restart is needed, when this parameter is altered.

`Gateway ACC interface`: NIC address, that is used to interface with the ACC. The IP address is the location of the ACC.

`Bitrate threshold`: The function “Calibrate” sets all the bitrate threshold values within a certain margin. This setting defines this margin for example +/- 10%

`Delay at startup:` The delay at start-up allows initialization grace period before the measurements actually starts. This is done because some measurements are dependent of the data in the PSI/SI, which is only arrived after a couple of seconds after start-up. For example, before the system generates an alarm for the EITscheduled check, we must be sure that the EITsched info is not in the TS stream, and therefore we should wait long enough to draw this conclusion.

`Analyzed Service Name:` This setting defines how analyzed services are named. Also defines the name in the UMDs.

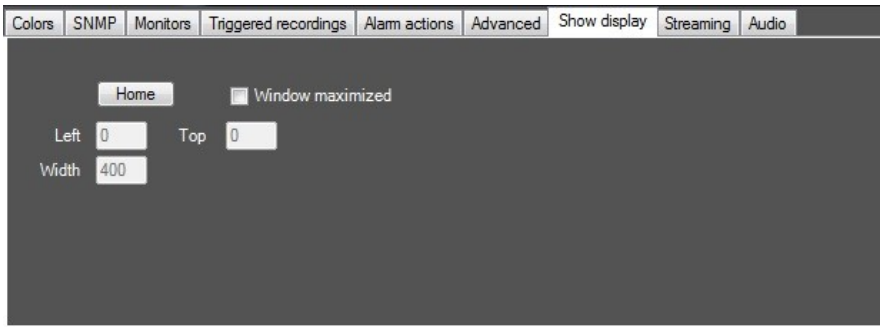


`EPG format:` This setting defines how EPG times are visualized, according to UTC time or local system time.

`Start minimized:` The UI is started in minimized mode, when this setting is enabled. For example, in order to display Multi-viewer in foreground at probe start-up.

`Remember password for maintenance:` When setting the probe to configuration mode a password must be entered. This option stores the password so it doesn't have to be entered.

Show display

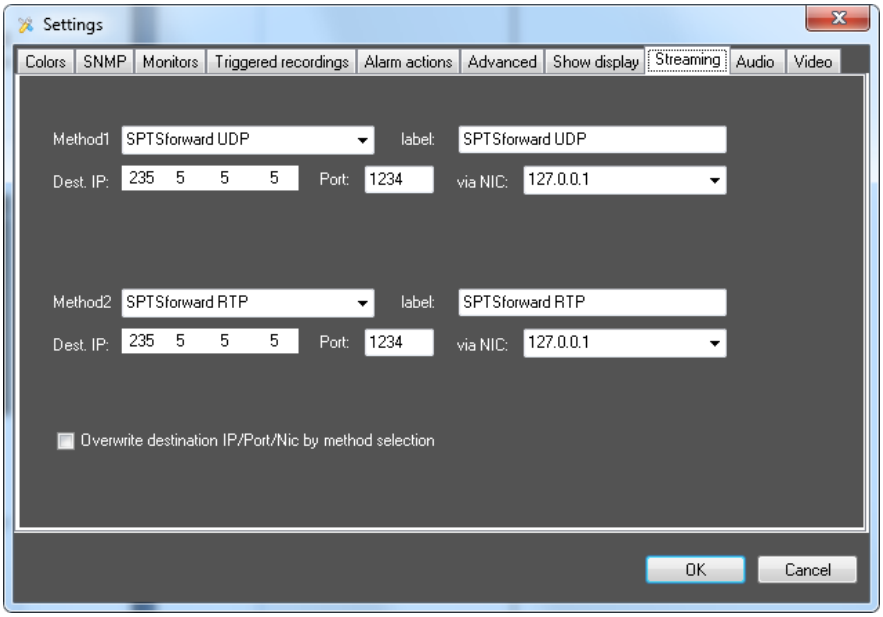


`Home:` This function resets the show display window sizes (400x300) and location (0,0).

`Window maximized:` This function maximizes the show display form.

`Left, Top, Width:` These settings define the dimensions of the 'Show display' output panel. The Height is calculated and set automatically.

Streaming
Pro only



`Streaming:` This setting defines the pre-selection method and destination addresses were the SPTS stream is forwarded.

`Method:` stream forwarding in UDP or RTP mode.

`Label:` User definable name for the method setting. This name will appear in the tree to select the method.

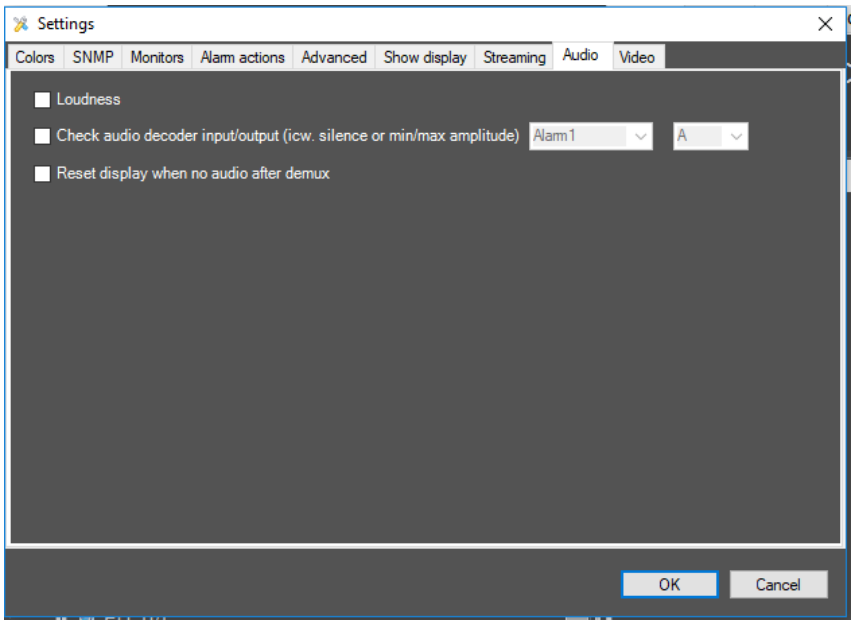
`Dest IP:` Destination IP address of the receiving player.

`Port:` Destination Port number of the receiving player.

`Via NIC:` IP address of the outgoing NIC of the Probe.

`Overwrite destination IP /Port/Nic by method selection:` Destination IP, Port number of the receiving player and NIC can be decelerated in the Method. By selecting the check box this option will use the predefined settings. By unselecting the check box the predefined IP address, Port number and NIC are used as entered.

Audio

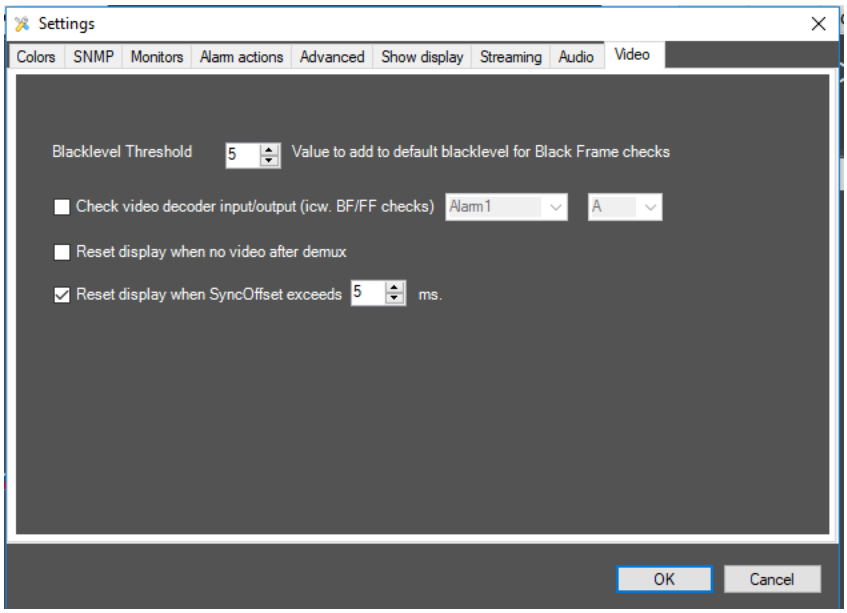


`Loudness:` This selection enables the Loudness functionality. Pro only

`Check audio decoder input/output (icw. Silence or min/max amplitude):` Select alarm type for audio decoder

`Reset display when no audio after demux:` Resets display if no audio found

Video



`Blacklevel Threshold:` This value sets the RGB level for Black level. The value will be in this case R:G:B = 5:5:5.
All the pixel RGB values below 5:5:5 will be recognized as black.

`Check video decoder input/output (icw. BF/FF checks):` Select alarm type for video decoder, including black frame and freeze frame

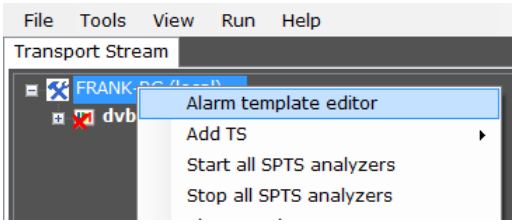
`Reset display when no video after demux:` Resets display if no video found

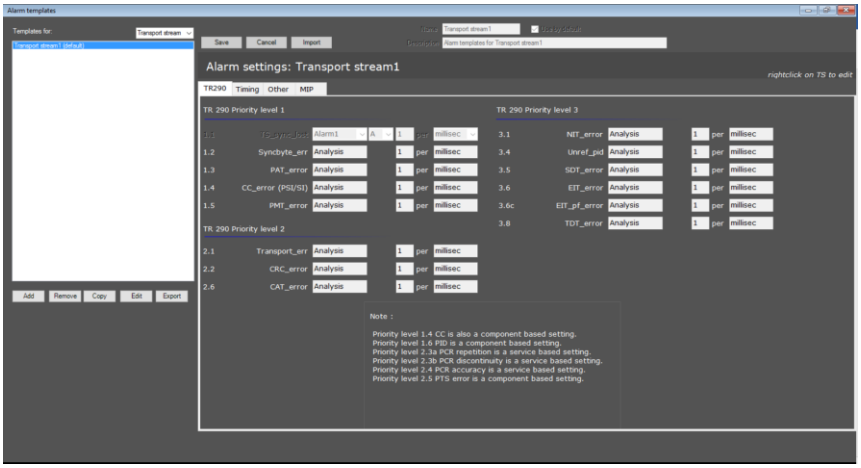
`Resets display when SyncOffset exceeds X ms:` Resets display when SyncOfset exceeds specified number of milliseconds

9. Alarm settings

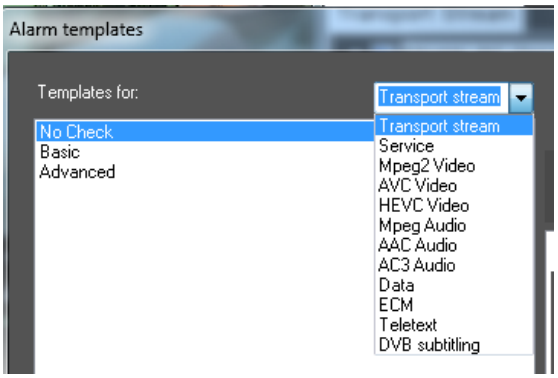
Alarm template editor

This function can be used to define the default behaviour of the measurements of a newly added transport stream or service for analysis. Later the specific transport streams and services measurement settings can be modified. The menu can be accessed by Clicking on the right mouse button on the Probe Analyzer window on the probe level.





The sub menu has an option to define the parameters for TS level, Service Level, Video, Audio, Data and ECM components.



In the Factory folder (path C://programfiles(x86)/Dualz Solutions/SMART/factory/) are three or more templates per TS, Service or Component to import to the Alarm template editor. After importing the example templates, you can use these as your basic, advanced or expert template. The 'no check' alarm template per TS, Service or Component is also available.

Alarm TS level settings

This screen provides the user, the measurement parameters which are recommended for continuous or periodic monitoring of transport stream. The settings are grouped into five tabs according to their importance for monitoring purposes.

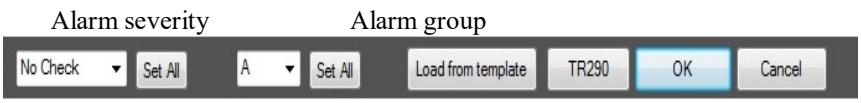
The first section (TR290) lists a set of parameters for First Priority / Second Priority and Third Priority measurements. The second section is for measurements of Timing parameters for the transport stream. The third section is for other miscellaneous measurements. The last section is the MIP section which checks for the correct format and timing of the MIP packets for proper operation of Single Frequency Networks.

By default, TR290 defined monitoring points are set to 'analysis'; this means the values within TR290 are continuously monitored to facilitate the TR290 display & functionality. Alarms however will not be raised in the probe alarms unless an alarm level has been defined.
The "No Check" option in the pull down menu is selectable if the Analysis should be switched to off

Function buttons

The probe reports test results by raising alarms under exactly the preconditions described in the screens. For each parameter settings an alarm category can be defined. An alarm is raised only when the number of occurrences within a given interval is reached.

The default menu can be accessed by right clicking on probe node in TS window.



`Set All {Alarm severity}`: The selected Alarm severity in the global pull down menu will be set to each of the individual pull down menu at the selected template.

`Set All {Alarm group}`: The selected group in the global pull down menu will be set to each of the individual pull down menu at the selected template.

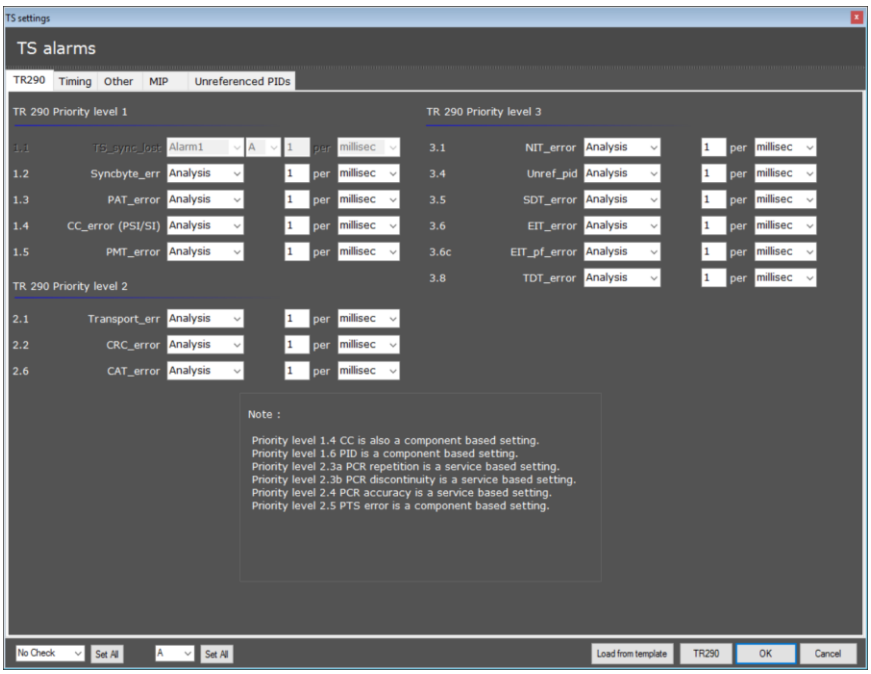
`Load from template`: By selecting this button a list with available template(s) will pop up. After selecting a template from the list it is automatically selected and stored.

`TR 290`: By selecting this button the predefined TR 101.290 values are entered into the intended ETR 101.290 alarm threshold boxes.

`OK`: By selecting this button, the template is stored and entered. The template will close.

`Cancel`: None of the changes are stored or entered. The template will close.

TR290



`ETR first priority settings`: Following are the ETR First Priority settings. These are set of parameters which are considered necessary to ensure that the TS can be decoded.

- `TS_sync_lost`: Check to monitor the Loss of synchronization in the TS Stream. This setting is not user

definable alarm. (Is always active)

- `Sync_byte_error:` Check to monitor the Sync_byte_error. The error is raised as soon as the correct sync byte (0x47) does not appear after 188 or 204 bytes.
- `PAT_error:` The error is raised when PID 0x0000 does not occur at least every 0.5 seconds or a PID 0x0000 does not contain a table_id 0x00 (i.e. a PAT)
- `CC_ (Continuity Count) error (PSI/SI):` A continuity-count error occurs when successive counter words contain the same count (indicating a repeated packet) more than twice, or if the count is out of order, or if packets are lost.
  This Alarm is only indicating CC_errors for the first 32 PIDs
- `PMT_error:` This is generated when sections with table_id 0x02, (i. e. a PMT), do not occur at least every 0.5 seconds on the PID which is referred to in the PAT.

`ETR second priority settings:` Following are the ETR Second Priority settings. These are list of parameters which are recommended for continuous monitoring.

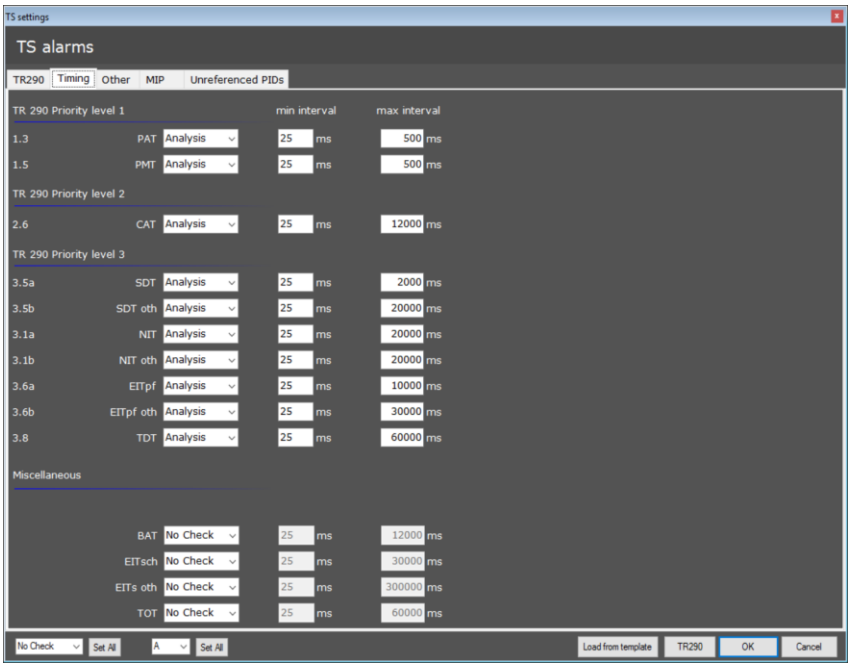
- `Transport_error:` Transport_error_indicator in the TS header is set to "1".
- `CRC_error:` The CRC check for the CAT, PAT, PMT, NIT, EIT, BAT, SDT and TOT indicates whether the content of the corresponding table is corrupted. In this case no further error indication should be derived from the content of the corresponding table.
- `CAT_error:` The error is generated in case no CAT table is present in the TS. 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.

`ETR third priority settings:` Following are the ETR Third Priority settings. These are the parameters which could be of interest for certain applications.

- `NIT_error:` Network Information Tables (NITs) as defined by DVB contain information on frequency, code rates, modulation, and polarization etc. of various programs which the decoder can use. The NIT error is generated in case of the following conditions:
  - 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
- `Unreferenced_PID`: Unreferenced PIDs are PIDs (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 seconds. This parameter checks for unreferenced PID in to the Transport Stream.
- `SDT_error:` When the sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2 seconds or sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011 then the SDT_error is generated.
- `EIT_error:` The EIT error are generated when sections with table_id = 0x4E (EIT-P/F, actual TS) not present on PID 0x0012 for more than 2 seconds or sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012.
- `EIT_pf_error:` It checks for EIT_PF_error. If either section ('0' or '1') of each EIT P/F sub table is present both must exist. Otherwise EIT_PF_error should be indicated
- `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. The TDT_error is generated in case of following conditions
    - Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30 seconds
    - 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).

Timing



`PAT:` This is generated when the sections with table_id 0x00 do not occur at least every 0.5 seconds on PID 0x0000 or Section with table_id other than 0x00 found on PID 0x0000.
`PMT:` This is generated when sections with table_id 0x02, (i. e. a PMT), do not occur at least every 0.5 seconds on the PID which is referred to in the PAT.

`CAT:` The error is generated in case no CAT table is present in the TS. 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.

`SDT:` When the sections with table_id = 0x42 (SDT, actual TS) not present on PID 0x0011 for more than 2 seconds or sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011 then the SDT_error is generated.

`SDT Other:` When the sections with table_id = 0x46 (service description table – other transport stream) not present on PID 0x0011 for more than 2 seconds or sections with table_ids other than 0x42, 0x46, 0x4A or 0x72 found on PID 0x0011 then the SDT_error is generated.

NIT: Network Information Tables (NITs) as defined by DVB contain information on frequency, code rates, modulation, and polarization etc. of various programs which the decoder can use. The NIT error is generated in case of the following conditions:

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

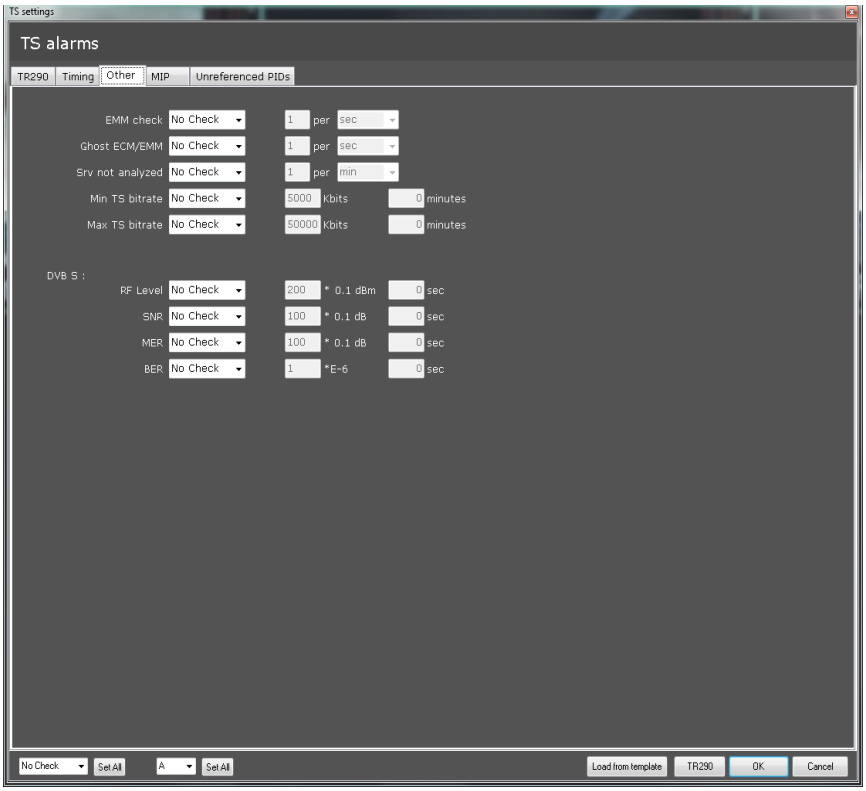
EIT pf: The EIT error are generated when sections with table_id = 0x4E (EIT-P/F, actual TS) not present on PID 0x0012 for more than 2 seconds or sections with table_ids other than in the range 0x4E - 0x6F or 0x72 found on PID 0x0012.

TOT/TDT: 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. The TDT_error is generated in case of following conditions:

- Sections with table_id = 0x70 (TDT) not present on PID 0x0014 for more than 30 seconds
- 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).

BAT: This is generated when sections with table_id 0x4A, (i. e. a BAT), does not occur during the defined interval in ms.

Other



`EMM Check:` It checks if the EMM is present in to the TS. If the EMM is not present for a defined interval the system would generate and alarm.

`Ghost EMM/ECM Check:` Ghost EMM/ECM might indicate a serious problem with regard to scrambled services. This alarm will be triggered when such a ghost is detected.

`Non Analyzed:` If services are found in PSI that are not analyzed, an alarm is generated

`Min TS Bitrate:` It checks the minimum bitrate for the total TS bitrate. If the TS bitrate is less than the defined bitrate value, then an alarm is raised of the defined category.

`Max TS Bitrate:` It checks the maximum bitrate for the total TS bitrate. If the TS bitrate is more than the defined bitrate value, then an alarm is raised of the defined category.

Alarms RF DVB S/S2

`RF Level:` (Only with DTA2137c) It checks the minimum RF level. If the RF level is less than the defined value, then an alarm is raised of the defined category.

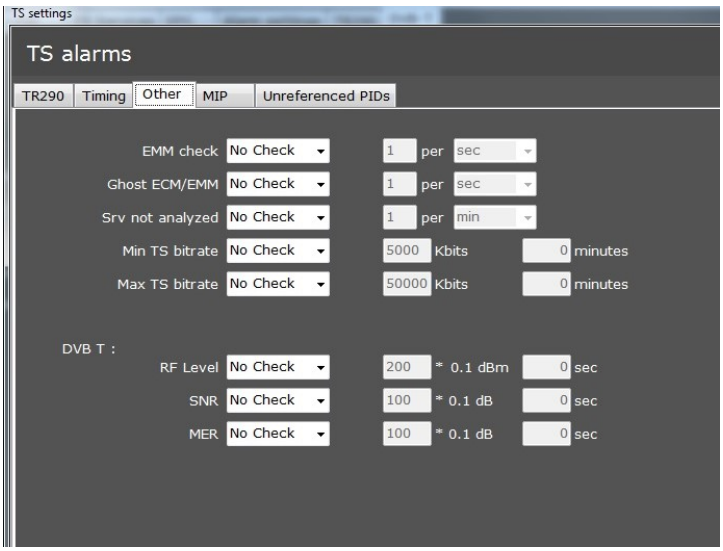
`SNR:` (Only with DTA2137c) It checks the minimum SNR. If the measured SNR is less than the defined value, then an alarm is raised of the defined category.

`MER:` (Only with DTA2137c) It checks the minimum MER. If the measured MER is less than the defined value, then an alarm is raised of the defined category.

`Post Vit. BER:` (Only with DTA2137c) It checks the maximum Post Viterbi BER. If the measured Post Viterbi BER is more than the defined value, then an alarm is raised of the defined category.

Note

Note: The Post Vit BER alarm will disable ALL other alarms, because too many bit errors results in invalid measurements.

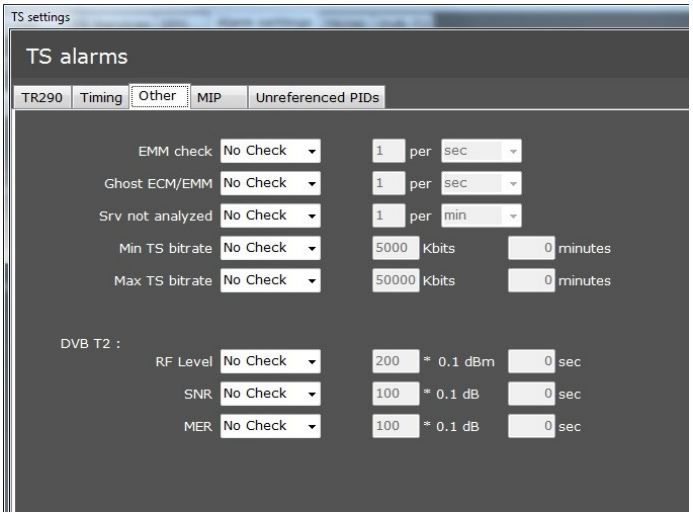


Alarms RF DVB T

`RF Level:` (Only with DTA2138b) It checks the minimum RF level. If the RF level is less than the defined value, then an alarm is raised of the defined category.

`SNR:` (Only with DTA2138b) It checks the minimum SNR. If the measured SNR is less than the defined value, then an alarm is raised of the defined category.

`MER:` (Only with DTA2138b) It checks the maximum MER. If the measured MER is more than the defined value, then an alarm is raised of the defined category.

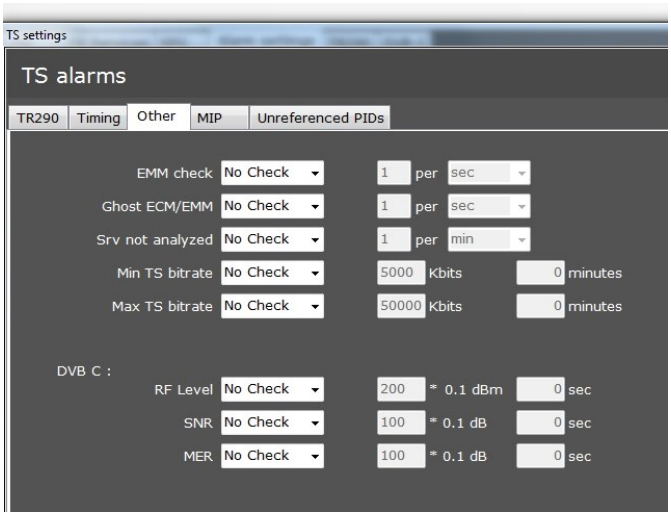


Alarms RF DVB T2

`RF Level:` (Only with DTA2138b) It checks the minimum RF level. If the RF level is less than the defined value, then an alarm is raised of the defined category.

`SNR:` (Only with DTA2138b) It checks the minimum SNR. If the measured SNR is less than the defined value, then an alarm is raised of the defined category.

`MER:` (Only with DTA2138b) It checks the maximum MER. If the measured MER is more than the defined value, then an alarm is raised of the defined category.



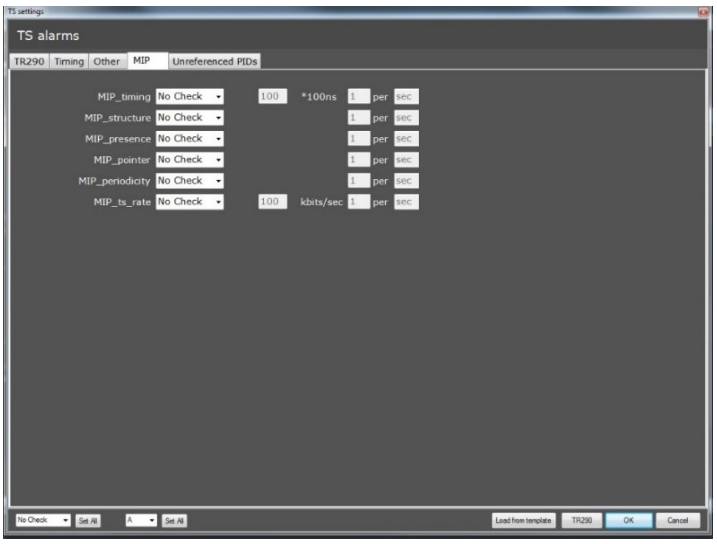
Alarms RF DVB C

`RF Level:` (Only with DTA2138b) It checks the minimum RF level. If the RF level is less than the defined value, then an alarm is raised of the defined category.

`SNR:` (Only with DTA2138b) It checks the minimum SNR. If the measured SNR is less than the defined value, then an alarm is raised of the defined category.

`MER:` (Only with DTA2138b) It checks the maximum MER. If the measured MER is more than the defined value, then an alarm is raised of the defined category.

MIP DVB T SFN



MIP Packets are inserted in the transport stream by a SFN Adaptor at the network source. Each transmitter location relies on information within the MIP packet to synchronize with other transmitters – thus creating a unified, single frequency network.

Naturally, the correct format and timing of the MIP packets is essential for proper operation of Single Frequency Networks. ETSI/DVB has defined a number of tests for MIP validation and monitoring.

`MIP_timing_error:` A necessary precondition for SFN synchronization is that the Synchronization Time Stamp (STS) values inserted in the Mega-frame Initialization Packet (MIP) are correct. This test checks that successive STS values are self-consistent.

`MIP_structure_error:` This test verifies that the syntax of the MIP complies with the specification in TS 101 191 [14].

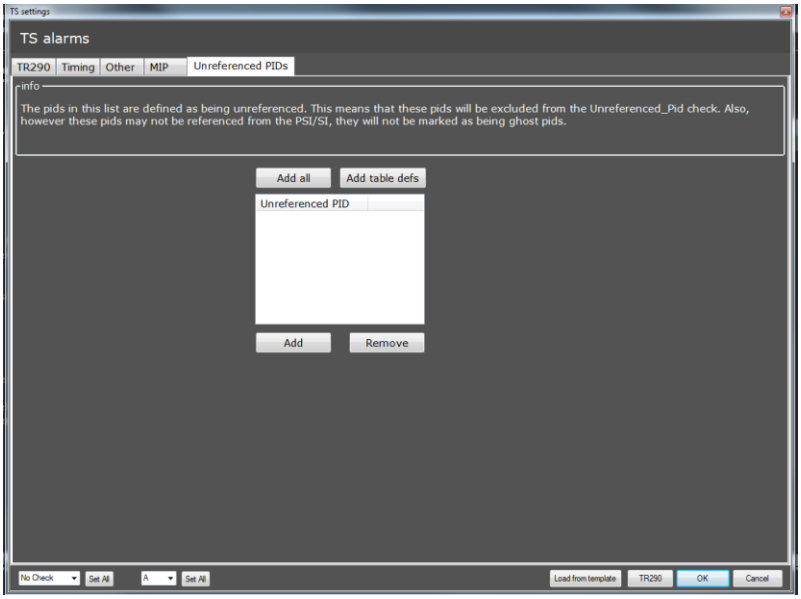
`MIP_presence_error:` This test verifies that the MIP is inserted into the transport stream only once per mega-frame.

`MIP_pointer_error:` The MIP insertion can be at any location in the mega-frame. If the insertion is periodic as defined in the MIP, the MIP location in the mega-frame is constant over time. The MIP can be used to determine the mega-frame size and where each mega-frame starts and ends in the transport stream thanks to the pointer field verified by this test.

`MIP_periodicity_error:` In the case of a periodic MIP insertion (as defined in TS 101 191 [14] clauses 5 and 6), the pointer value shall remain constant, as well as the number of packets between each MIP.

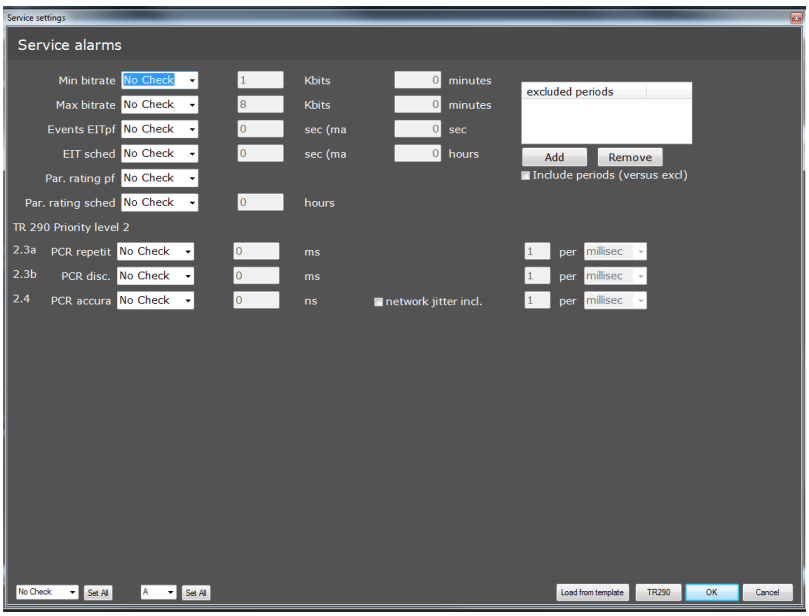
`MIP_ts_rate_error:` In a SFN network the modulator settings are transmitted by the tps_mip (see TS 101 191 [14] clause 6, table 3). These settings determine the transmission mode and in this way the bit rate of the Transport Stream. This test verifies that the actual Transport Stream data rate is consistent with the DVB-T mode defined by the tps_mip.

Unreferenced PID



`Unreferenced PID:` The PIDs in this list are defined as being unreferenced. This means that these PIDs will be excluded from the Unreferenced PID check. The indication of ghost PID will be switched to off. This is the case if the PIDs are used in a stream for private tables and descriptors which are not declared in to the PAT or PMT.

Service level alarm settings



`Service minimum bit rate:` The minimum bit rate can be defined for the service. If overall bit rate for the service goes below defined bit rate the system generates an alarm of the defined category. If the number of minutes is set to '0' this alarm is raised immediately, when the bitrate is below the threshold. Otherwise the bitrate must be below the threshold during the complete interval (for example 5 minutes), before the alarm is raised.

`Service max bit rate:` The maximum bit rate can be defined for the service. If the overall bit rate for the service goes above defined bit rate the system generates an alarm of the defined category. If the number of minutes is set to '0' this alarm is raised immediately, when the bitrate is above the threshold. Otherwise the bitrate must be above the threshold during the complete interval (for example 5 minutes), before the alarm is raised.

`Events EIT p/f check:` This will check for a mandatory EIT present/following for each program_number (service_id) which contains at least one video stream. If any such EIT is not received within the specified interval, an alarm is raised. In addition, if an EIT p/f is received for any program, then the system will check if that EIT p/f continues to arrive at least once within defined interval. The DVB specifications (ETSI EN 300 468, TR 101 290, and ETR 211) state that an EIT p/f is mandatory for all services. Even if the service is not being transmitted, so that there is in fact no present event, an empty section 0 (present) is supposed to be sent. Therefore, the user can select to check for an EIT p/f for all programs or selected programs.

`EIT scheduled check:` The EIT scheduled check expects EIT scheduled events for hours, with possible gaps of seconds. If EIT scheduled is not received within the specified interval, an alarm is raised. In addition, if an EIT scheduled is received for any program, then the system will check if that EIT scheduled continues to arrive at least once within defined interval.

`Par. Rating pf check:` The Parental Rating pf check monitors the presence of the parental rating descriptor (0x55) in the pf schedule.

`Par. Rating schedule check:` The Parental schedule pf check monitors the presence of the parental rating descriptor in the full schedule. The period to monitor ahead of the current time can

be entered in hours.

PCR analysis

PCRs provide a means for a digital TV receiver to lock its decoded video output to the video source present at the input to an encoder. PCRs are snapshots of a counter, driven by this program clock, that are inserted into packets within the Transport Stream (TS) at more or less regular intervals.

PCR Analysis is a measurement of the Program Reference Clock contained within each service (program) of a transport stream. PCR timing can be indicative of the quality of the incoming stream and large inaccuracy values will often lead to problems decoding the video/audio contained within the services of a transport stream.

PCR overall jitter is the most important measurement of high frequency errors in PCRs and, again, includes errors from both PCR generation and regeneration, as well as arrival time errors caused by transmission impairments.

`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 Discontinuity Error:` PCR discontinuity of more than defined duration will raise the defined alarm.

`PCR_accuracy_error:` PCR accuracy values should fall between ± 500ns (referenced to zero, which is no inaccuracy) to be considered good. Network_jitter_included checkbox: The PCR_accuracy is measured in Five different algorithms:

- Network jitter included: Measurement based on actual timing of packet arrival. This setting is mandatory for transport streams with variable bitrate. This setting will only apply to interfaces that can provide the timestamp. Filebased or standard Ethernet ports cannot support this.

- Network jitter not included: Measurement based on a constant TS bitrate and position of the packet within the transport stream.
  The constant bitrate used is based on an average of 60 seconds and only apply to interfaces that can provide the timestamp.

- Network jitter not included: Measurement based on a constant TS bitrate and position of the packet within the transport stream.
  The constant bitrate is calculated by counting the TS packets between 2 executive PCR values a first seen PCR PID.

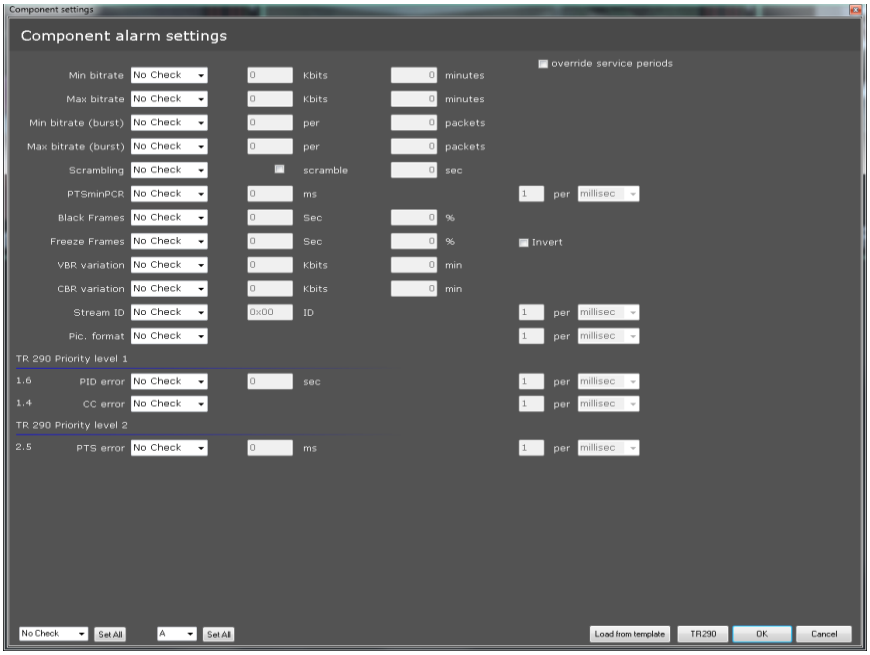
- Network jitter not included: Measurement based on a constant TS bitrate which is manual entered by the user.

- Network jitter not included: The constant TS bitrate is calculated from the modulation parameters in the delivery_system_descriptor in the NIT.

Note

Note 1: This setting is also applicable for the PCR views, even when the alarm is disabled!
Note 2: See information documentation related to V2.6 software release for in-depth information (Annex 1 in this document)

Video component alarm settings



`Min Bitrate:` Checks for the minimum bitrate for the component. If the bitrate for the component is ever lower than the defined, then the system will raise an alarm of defined category. The interval (x minutes) indicates the period that the bitrate must be lower than given value before the alarm raises.

`Max Bitrate:` Checks for the maximum bitrate for the component. If the bit rate is higher than defined, the system will raise an alarm of defined category. The interval (x min.) indicates the period that the bitrate must be higher than given value before the alarm raises.

`Min Bitrate (burst):` The burst measurements count the number of packets arriving within a certain period. This period is defined by the number of TS packets. If packets of a component PID arrive too late, the burst bitrate is too low and the minimum burst bitrate alarm will be triggered.

`Max Bitrate (burst):` The burst measurements count the number of packets arriving within a certain period. This period is defined by the number of TS packets. If packets of a component PID arrive too often, the burst bitrate is too high and the max burst bitrate alarm will be triggered.

`PID Error:` The PID error occurs when the specific component PID does not occur in the transport stream for a certain period. The length of this period can be specified in seconds.

`CC (Continuity Count) Error:` A continuity-count error occurs when successive counter words contain the same count (indicating a repeated packet) more than twice, or if the count is out of order, or if packets are lost.

`PTS Error:` Presentation Time Stamp repetition period more than given value. (default is 700 ms)

`Black Frames:` When black frames are detected for a specified time alarm will be triggered. This is augmented with a configurable black level defined by a percentage. The percentage entered represents the deviation of the number of pixels that are not black. This provides greater freeze frame detection in noisy video streams. 0% represents all pixels being ‘black’. In practical situations a value of below 2% is suitable. When logo’s or other elements need to be excluded then a selection window can be applied (right click video PID in tree view and define exclude area).

`Freeze Frames:` When freeze frames are detected this alarm will be triggered after a specified time. This is augmented with a configurable threshold. A percentage is entered to specify the variation which is allowed across all pixels. 1% means all pixels must be equal in a given picture. Exclude area as per above will also apply.

`Invert selection box at Freeze Frames:` When selected an Alarm will be raised if the video payload value is changed according the selected criteria.

`VBR variation:` VBR variation alarm will be triggered when the difference between the minimum and maximum bitrate during the selected interval (maximum 120 minutes) is not exceeding the given value.

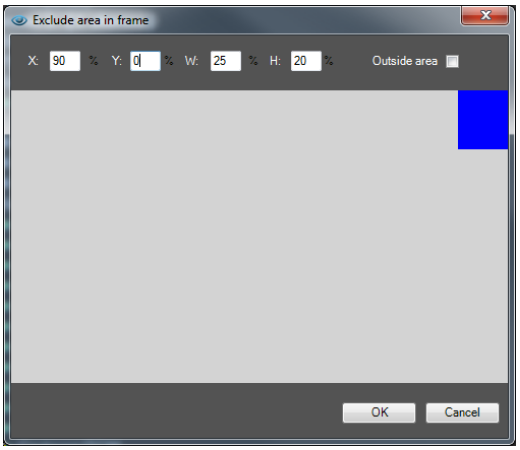
`CBR variation:` CBR variation alarm will be triggered when the difference between the minimum and maximum bitrate during the selected interval (maximum 120 minutes) exceeds the given value.

`Stream ID:` The stream_id in the MPEG header is checked against the given value, if they are not equal, this alarm will be triggered.

`Pic format:` The picture format in the MPEG header is checked against the given value, the picture format is located in the Active Format Descriptor (AFD) in the MPEG2/4 header.

Excluded area in video frame

The logo exclusion can be defined by a rectangle. The coordinates of the rectangle (left, top, width, height) are given in percentages of the actual frame width and height.



The blue rectangle shows the part of the video frame that will be excluded from the pixel comparison (BF, FF).

The “Outside area” checkbox indicates whether the given rectangle includes or excludes the pixels for BF FF comparison.

Test excluded frame area

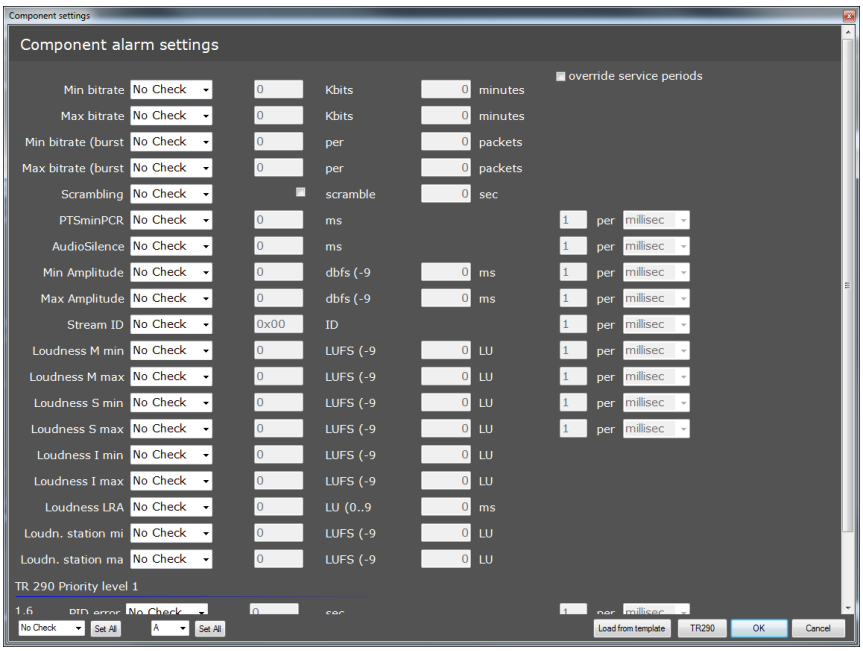
In order to test the area, the function “Draw excluded video area” is available in popup menu of a display (right click on display). When this function is selected, the displays shows the part of the picture which is excluded from the BF/FF check.

Note

- Note: Feature in SMART DVB Pro available in Show View.

Audio component alarm settings

In this section, the settings for Audio Components are shown. Most of the settings are similar to the video component. For details on those settings, please refer to the video settings.



`Audio Silence:` This is to check if the transport stream has any audio silence in to the transport stream.

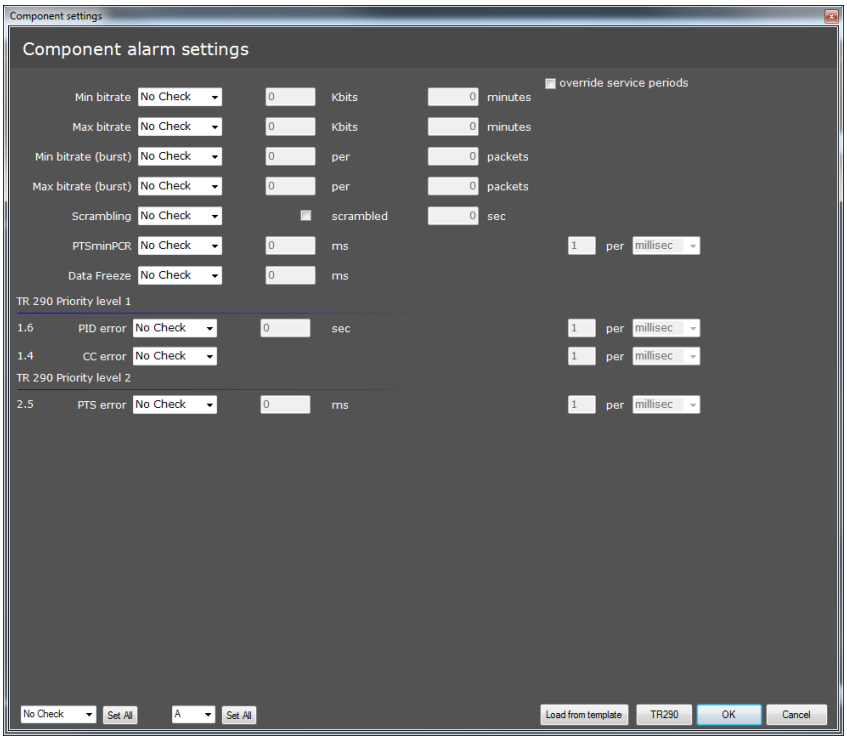
`Minimum Amplitude:` Checks for the minimum amplitude for the component. If amplitude is less than the defined value, then the system will raise an alarm of defined category.

`Maximum Amplitude:` Checks for the maximum amplitude for the component. If the amplitude exceeds the defined value, then the system will raise an alarm of defined category.

`Stream ID:` The stream_id in the MPEG header is checked against the given value, if they are not equal, this alarm will be triggered.

`Loudness:` The whole group of settable values are described and explained in a separate chapter #17 of this document.

Data component alarm settings



In this section, the settings for data components are shown. Most of the settings are similar to the video component. For details on these settings, please refer to the video component settings.

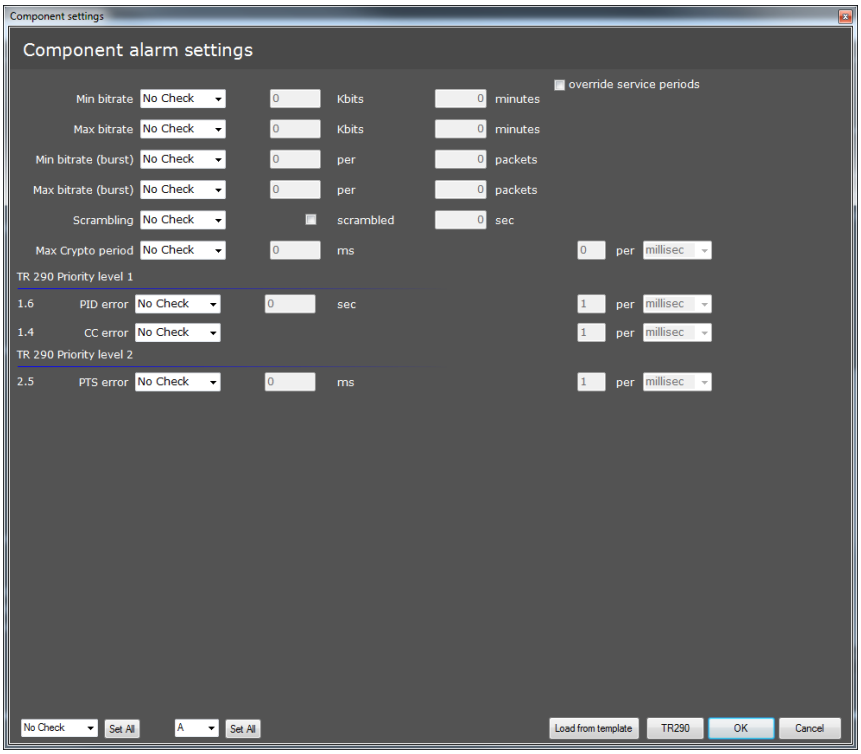
`Data freeze:` Checks for the freeze of data component. If the data does not change during the specified interval, the system will raise an alarm of the defined category

Note

Note:

- The Data Alarm template can be used for each PID retrieved from the PID list of the stream and added to the component Analyzer in the Tree.
- The SCTE 35 PID has automatically the Data Alarm template assigned and has no dedicated Alarm template (Pro only)

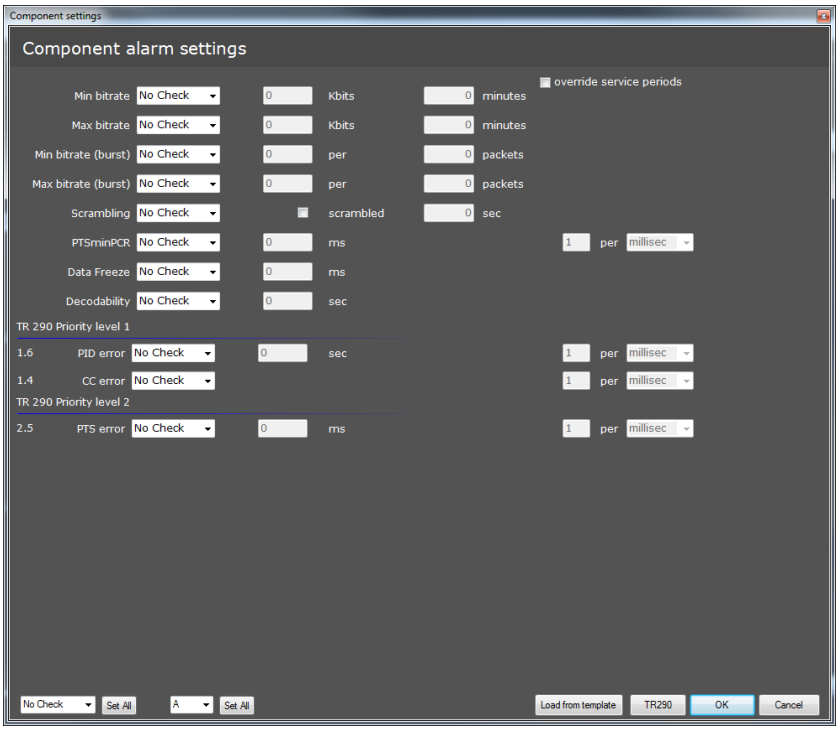
ECM Component alarm settings



In this section, the settings for ECM components are shown. Most of the settings are similar to the data component. For details on these settings, please refer to the data component settings.

`Max Crypto Period`: Crypto Period defines how long in milliseconds a crypto word will be used. A check can be defined to monitor this interval.

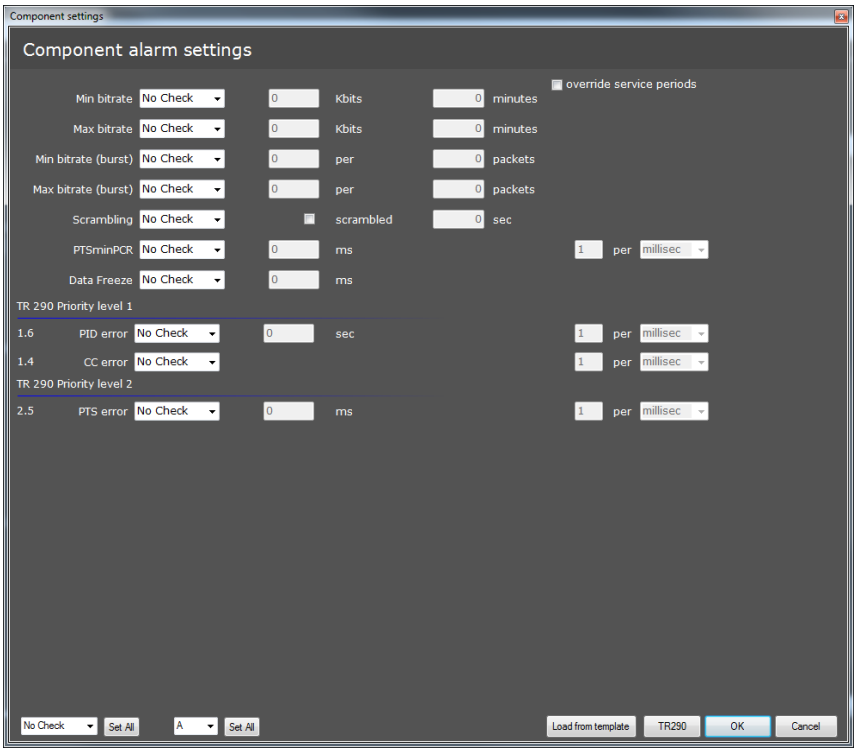
DVB subtitling component alarm settings



In this section, the settings for DVB subtitling components are shown. Most of the settings are similar to the data component. For details on these settings, please refer to the data component settings.

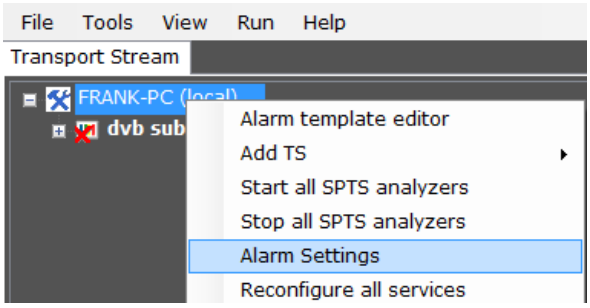
`Decodability:` Decodability alarm is raised when the DVB subtitling data is not decodable according to the technical decoding specification.

Teletext component alarm settings



In this section, the settings for teletext components are shown. Most of the settings are similar to the data component. For details on these settings, please refer to the data component settings.

Probe based spreadsheet based Alarm overview



`Alarm Settings, All Settings:` Opens a spreadsheet view with all the Alarm levels, groups and trigger values. The way of operation is like Excel. The functions Copy, Paste and multiple cell selection are available to manipulate the cell content.

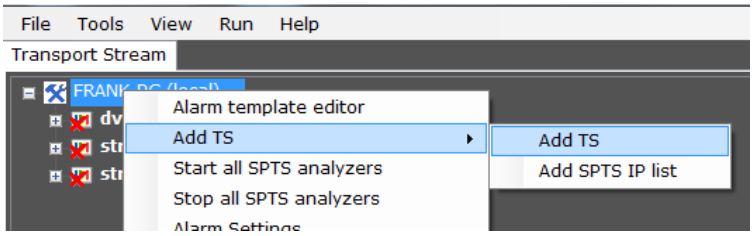
`Alarm Settings, BB/BF Settings:` Opens a spreadsheet view with Black Frame and Freeze Frame Alarm levels, groups and trigger values. The way of operation is like Excel. The functions Copy, Paste and multiple cell selection are available to manipulate the cell content.

(See Annex 1 for more in-depth information)

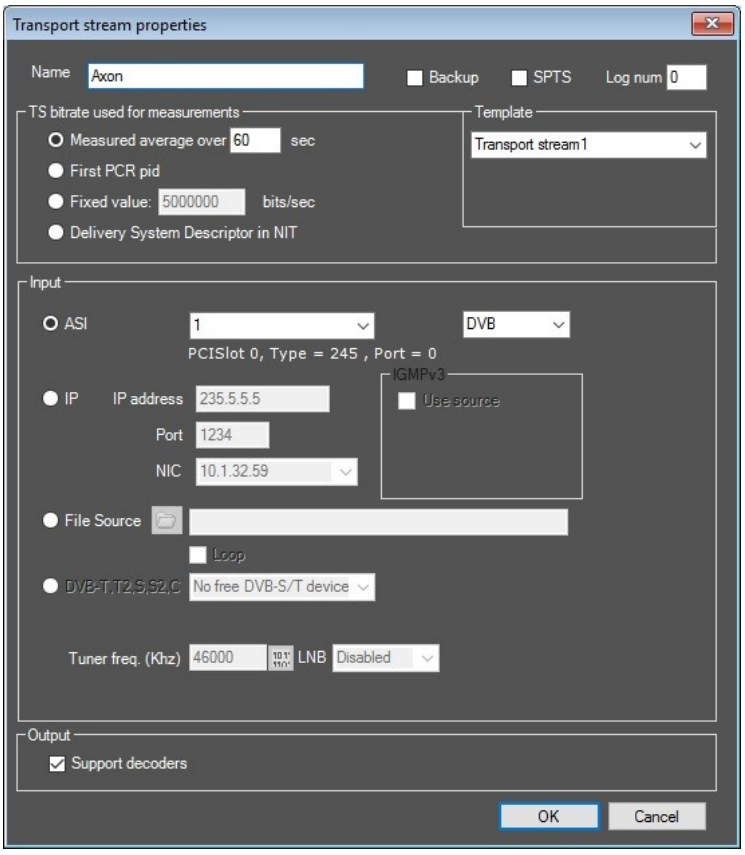
10. Starting probe

Adding TS

A transport stream can be added for analyzing and monitoring in configuration mode.



Clicking `Add TS` from the File menu, the following screen appears:



`Name`: The Name for the Transport Stream. A name must be entered which identifies the transport stream.

`Backup:` This checkbox is only for indication in the ACC. The transport stream will be tagged as “backup” and can as such be identified and organized in the ACC transport stream overview.

`SPTS:` This checkbox identifies if the stream to be added is to considered an SPTS or an MPTS. If tagged as SPTS, the probe will only allow a single analyzed service. *One can leave the SPTS checkbox unticked for SPTS streams, but this will consume a full MPTS license so this is poor use of the obtained license.*

`Log num:` The number entered will point to the transport steam position in tree.

`TS Bitrate used for measurements:` For some measurements, a constant TS bitrate is needed. This constant can be provided, using 4 different methods:

- Measured over long term interval (60 sec)
- First PCR PID
- Fixed user value
- Calculated from parameters in Delivery System Descriptor in NIT

Note that the method of TS bitrate selection affects the PCR accuracy measurements. (See for in-depth information Annex 1 chapter PCR Accuracy)

`Template:` Allows selection of the transport stream alarm template that will be applied.

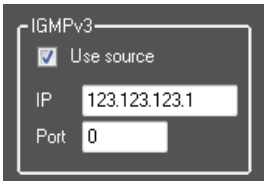
`Input Selection:` The Probe supports analyzing transport streams received via ASI and IP. A TS file can also be selected for analyzing purposes. In this screen the user can select the interface.

`ASI Input:` The ASI Input on which the transport stream is connected can be selected in this screen. An ASI port is mapped onto an ASI output port via configuration file (refer to installation manual). An ASI port can only be selected once.

`Mode:` The Mode indicator can be set to ‘DVB’,’Mode1’ or ‘ISDBT’. In Mode1, the streamtype 129 (0x81) will be mapped to ATSC AC3. In ‘ISDBT’ mode specific ISDBT analysis is included.

`IP Input:` If the transport stream is an MPEG streaming content via IP then the following information is to be entered

- Multicast IP: The IP Address on which the MPEG2 Stream is being multicast.
- Port: The UDP Port for the multicast.
- NIC: The address of the local network interface which is used to receive the stream.
- IGMPv3 use source: This tick box needs to be checked when source specific multicast is required. The TS probe will request and filter packets that match the source IP and Port criteria that need to be entered in the dialog that becomes available.



`File Source:` The file source is meant for offline TS analysis. The user can select a TS file as the source file and analyse it for defined measurements parameters. The file can also be opened in a loop mode so that it is replayed after it is played once completely.

Note: If this option is chosen in the ACC, the selected source file must be reachable from the probe, while the "open file" dialog runs on the ACC. Using a shared directory is the only option (alternatively, perform this function on the probe itself). (Pro only)

Note

Note: File source depends on disk access and throughput; we do not guarantee the accuracy of bitrate/PCR measurements nor smooth display of video.

`DVB-T/T2/S/S2/C Source:`

- The DVBS/S2 source is meant for satellite (LNB) input. Parameters input ID, L-band frequency (which is the transponder frequency minus the LNB Local oscillator frequency) and LNB control parameters; (high/low band using 22KHz tone burst on/off respectively and horizontal/vertical using 13/18V supply voltage respectively) and the Diseqc support can be entered here. (DTA 2137c Input adapter) (See for in-depth information Annex 1, chapter about DVB S/S2)

DVB T/T2/C are using the DTA 2138b input adapter

- DVB-T source is for Terrestrial input, only the DTT frequency need to be specified.
- DVB-T2 source is for Terrestrial input. Frequency, Raster and PLP needs to specified
- DVB-C source is for Cable input. Frequency and QAM needs to specified

`Support decoders:` This checkbox determines if decoder instances will be available for the transport stream. Decoders are required for multiview/showview display of the services and for the functioning of the black frame/freeze frame checks as well as the audio level checks. Disabling decoder support results in less CPU resource usage on the probe.

Unicast Connection

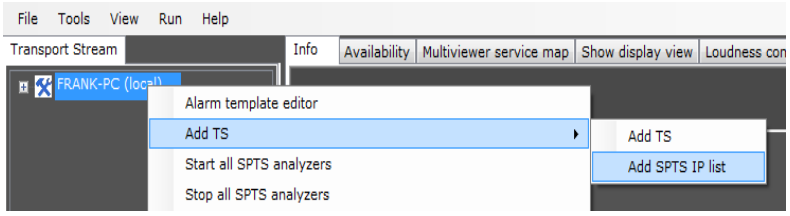
In case of UNICAST IP stream enter 0.0.0.1 as Multicast IP address.

Note

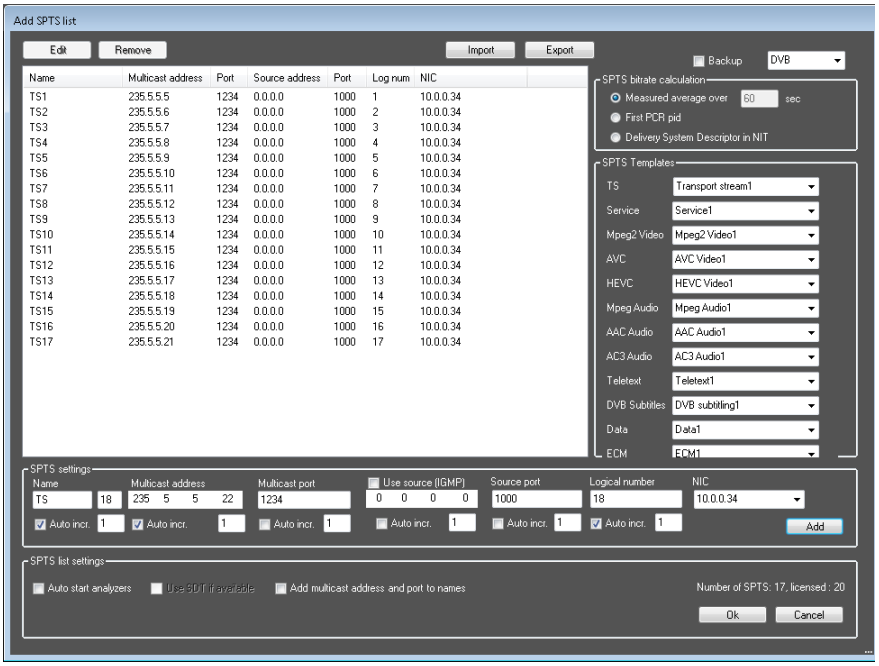
Note : Unicast is only available in the Add TS menu and not in the Add SPTS list menu. Having a SPTS stream on Unicast mark the accordingly checkbox “SPTS” on top of the Add TS menu.

Adding Multiple IP SPTS

Multiple IP SPTSs can be added at once from the same interface. In probe configuration mode right click the top of the Probe tree → Add TS → Add SPTS IP list



`SPTS List:` The window will appear unpopulated. Filling in the fields and clicking ‘add’ with add a single STPS to the list. When the list is populated with the user requirements click, save to add all STPSs to the probe.



`Edit:` Allows editing of highlighted STPS

`Remove:` Removes highlighted STPS from list

`Import:` Imports the earlier exported list

`Export:` Exports the list to disk/stick

`Backup:` Enters a flag value to the stream. This flag can be used in the Gateway “Cockpit” View to discriminate Main and Backup streams

`SPTS bitrate calculation:` The selecting is used to calculate the constant bitrate used for example: the PCR-AC (Accuracy)

`SPTS Template:` Add a prepared Alarm template per stream/service/component

`SPTS setting:` Menu to appoint to the stream

- `Name:` Defines the name of SPTS to be added. Default name auto increments
- `Multicast Address:` Defines the multicast address of the SPTS

- Port: Defines the TCP IP port of the SPTS
- Auto increment check box: Each time the 'add' button is used the IP address is auto incremented.
- NIC: Defines the physical network interface to be used. Listed by the port IP address.

Add: Adds entries configured in the address fields to the list

SPTS list setting:

- Auto start analyzers: SPTS streams will automatic start analyzing after pressing the Ok button
- Use SDT if available: The name from the SDT will merge automatically
- Add multicast address and port to names: The multicast address and port number will by automatically merge in the name

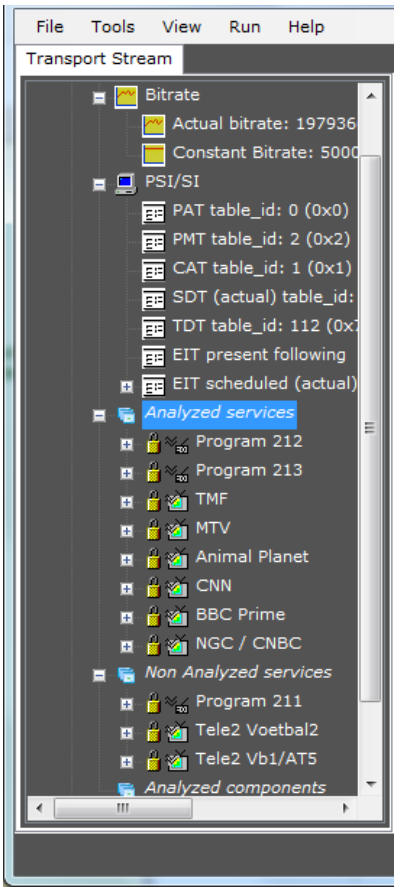
Ok: Saves all STPS to the probe

Cancel: Cancels current window and makes no additions to probe configuration.

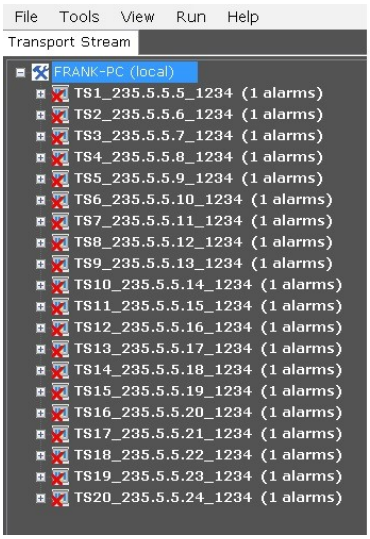
Selecting the OK button will add the TS from the selected interface. The added TS will be shown in the Transport Stream section as shown below:

Tree View:

MPTS



SPTS



The screen shows the SI/PSI View on the *Transport Stream*. All the SI / PSI tables present in the TS will be shown. Any specific node of the table can be expanded to see the detailed information present in the tables.

There are the following ways for starting analyzing the service.

1. A specific service can be selected by clicking on *Start Analyzing Service* from the context menu.
2. All the services in the list can be analyzed by selecting the *Start analyzing all services.*

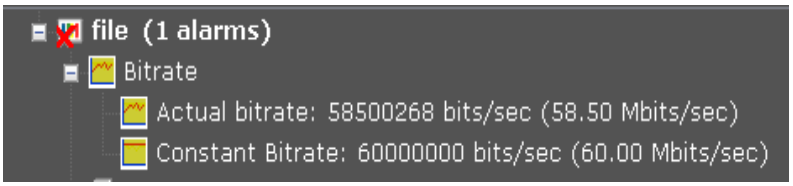
A specific service can be dragged and dropped in the *Analyzed Services* window.
Once the service is selected for analyzing, the service is to be configured for measurements and monitoring parameters.

Default values for measurements and monitoring parameters can be set using *Service Defaults* and *TS Defaults* under *Settings* Menu.

In case TS is added and the CPU of the probe is > 80%, a warning is given and the TS is not added.

TS bitrate tree nodes

The Bitrate tree node has 2 sub nodes, called “Actual bitrate” and “Constant bitrate”. The actual bitrate shows samples of the TS bitrate measured over 8 sec intervals. The Constant TS bitrate shows the constant value according to the settings (measured/NIT/fixed) that is provided.



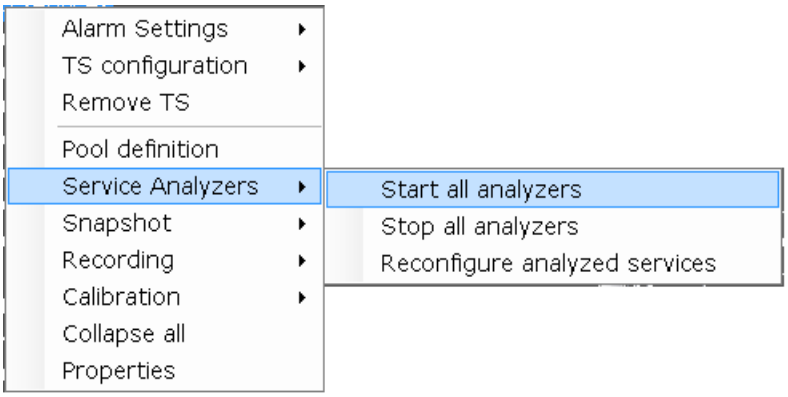
Input Buffer Overflow

When system resources are violated, input errors may occur. This will be indicated in the **“B**itrate**”** tree node, as shown below.

11. Start Analyzing

Start analyzing all services

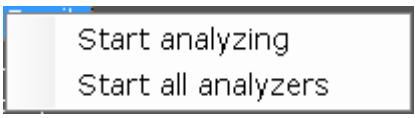
Clicking on the right mouse button on TS Level or *Non Analyzed services node* or *Analyzed services node* will show the following menu



Click on the Start All analyzers menu to start analyzing all the services in to the Transport stream. The system will show a confirmation screen. Click the Yes button to proceed.

Start Analyzing a specific service

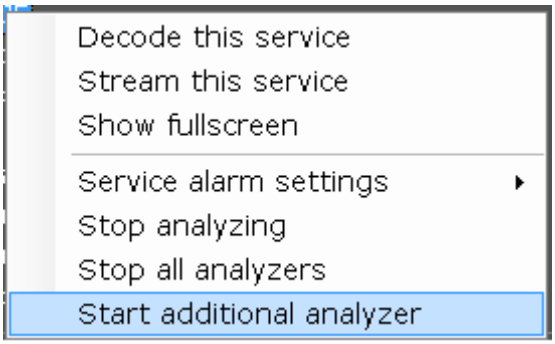
The services which are not analyzed are present in *Non Analyzed services node*. To start the analyzing a specific service, right click the service and start analyzing.

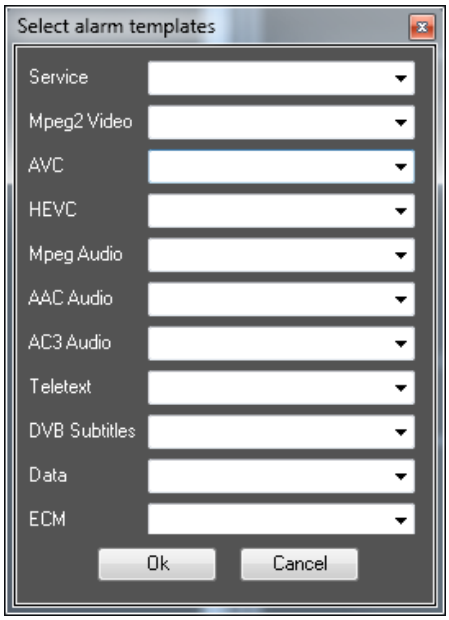


Start and additional Analyzer

The services which are being analyzed can be analyzed with different parameters also by starting an additional analyzer.

To start an addition analyzer the user can click on the right mouse button on the Service Level node under the *Analyzed Services node* and select *Start additional analyzer* menu option.





Before services are added for analysis, the alarm template selection window will appear. Here you can select preconfigured templates for each level of the service(s) to be monitored. See 'Creating & Editing Alarm Templates'. Selecting none will apply the default template (empty).

Once the analyzing for all the services is started all the services from the *Non Analyzed Services Node* will be moved to the *Analyzed Services Node.*

Note

NOTE:

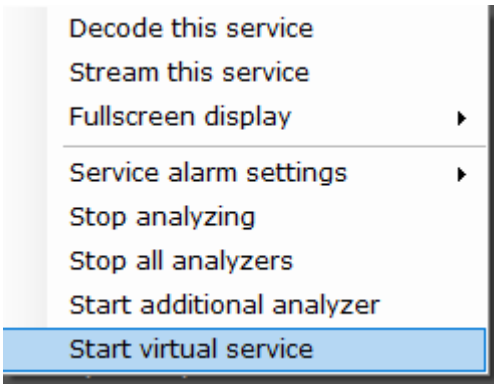
- When a service I being started as an analyzer the probe sets the name according to the info in the SDT. When this function is started, before the SDT (or SDT change) is read, the service name is set to “Program x”. A “Reconfigure Service” will solve this issue and reset the new service name with the (new) info from the SDT.
- This Additional service feature is only available in the MPTS mode

Start virtual service

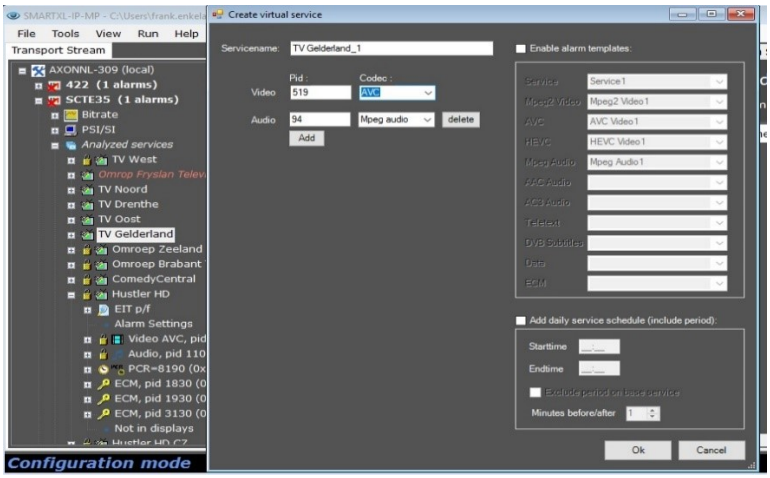
The services, which are being analyzed, can be used to create a PMT with different or non-existing parameters and or service name and or PID’s by starting a virtual service. (See for in-depth information Annex 1, chapter Virtual PMT).

The virtual service can be used for scheduled services in the stream whom are not existing during the setup. (White listed PAT/PMT changes are possible with this feature)

To start a virtual service, the user can click on the right mouse button on the Service Level node under the *Analyzed Services node* and select *Start virtual service* menu option.



Selecting the Start virtual service opens the “create virtual service” window



`Servicename`: In the name box the original SDT related name is appearing extended with _1.
The user can create his own name in this box.

`Video (Pid)`: This the pointing at the original Video PID of the base service.
The user can select a PID number what is related to the (new) virtual service

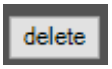
`Video (Codec)`: This the pointing at the original Video PID of the base service.
The user can select a CODEC what is related to the (new) virtual service.

`Audio (Pid)`: This the pointing at the original Audio PID of the base service.
The user can select a PID number what is related to the (new) virtual service

`Audio (Codec)`: This the pointing at the original Audio PID of the base service.
The user can select a CODEC what is related to the (new) virtual service.

Button adds an Audio PID in the virtual PMT.

The virtual service (PMT) supports up to 16 Audio PID.



Button deletes an Audio PID in the virtual PMT.

Note

Note: The created virtual service needs to point to an PCR PID. This PCR should be in the existing original PMT or in the scheduled PMT.
Note2: You can only add a Virtual Service if SPTS flag is not enabled in TS properties

`Enable alarm templates:` This feature ables the user, to select the pre-defined alarm templates to the virtual service.

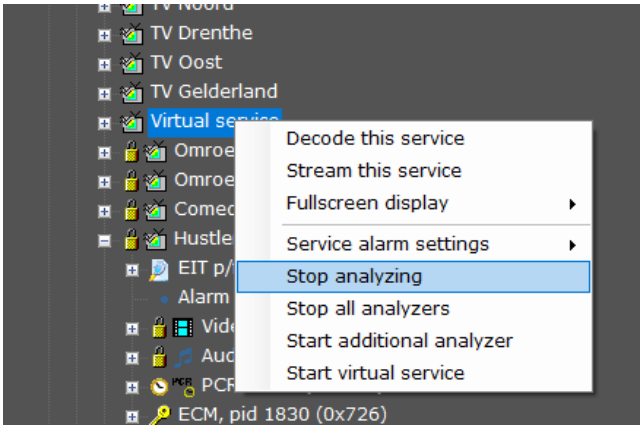
`Add daily service schedule (included period):` This feature allows the user, to set the alarm schedules.

`Start time:` This the start time of the “Virtual Service level”measurements

`End time:` This the end time of the “Virtual Service level” measurements

`Exclude period on base service:` This feature creates a relation between the original used Service and the Virtual Service. The function will switch automatic the measurement of the orignal service off. This only during the scheduled time.

`Minutes before/after:` The feature sets the pre & post overlap of the measurement of the Alarm measurements between the orinal and virtual Service.



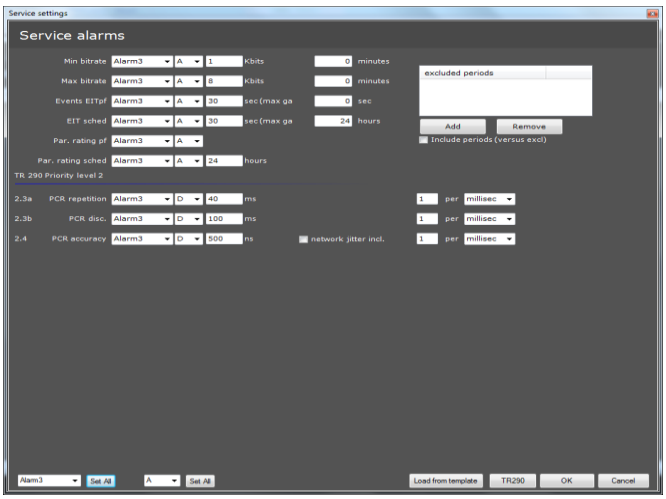
Stop analyzing virtual service; To remove the created virtual service select the service in the tree and use the “Stop analyzing” function of the menu.
The virtual service is removed from the Transport Stream.

Note

Note: This Virtual Service is only available in MPTS mode.

Service alarm settings

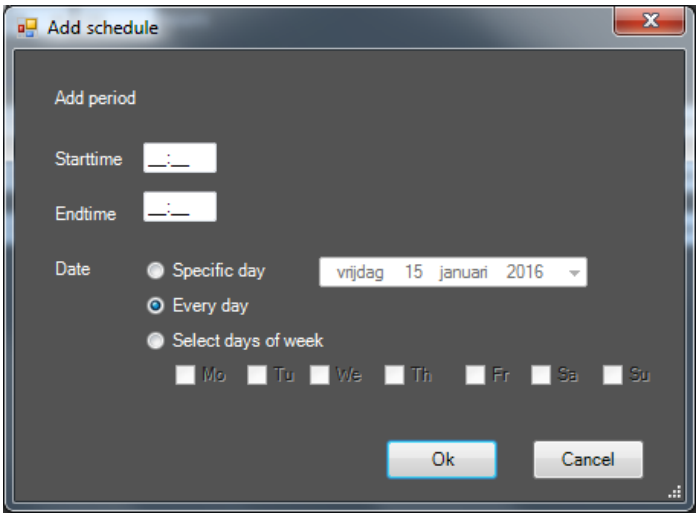
Selecting the Service alarm settings would display the current alarm settings for the service as shown below:



`Excluded/included period:` Included/Excluded period during the day can be implemented for service measurements. The periods that are added to the list are included / excluded with respect to measurements of this service. The functionality is provided to give the user an option to skip the measurements in case of maintenance work during a specific time period.

Note

Note: Non schedule setting will implicate always measurement



50 periods can be added to the lists.

In case of period inclusion, the alarms are only initiated if the timestamp is within one of the given intervals.
In case of period exclusion, the alarms are only initiated if the timestamp is not within one of the given intervals.

The last minute is also part of the interval, for example, end time 23:59 for 'included' period, will trigger the alarms in minute 23:59.

Note that, when an excluded interval has ended, or an included interval has started, the measurements will start and alarms having an interval as a threshold will be delayed, for at least that interval.

For example, suppose:
Included interval: 10:00h – 21:59h, and bitrate alarm having a 5

minutes threshold (before bitrate alarm triggers).
This bitrate alarm will not be triggered before 10:05h.

Note

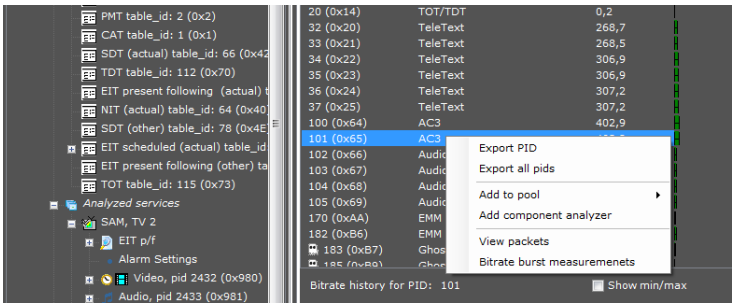
Note: Start Time must be in advance of End time.

Excluded Service Template will have the following message at the multi-viewer: not supported in Pro

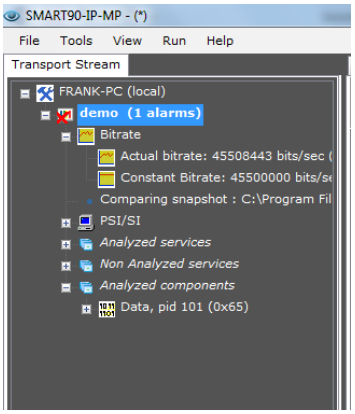
The Service ZDF HD is excluded until coming Sunday, 10.00.
The Service zdf, neo HD is excluded until today 20:00.
Zdf.kultur HD will be active 2016-12-31 (31st of December 2016)

Start analyzing a component

Analyzing a specific component can be started by starting a component analyser (TS node in tree view, select PID tab in probe view right click on a PID that needs to be analysed.



Once the component analyser is started the component will be seen under the *Analyzed components node* as a data component. The alarm settings for the component will also be see inside the node as shown below:

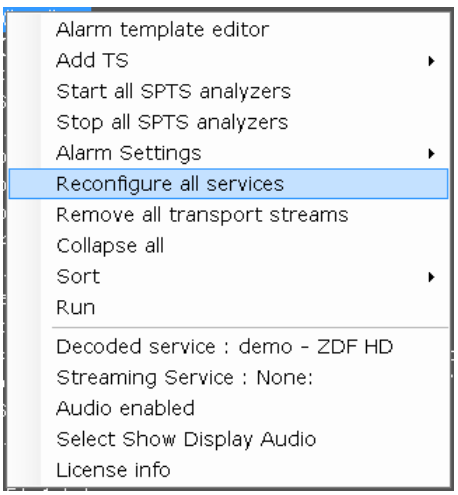


With each alarm settings the category and threshold value is shown in the node.

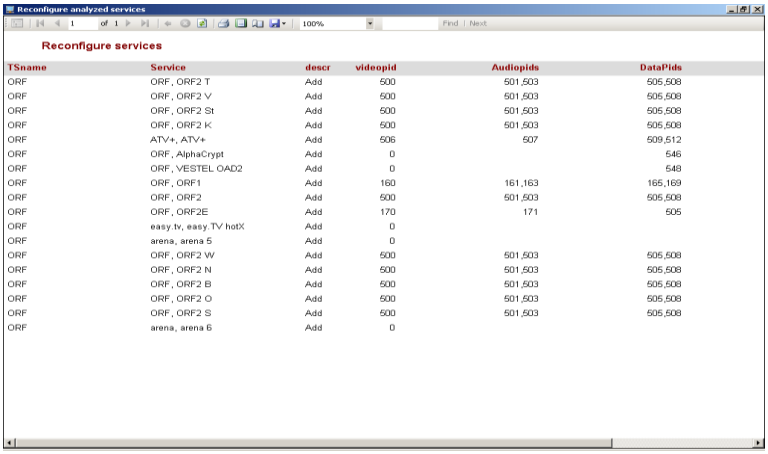
Reconfigure all

This function reconfigures the selected analysed service. This means, according to the information currently in the PMT, if there are changes in this service, the components are adapted. New components are added with default parameters, old components are removed from the services. If the service is not available any more in the PMT, the service is removed.

The option can be accessed by clicking on the right mouse button on the Probe level will pop up the following menu:



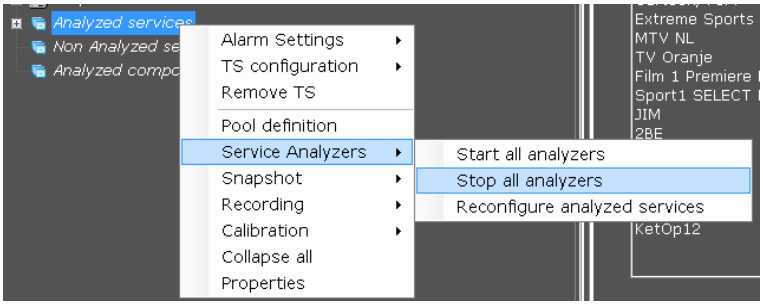
Clicking on the *Reconfigure all services* menu will reconfigure all services. A report of the required changes is shown.



12. Stop Analyzing

Stop all analyzers

Clicking on the right mouse button on TS Level or *Non Analyzed services node* or *Analyzed services node* will show the following menu



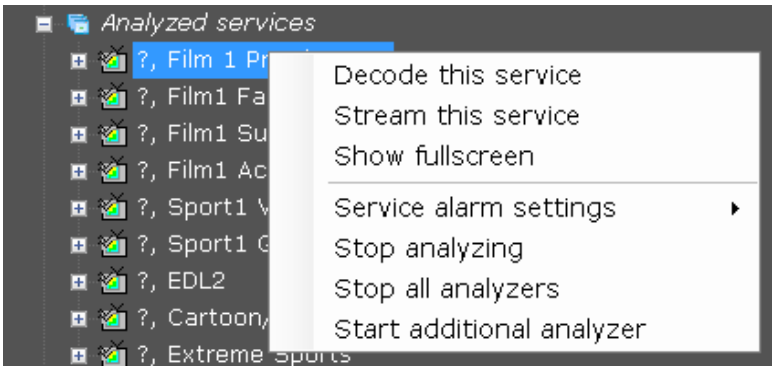
Click on the Stop All analyzers menu to stop analyzing services. The system will show a confirmation screen. Click on YES button to stop all active analyzers. Once the analyzing for all the services is stopped all the services from the *Analyzed Services Node* will be moved to the *Non Analyzed Services Node.*

Clicking on the right mouse button on the service under the Analyzed services node and selecting the *Stop all analyzers* will also stop all active analyzers for the TS.

Stop analyzing a specific service

The services which are analyzed are present in *Analyzed services node*. To stop analyzing a specific service, drag and drop the service from *Analyzed Services node* to the *Non Analyzed services node*. This would stop analyzing the services.

You can also Click on the right mouse button on the service under the Analyzed services node and select the *Stop analyzing* option. This will also stop analyzing the current service.



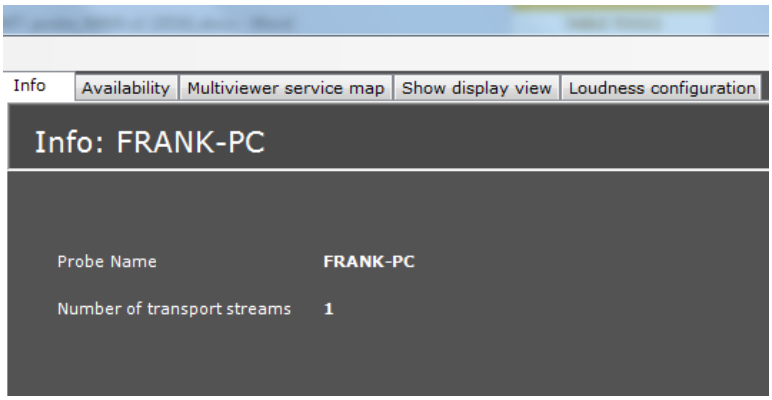
13. Using the Probe Analyser

PROBE VIEW

The following views are possible when selecting the probe level from the transport stream view.

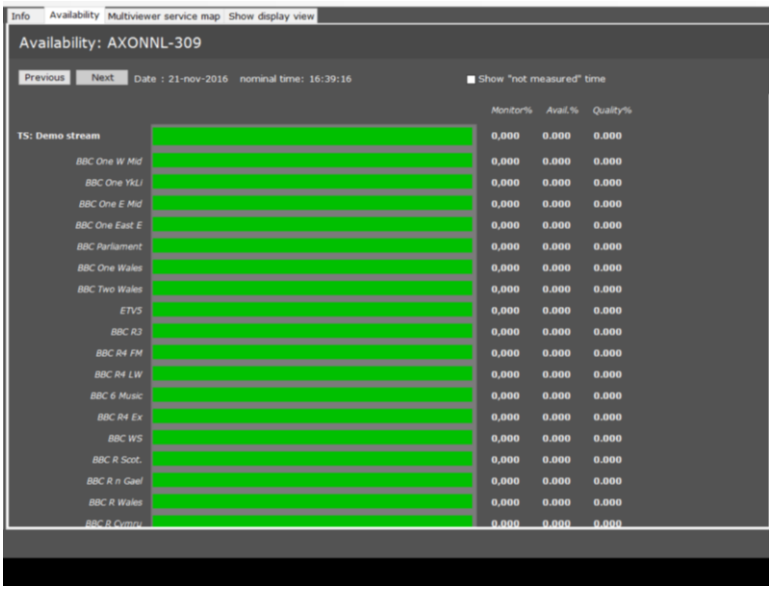
Info

The view shows Probe name and the number of connected Streams. This view is read-only.



Availability

This view shows, per Transport Stream and Service, the availability. This is displayed as a percentage of the daily raised number of configured A-group alarms.



The coloured bars indicate per alarm category, the amount of time in percentage, that this category was the highest category of outstanding alarms. The colors are the same as the background colors of the alarm logging. For example, 60% red means 60% of

the time (since beginning of the day or probe start if the Probe is started during the day), an alarm1 category was active and the highest category.

Note

Note: In combination with the Gateway ACC (auto) reports are definable per Day or Week.

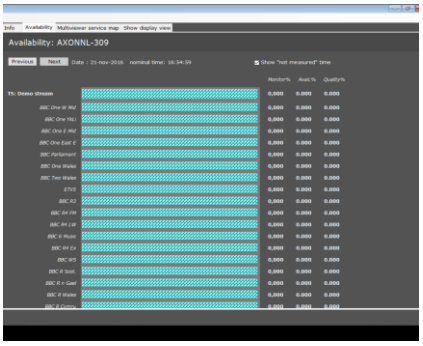
`Previous:` Switch to availability View of the Day before.

`Next:` Switch to availability View of the Day after.

`Date:` Date of the availability View.

`Nominal time:` Shows the Daily running time of the probe from midnight (00:00).

`Show "not measured" time":` Switch to not measured time View.
The blue area is the not measured period from the start or Midnight.



`TS:` Displays the name of the stream.
The bar behind displays the Transport Stream Alarms in color present during the Day.

`Italic Service name:` The bar behind displays the Service Alarms in color present during the Day.

`Monitor%:` Indicates the availability value of the Stream/Service of the total measured time during the Day.
E.g.:

1. When having maintenance for 2 hours a Day, you will have an indication of 22/24 of the running time. (at the end of the Day you will have 22/24x100= 91.667% Monitoring Availability)

`Avail%:` Indicates the availability value of the Stream/Service of the total **Alarm level group combination 1A** measured time during the Day.

`Quality%:` Indicates the availability value of the Stream/Service of the total **Alarm level and group combination 1A+2A+3A+4A+5A** measured time during the Day.

Note

Note:

1. Alarm level group combination 1B-E, 2 B-E, 3 B-E, 4B-E and 5B-E are excluded from the Availability
2. 1 Day is from 00:00 till 24:00 = 100%
3. In combination with the Gateway ACC, manual and automatic reports are available, see Gateway Manual. . (Pro only)

Multi-viewer image

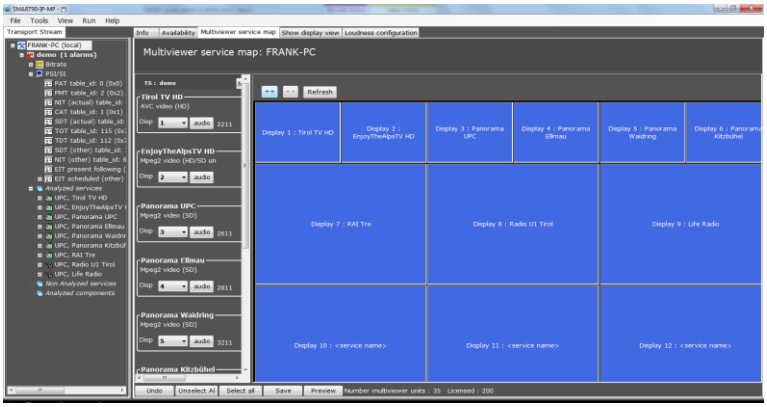
The Multi-viewer image view shows a static (jpg) image of the Multi-viewer. The image updates in intervals of 8 sec. . (Pro only)

Note

Note: This function of displaying the Multi-viewer screenshots can only be viewed on the Gateway ACC and or Gateway WEB. (Pro only)

For more details on multi-view configuration, please refer to our SMART DVB Familiarization guide.

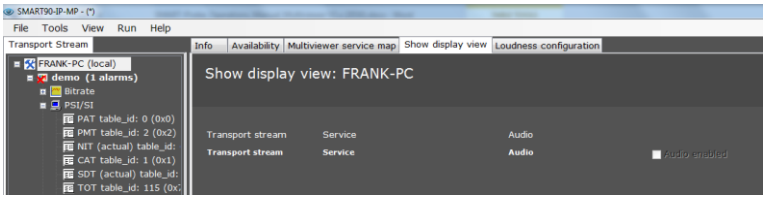
Multi-viewer service map



In the Multi-viewer service Map in Run and configuration mode the user is able to select and position the video and or audio onto the prepared monitor wall.

Show display view

In the “Show display view’, the operator can review the currently selected service that runs in the show display window. For single service decode see chapter 6.

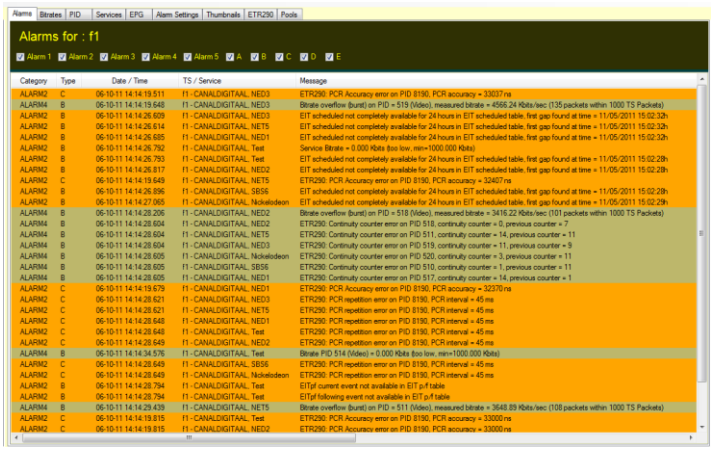


TS VIEW

The following views are possible when selecting a TS level from the transport stream view

Alarms view

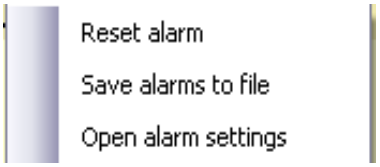
The view shows the list of alarms for the selected transport streams. The user can select to filter all alarms from a specific level.



All the alarms can be shown in different colors based on the selection in the logging settings. On the top there are Alarm1 to Alarm5 check boxes and the user can check the alarms which need to be displayed in the log window. The various category of alarms shown are:

- Alarm1
- Alarm2
- Alarm3
- Alarm4
- Alarm5
- Counter Alarm (not visible in current alarm view)

Alarm types A-E can be selected. For each alarm the information shown are Category, Date and time of occurrence of the alarm, message description.



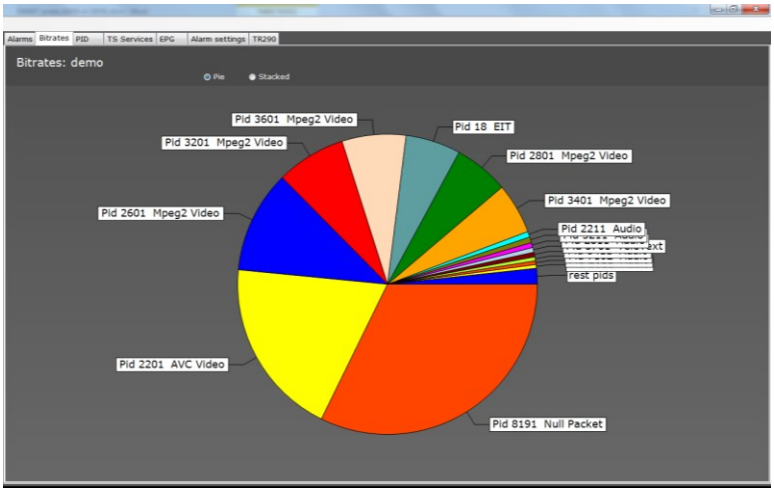
`Reset alarm:` The alarms can be reset using this option

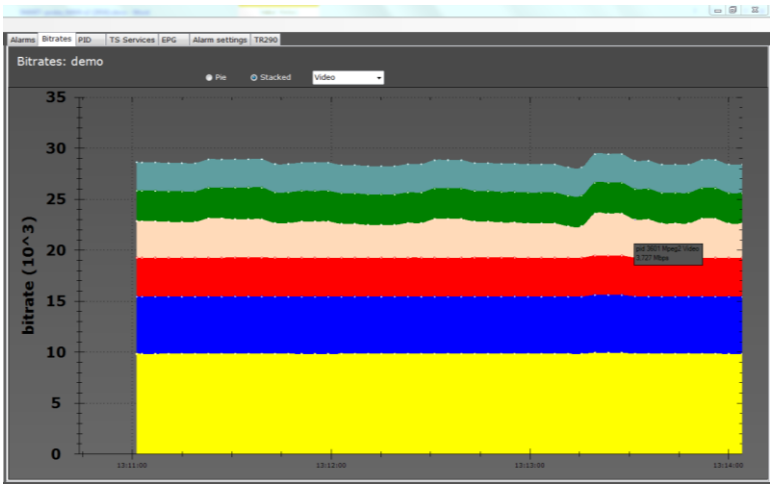
`Save alarms to file:` alarms can be saved to an external file.

`Open alarm settings:` The selected alarm row will open the Alarm template of the TS, Service or Component without switch to Configuration mode. The user is able to change the Alarm value in the template. This “shortcut” feature is only available in “admin mode”
In user mode Open alarm settings feature will be greyed out.

Bitrate views

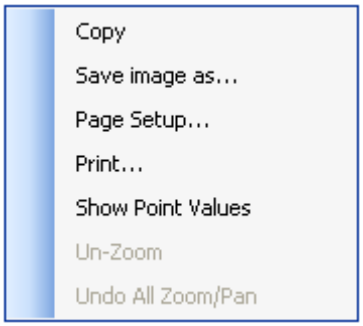
This view shows the Pie or Stacked chart showing PID utilization by the selected streams.





For each PID the PID number and component, type is shown.
For e.g. PID 3601: Mpeg2 Video

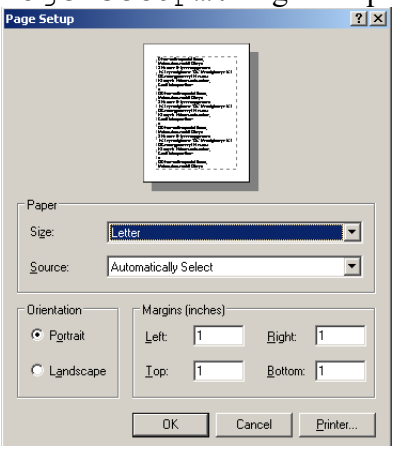
Right click the graph to show the popup menu:



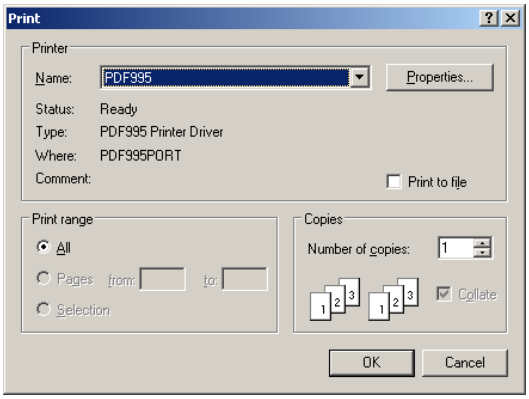
`Copy`: Copies the image to the clipboard

`Save image as...`: Save the bitrate information to file

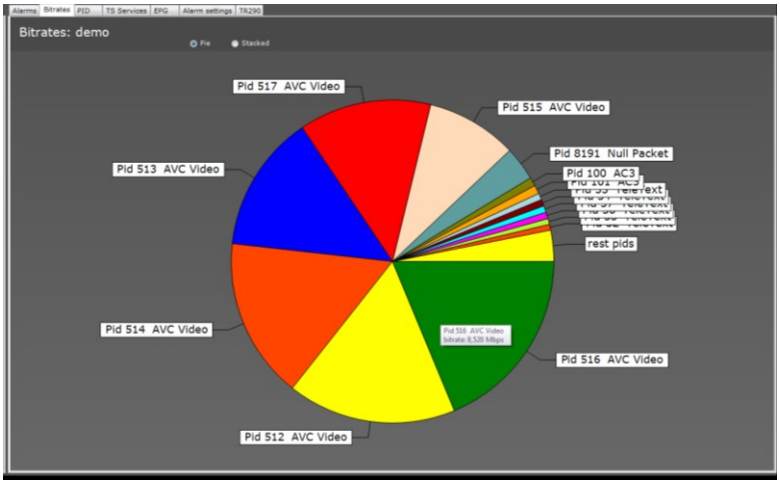
`Page setup...`: Page Setup for printing



`Print...`: Print the bitrate information



`Show Point values`: Shows the values (highlighted in pie graph)

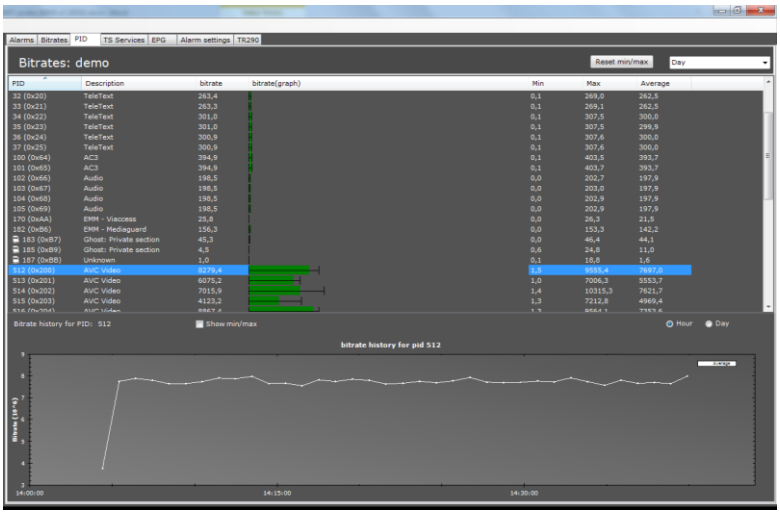


`Un-Zoom`: Un zoom the image

`Undo All Zoom/Pan`: Undo zoom / pan, and return the default image

PID view

Chart showing PID utilization, sorted by bitrate in this case.



The PID view allows the PIDs to be sorted by means of the columns. Right click on the legend bar will allow selection of which columns to display.

The bitrate graph will show the current bitrate with indication of min and max encountered (Show min/max checkbox). The graph can be adjusted to display the graph in days or in hours.

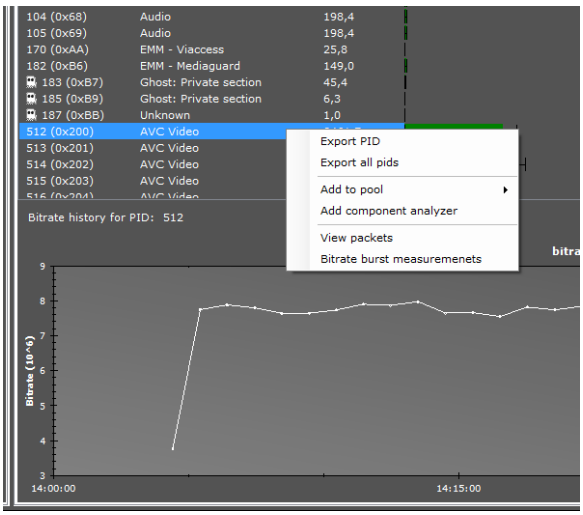
The combo box on the top right side has 4 items:

- 8 sec avg: bitrate calculated every second, min/max is since start (or last Reset min/max). Average is a 8 seconds average.

- Day: bitrate is 8-second average values, min/max/average are calculated over current day
- Week: bitrate is 8-second average values, min/max/average are calculated over current week
- Month: bitrate is 8-second average values, min/max/average are calculated over current month

In the lower part of the view, the bitrate can be seen "in time" With the radio buttons on the right, the scale can be set to: Hour (last 60 measurements, 1-minute interval) or Day (last 48 measurements, 1-hour interval)

Right click in the PID view shows a popup menu:

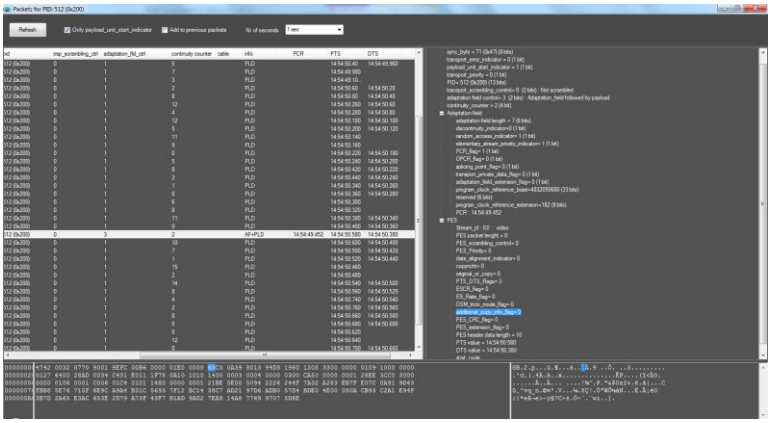


`Export PID`: Exports the measured content of the selected PID to a comma separated (.csv) file.
`Export all PIDs`: Exports all PIDs to a comma separated file.

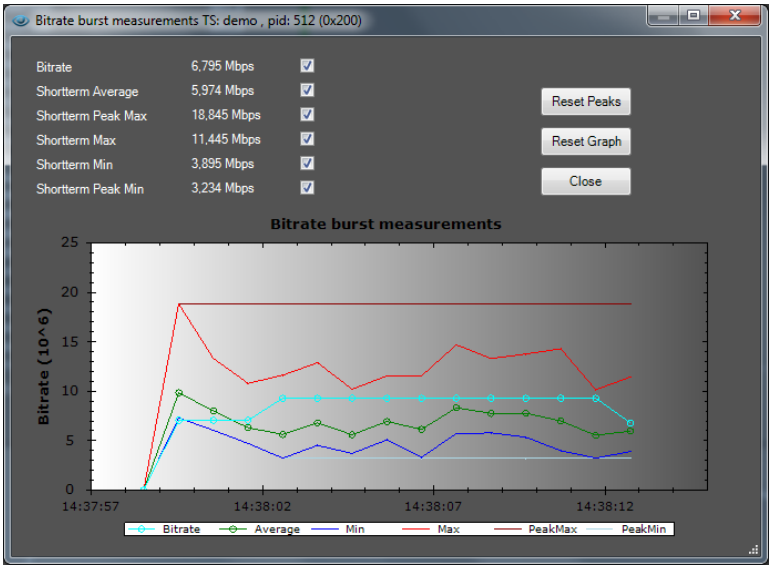
`Add Component Analyzer`: This can be used to start analyzing the selected component.

`Add to pool`: This menu lists all the available pools, and adds the selected PID to the pools that will is chosen.

`View packets`: View packets for the selected PID. The information about the packet will be as shown below:



Double click a row in the PID view to show the bitrate burst measurements dialog. This dialog displays the burst bitrate details of the selected PID

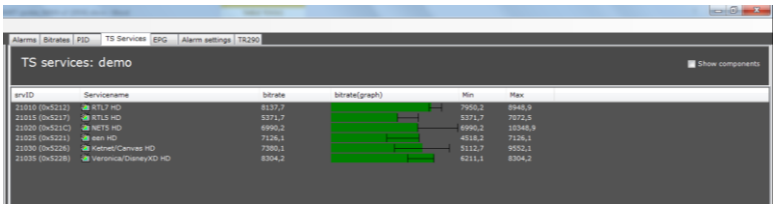


`Bitrate:` 8 seconds average bitrate
`Shortterm Average:` 1 second average
`Shortterm max:` maximum bitrate of last 10 intervals of 100ms
`Shortterm min:` minimum bitrate of last 10 intervals of 100ms
`Shortterm Peak Max:` maximum “Shortterm max”
`Shortterm Peak Min:` minimum “Shortterm min”

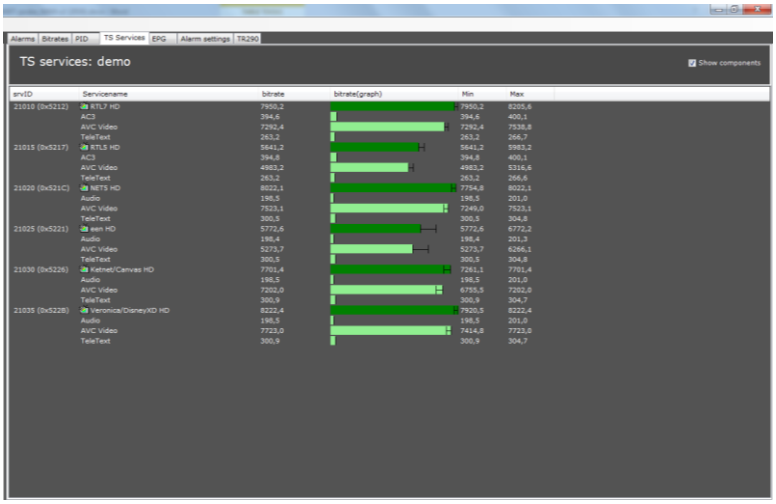
Button `Reset Peaks` resets the Peak Min/Max to the current Min/Max.
Button `Reset Graph` clears the graph, so it builds from scratch.

Service view

This view contains a list of services present in the transport stream with the bit rate utilization for each service.

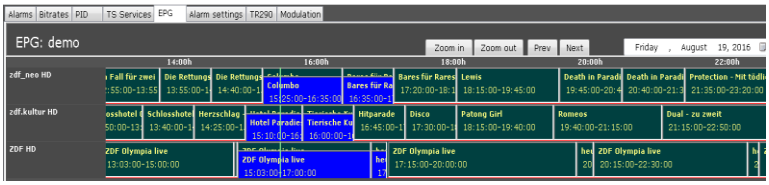


For each service with the actual bitrate, the range bitrate is also displayed. The user can also select *Show Component* to view the components present with their bitrate for each service.



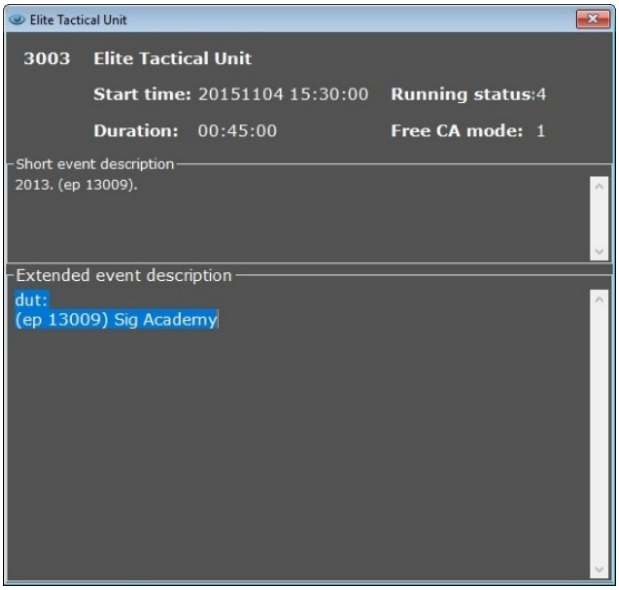
EPG view

EPG Grid View shows the entire event present for the selected service. The user can select the dates to see the EPG for a specific date.



The green events are the 'scheduled' events, the EIT present/following events are drawn in blue.

Double clicking an event will expand the contents fully in a new window.

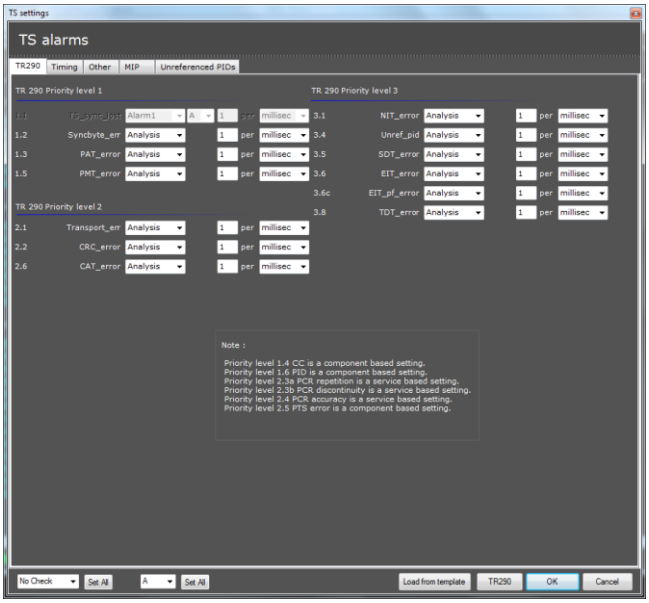


Note

Note: it is also possible to view the full EIT table decode PSI/PS tables of the tree.

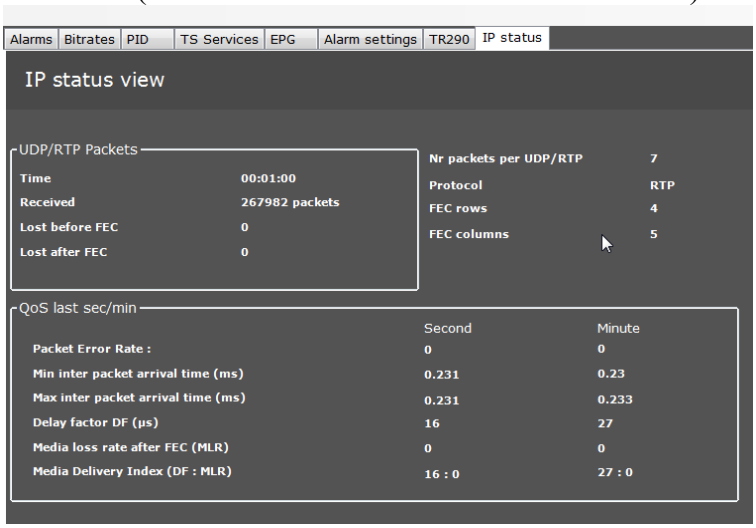
Alarm settings view

The screen will show the active measurement parameters for the selected TS. The details on each parameter are explained in the *TS Settings* section.



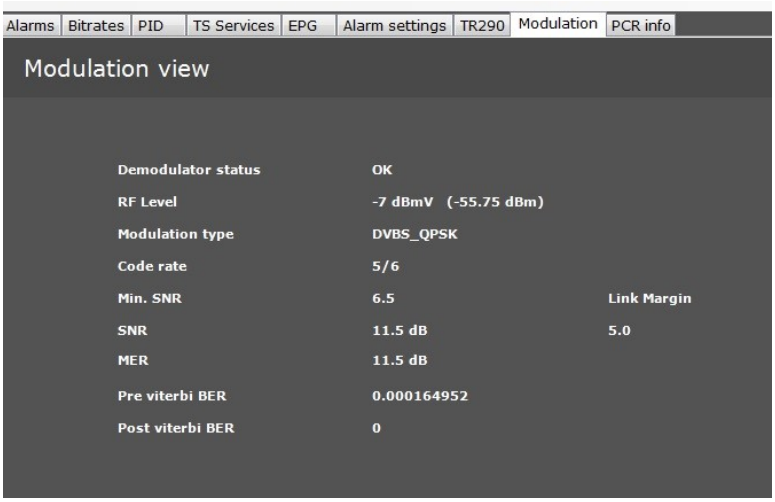
IP statistics view

At TS node, in case of IP input, an extra view is available, IP Statistics. This view shows IP specific information. The measurements in this view are started once the view is opened. For long term measurements or comparison purposes the view can be undocked (Menu bar > View > Undock selected view).



Modulation view DVB-S/S2

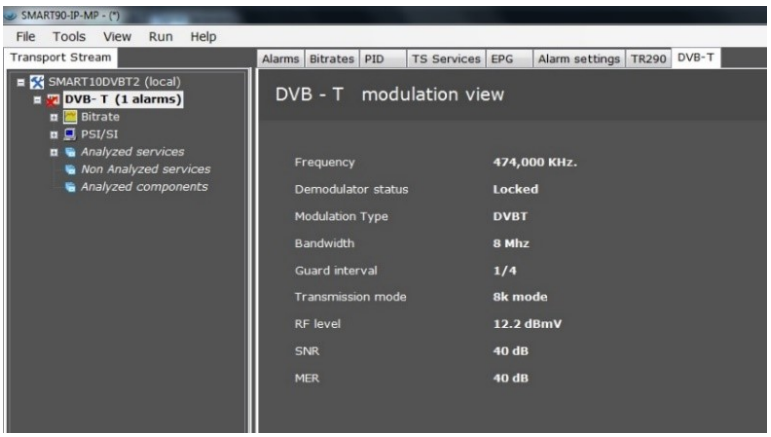
At TS node, in case of DVB-S input, an extra view is available, Modulation. This view shows DVB-S modulation specific information.



Modulation view DVB-T

At TS node, in case of DVB-T input, an extra view is available, Modulation. This view shows DVB-T modulation specific information.

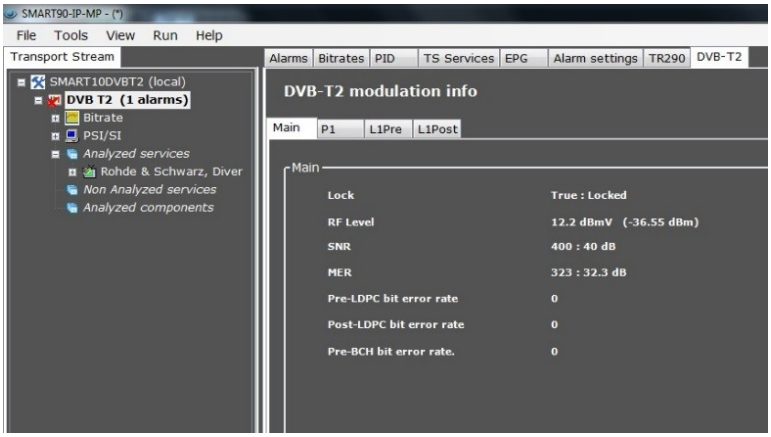
Main



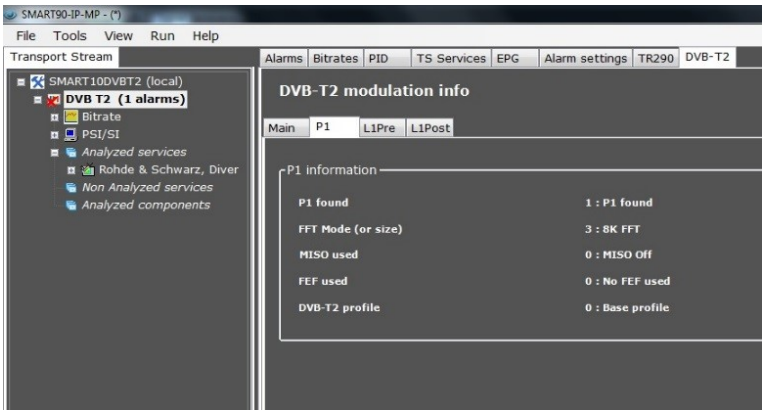
Modulation view DVB-T2

At TS node, in case of DVB-T2 input, an extra view is available, Modulation. This view shows DVB-T2 modulation specific information.

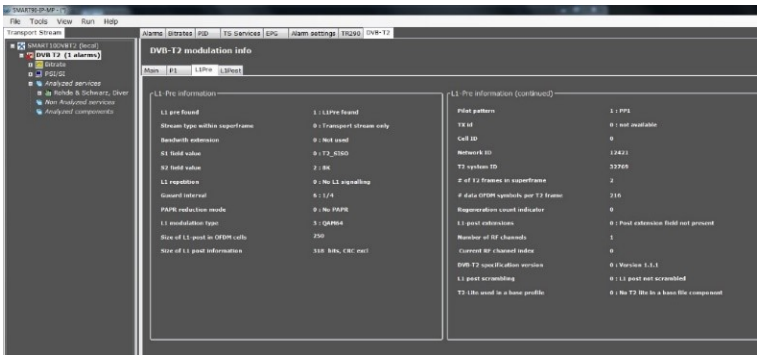
Main



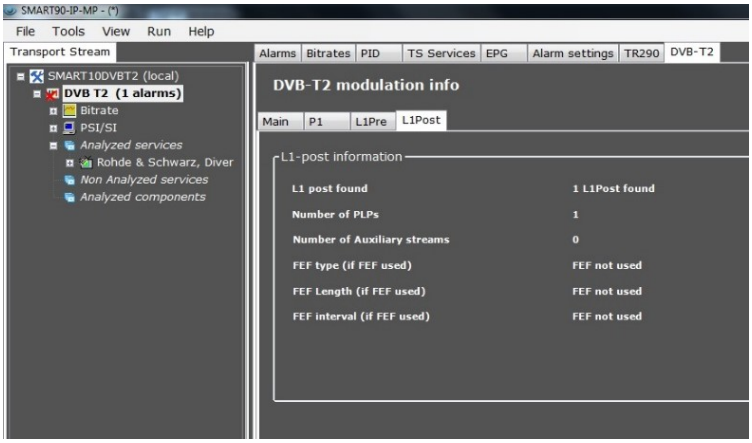
P1



L1 Pre



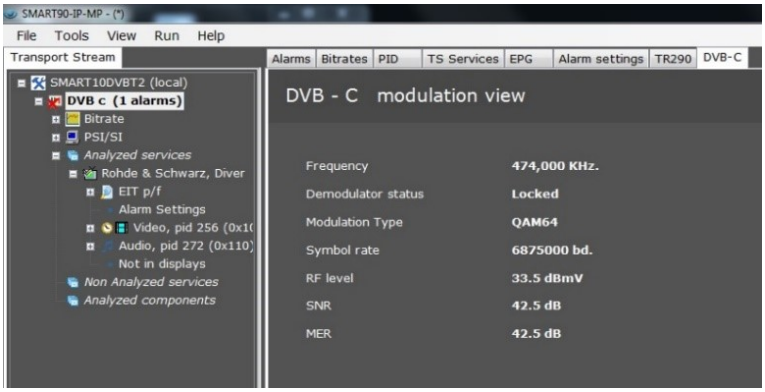
L1 Post



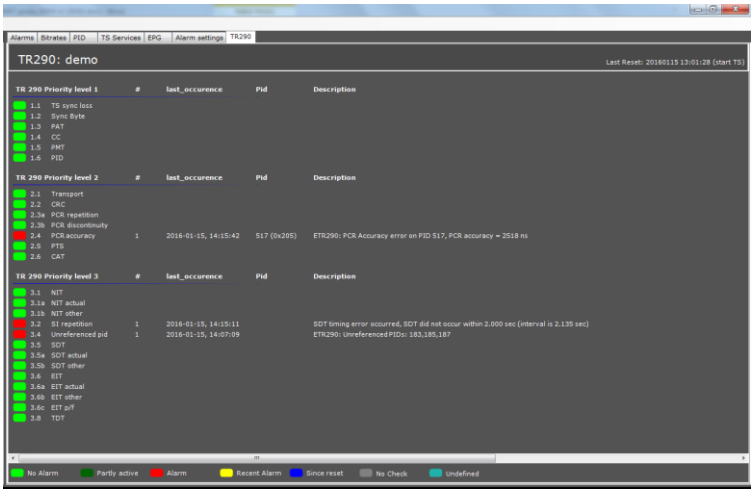
Modulation view DVB-C

At TS node, in case of DVB-C input, an extra view is available, Modulation. This view shows DVB-C modulation specific information.

Main



TR290 view



The meaning of the icons is as follows:

Green: No alarm occurred since last reset of the counters
Red: TR290 alarm condition present
Yellow: Alarm occurred but countered, recently (not more than 10 seconds ago)
Blue: Alarm occurred but countered, since last reset.

The information per line:

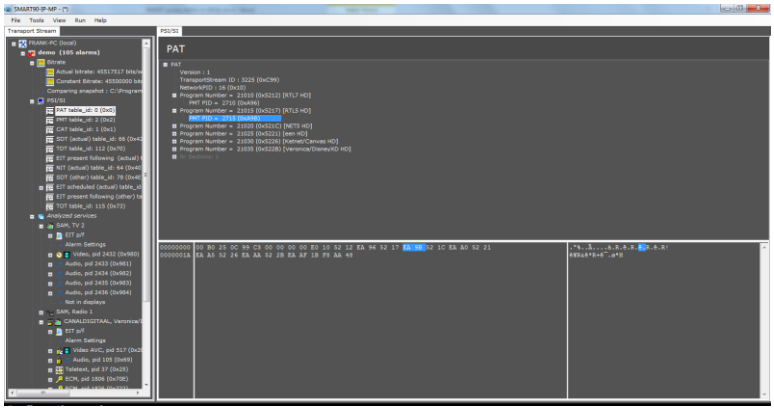
- Number of occurrence since last reset
- Date/time of last occurrence
- Pid of last occurrence
- Description of the error
-

Right click in the view results to get a popup menu like this:

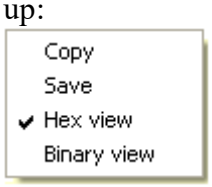
When clicking Reset Counters, the columns #, Last Occurrence and Pid are cleared.

PSI/SI VIEW

In the *PSI/SI* Node of the tree view all the PSI/SI tables nodes are present and the user can select any specific node to see the detailed decode of the table.

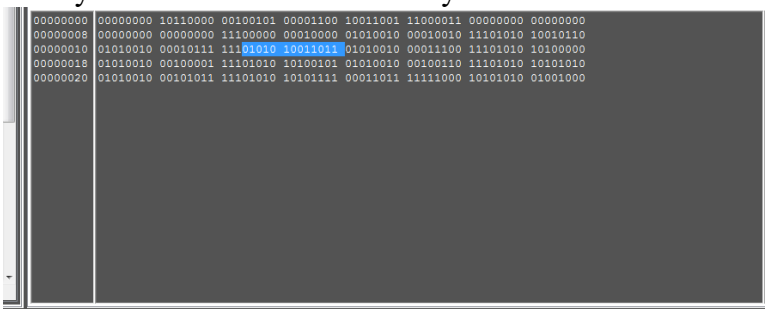


In the hex/binary window, on right click, the following menu pops up:



Hex view or Binary view can be toggled and well as copy to clipboard or save to text.

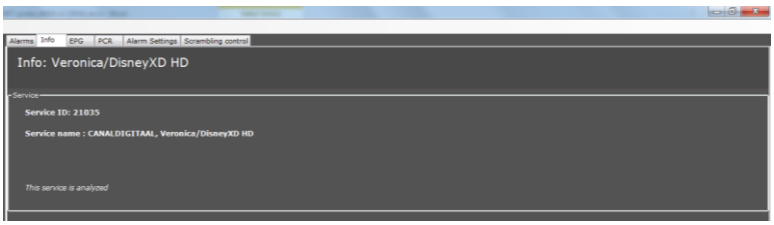
The information about the selected table is shown on the right PSI/SI view. The data view can be either in the HEX view or in the Binary view. The data in the binary view is shown as below:



ANALYZED SERVICE VIEW

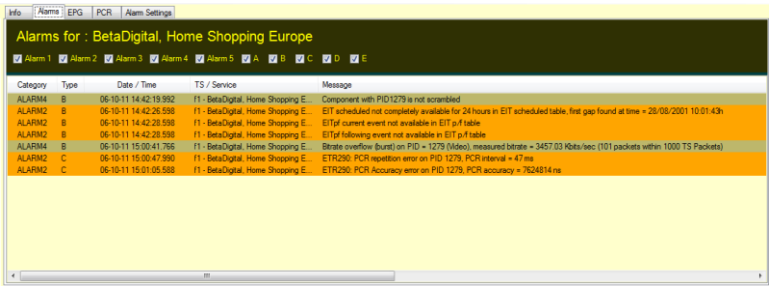
Info

The information about the service like *Service ID* and *Service name* is shown in the tab. It also indicates if the service is selected for analyzing.



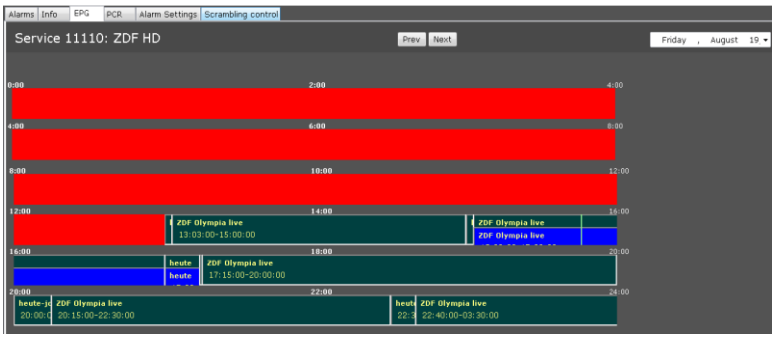
Alarms

List of Alarms for the selected service is shown in the tab. The checkboxes can be used to see only a specific level of alarms.



EPG

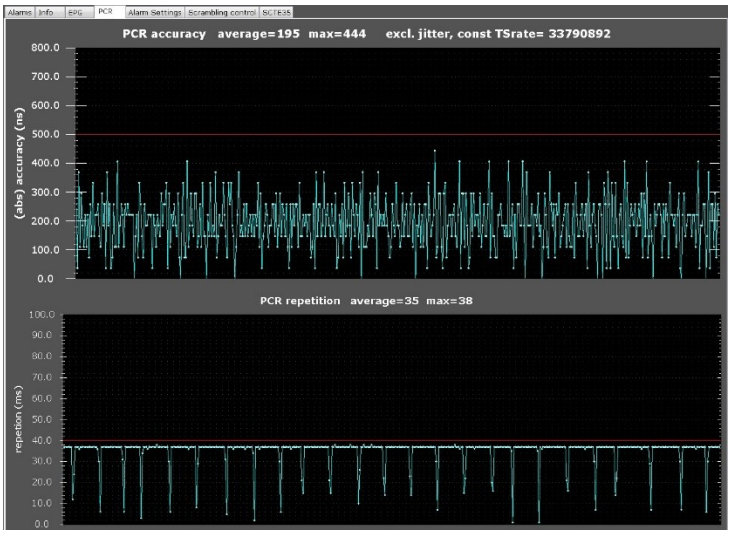
EPG Grid view for the selected service. On the top is the Service UD and the name of the service. The event present in the EPG is shown as per the timing of the event as shown below:



For each event the event name, duration of the event is displayed.

PCR

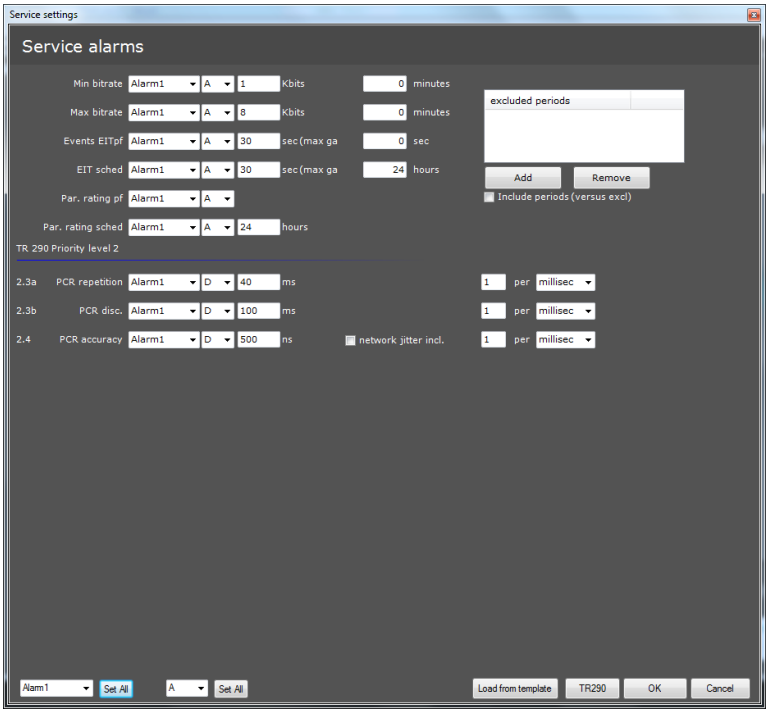
PCR analysis in the graph mode. There are graph analysis present for PCR accuracy and PCR repetition as shown below:



The PCR accuracy average and maximum value is shown for the PCR accuracy graph. In the same way the PCR repetition average and maximum value is shown for the PCR repetition graph.

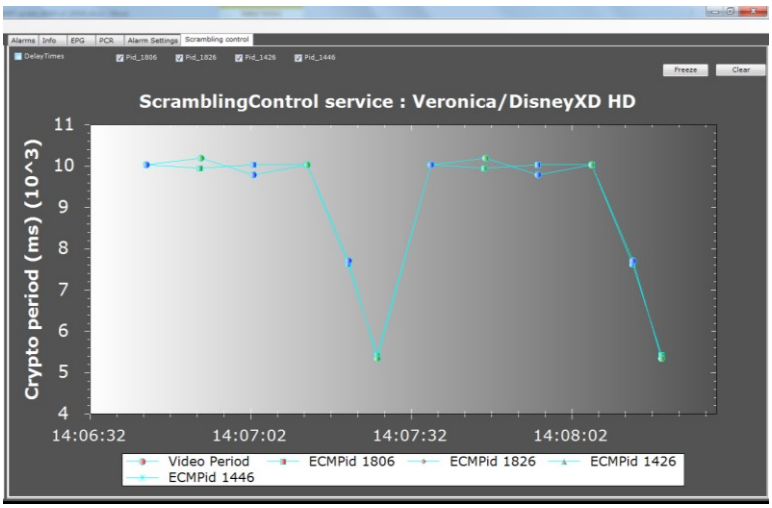
Alarm settings

The measurements settings for the service is shown in the template.



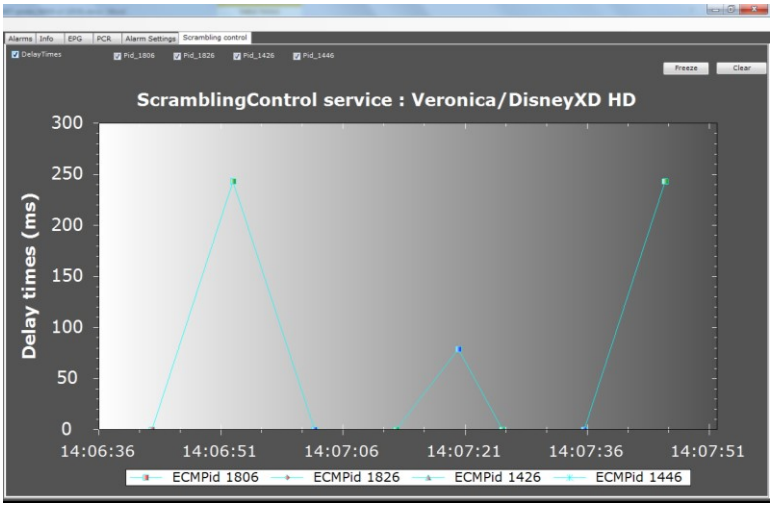
SCRAMBLING CONTROL VIEW

The scrambling control view can be very useful to analyse the crypto period behaviour related to the scrambling control field intervals.



The scrambling control changes (odd/even) are drawn in combination with the crypto period (ECM changes).

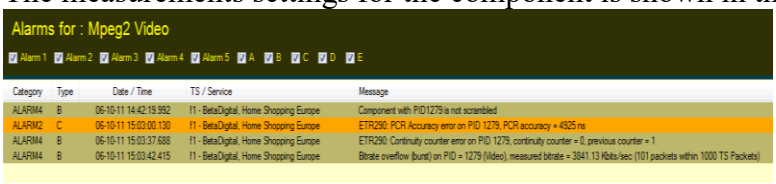
When “DelayTimes” is enabled, the difference (in ms) between these changes is shown.



COMPONENT VIEW

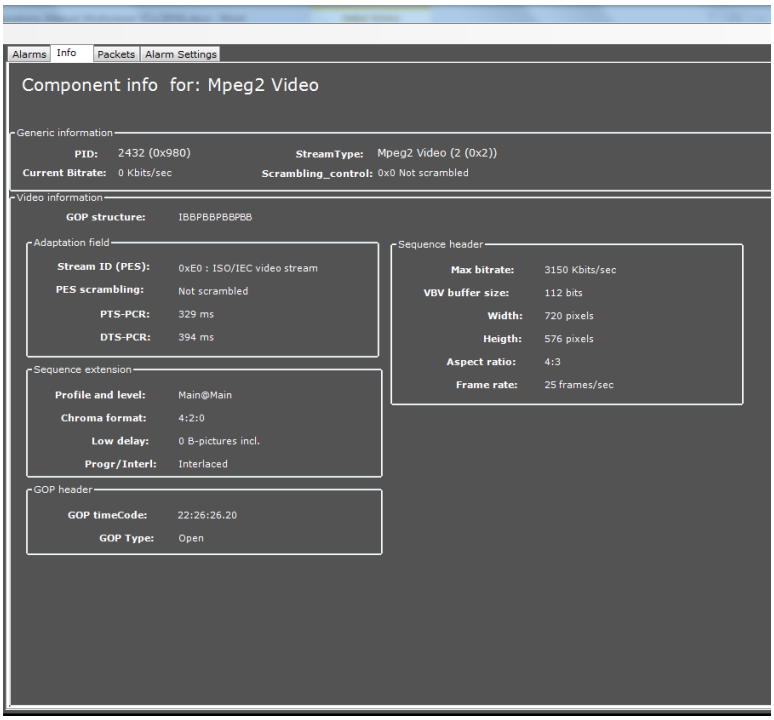
Alarms

The measurements settings for the component is shown in the tab.



Info

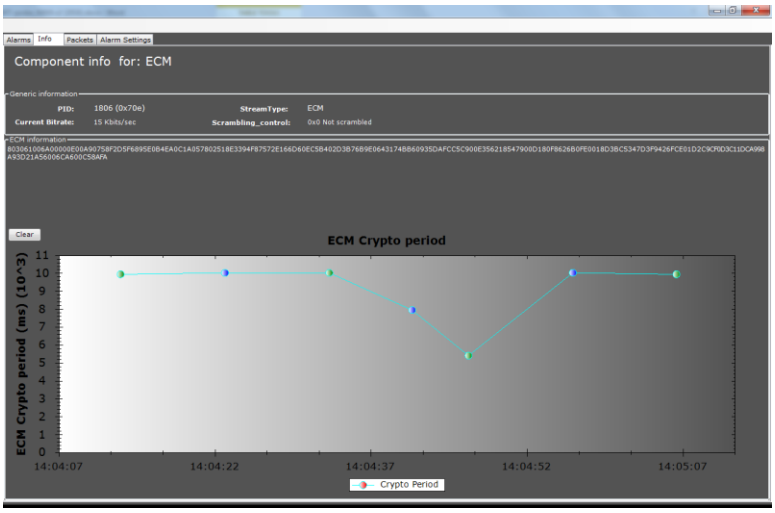
Information about the component like PID, Stream type, bitrate and other information



Note

Note: When parameters are not in the in the stream, or not valid, question marks are shown.

In case of an ECM component, details on the ECM (crypto period) are shown:



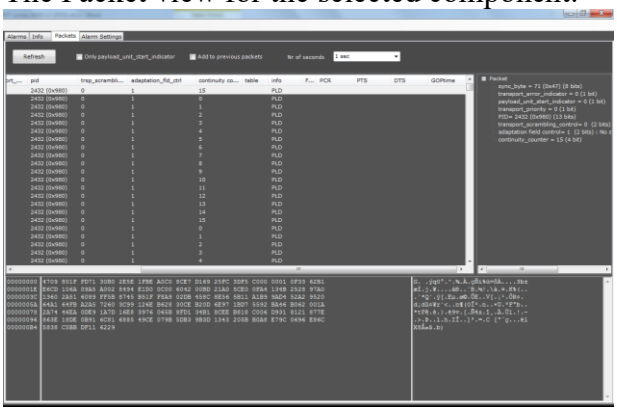
For each component the following information is shown: PID Value, Stream Type, Current bitrate and Scrambling control.

Based on the component type the details of the component will be shown. For example, MPEG2 header information, or MPEG4 specific parameters or audio parameters. When parameters are not in the stream, or not valid, question marks are shown.

In case of an ECM component, details on the ECM (crypto period) are shown

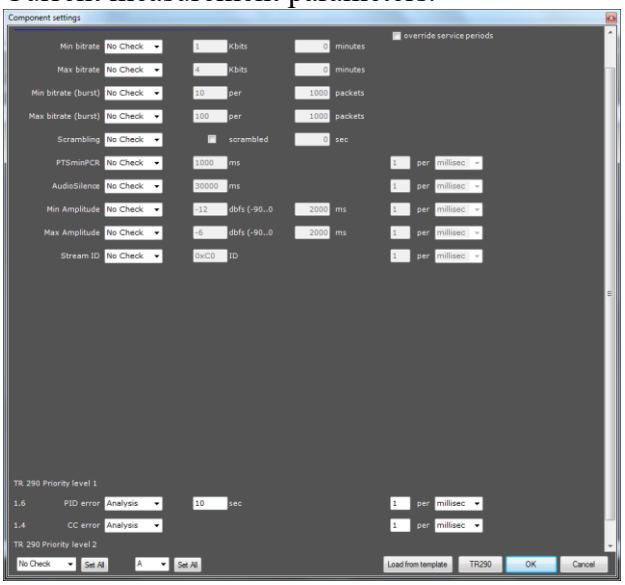
Packets

The Packet view for the selected component.



Alarm settings

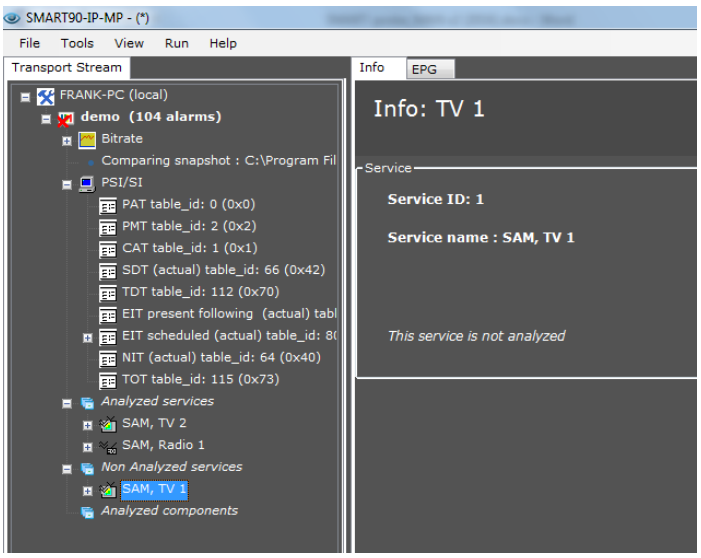
Current measurement parameters.



NON ANALYSED SERVICE

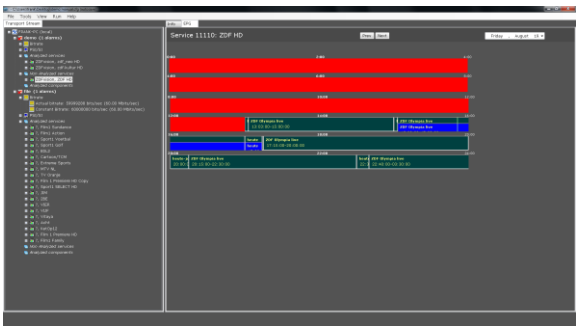
Info

Show the Information about the selected service. Service ID and name are shown for the service. It is also mentioned that the service is not analyzed.



EPG

For the Non Analyzed service the EPG Grid view is possible. So even though the service is not selected for analyzing the events for the service can be seen.

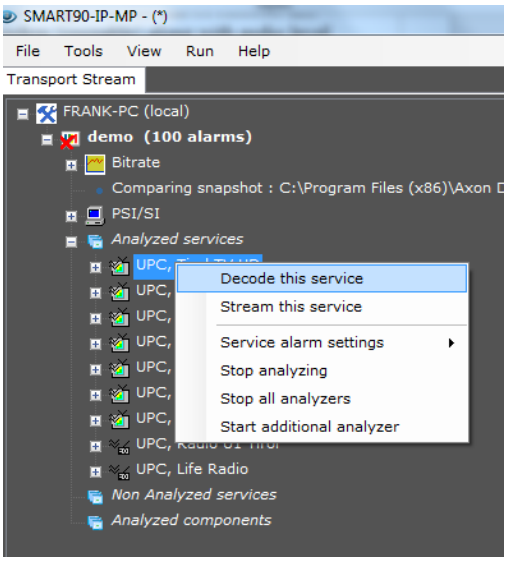


14. Decoding and recording

Single service decode window (show display)

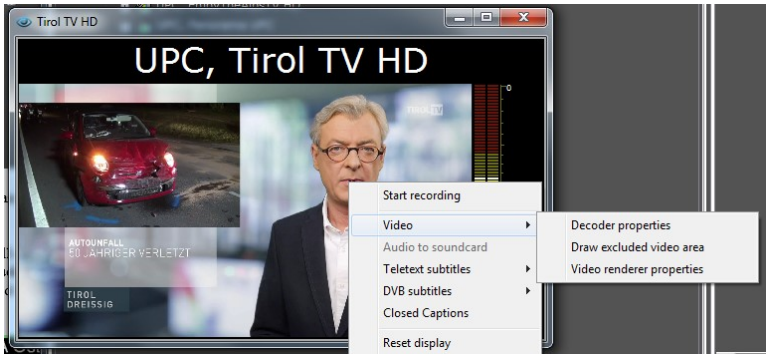
ShowDisplay is the mechanism where a single service can be selected and displayed in a separate undocked window (resizable) along with audio level indicators.

Before the single service can be viewed the service must be selected.
In the analysed services list, right click the desired services and click ‘decode this service’. When the service has been selected for decode in the same panel menu it is also possible to selected the audio track desire (right click service → Audio Selection).



Once selected the display can be opened. From the menu bar click View → Show Display.

A new resizable window will open with the service decode. Information concerning which service/audio is selected can be retrieved from the Show Display when the probe node selected from the tree view or when right clicking on this node.

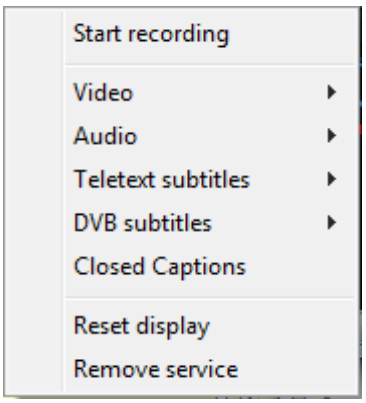


Multi-viewer Decode

(Not supported in Pro version)
A service that needs to be displayed can be added (via Multi-viewer configuration function) to the *monitor* window. An example of (a part of) the Multi-viewer window with the decoding is shown below:

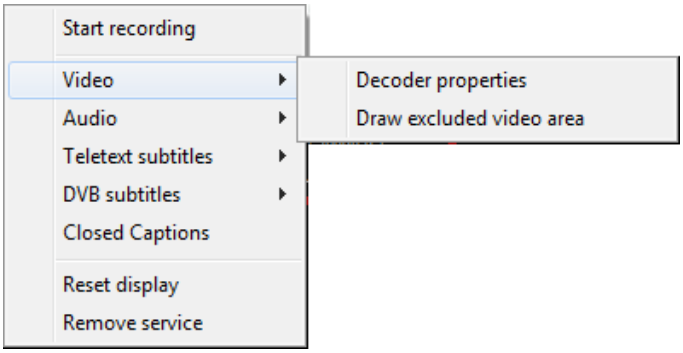
The basic decoding output is divided into several parts: *Preview, Service Name (UMD), Audio Levels, EITpf view and more…*

The user can make the video screen size bigger by changing the resolution for the display. The display resolution can be changed by opening the context (right click) menu on the *monitor* window. The menu is shown below:



`Start recording`: This function creates an mpg file of this service (video and audio), in the in “Tools”-> ”Settings” configured directory. A red bullet indicates the recording function.
Note: The result of this recording function might not be playable in all media players. This is caused by imperfect PCR/timing or other issues caused by the remux.

`Video`: The Video menu shows sub menu:



`Decoder properties`: This functions open the property form of the specific decoder. (this feature is not in all standard View available)

`Draw excluded video area`: This functions draws the configured excluded area (from BF / FF checks) in the picture.

`Audio`: The audio menu shows a sub menu containing the function to open the property form of the specific audio decoder.

`Teletext subtitles`: This function selects a Teletext subtitle component in the service, that is shown in the display afterwards.

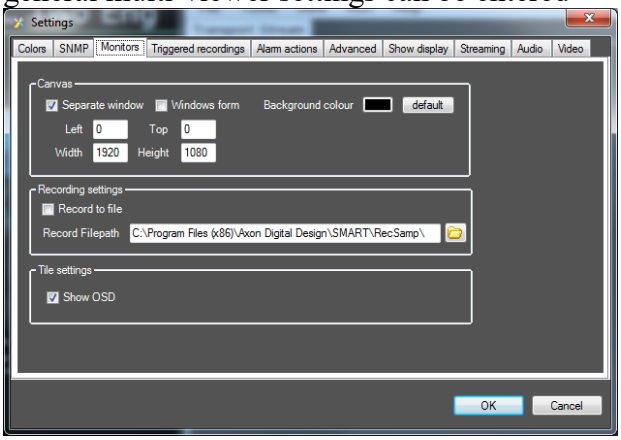
`DVB subtitles`: This function selects a DVB subtitle component in the service, that is shown in the display afterwards.

`Closed Captions:` This function opens a window where the Closed Captions are shown.

`Reset display:` This function clears all buffers in the display graph (demux, decoder, video renderer, etc.). Might be needed to fix some artefacts or blocking issues.

Multi-viewer-General settings

In the Probe GUI, via menu “Tools”->”Settings”->”Monitors”, the general multi-viewer settings can be entered



The layout of the multi-viewer panel is configured here.
The multi-viewer panel can be docked in the Probe UI or separate form.
For example, the multi-viewer panel can be placed on extended monitor, a separate LCD screen. The items in this screen are explained here:

Separate window This checkbox defines whether the multi-viewer panel is placed in an external form or not. If not, it is docked in the (bottom panel) of the Probe UI.

Windows form
This checkbox defines whether the form (if placed externally) contains a title bar, and resizable form.

Background color
Color chooser to select the background color of the multi-viewer panel, default: Black (UI color). *Note: Only visible if no background image is selected in the loaded pre-set.*

Left, Top, Width, Height

In case of separate window, this location and size of this window is defined here. *This can also contain negative values, e.g. for "Left" depending on monitor orientation and setup.*

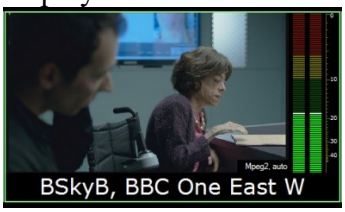
Directory
This textbox defines the directory where the pre-sets (xml files) are stored.
Note: Read-only.

Record to file (option)
This checkbox defines whether the services can be stored to disk or not.
Note: The services are stored in compressed format.

Record File path
This checkbox defines the path where the service samples are stored.

Tile settings (OSD) . (Not supported by Pro)

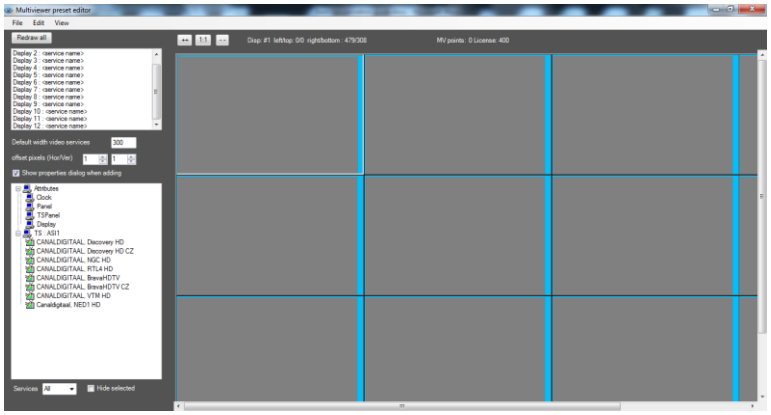
This check box enables the "Show OSD" function.
The On Screen Display shows the Video codec, (Mpeg2/AVC/HEVC) and the Aspect ratio setting (auto/4:3/16:9) Multi-viewer service at the right bottom corner of video Tile displayed at the multi-viewer. (See figure 1)



NOTE:

- This setting is a global setting
- Default the aspect ratio setting is "auto". Changing/forcing the aspect ratio can be done in the Tile Properties.
- The Pro version has own features in Multiviewer Control

Multi-viewer Pre-set configuration



Menu

The pre-set configuration menu consists of the following menu items.

The “File” menu consists of the following submenu items:

Preset->Load
Loads a specific pre-set.

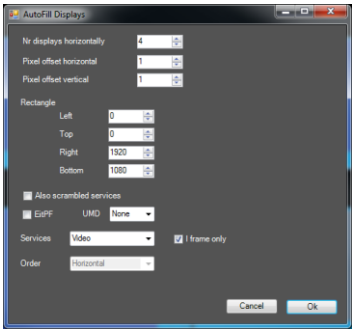
Preset->Save
Saves a specific pre-set.

Save
Sets the currently loaded pre-set to current (DisplaysConfig.xml).

Clear All
This function clears all the used items at the pre-set editor.

Clear Displays
This functions will only clear the used video and audio displays

Auto Fill
This function will create an automatic setup of the multi-viewer.



Nr displays horizontally
The number of horizontal services based on the rectangle setting

Pixel offset horizontal
The number of pixels between the next aligned service

Pixel offset vertical
The number of pixels between the below aligned service

Rectangle
This wind marks the auto align aria. Top left of the screen is 0,0 and the right bottom is 1920,1080. (Only if the screen size is 1920x1080)

Also scrambled service
By default, the scrambled service are/is excluded of the auto fill. By marking the box, the scrambled services are/is included at the auto fill feature.

Eitpf (Not supported by Pro)
Selecting this property, the auto fill option will include the EITp/f option.

UMD
Selecting the UMD box will use this setting to create the auto fill.

Services
This function allows you to do an Audio or Video Tile auto fill

I-frame only (Not supported by Pro see Familiarization documentation)
This selection will switch off the full frame decoding and will display only the I-frames of the video services.

Order
By default, the function will draw the horizontal order. By selecting vertical the drawing order in from the left top to the left bottom. (This function is not active)

Note: Make sure that the 1920x1080 Full HD multi-viewer screen/display has been set to either “screen fit” or “scan” and **not fixed to 16:9**

Edit

The “Edit” menu consists of the following submenu items:

Undo
Rollback to previous edit action.

Add
Adds a multi-viewer entity (display, clock, panel, URL display).

Remove selected item
Removes the currently selected multi-viewer entity.

Pre-set properties
Opens pre-set properties form.

View

The “View” menu consists of the following submenu items:

Refresh
Redraw of the preview panel.

Zoom in (++)
Zoom function, to see more detail.

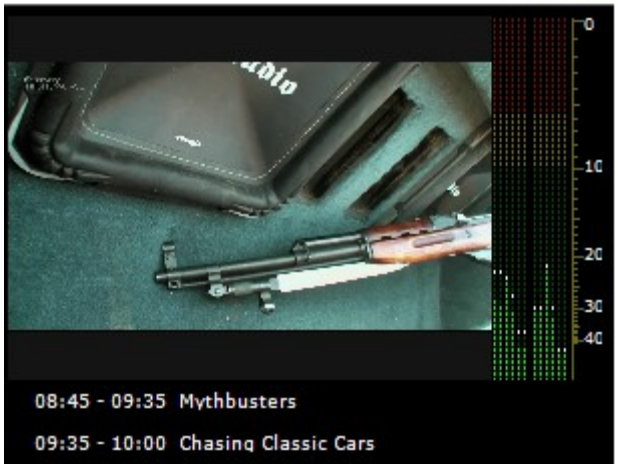
Zoom out (--)
Zoom function, to create higher level view

Multi-viewer entities

The following entity types can be instantiated in the multi-viewer:

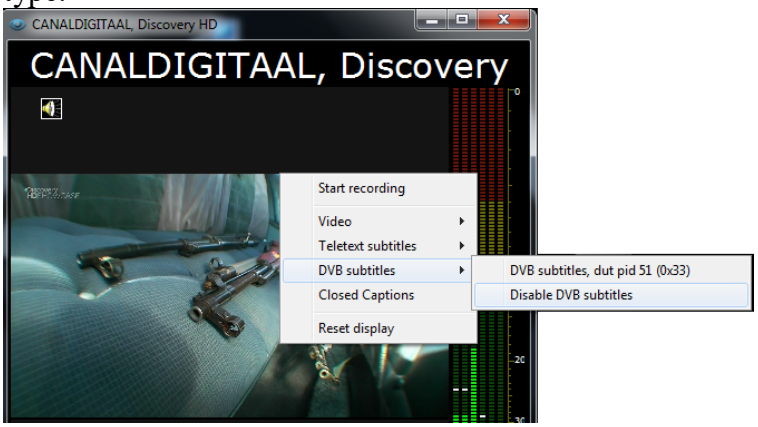
- Display (presentation of video or audio service)
- Clock (analog or digital clock)
- Panel (allows definition of static text blocks)
- TS (Panel presenting the status of a transport stream by means of alarm color)

For example we will explain the instantiation of some displays. An example display is shown below (Not supported by Pro)



As seen in the picture above, the EIT p/f is visible in the display.

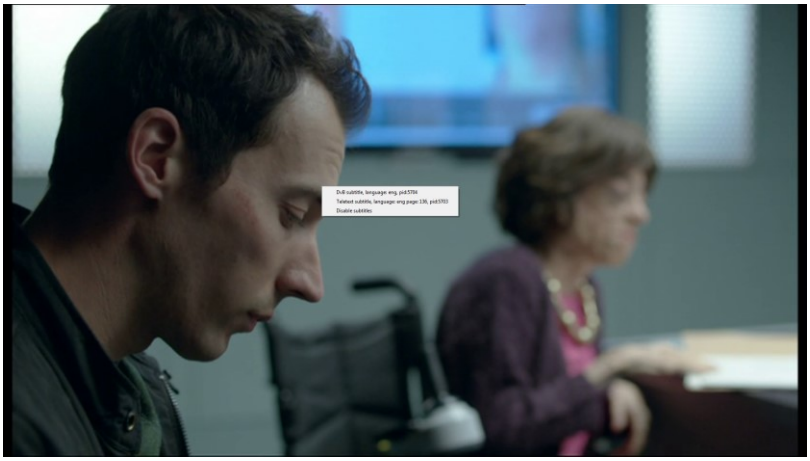
Below is shown how to decode either Teletext Subtitles, DVB Subtitles by right clicking the display and choosing either subtitling type.

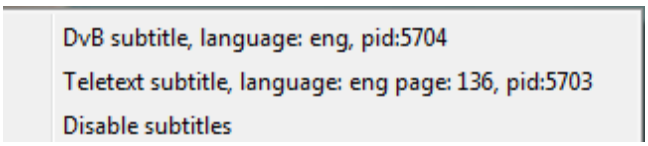


Full Size Service popup
Only in Pro

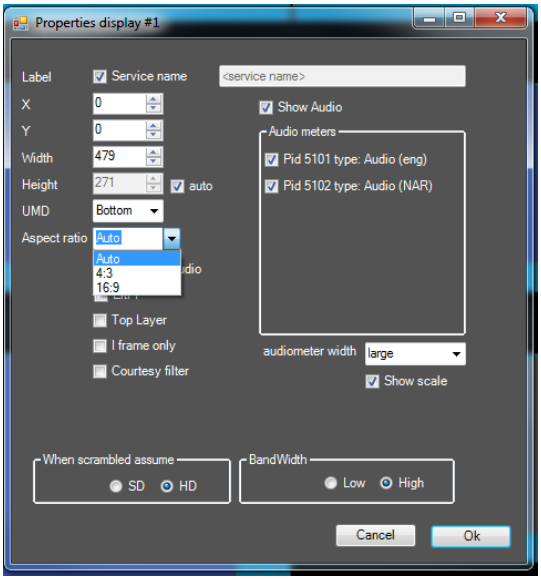
By double left mouse click at multi-viewer tile, video part a full size picture will popup.
This full size video is a “clean feed” of the source.
No UMD ore Audio are available. By double clicking or using the Escape button the Multi-viewer will be active again.

The full size window will allow you to show the real time behaviour of the DVB and Text Subtitling. Also to display TXT Service with user selectable page numbers.





Display Settings



Label Text visible in the UMD (Under Monitor Display) of the display. In case checkbox “Service name” is checked, the service name is automatically filled in.

X, Y, Width, Height
Location and size of the display within the multi-viewer panel.

UMD
Indication if and where the UMD is placed on the display (No UMD, UMD on top, UMD bottom). (see Familiarization documentation for Pro version)

Aspect Ratio
Default this setting is “auto”. To force the picture in a specific ratio you can use this setting. The picture will be fixed displayed in the selected Video window.

The auto recognizing of the format is according to information in the mpeg header. In case of MPEG2, the aspect ratio is read.
In case of MPEG4, the signals resolution and Sample Aspect Ratio (SAR) is read.

Audio (horizontal)
Audio only display, draw the VU meter horizontal.

EITpf
Indication whether EITpf info is shown. (Not supported by Pro)

Top Layer
Indication whether the display is drawn on top or not.

I-Frame Only
Only shows I-Frames, decreases CPU usages. (see Familiarization documentation for Pro version)

Courtesy filter
Used to block the display when inappropriate content is displayed. (Not supported by Pro)

Show Audio
By selecting this check box the audio meters (bars) will be viewed according the number of selected audio pids. The SMART can have up to 5 audio bars displayed) (see Familiarization documentation for Pro version)

Audio meter
To select the audio PIDs according to the video tile. (see Familiarization documentation for Pro version)

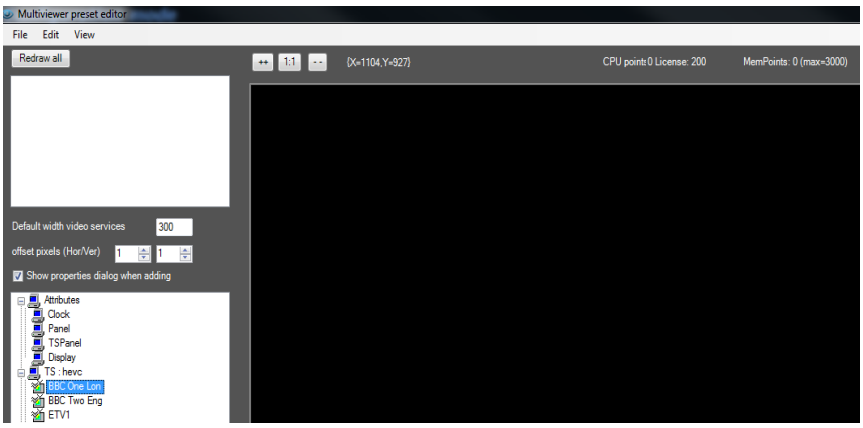
Audio meter width
SMART can have different sizes of audio bars
(see Familiarization documentation for Pro version)

Show scale
This option allows to switch off the scale of the audio bar.

When scrambled assume (SD/HD)
When displaying a Scrambled Service at the Multi-viewer select the actual and real resolution. This switch is used to protect the system and allows you to use the realistic point counts. By default, an unrecognized service is defined as HD, the highest point count.

Bandwidth (Low/High)
This option allows you to adjust the actual used bandwidth and is just to protect the system against memory and CPU overload.
By default the High selection is set.
Low can be set when using Mpeg2/H264/AVC/Mpeg4 part 10/H265/Hevc is < 7 Mbps video bandwidth.

Adding manual "Display"



Default width video services
The value behind this text will "300" indicates the horizontal pixel width of the drawn video tile.

Offset pixels (Hor/Ver)
The values behind this text will indicate the automatic number of pixels between the existing window at the right hand site or below the added window (video tile).

Automatic stitching means that hoovering the mouse over the existing video tile and drop the new video tile on the right hand site or below the existing tile. By hoovering the mouse above the existing tile you will copy the settings from that tile.
Dropping the new tile within an area of 5 pixels the automatic connection will be activated.

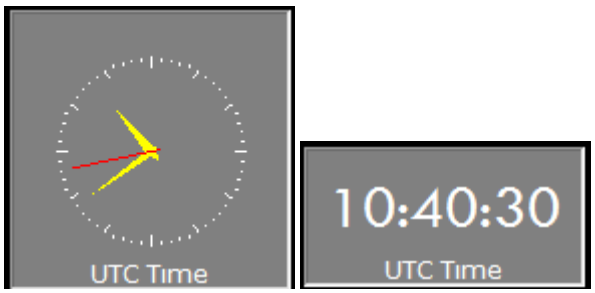
To switch off the automatic connection temporary you can use the "CTRL" button when dropping the Tile.

Show properties when adding
This function is by default selected. Unselected the properties menu will be suppressed.
This function can be used when you have the same properties settings while copying hoovering over the existing tiles.

Multi-viewer entities (attributes)

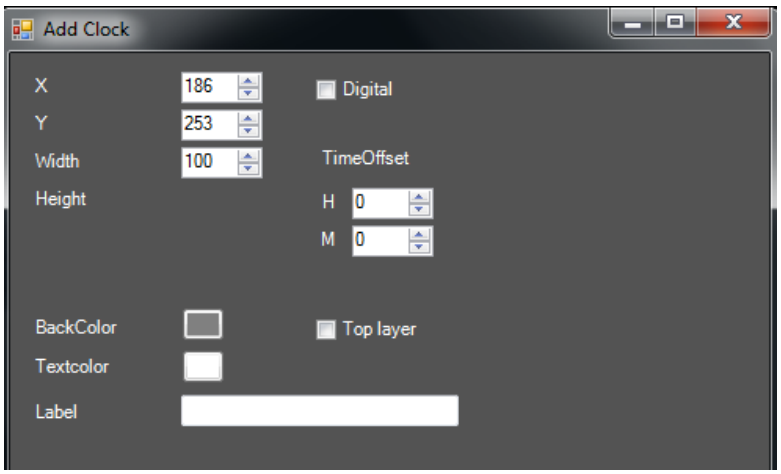
Adding a clock

A clock can be configured as 'analogue' or 'digital'. The examples are shown below:



Clock settings

The picture shows the settings of a clock



X, Y. Width, Height
Location and size of the clock within the multiviewer panel.

Digital
Indication whether a digital or analogue clock is drawn.

Time Offset H, M
Hour and minutes offset, of the clock related to the system time (probe system clock).

Back Color
Background color of the clock

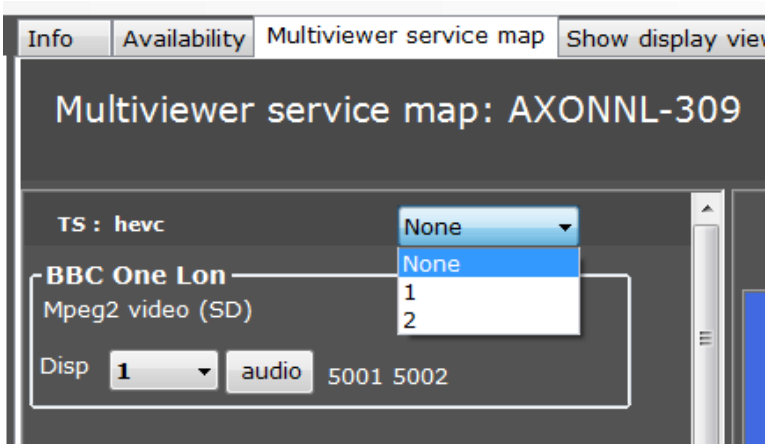
Top Layer
Indication whether the clock is drawn on top or not.

Text Color
Color of the text label.

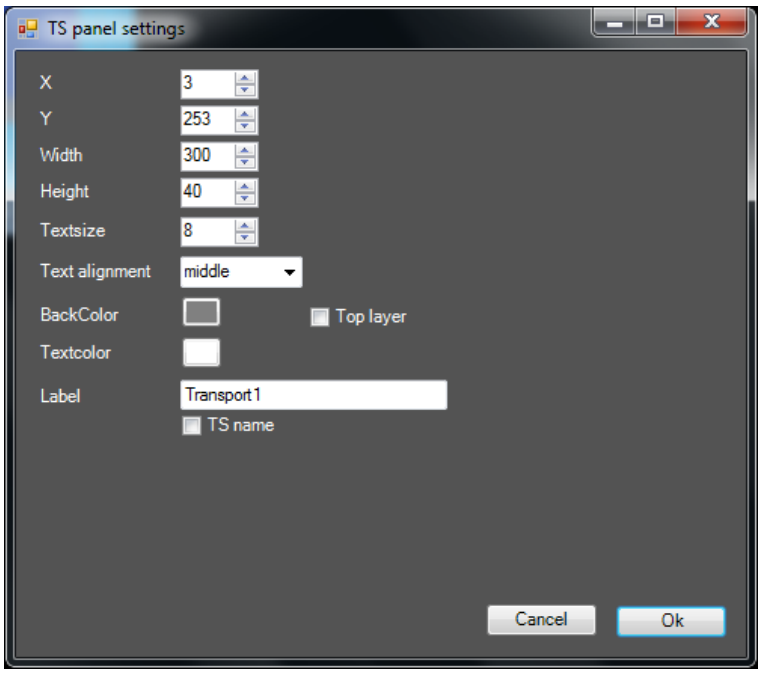
Label
Text visible in the clock

Transport Panel (TS)

A Transport Panel is a dynamic panel, which can be linked to a Transport stream. The panel color is dependent on the alarm state of the linked transport stream. The color follows the alarm configuration in the Probe options. The transport to be monitored must be mapped to the panel.



Transport Panel (TS) Settings



X, Y Width, Height
Location and size of the panel within the multi-viewer panel.

Textsize
Sets the size of the font used in the label.

Text alignment
Indication how the text label must be aligned (top, top left, top right, middle, etc…).

BackColor
Background color of the panel (default state; this will color overridden by alarm states when present)

Top Layer
Indication whether the panel is drawn on top or not.

TextColor
Color of the text label.

Label
Text in label is displayed in the panel of the multiviewer. Standard this the TS name of the stream.

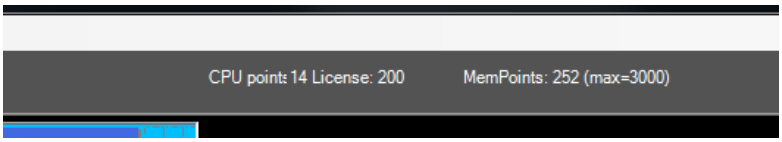
TS name
Using this option, you are overwriting the automatic entered TS name with a user defined name.

Display CPU and Mem points

Note

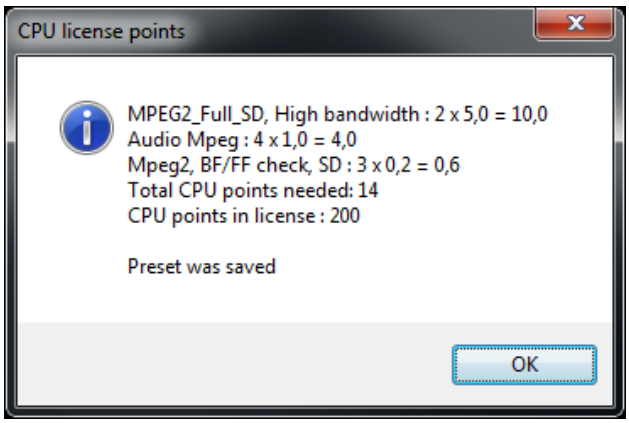
NOTE: CPU and Memory points are not part of a commercial package. Only the hardware is leading for the total of points.

The points are used to protect the system against overload.



At the top of the Multi-viewer Pre-set Editor, you will find a point count of the CPU and Memory used by the Multi-viewer.
The license value is the maximum number what the user can use. Each type of decoding has his own value. The values will be automatic counted. If the user is over the CPU and or Mem point, the value will be red.

If the value is higher than the maximum, the Multi-viewer template cannot be saved.
In the communication window after saving you can see the calculation and the message of the pre-set is saved or not.

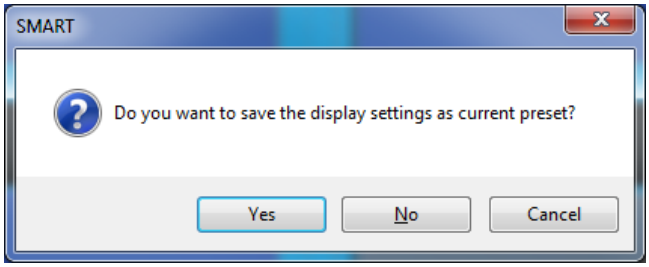


Note

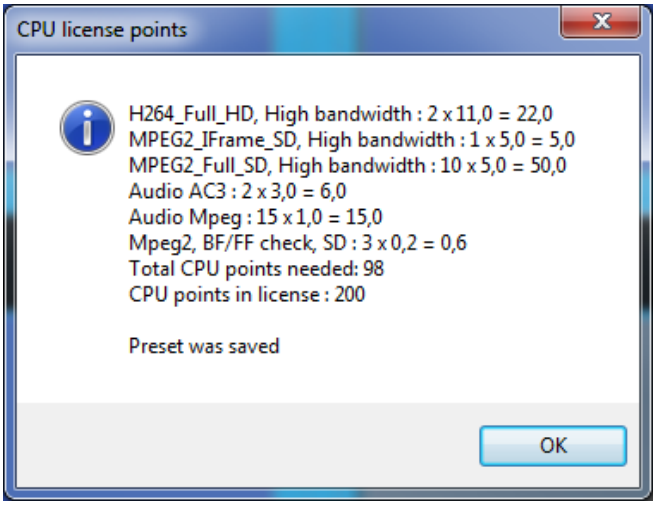
Note: An overview of the weighed point count and Memory size is available in the Performance documentation.

Closing down the Multi-viewer Preset editor

Closing down the Multi-viewer Pre-set editor by left mouse clicking at the top right red cross. This will generate a pop-up window.



Press “Yes” to save or “No” to go back without changing the Multi-viewer
If Yes



The window shows the calculation of used CPU and Memory points. Most important is the message that the “Pre-set was saved” press OK to proceed.

Service Mapping

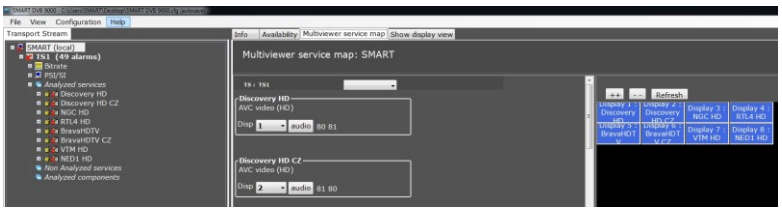
Note

Note:

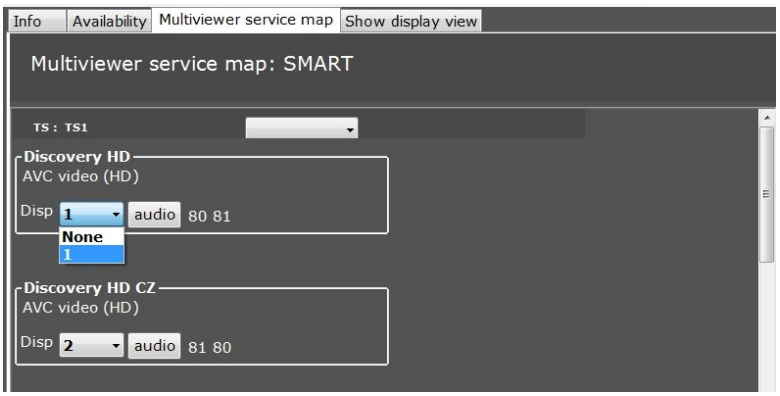
1. If you have used the “Display” option to create a multi-viewer in the multi-viewer config editor you have to map the services to the panels.
2. If you have used the drag and drop feature from the direct service you can skip the next part about service mapping.

After we created the Multi-viewer we will have to map services to the created displays.
For this click on the server name (in our example below SMART server).
On the right page choose the tab “Multi-viewer Service Map”

Here the created configuration shall be displayed.



To map a service to a display, choose the display you want to use for this specific service.
When finished press “save”. The chosen services will be visible on the screen.



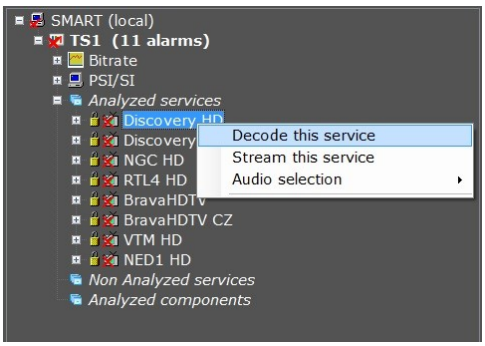
On this screen, you can also load a specific alarm template for the Transport stream. When adding a transport stream panel to the multi-viewer it will show the alarms as configured in the alarm

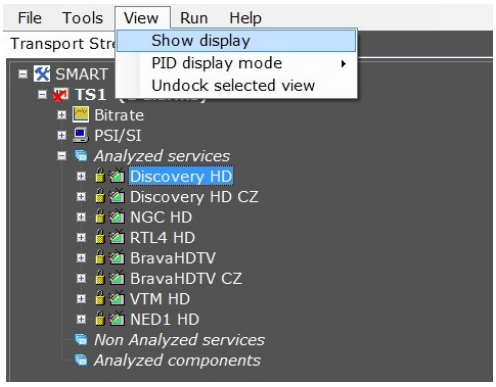
template.

Show Display selecting

ShowDisplay is the mechanism where a single service can selected and displayed in a separate undocked window (resizable) along with audio level indicators.

The selection mechanism can be accessed from the tree view (right click on the service, available in probe and ACC) (Pro only)

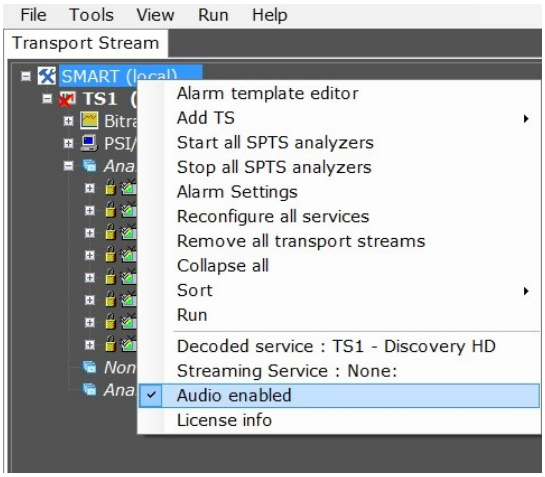




Note

Note:
Show display is feature is not supported in de Gateway ACC.

Audio on/off is switched globally on Probe level by right clicking on the Probe name at the top of the tree.



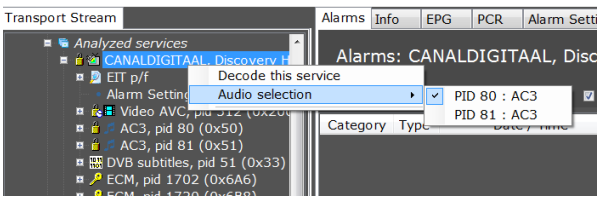
Information concerning which service/audio is selected can be retrieved from the Show Display when the probe node selected from the tree view or when right clicking on this node.

Multichannel audio

Note

Note: In principle, multichannel audio is down mixed to stereo, which is fed to the multi-viewer and audio level detection mechanism.

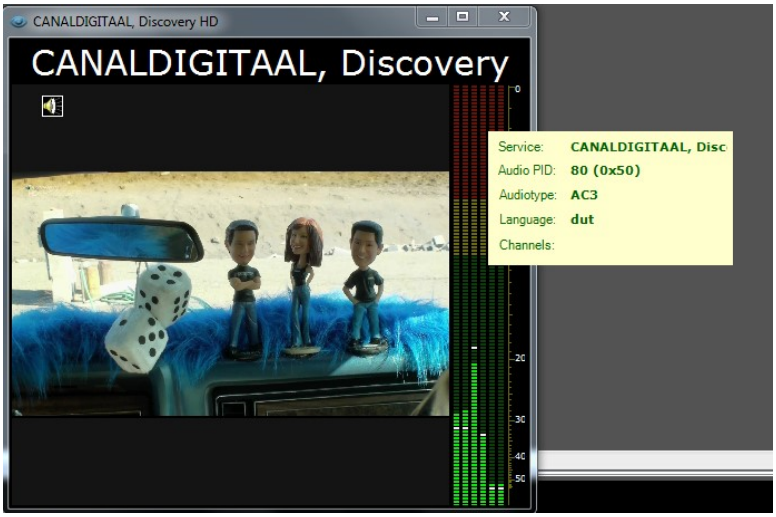
When the individual multichannel channels need to be checked and decoded an additional action is required.



Right click the decoded service and select “Audio selection”. Her you can choose what PID should be monitored. In this example we choose to monitor the AC3 PID

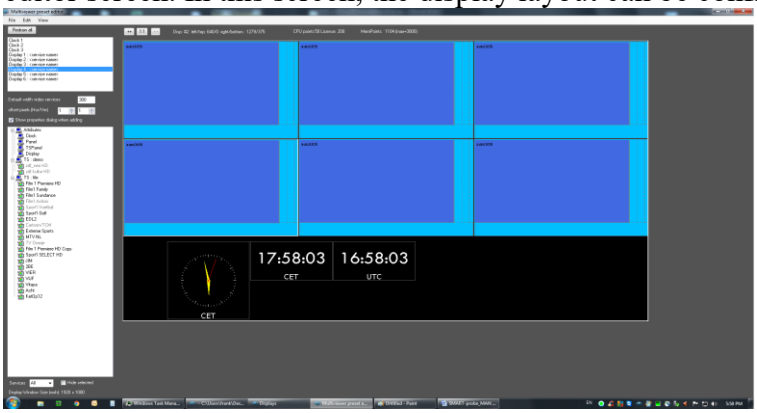
Once chosen, right click on the decoded display VU bars

Now the AC3 details will be shown on the screen.



Multi-viewer Configuration

The picture on the following page shows the Multi-viewer present editor screen. In this screen, the display layout can be configured.



The multi viewer layout is composed by drag and drop components of the following type:

- Display, size, location and display properties can be configured
- Panel: size, location and label can be configured
- TS panel: size, location and label can be configured
- Clock: size, location, time, time offset and label can be configured

Display pre-sets can be loaded and stored. The current pre-set can be selected.

Multi-viewer example

The picture below shows an example of a multi viewer setup in the probe Multi-viewer display.

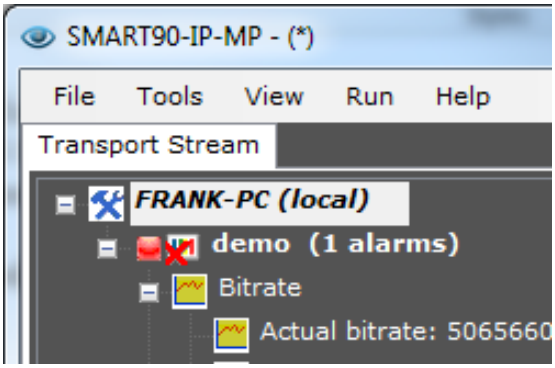
Above Lite multi-viewer and below the Pro version

Recording TS

The probe provides functionality for recording the TS. Using this functionality incoming TS can be saved to a TS file on disk.
The functionality is accessible from the context menu on the Transport stream window.
Note: When recording is engaged, measurements and alarming will be suppressed!

Clicking on the Record TS command and selecting the file name for the recorded file the recording starts.

TS recording will be indicated by a RED Probe name on top of the tree view as well as a red Icon in front of the TS that is recorded.



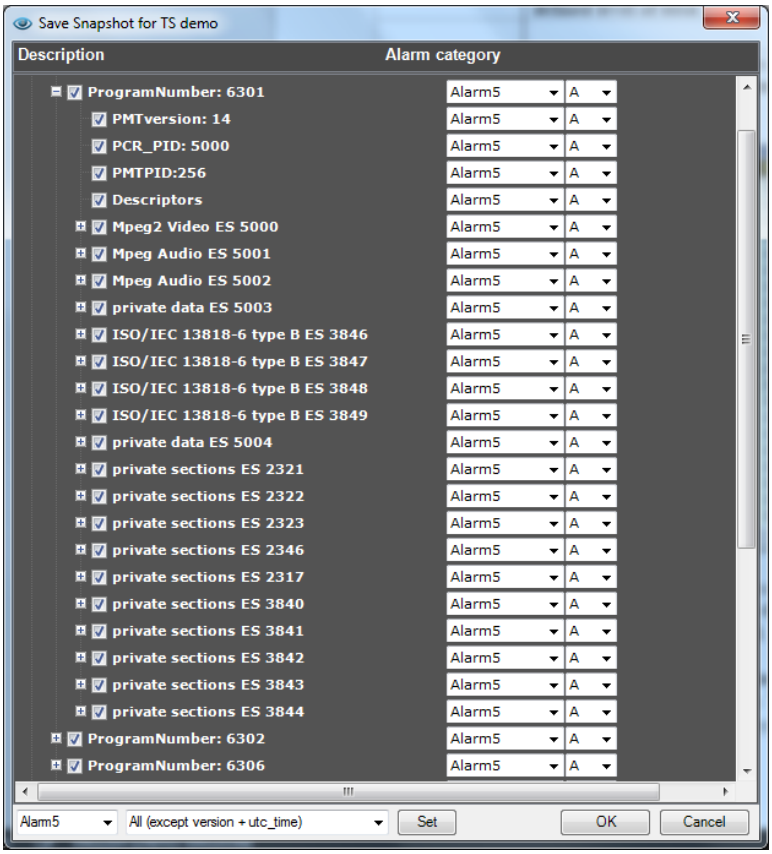
To stop the recording right click the TS > Recording > Stop recording

15. Snapshot functionality

Snapshot is very powerful functionality in the probe. Once the system is configured and working correctly the user can save the configuration to a snapshot file. Later on, the configuration can be checked with the saved snapshot files. If the existing information differs from the snapshot file then the system will generate a defined level of error.

Save snapshot

To save the snapshot the user can select the transport stream and click on the Save Snapshot menu from the context menu. When 'Save Snapshot' is selected, the following screen is shown:



In the screen, the user can see all the tables present in the Transport stream. Before saving the configuration into the snapshot file (.snp) the user can select the information need to be saved.

The values of specific table items or descriptors are shown, which cannot be changed in the user interface. These are the values that

are checked against the active table/descriptor values in the transport stream to be analyzed.

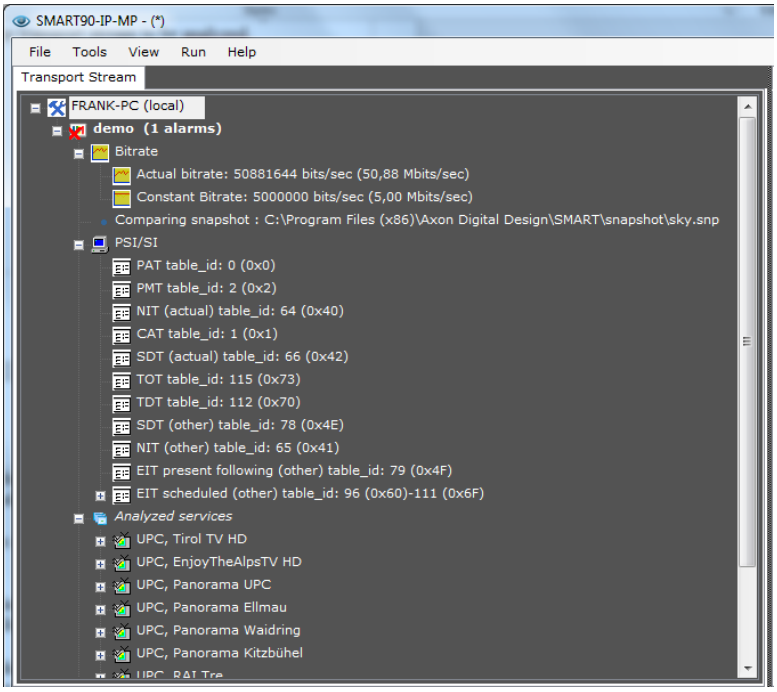
Compare snapshot

The Compare Snapshot menu on the context menu lets the user compare the configuration with the saved snapshot file.

The user can select the Check Box in front of the Check Snapshot node to start compare snapshot.

After this an Open snapshot file dialog box appears which allows the user to select the Snapshot file from the saved files.

The transport stream view will indicate that the probe is comparing the stream with the snapshot from the selected snapshot file. The Comparison can be stopped by deselecting the Check box before the Check Snapshot.

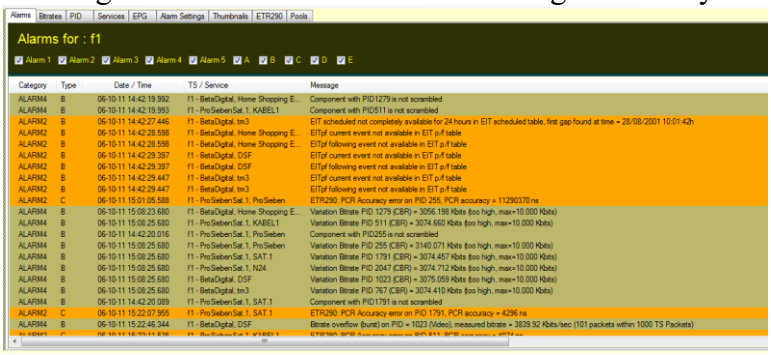


The result of the Snapshot comparison is shown via raising an alarm of the specified category.

16. Alarms

Current alarms

The Log window shows the list of Alarms generated by the system.



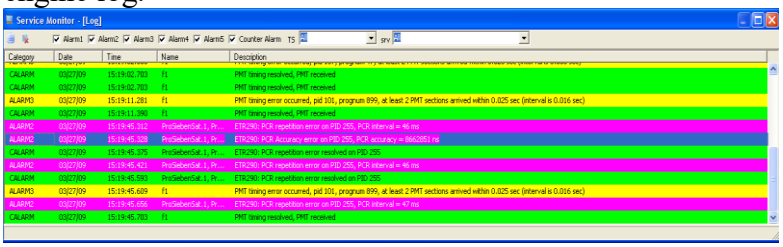
The Log is displayed as per settings defined in the settings. The information shown is Date, Time, and Name of the TS which is in alarm state and the description of the alarm text.
The different category of alarms shown are :

- Alarm1
- Alarm2
- Alarm3
- Alarm4
- Alarm5
- Counter Alarm (not visible in current alarm view)

The checkboxes on the top define the Alarms which are shown in the Log window. Un checking the Alarm4 implies that all alarms of Alarm4 level is not shown in the log window. The type A – E can also be selected in the view.

Engine log

In de engine log, all alarm triggers are visible, including counter alarms. Right-clicking on the systray icon->Logging opens the engine log.



The Log is displayed as per settings defined in the settings. The information shown is Date, Time, and Name of the TS which is in alarm state and the description of the alarm text.
The different category of alarms shown are :

- Alarm1
- Alarm2
- Alarm3
- Alarm4
- Alarm5
- Counter Alarm

The logging items can be cleared, to create a clear view without removing them from the database. The view can show all items of this probe, or a subset, per TS or per service.

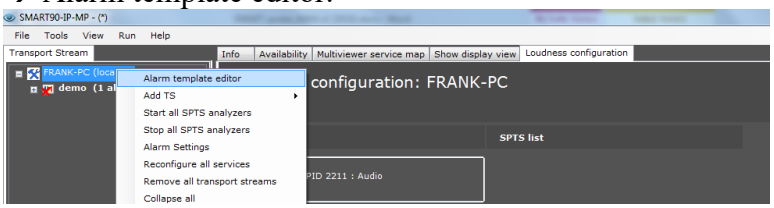
The checkboxes on the top define the Alarms which are shown in the Log window. Un checking the Alarm4 implies that all alarms of Alarm4 level is not shown in the log window.

Creating and editing alarm templates

Alarm templates (configuration templates) can be created and edited using a configuration dialog named “alarm template editor” retrievable in the tree view probe node, right click the server name and choose the “Alarm template editor” (only in configuration mode)

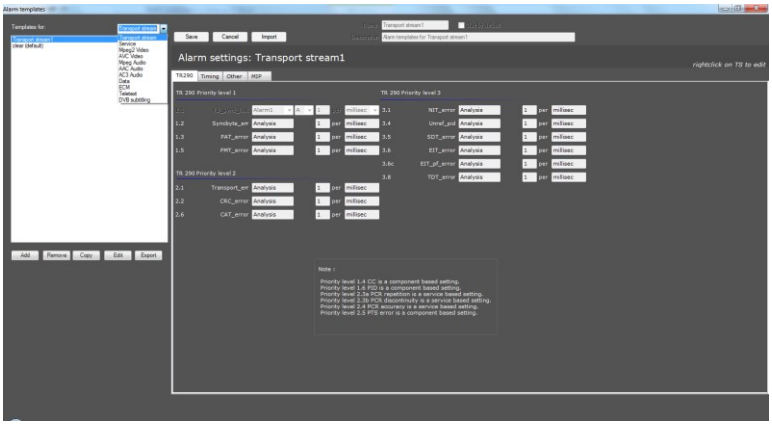
These Templates can be selected and assigned when adding a stream or when moving services from non-analysed to analysed.

To access the template editor, right click the top of the probe tree → Alarm template editor.



The template editor window is opened. To start creating a template select the stream type from the dropdown ‘type’ box. Click add to create a template.

The alarms trigger levels can be defined in the right hand editor box.
Once the alarm has been tailored click, save to store the template.



`Template type dropdown list:` Specifies the alarm level type for creation

`Add:` Creates a template for editing based on the type selected in 'template type'

`Remove:` Removes the highlighted template

`Copy:` Duplicates the currently highlighted template. This provides the ability to further adjust a template while keeping an original

`Edit:` Opens the selected template for editing (used to edited previously 'saved' templates'

`Export:` Export templates to XML, allowing them to be imported into other Probe units

`Save:` Saves the current template open in the editor.

`Cancel:` Cancels current operation and closes window.

`Import:` Allows import of alarm templates from other units.
Note: Alarm setting exports from release 3.6.14 can be imported in the template editor.

`Name:` Allows user to define a name for the template in editor.

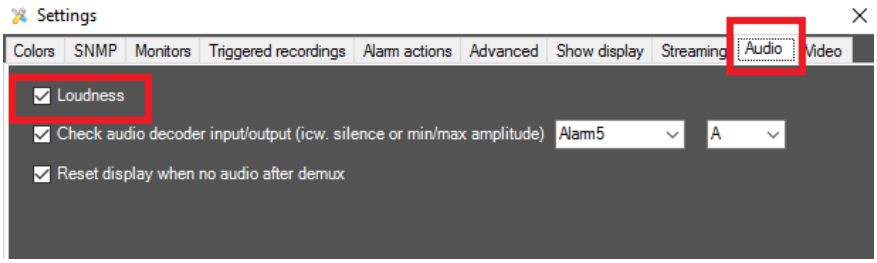
`Description:` Description field for template in editor.

17. Loudness monitoring

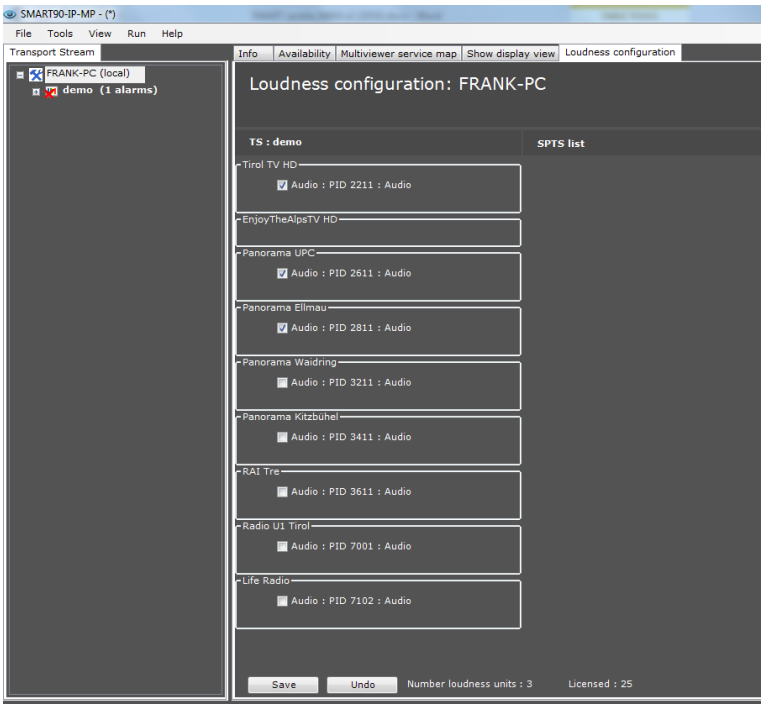
For loudness monitoring to be enabled, the probe must be licensed for loudness monitoring.

Enable loudness monitoring
(Pro only)

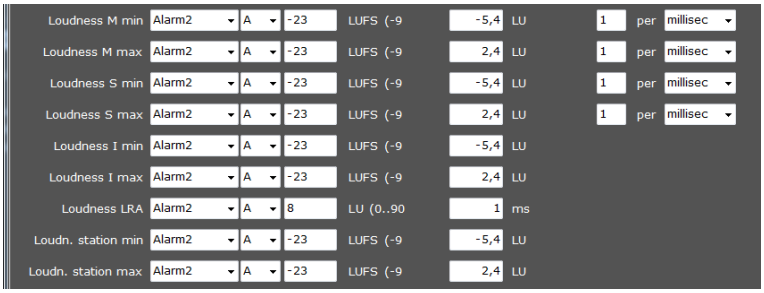
To enable loudness monitoring feature, navigate Tools → Settings → Audio Tab. Check the 'loudness' check box.



To then specific which audios will be routed for loudness analysis, highlight the top of the probe tree and select the 'Loudness Configuration tab. Tick check box of audio PIDs in which loudness monitoring is required.



The audio component must have Alarms enabled for monitoring on the specific loudness measure desired. These are configured within the component alarm settings.



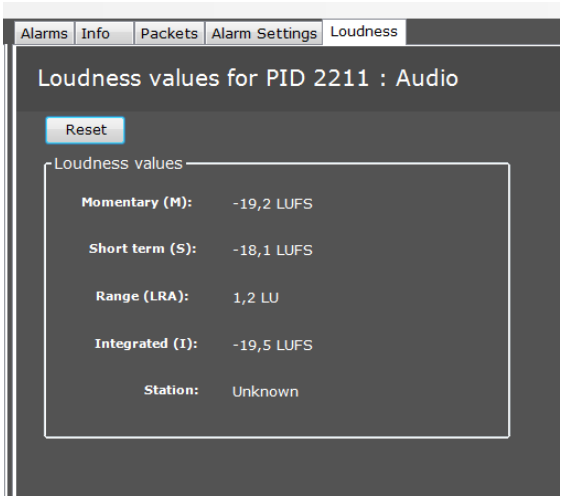
Alarms will be generated when the measurement meets the configured values. An additional tolerance can be added to the LUFS level (LU); behind this an alarm is raised.

Measurement	Setting
Loudness M min	Minimum Momentary Loudness
Loudness M max	Maximum Momentary Loudness
Loudness S min	Minimum short term Loudness
Loudness S max	Maximum Short term Loudness
Loudness l min	Minimum Integrated Loudness
Loudness l max	Maximum Integrated Loudness
Loudness LRA	Loudness Range
Loudn. Station min	Minimum Station/Service loudness over 24 hour period
Loudn. station max	Maximum Station/Service loudness over 24 hour period

LUFS – Loudness units relative to Full Scale
Measurements are in accordance with ITU-R BS.1770-2, EBU R 128 & EBU-R 3344.

Operational levels

When loudness alarms have been configured, the component ‘loudness’ tab will display the actively measured values.



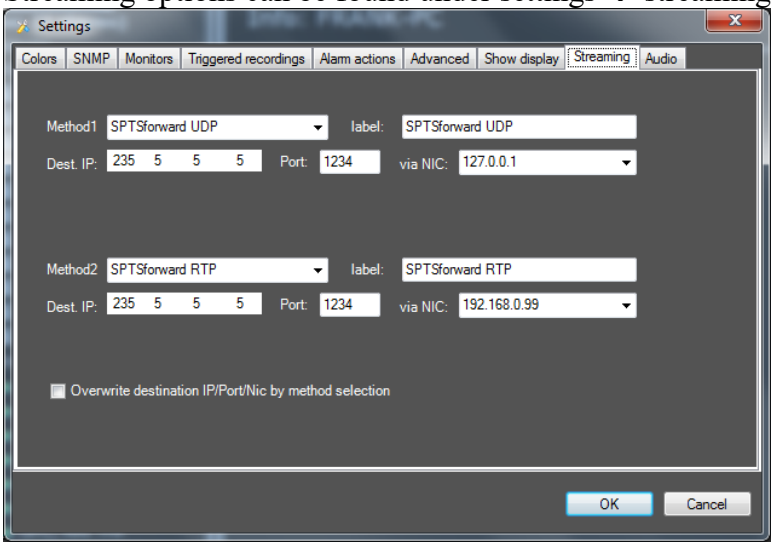
*Momentary and Short-term loudness alarm hysteresis start time can be configured by pressing “Reset” button.
* Station or Service loudness will not be know until 24 hours of monitoring.

18. SPTS Streaming

To enable streaming the probe must be licensed for streaming and the streaming service must be installed and running. Consult your distributor for more information.

Streaming configuration
Pro only

Streaming options can be found under settings → streaming tab.



Two methods can be stored (selection prompted when setting a service to stream).

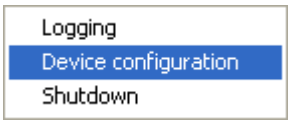
The following details will need to be entered:

- Method – select the protocol of the stream
- Label – Label of the streaming method
- Dest. IP – Destination IP address
- Port – Destination IP port
- via NIC – Destination NIC port.

When completed, click OK and toggle the probe into run mode. Right click the desired service to be streamed and select ‘Stream Service’. A dialogue box appears prompting the desired method. After selecting, the service will now be routed to the Streamer Service.

19. System tray icon

When right click on the probe systray icon the following popup menu appears



'Logging' opens the engine log

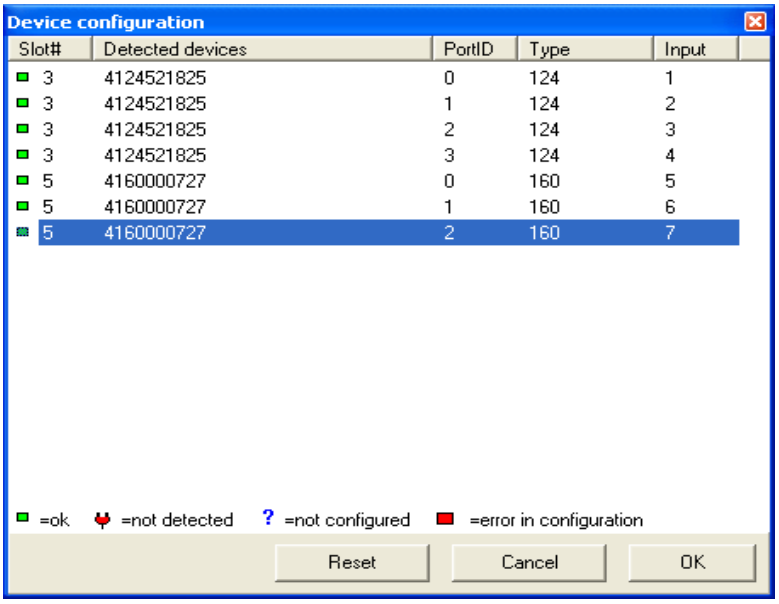
Device Configuration opens the "Device configuration" screen.

The logging items can be cleared, to create a clear view without removing them from the database. This view can shown all items of this probe, or a subset, per TS or per service.

The checkboxes on the top define the Alarms which are shown in the Log window. Un checking the Alarm4 implies that all alarms of Alarm4 level is not shown in the log window.

Device configuration

The "Device Configuration" screen is shown below



All icons on the left should be green. Otherwise a "Reset" can reset the configuration.

Note: a “Reset” changes the input identifications. Existing configs might not work anymore.

20. DVB Tables

Table ID values

All DVB tables have unique table_id values. There are as follows:

Value	Description
0x00	program association table
0x01	conditional access table
0x02	program map table
0x03	transport stream description table
0x04 - 0x3F	reserved
0x40	network information table – actual network
0x41	network information table – other network
0x42	Service description table – actual transport stream
0x43 - 0x45	reserved for future use
0x46	service description table – other transport stream
0x47 - 0x49	reserved for future use
0x4A	bouquet association table
0x4B - 0x4D	reserved for future use
0x4E	event information table – act. transport stream, present/following
0x4F	event information table – other transport stream, present/following
0x50 - 0x5F	event information table – actual transport stream, schedule
0x60 - 0x6F	event information table – other transport stream, schedule
0x70	time date table
0x71	running status table
0x72	stuffing table
0x73	time offset table
0x74 - 0x7D	reserved for future use
0x7E	discontinuity information table
0x7F	selection information table
0x80 - 0xFE	user defined
0xFF	reserved

Valid PIDs

The following PIDs are valid:

Table name:	Table_id	PID
Program association table	0x00	0x00
Program map table	0x02	as specified in PAT
Conditional access table	0x01	0x01
Network information table	0x40-0x41	0x10
Service description table	0x42 or 0x46	0x11
Event information table	0x4E-0x6F	0x12
Bouquet association table	0x4A	0x11

Time and date table	0x70	0x14
Time offset table	0x73	0x14

Tables and descriptors are described in more detail below.

Program Association Table (PAT)

This is an MPEG defined PSI table like the PMT and CAT. The other tables are SI tables and defined by DVB. Each Transport Stream has an own PAT. The PAT is always transmitted on PID 0x00. The PAT provides a list of the programs present in the Transport Stream. For each program the PAT contains a program number which is the same as the Service_ID as defined by DVB and present in the SDT. The PAT contains a different PID for each program, which is the PID of the Program Map Table (PMT) belonging to that particular program. The PAT doesn't have descriptors.

Program Map Table (PMT)

Each Program has an own PMT. Each PMT is transmitted on a different PID in the range from 0x20 to 0x1FFE. The PMT provides a list of components and their PIDs that are part of the program. For each component a stream type is transmitted. The PMT includes also the PCR_PID.

Conditional Access Table (CAT)

Each Transport Stream transmits one CAT on PID 0x00. It includes the CA_descriptor, which is the only mandatory descriptor in this table. The CA_descriptor conveys for each CA System the CA_System_id and the EMM_PID. A private_data_specifier_ descriptor is optional.

Network Information Table (NIT)

The NIT conveys information relating to the physical organization of the multiplexers/TSs carried via a given network, and the characteristics of the network itself. The combination of original_network_id and transport_stream_id allow each transport stream to be uniquely identified throughout the ETS application area. Networks are assigned individual network_id values, which serve as unique identification codes for networks. In the case that the NIT is transmitted on the network on which the transport stream was originated, the network_id and the original_network_id shall take the same value.

Service Description

Each sub-table of the SDT describes services that are contained

Table (SDT)	within a particular transport stream. The services may be part of the actual transport stream or part of other transport streams, these being identified by means of the table_id.
Event Information Table (EIT)	The EIT provides information in chronological order regarding the events contained within each service. Four classifications of EIT have been identified, distinguishable by the use of different table_ids: 1. Actual TS, present/following event information = table_id = "0x4E"; 2. Other TS, present/following event information = table_id = "0x4F"; 3. Actual TS, event schedule information = table_id = "0x50" to "0x5F"; 4. Other TS, event schedule information = table_id = "0x60" to "0x6F". All EIT sub-tables for the actual transport stream shall have the same transport_stream_id and original_network_id values. The present/following table shall contain only information pertaining to the present event and the chronologically following event carried by a given service on either the actual transport stream or another transport stream, except in the case of a Near Video On Demand (NVOD) reference service where it may have more than two event descriptions. The event schedule tables for either the actual transport stream or other transport streams contain a list of events, in the form of a schedule, namely, including events taking place at some time beyond the next event. The EIT schedule tables are optional. The event information shall be chronologically ordered.
Time and Date Table (TDT)	The TDT carries only the UTC time and date information
Bouquet Association Table (BAT)	The BAT provides information regarding bouquets. A bouquet is a collection of services, which may traverse the boundary of a network.
Time Offset Table (TOT)	The TOT (see: table 9) carries the UTC-time and date information and local time offset.

21. Definitions, Acronyms and abbreviations

Abbreviation	Term	Definition
CA	Conditional Access	Collection of system components that make sure that entitled subscribers have access to the broadcast products and not entitled subscribers have no access.
ECM	Entitlement Control Message	Conditional Access message describing in a secure way how the components of a broadcast product are scrambled.
ECM Stream		Transports all the ECMs belonging to a service. The ECM stream ID (0 - 65535) identifies to which ECM Stream the ECMs of a service are sent. One or more services can be assigned to the same ECM stream. See also: SCG.
ECMG	Entitlement Management Message Generator	Generates ECMs based on the received control words and access criteria.
EIS	Event Information Scheduler	Stores all CA-specific information required for the complete head-end system. The complete functionality of the EIS is implemented in CAPS. See also: CAPS.
EMM	Entitlement Management Message	Conditional Access message containing a secure command for one or more smart cards.
Encryption		The process of rendering a digital signal, unintelligible to any receiver that does not have some unique piece of information needed to recover the signal.
EPG	Electronic Program Guide	Application software in the subscriber's receiver that allows the content provider to promote the selling of his services and events and that helps the subscriber to select these products.
Event		Grouping of elementary broadcast data streams with a defined start and end time belonging to a common service, e.g. first half of a football match, News flash, first part of an entertainment show.
IRD	Integrated Receiver and Decoder	Receiver and decoder of digital TV services. Either a consumer set-top box or a receiver for professional applications ("Commercial IRD").
MPEG-2	Motion Picture Experts	Refers to the standard ISO/IEC 13818-1. Systems

	Group	coding is defined in part one.
Multiplex		Stream of all the digital data in a single physical channel carrying one or more services or events
MUX	Multiplexer	Head-end component that performs time multiplexing of input data and outputs an MPEG-2 transport stream. The exact functionality of a MUX is implementer specific.
Network		Transportation medium for multiple transport streams. See also: Transport Stream.
PSI	Program Specific Information	Data structures defined in the DVB standard to describe programs in a digital broadcast application
Scrambling		In data transmission, scrambling refers to the process of randomizing the bit pattern of a transmitted signal to prevent peaks in the spectrum of the modulated signal. The television industry usually uses the term 'encryption' for program denial of digital signals.
Service		The content provider offers services to the subscriber. A key set, product type and service number uniquely identifies every service.
Service schedule		Timing and Conditional Access information assigned to a service, which is used to schedule a service as part of a timetable.
Set-top box		A box for consumer/subscriber purposes with an Integrated Receiver and Decoder for digital TV services. See also: IRD.
Smart card		Secure device (credit card format) used in receiver.
Transport Stream		Data structure defined in ISO/IEC 13818-1. It is the basis of the ETSI digital video-broadcasting standard. Multiple transport streams constitute a network.
Service Type		Method to categorize the program types on a service. A unique number (0 -255) identifies the type of program. See also: Type/Version.

ANNEX 1

Information NEW features in SMART DVB Product line

Version 2.6

Version 1.0
July 1st 2017
Frank Enkelaar

Introduction

The SMART DVB Lite, 10, 25, 50, 80, 90, XL and GATEWAY is introducing new standard functionality coming with Software release 2.6.x

1. SCTE 35 support in SMART* Pro only
2. Extension of PCR support in SMART*
3. Up to 32 Audio Channels in 16 PID support in PMT*
4. MPEG1 L3 Discrete Audio Alarm selection
5. Virtual PMT creation*
6. Faster Alarm setting sheet functions
7. 3x outputs (Display ports, HDMI & DVI) Pro only
8. HDMI to 2.0b standard (Support full 4Kscreen)
9. DVB S/S2 expansion*
10. MIB adjustment

New extra functionality in options:

1. Support for AVC 4:2:2 decoding, license for monitoring and multi-viewer Pro only

***=Not present in SMART DVB 80**

Remark:

The software release 2.5.x is not released for commercial use.
All the 2.5.x improvements are incorporated in version 2.6.x

Note

Note:

Upgrading from version 2.4.x to version 2.6.x can be done without driver updates.
Users with earlier versions, before 2.4, need to contact Dualz Solutions support for assistance (smartsupport@dualz-solutions.nl)

SCTE35 support in SMART Pro only

General

ETSI: SCTE 35, Digital Program Insertion Cueing Message for Cable, is the core signalling standard for advertising and distribution control (ex. blackouts) of content for content providers and content distributors. SCTE 35 is being applied to QAM/IP, Title VI/TVE (TV Everywhere), and live/time shifted (DVR, VOD, etc.) delivery. SCTE 35 signals can be used to identify advertising breaks, advertising content, and programming content (ex. specific Programs and Chapters within a Program). SCTE 35 complements other Standards to complete the eco-systems.

SMART-DVB from version 2.6 is supporting SCTE35 with analysing and logging functionality.

The functionality is separated in different parts:

- Detection of services containing SCTE35 in PSI (PMT)
- Detection of components(PID's) containing SCTE35 in PSI (PMT)
- View on TS level, which services/PID's contain SCTE35 data
- Parsing TS-packets on SCTE35 PID's, and show in "Packetview"
- Parsing SCTE35 sections on PID level and show in functional view
- Parsing SCTE35 sections on service level, and show in functional view
- Exporting data to CSV and/or XML, based on user selectable filters
- Alarm template logic for SCTE35 PID's

- Exports of scte35 splice_info sections to xml
- Exports of scte35 splice_info sections to csv
- Exports of segmentation descriptors to csv

PSI/SI SCTE35 signalling

On Service level a PSI descriptor in the first loop of the PMT, the “registrar “indicates that a service contains SCTE35.

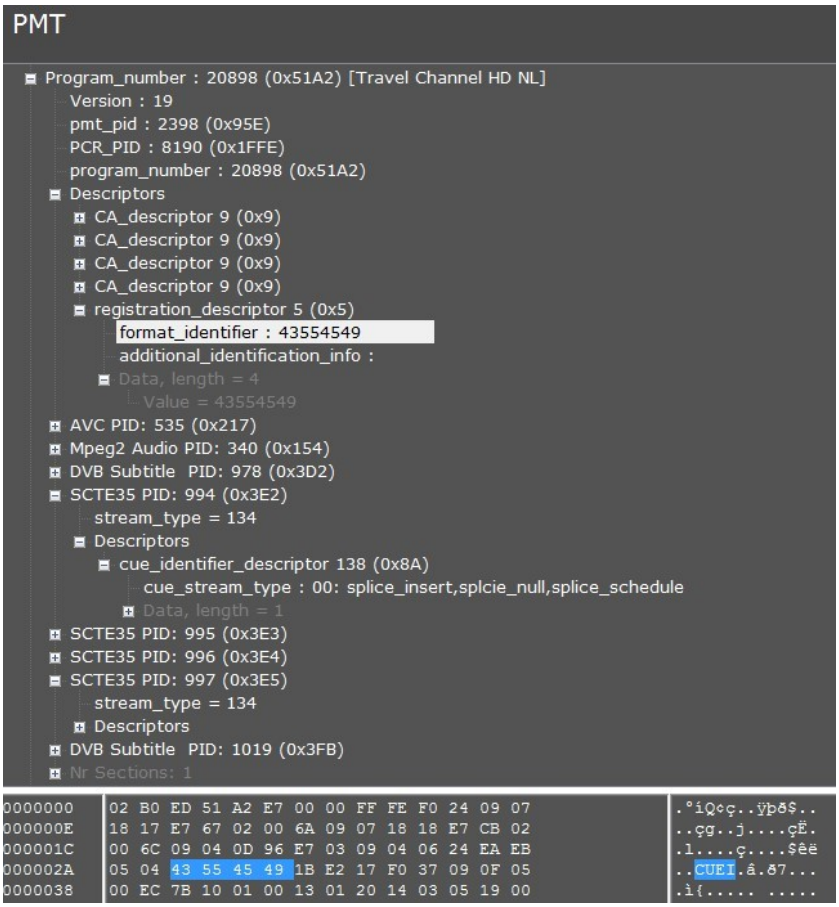


Figure 1: Service and PID signalling in PSI/SI ((PMT)

Also signalled in this view are the PIDs (994,995,996,997) for which SCTE35 data is available. This indication is done on stream type (134 or 0x86), in combination with above mentioned registrar descriptor.

PID indication in tree

When PID's are detected as containing SCTE-35, they will be indicated in the left Tree view with new icon:

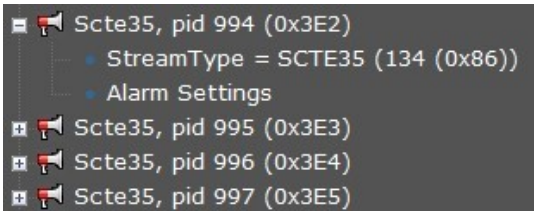


Figure 2: SCTE35 PID indication in tree

Packetview

When Packetview is selected for a PID which contains SCTE35 data, the data is parsed and showed:

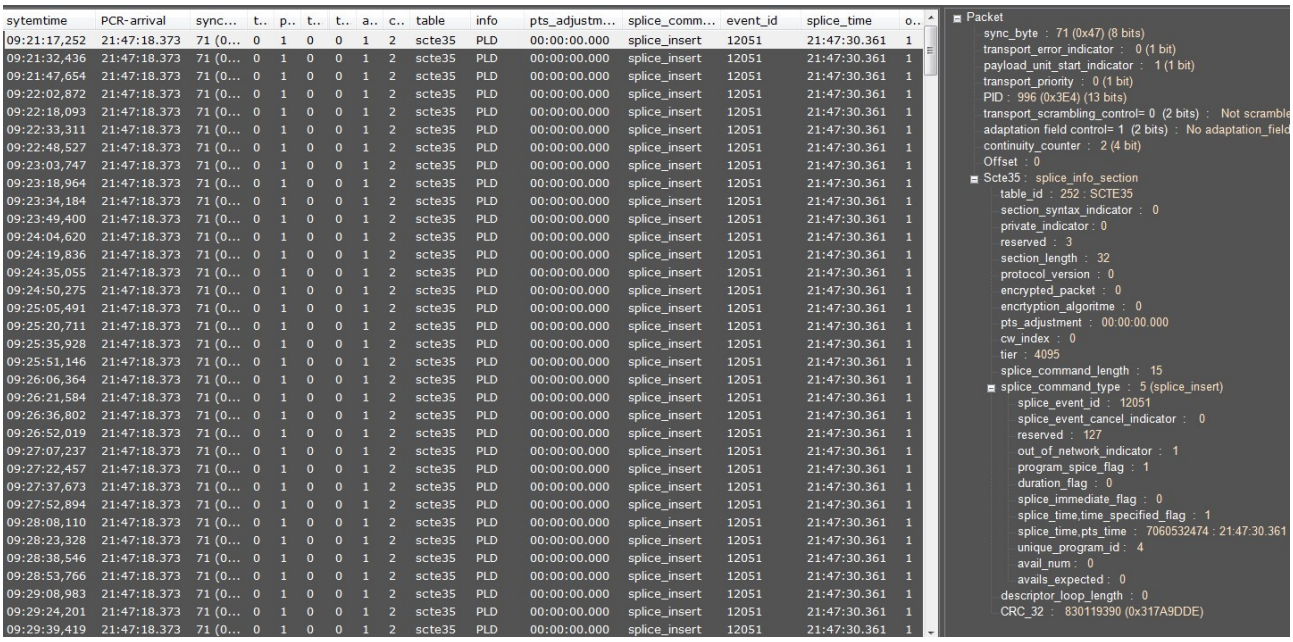
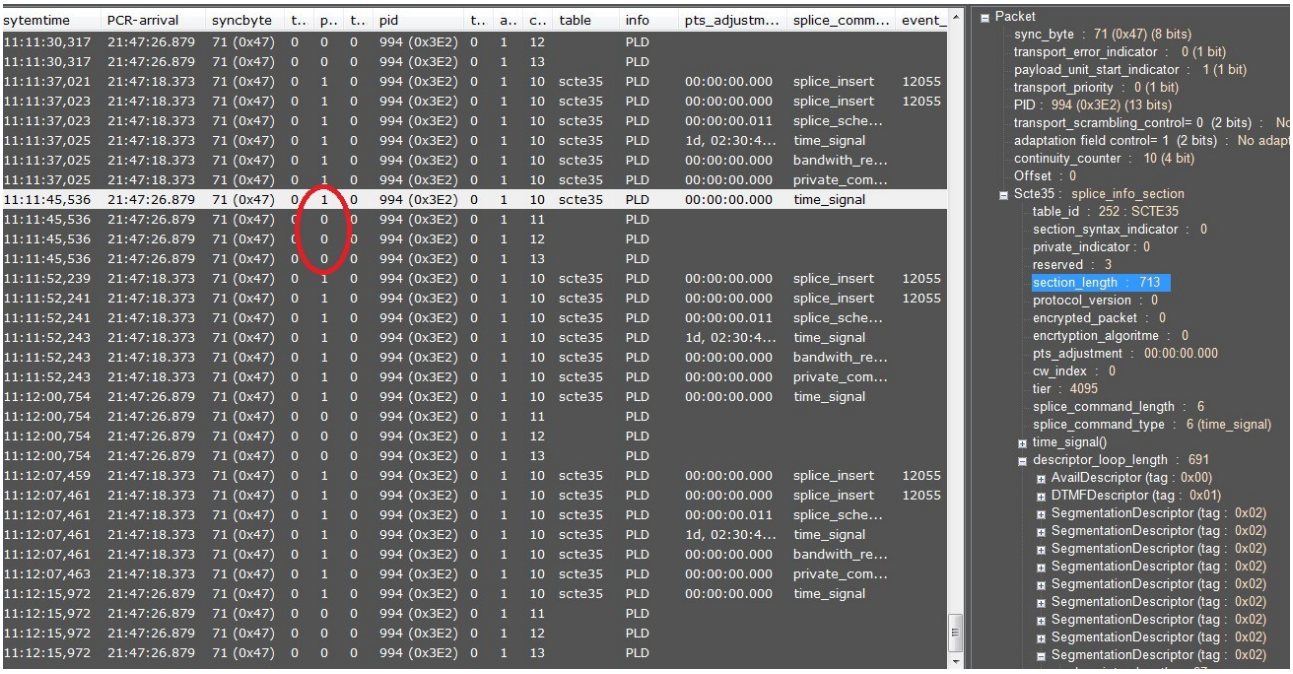


Figure 3: SCTE35 parsing in Packetview

In contrast to other components, new scte35 sections which cross the TS-packet boundary (188 bytes) will be parsed as a whole. This means that multiply lines in Packetview Listview, can result in 1 tree view on the right. In following picture this is illustrated. A section with length of 713 is divided over 4 TS packets, with the first one containing packet_unit start indicator=1,

followedby3packet -unit indicator start=0packets.

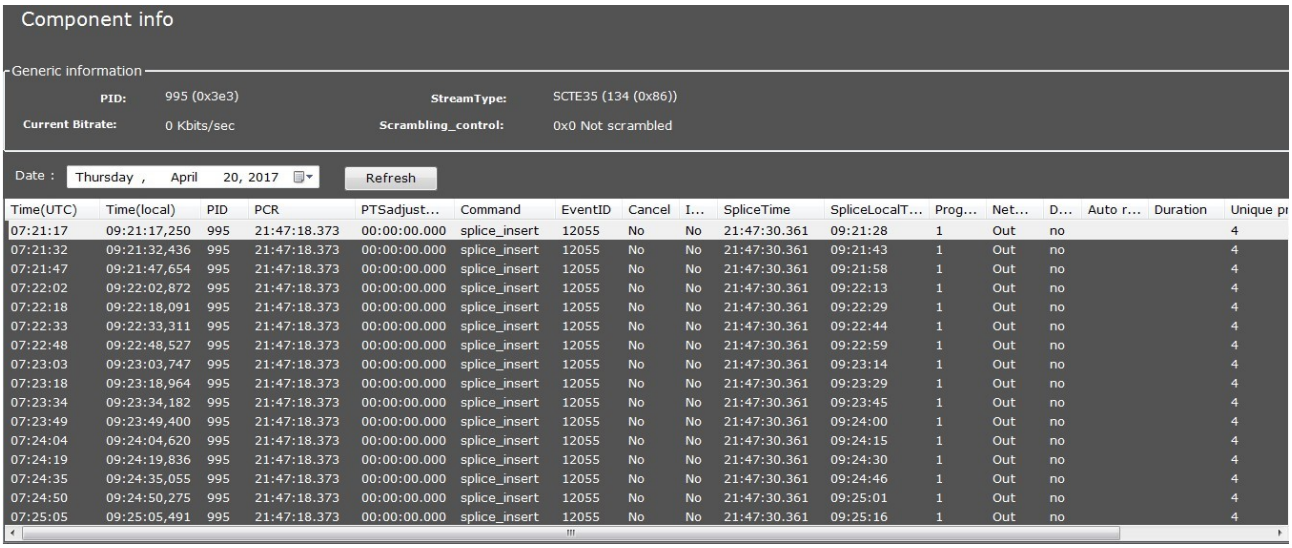


sytemtime	PCR-arrival	syncbyte	t..	p..	t..	pid	t..	a..	c..	table	info	pts_adjustm...	splice_comm...	event_
11:11:30,317	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	12		PLD			
11:11:30,317	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	13		PLD			
11:11:37,021	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:11:37,023	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:11:37,023	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.011	splice_sche...	
11:11:37,025	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	1d, 02:30:4...	time_signal	
11:11:37,025	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	bandwith_re...	
11:11:37,025	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	private_com...	
11:11:45,536	21:47:26.879	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	time_signal	
11:11:45,536	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	11		PLD			
11:11:45,536	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	12		PLD			
11:11:45,536	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	13		PLD			
11:11:52,239	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:11:52,241	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:11:52,241	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.011	splice_sche...	
11:11:52,243	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	1d, 02:30:4...	time_signal	
11:11:52,243	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	bandwith_re...	
11:11:52,243	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	private_com...	
11:12:00,754	21:47:26.879	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	time_signal	
11:12:00,754	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	11		PLD			
11:12:00,754	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	12		PLD			
11:12:00,754	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	13		PLD			
11:12:07,459	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:12:07,461	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	splice_insert	12055
11:12:07,461	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.011	splice_sche...	
11:12:07,461	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	1d, 02:30:4...	time_signal	
11:12:07,461	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	bandwith_re...	
11:12:07,463	21:47:18.373	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	private_com...	
11:12:15,972	21:47:26.879	71 (0x47)	0	1	0	994 (0x3E2)	0	1	10	scte35	PLD	00:00:00.000	time_signal	
11:12:15,972	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	11		PLD			
11:12:15,972	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	12		PLD			
11:12:15,972	21:47:26.879	71 (0x47)	0	0	0	994 (0x3E2)	0	1	13		PLD			

Figure 4: SCTE35 parsing in Packetview

Pid info view

When on component level, the PID Info tab is selected, the SCTE35 data is shown on a more functional level:

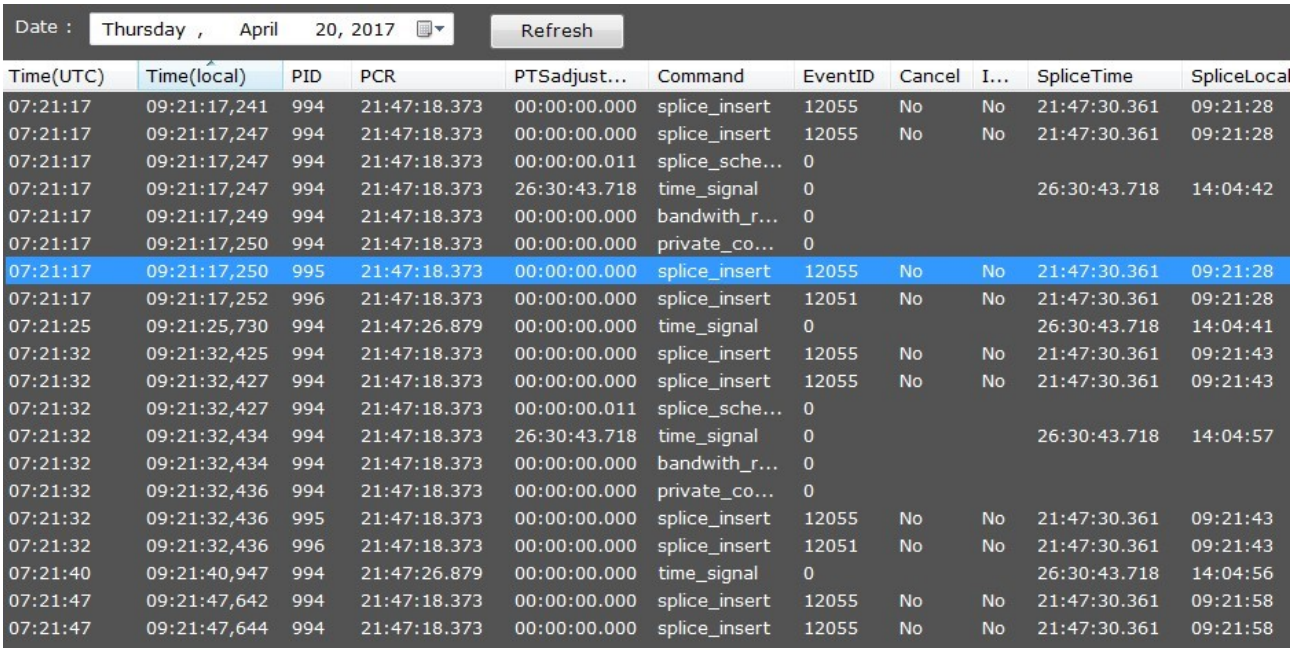


Time(UTC)	Time(local)	PID	PCR	PTSadjust...	Command	EventID	Cancel	I...	SpliceTime	SpliceLocalT...	Prog...	Net...	D...	Auto r...	Duration	Unique pr
07:21:17	09:21:17,250	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:28	1	Out	no			4
07:21:32	09:21:32,436	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:43	1	Out	no			4
07:21:47	09:21:47,654	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:58	1	Out	no			4
07:22:02	09:22:02,872	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:22:13	1	Out	no			4
07:22:18	09:22:18,091	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:22:29	1	Out	no			4
07:22:33	09:22:33,311	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:22:44	1	Out	no			4
07:22:48	09:22:48,527	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:22:59	1	Out	no			4
07:23:03	09:23:03,747	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:23:14	1	Out	no			4
07:23:18	09:23:18,964	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:23:29	1	Out	no			4
07:23:34	09:23:34,182	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:23:45	1	Out	no			4
07:23:49	09:23:49,400	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:24:00	1	Out	no			4
07:24:04	09:24:04,620	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:24:15	1	Out	no			4
07:24:19	09:24:19,836	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:24:30	1	Out	no			4
07:24:35	09:24:35,055	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:24:46	1	Out	no			4
07:24:50	09:24:50,275	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:25:01	1	Out	no			4
07:25:05	09:25:05,491	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:25:16	1	Out	no			4

Figure 5: SCTE35 PidInfo view

Service info view

When on service level, the SCTE35 tab is selected, the same view as above is shown, but this will contain data for every SCTE35 PID related to this service:



Time(UTC)	Time(local)	PID	PCR	PTSadjust...	Command	EventID	Cancel	I...	SpliceTime	SpliceLocal
07:21:17	09:21:17,241	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:28
07:21:17	09:21:17,247	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:28
07:21:17	09:21:17,247	994	21:47:18.373	00:00:00.011	splice_sche...	0				
07:21:17	09:21:17,247	994	21:47:18.373	26:30:43.718	time_signal	0			26:30:43.718	14:04:42
07:21:17	09:21:17,249	994	21:47:18.373	00:00:00.000	bandwith_r...	0				
07:21:17	09:21:17,250	994	21:47:18.373	00:00:00.000	private_co...	0				
07:21:17	09:21:17,250	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:28
07:21:17	09:21:17,252	996	21:47:18.373	00:00:00.000	splice_insert	12051	No	No	21:47:30.361	09:21:28
07:21:25	09:21:25,730	994	21:47:26.879	00:00:00.000	time_signal	0			26:30:43.718	14:04:41
07:21:32	09:21:32,425	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:43
07:21:32	09:21:32,427	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:43
07:21:32	09:21:32,427	994	21:47:18.373	00:00:00.011	splice_sche...	0				
07:21:32	09:21:32,434	994	21:47:18.373	26:30:43.718	time_signal	0			26:30:43.718	14:04:57
07:21:32	09:21:32,434	994	21:47:18.373	00:00:00.000	bandwith_r...	0				
07:21:32	09:21:32,436	994	21:47:18.373	00:00:00.000	private_co...	0				
07:21:32	09:21:32,436	995	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:43
07:21:32	09:21:32,436	996	21:47:18.373	00:00:00.000	splice_insert	12051	No	No	21:47:30.361	09:21:43
07:21:40	09:21:40,947	994	21:47:26.879	00:00:00.000	time_signal	0			26:30:43.718	14:04:56
07:21:47	09:21:47,642	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:58
07:21:47	09:21:47,644	994	21:47:18.373	00:00:00.000	splice_insert	12055	No	No	21:47:30.361	09:21:58

Figure 6: SCTE35 PidInfo view

Splice descriptors

When SCTE35 is containing splice descriptors, they will be parsed and show in Packetview. Also on component Info tab page, as well in service based SCTE35 tab page, the descriptors for selected section are shown:

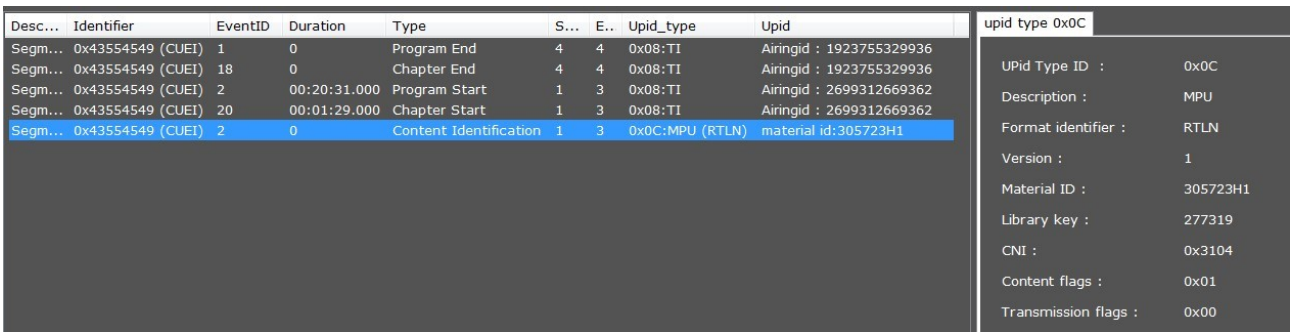


Figure 7: SCTE35 PidInfo view

Exports

At service level SCTE35 view, and also at component level Info view, a context menu (right click) will be implemented for exporting:

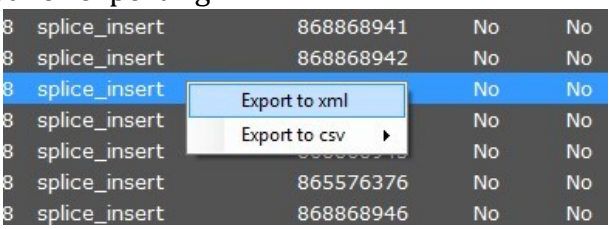


Figure 8: Export context menu

When export to xml is chosen a file will be created according to SCTE35-2016 spec:

```
- <splice_info_sections>
  - <SpliceInfo PCRArrival="7126217387" UTCTime="1494242799" PID="962">
    - <SpliceInfoSection tier="4095" protocolVersion="0" ptsAdjustment="3001540349">
      - <SpliceInsert availsExpected="0" availNum="0" uniqueProgramId="0"
        outOfNetworkIndicator="1" spliceEventCancelIndicator="false"
        spliceEventId="865576310">
            <BreakDuration duration="2700000" autoReturn="TRUE"/>
        </SpliceInsert>
        <AvailDescriptor providerAvailId="859019173"/>
      </SpliceInfoSection>
    </SpliceInfo>
  - <SpliceInfo PCRArrival="7128916308" UTCTime="1494242829" PID="962">
    - <SpliceInfoSection tier="4095" protocolVersion="0" ptsAdjustment="3001540349">
      - <SpliceInsert availsExpected="0" availNum="0" uniqueProgramId="0"
        outOfNetworkIndicator="1" spliceEventCancelIndicator="false"
        spliceEventId="868868939">
            <BreakDuration duration="1800000" autoReturn="TRUE"/>
        </SpliceInsert>
        <AvailDescriptor providerAvailId="859032035"/>
      </SpliceInfoSection>
    </SpliceInfo>
```

Figure 9: Export to XML

Also it is possible to export to csv. A submenu will appear with option to export on splice info section level or on segment descriptor level:

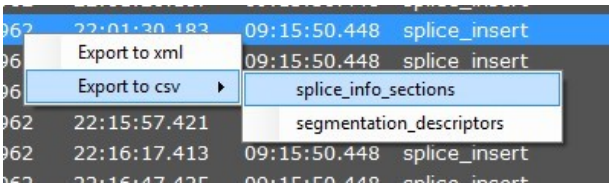


Figure 10: Export CSV

When exporting to csv - splice-info-sections following export will be generated (csv file was imported in excel)

UTCsystemtime	LocalTime	PID	PCRArrival	PTSAdjustment	Command	EventID	CancelInd	ImmediateFlag	SpliceTime	SpliceTimeLocal	programflag	OutOfNetwork	DurationFlag	AutoReturn	Duration
11:26:39	13:26:39,108	962	7126217387	3001540349	splice_insert	865576310	0	0	4125420759	13:26:47	1	1	1	1	2700000
11:27:09	13:27:09,105	962	7128916308	3001540349	splice_insert	868868939	0	0	4128120759	13:27:17	1	1	1	1	1800000
11:27:29	13:27:29,103	962	7130715589	3001540349	splice_insert	868868940	0	0	4129920759	13:27:37	1	1	1	1	2700000
11:27:59	13:27:59,101	962	7133417567	3001540349	splice_insert	868868941	0	0	4132620759	13:28:07	1	1	1	1	1800000
11:28:19	13:28:19,112	962	7135216847	3001540349	splice_insert	868868942	0	0	4134420759	13:28:27	1	1	1	1	900000
11:28:29	13:28:29,110	962	7136116487	3001540349	splice_insert	868868943	0	0	4135320759	13:28:37	1	1	1	1	1800000
11:28:49	13:28:49,108	962	7137915768	3001540349	splice_insert	868868944	0	0	4137120759	13:28:57	1	1	1	1	1800000
11:29:09	13:29:09,105	962	7139718109	3001540349	splice_insert	868868945	0	0	4138920759	13:29:17	1	1	1	1	2700000

Figure 11: Export Csv Splice-info-sections

When exporting to csv - segmentation descriptors following export will be generated (csv file was imported in excel)

UTCsystemtime	LocalTime	PID	PCRArrival	PTSAdjustment	SpliceTime	SpliceTimeLocal	segEventID	segDuration	segType	segNum	segsExpected	SubSegNum	SubSegsExpected	UpidTypeID	UPidType	FormatIdentifier
17:59:30	59:30.0	195	236340000	8505000000	324000000	20:00:00	1	0	17:Program End	4	4	0	0	8	TI	Airingid : 1923755329936
17:59:30	59:30.0	195	236340000	8505000000	324000000	20:00:00	18	0	33:Chapter End	4	4	0	0	8	TI	Airingid : 1923755329936
17:59:30	59:30.0	195	236340000	8505000000	324000000	20:00:00	2	110790000	16:Program Start	1	3	0	0	8	TI	Airingid : 2699312669362
17:59:30	59:30.0	195	236340000	8505000000	324000000	20:00:00	20	8010000	32:Chapter Start	1	3	0	0	8	TI	Airingid : 2699312669362
17:59:30	59:30.0	195	236340000	8505000000	324000000	20:00:00	2	0	1:Content Identification	1	3	0	0	12	MPU	RTLN
18:59:30	59:30.0	195	560340000	239065408	324000000	21:00:00	18	0	33:Chapter End	1	3	0	0	8	TI	Airingid : 2699312669362
18:59:30	59:30.0	195	560340000	239065408	324000000	21:00:00	34	0	52:Provider Placement Opportu	1	3	2	28	8	TI	Airingid : 4472639442313
18:59:30	59:30.0	195	560340000	239065408	324000000	21:00:00	2	110790000	48:Provider Advertisement Star	1	3	0	0	8	TI	Airingid : 4272418349021
18:59:30	59:30.0	195	560340000	239065408	324000000	21:00:00	2	0	1:Content Identification	1	3	0	0	12	MPU	RTLN

Figure 12: Export Csv Segments

When user-private segmentation upid's are seen, these will be exported accordingly, for example for RTL7 and SBS6:

version	material_id	librarykey	CNI	content_flags	Transmission_flags
1	305723H1	277319	12548	1	0
1	305723H1	277319	12548	1	0

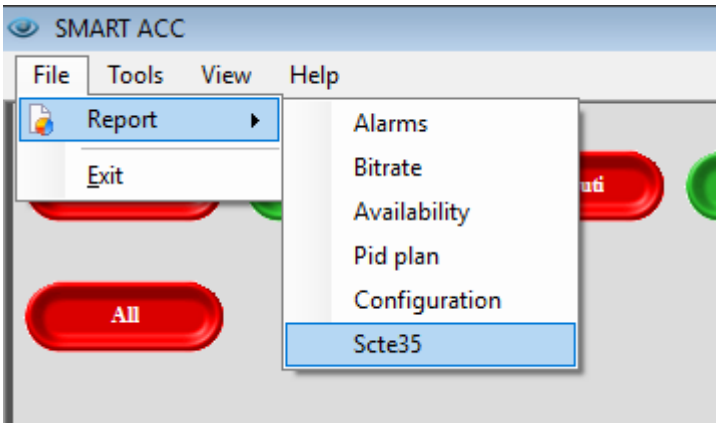
Figure 13: Export Csv Segments user-private, RTL7

version	transmission_id	program_id	online_product_id	CNI
1	2699312669362	27610	HyfBAHsOTPn/	12582
1	2699312669362	27610	HyfBAHsOTPn/	12582

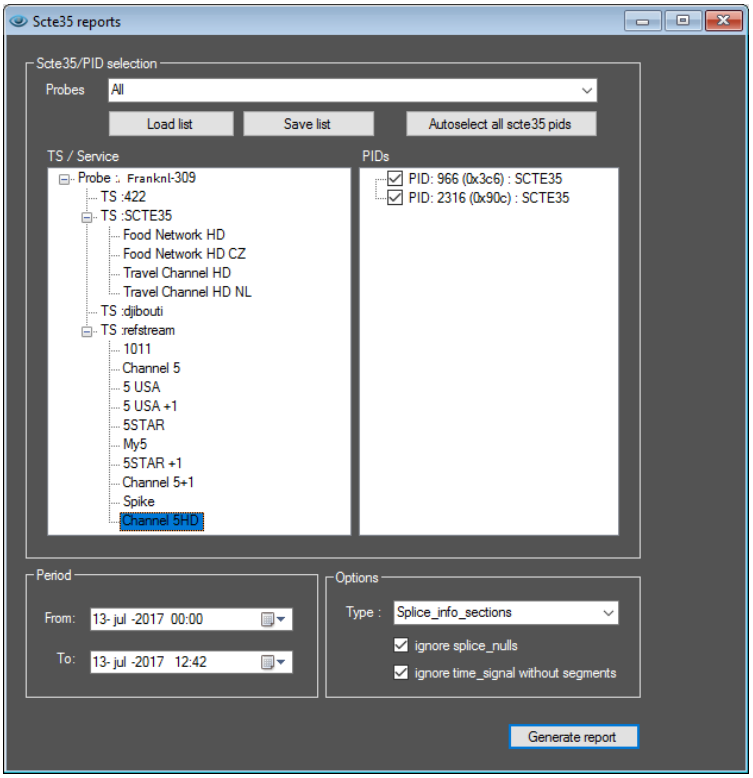
Figure 14: Export Csv Segments user-private, SBS

Reporting of SCTE35 in Gateway

The reporting feature is conform the existing report generation.
By selecting the “File” Tab in the left top corner at the Gateway ACC application the access to to Report feature will show.



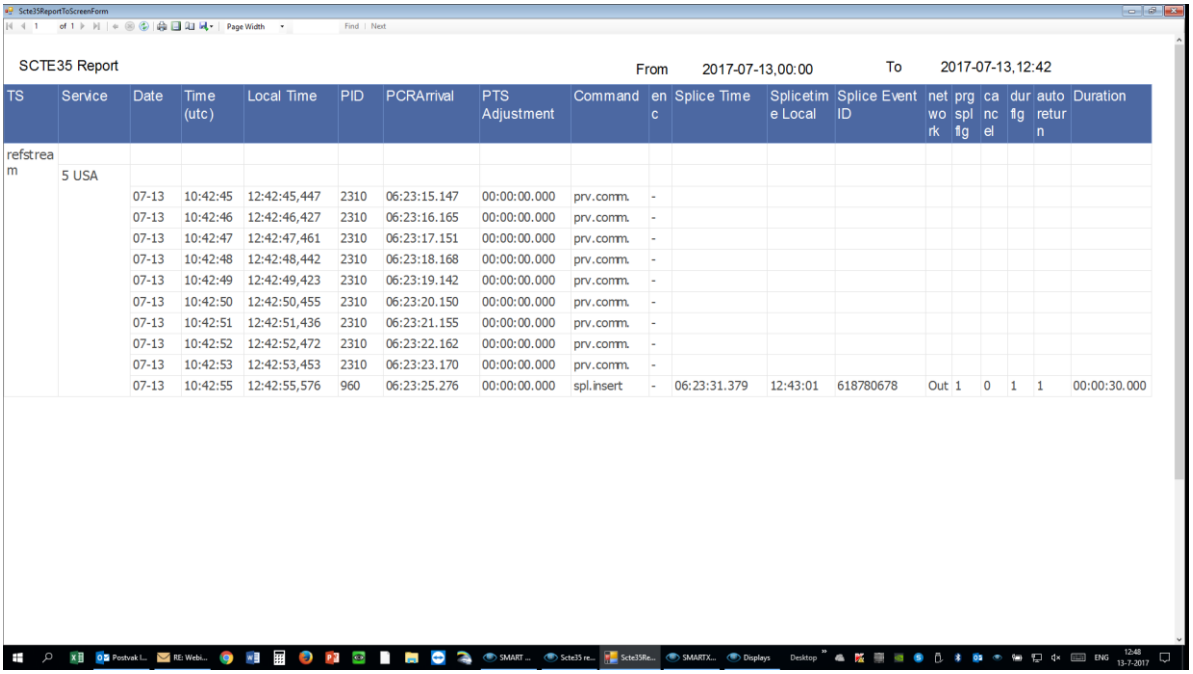
Selecting “Scte35” opens up the next dialog window.



In this window the following selections can be set:

- Multi or Single Probe report
- Load a list or Save a prepared list
- Auto select all SCTE35 PIDs
- Select or deselect PID for List creation
- Selection of Date and Time window
- Options like:
    - Only Splice_info_sections
    - Only Segmentation descriptors
    - Ignore splice_ruls
    - Ignore time_signal without segments

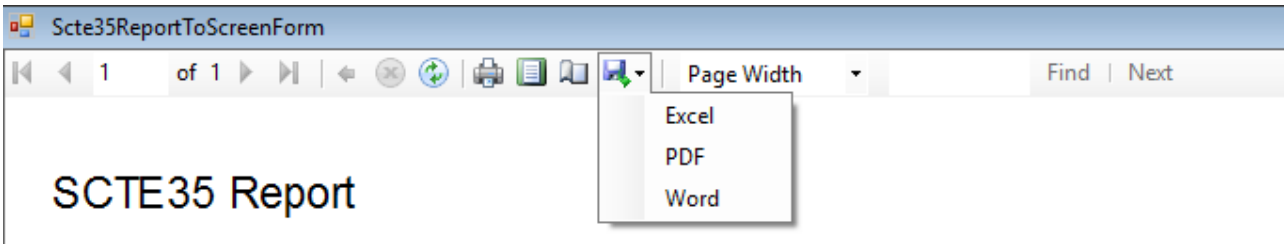
After pressing “Generate report” button the following, window will popup.



SCTE35 Report From 2017-07-13,00:00 To 2017-07-13,12:42

TS	Service	Date	Time (utc)	Local Time	PID	PCRArrival	PTS Adjustment	Command	enc	Splice Time	Splicetime Local	Splice Event ID	network	prg spl flg	cancel	dur flg	auto return	Duration
refstream	5 USA																	
		07-13	10:42:45	12:42:45,447	2310	06:23:15.147	00:00:00.000	prv.comm.	-									
		07-13	10:42:46	12:42:46,427	2310	06:23:16.165	00:00:00.000	prv.comm.	-									
		07-13	10:42:47	12:42:47,461	2310	06:23:17.151	00:00:00.000	prv.comm.	-									
		07-13	10:42:48	12:42:48,442	2310	06:23:18.168	00:00:00.000	prv.comm.	-									
		07-13	10:42:49	12:42:49,423	2310	06:23:19.142	00:00:00.000	prv.comm.	-									
		07-13	10:42:50	12:42:50,455	2310	06:23:20.150	00:00:00.000	prv.comm.	-									
		07-13	10:42:51	12:42:51,436	2310	06:23:21.155	00:00:00.000	prv.comm.	-									
		07-13	10:42:52	12:42:52,472	2310	06:23:22.162	00:00:00.000	prv.comm.	-									
		07-13	10:42:53	12:42:53,453	2310	06:23:23.170	00:00:00.000	prv.comm.	-									
		07-13	10:42:55	12:42:55,576	960	06:23:25.276	00:00:00.000	spl.insert	-	06:23:31.379	12:43:01	618780678	Out	1	0	1	1	00:00:30.000

The SCTE35ReportToscreenForm has support for exporting the created file to Excel, PDF or Word file.



Extension of PCR support in SMART

General explanation PCR Accuracy measurements:

ETSI: A MPEG-2 Transport Stream that is transmitted over any real network, is exposed to certain effects caused by the network components which are not ideally transparent. One of the pre-dominant effects is the acquisition of jitter in relation to the PCR values and their position in the TS. For the measurement of bitrates of Transport Streams, the requirements vary significantly for constant bitrate TS and partial TS/ variable bitrate TS. The application of statistical multiplexers led to more dynamic variations in the bitrate, especially of the video components. Other services such as opportunistic data transmission, have typical features which again differ in terms of occurrence or presence of the service and the variation of bitrates.

SMART implementation:

Measured average over 60 sec

Default Smart measures the constant TS bitrate, needed for PCR-AC calculations, by counting the number of TS packets over 60 seconds to eliminate the Network jitter.

Unexpected high values in PCR-AC can be the result of several reasons:

- Bitstream related:
  - Original clock used to stamp PCR values was not accurate (jitter)
  - Errors in PCR-AC generating algorithm
  - Remuxing TS (inserting/deleting packets) without adjusting PCR-values

- Playout/network related:
  - Frequency offset to original clock using to generate PCR values. (TS is constant but the bitrate is lower or higher then original)
  - Playout speed can be inaccurate due to clock/timing of playout system.
  - Playout speed can be inaccurate when playout is based on PCR PID X, while measuring PCR PID Y (With MPTS with inaccurate PCR PIDs)
  - Too much jitter on network resulting in not constant enough "constant TS bitrate"

note: The calculation is based on using Timestamps of arrival.

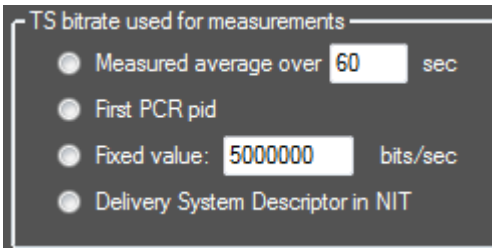
Fixed value bits/sec

Second way to measure the exact PCR- AC, without generating constant Bitrate, is to use a “Fixed” TS-rate.
Therefore, Smart has the opportunity to manually enter the TS-rate. The fixed value will be used for the PCR-AC measurements.
Note: The TS rate need to be known.

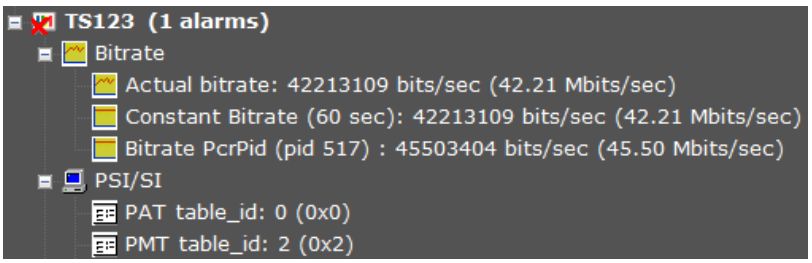
First PCR PID (New function)

The third option is collecting the TS-Bitrate from the PCR values. To "ruled out" (disregard) the above "playout/network" related causes, we can calculated the "original" TS rate.
The TS rate is calculated by counting the TS packets between 2 executive PCR values on a first seen PCR PID.

The Bitrate used for measurement is selectable in the Stream properties menu.



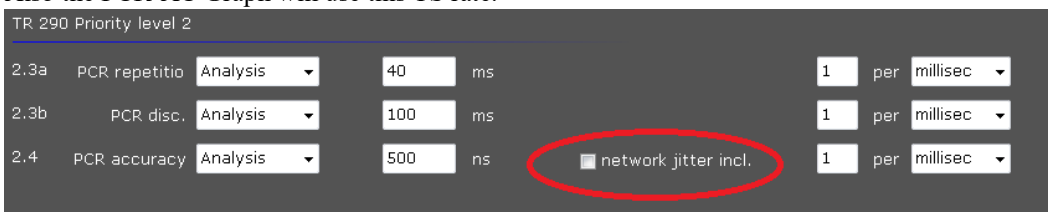
Selecting the “First PCR PID” option will add a 3th item in the TS tree, under node “Bitrate”



NOTE:

1. The PCR-AC alarms (only when checkbox “Incl. Network jitter” is NOT checked!) Will use the above TS-bitrate form the PCR PID, for the “constant TS bitrate” for the internal calculations.

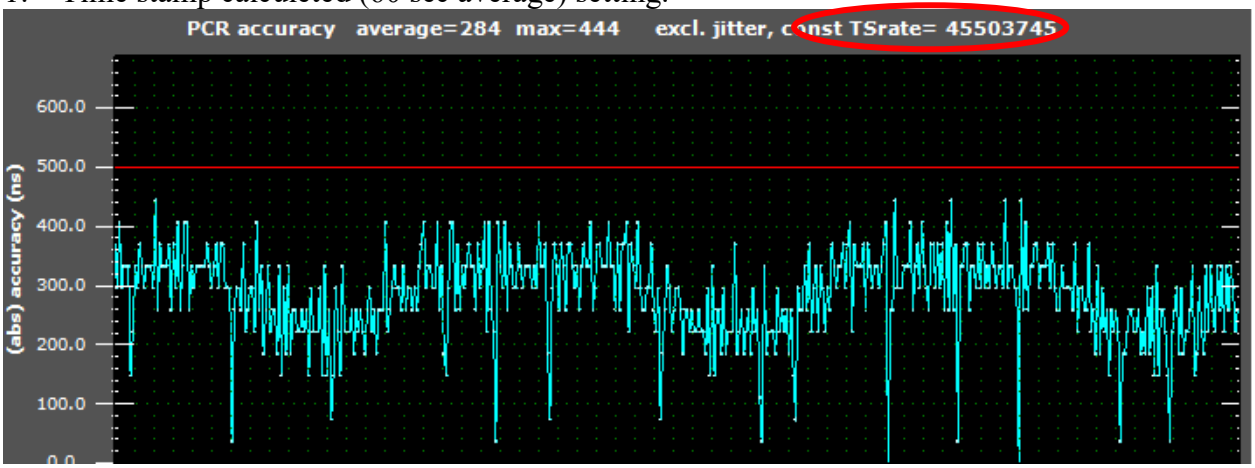
Also the PCR-AC Graph will use this TS rate.



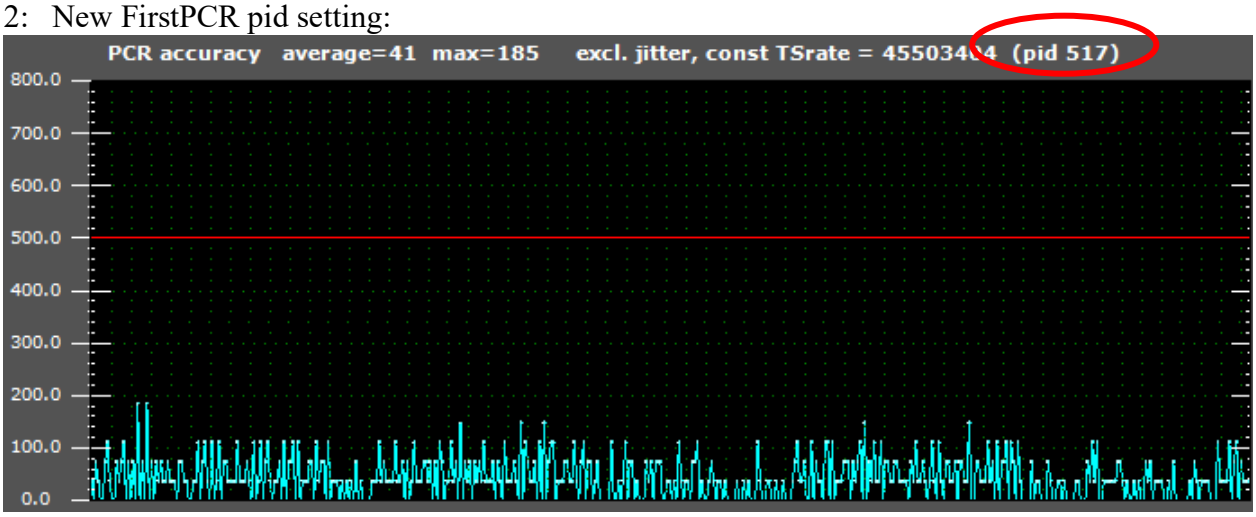
2. The text above the PCR-AC graph will be extended so it clear on which TS-rate the values in the graph are based on.

Examples view PCR Accuracy

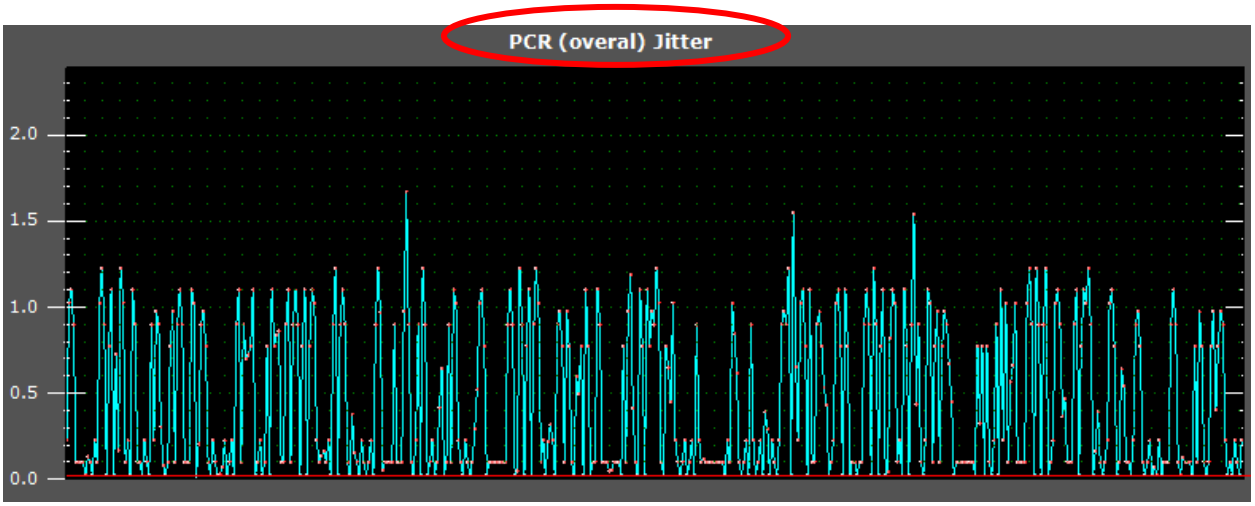
1: Time stamp calculeted (60 sec average) setting:



2: New FirstPCR pid setting:



3: Checkbox “Incl. network jitter” is checked (TS rate is not used!) :

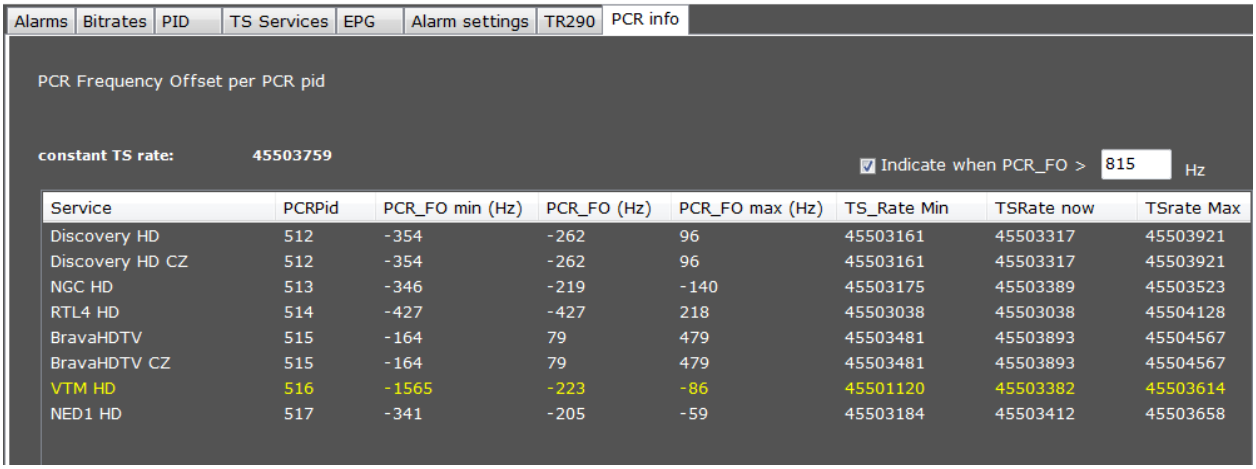


PCR Info View

ETSI: Program Clock Reference - Frequency Offset PCR_FO Definition PCR_FO is defined as the difference between the program clock frequency and the nominal clock frequency (measured against a reference which is not PCR derived, neither TS derived). The units for the parameter PCR_FO should be in Hz according to: Measured Frequency - Nominal Frequency, or in ppm expressed as: [Measured Frequency (in Hz) – Nominal Frequency (in Hz)]/Nominal Frequency (in MHz). Purpose the original frequency of the clock used in the digital video format before compression (program clock) is transmitted to the final receiver in

form of numerical values in the PCR fields. The tolerance as specified by ISO/IEC 13818-1 [1] is ±810 Hz or ±30 ppm.

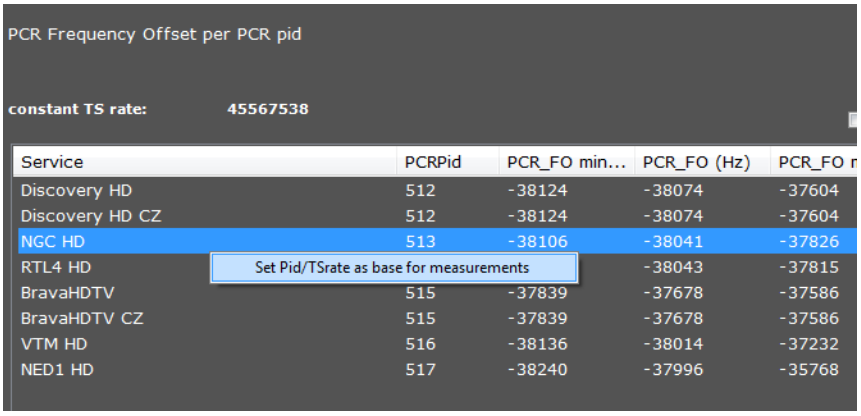
SMART Implementation: In a MPTS more than 1 PCR PID can be available.
Theoretically each PCR PID can indicate a different TS-rate (this should not be the case with correct streams, but we do not live in an ideal world!)
In the PCR Info View each available PCR PID is shown with the calculated value.
This value is refreshed each 5 seconds and indicates the PCR frequency offset. The calculated constant bitrate is available.



Service	PCRPid	PCR_FO min (Hz)	PCR_FO (Hz)	PCR_FO max (Hz)	TS_Rate Min	TSRate now	TSrate Max
Discovery HD	512	-354	-262	96	45503161	45503317	45503921
Discovery HD CZ	512	-354	-262	96	45503161	45503317	45503921
NGC HD	513	-346	-219	-140	45503175	45503389	45503523
RTL4 HD	514	-427	-427	218	45503038	45503038	45504128
BravaHDTV	515	-164	79	479	45503481	45503893	45504567
BravaHDTV CZ	515	-164	79	479	45503481	45503893	45504567
VTM HD	516	-1565	-223	-86	45501120	45503382	45503614
NED1 HD	517	-341	-205	-59	45503184	45503412	45503658

With this view, any major differences in PCR's inside one MPTS will be shown immediately.

By right clicking on a line, this PID/TS-rate can be used isolated. The automatically seen "first" PCR PID:

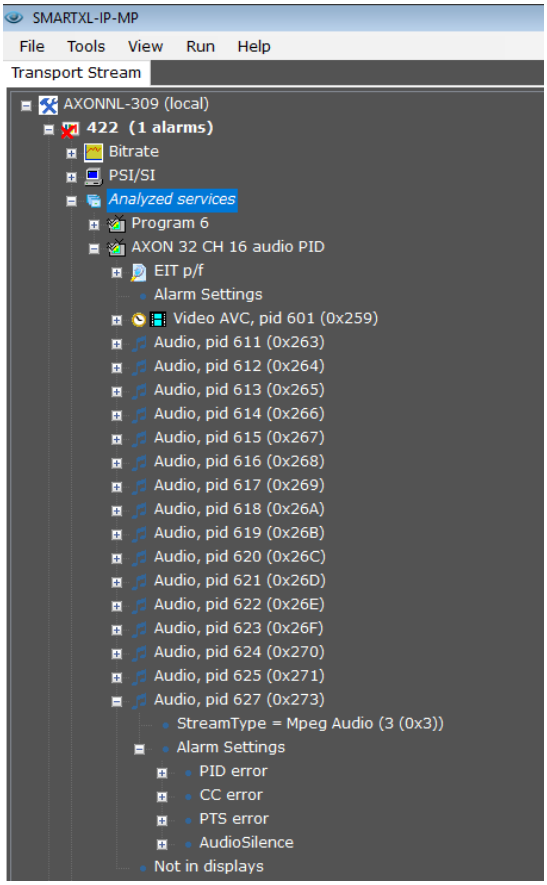


Service	PCRPid	PCR_FO min...	PCR_FO (Hz)	PCR_FO r
Discovery HD	512	-38124	-38074	-37604
Discovery HD CZ	512	-38124	-38074	-37604
NGC HD	513	-38106	-38041	-37826
RTL4 HD			-38043	-37815
BravaHDTV	515	-37839	-37678	-37586
BravaHDTV CZ	515	-37839	-37678	-37586
VTM HD	516	-38136	-38014	-37232
NED1 HD	517	-38240	-37996	-35768

The selected PID/TS-rate will be shown in the tree view (under bitrates), and will be used for calculations in alarms and in the PCR-AC view for ALL services in this TS (besides services where the "Incl. network jitter" is checked!).

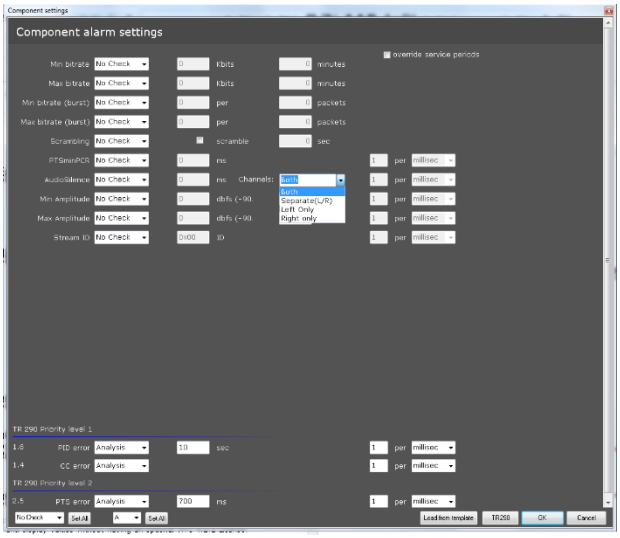
32 Audio channels in 16 PID per PMT support

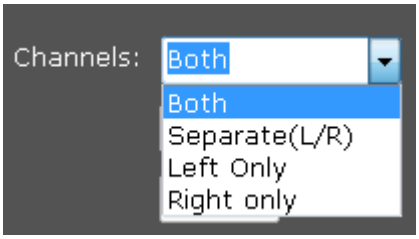
SMART supports up to 16 Audio PIDs per PMT.
This implicates that 32 Audio channels, belonging to 1 Video service can be analysed and monitored simultaneously.



MPEG1-2 L3 Discrete Audio Alarm selection

SMART introduced the Discrete Audio track measurement for Mpeg1/2 streams.





In the Component Audio Alarm template, the option “Channels” can be selected.
In this selection, the pull down offers 4 possibilities to set Alarm thresholds.

a. “Both” is the default for Stereo or Ch 1 = left and CH 2 = right
   The Alarm will be triggered if both channels are Silenced and or below level and or above level. In the condition that there is only one channel, within the threshold, there will be not an Alarm
b. Separate (L/R). Left and Right are independent from each other. Alarm message will be triggered. If left is past a trigger the alarm will raise.
c. Left Only. Only the left (Ch1) Will trigger the Alarm
d. Right Only. Only right (Ch2) will trigger the Alarm.

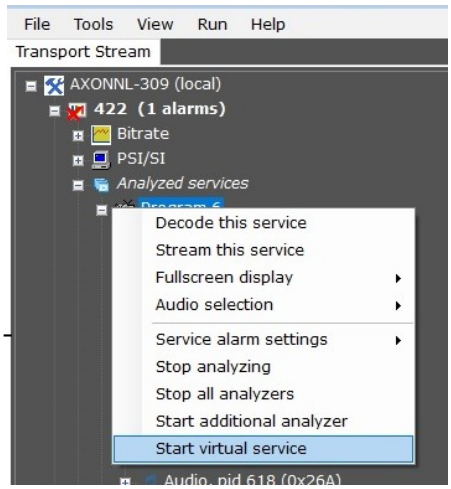
Note:

1. The Alarm threshold values and schedules are for both the Audio channels
2. The Alarm message is dedicated to the setting. In the Alarm notification, the left and right are mentioned in the message.

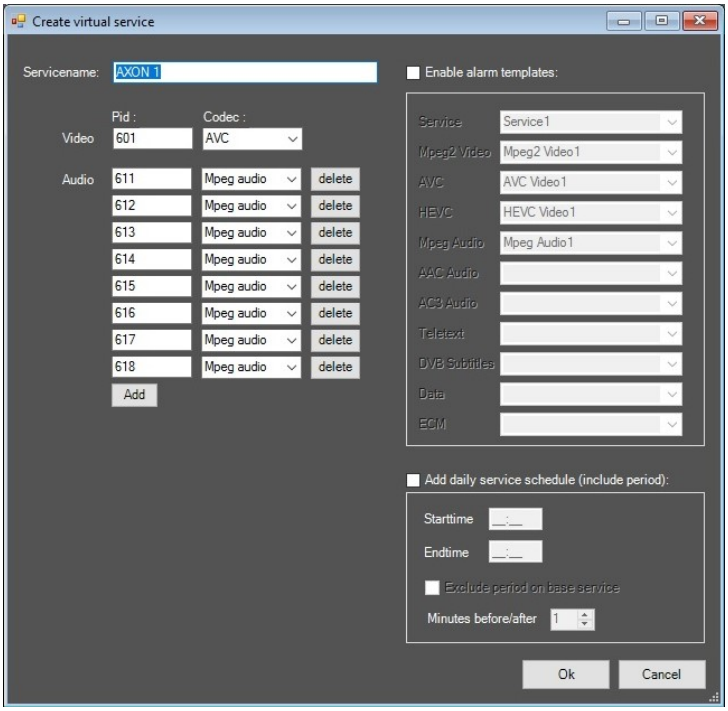
Virtual Service - PMT creation

ETSI: Program Map Table (PMT): - the PMT identifies and indicates the locations of the streams that make up each service and the location of the Program Clock Reference fields for a service. The PMT is an mandatory Table in the Program Service Information (PSI) of MPEG TS. The PMT groups the components of the appointed service.

SMART implentation:The Virtual Service creation allows the user to create an user definable Program Map Table (PMT) for the Video and Audio components



Start virtual service command is copying the parent information to the virtual created service.



The user can select his own:

- Servicename
- Video PID
- Video Codec
- Audio PID
- Audio Codec
- Number of Audio PID (max. 16)
- Alarm Templates
- Alarm base schedule
- Relate with the original source

The use cases for the Virtual service are:

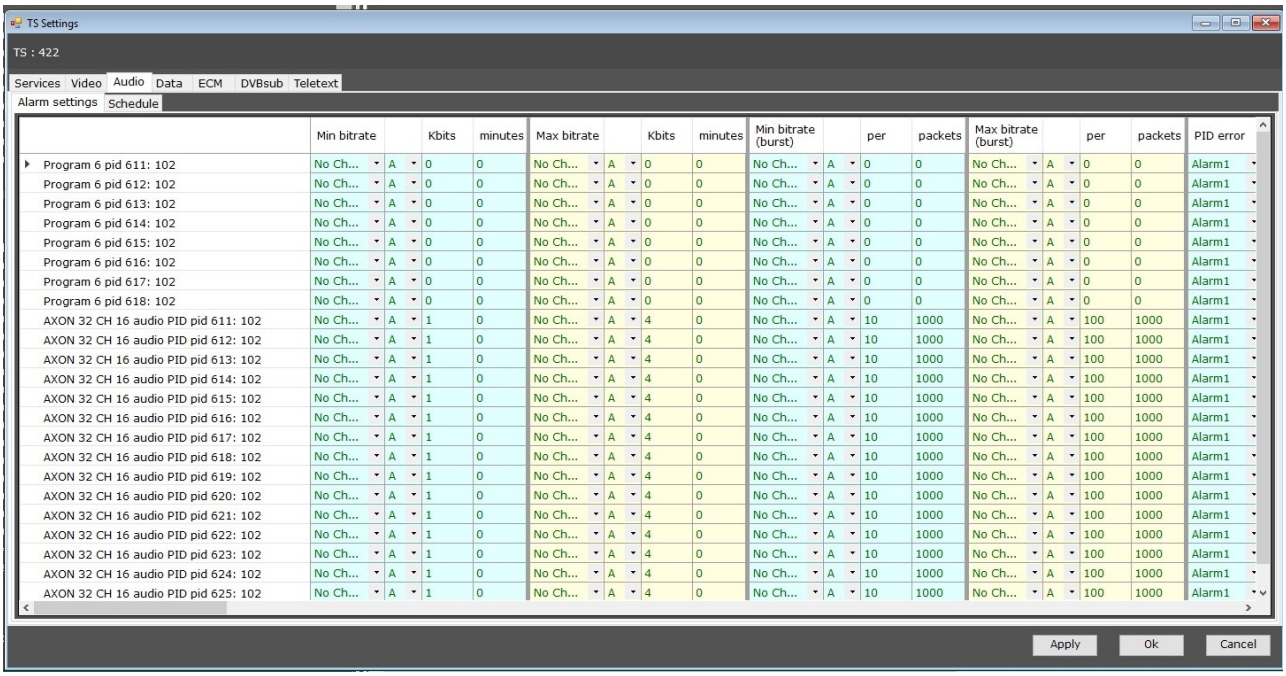
- Create new or extra Alarm template for existing Service with different name.

- Create a “white listed” service which is not actual in the stream but will turn up in fixed time slots. EG: Radio Service in different language during certain time per day or shared bandwidth/encoders with different programs. With other PIDs

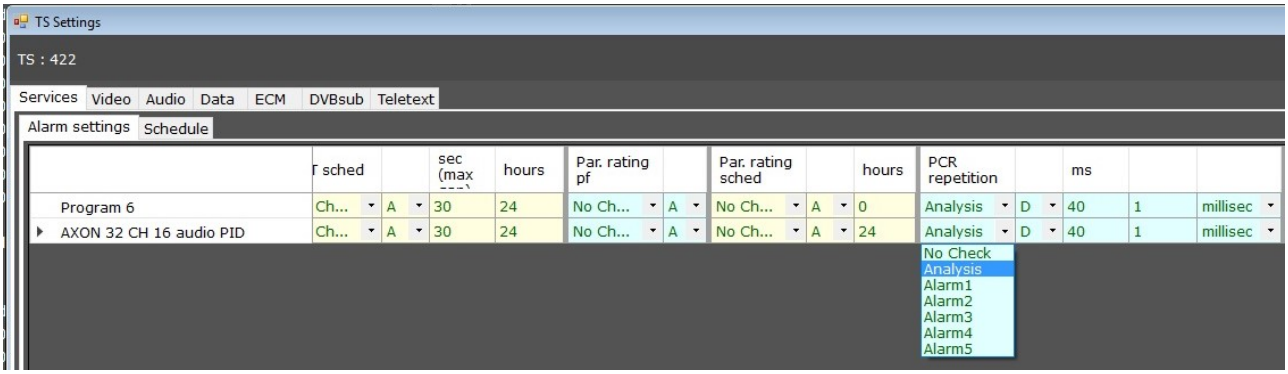
Note: The original PCR relation should be available.

Faster Alarm setting sheet functions

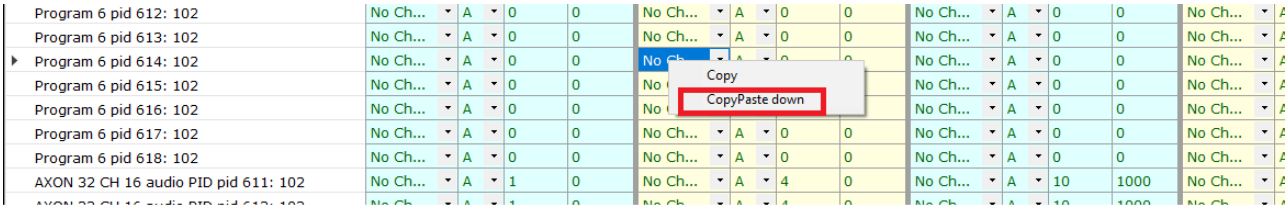
The update speed of this feature is increased.
The system will only set the changed values and will skip the non-licensed features.



At the ETR 101.290 Alarms the “Analysis” option is added.



Extra CopyPaste down function will increase the operational control



Triple head HD output two simultaneously portd

SMART DVB 50, 80, 90 and XL have a new video graphic card.
The Video Graphics card has a simultaneously out for two HD displays or Heads.

- VGA output has maximal resolution of 1920 x 1080 (**From 2020➔ VGA is changed by a Display port**)
- HDMI 2b output has maximal resolution of 3840 x 2160 at 60 Hz (4K)
- DVI-I output has maximal resolution 2560 x 1600 at 60 Hz

The audio is available at the HDMI connector.

Before 2020

From 2020

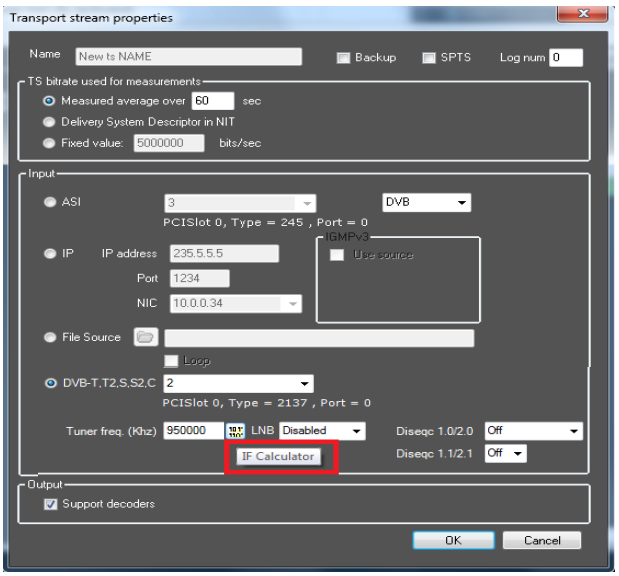
Decoder support AVC 4:2:2 (additional license)

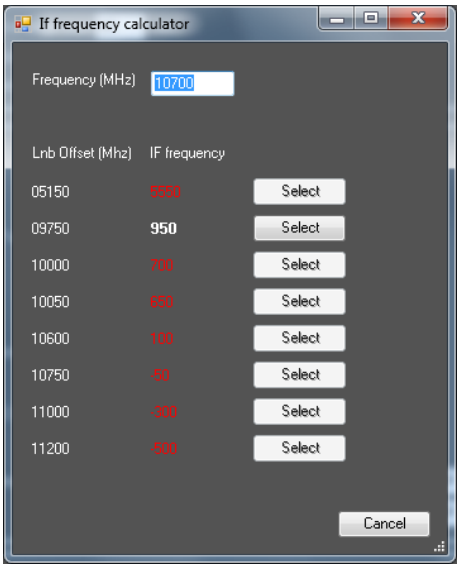
The Optional License is needed to decode AVC 4:2:2 coded Video in Multi-viewer or decode the Video PID for Black/Freeze Frame checks in Monitoring Mode.

Note: The Analyser information tab function is a standard function of the Probe.
The Probe will recognize and display the info values without having the optional AVC 4:2:2 License.

DVB S/S2 enrichment of features

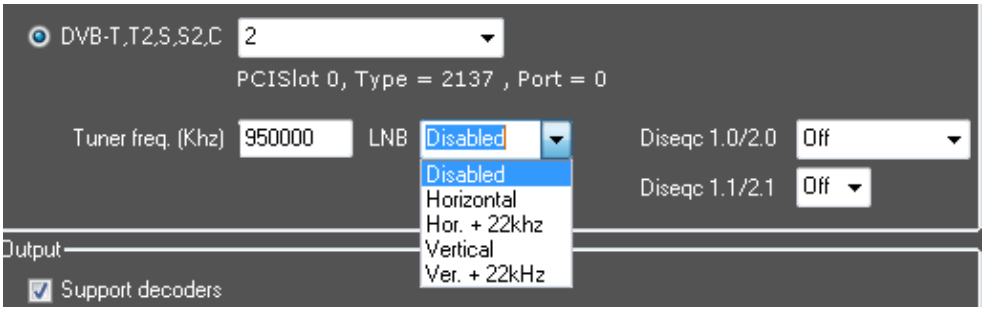
IF Calculator



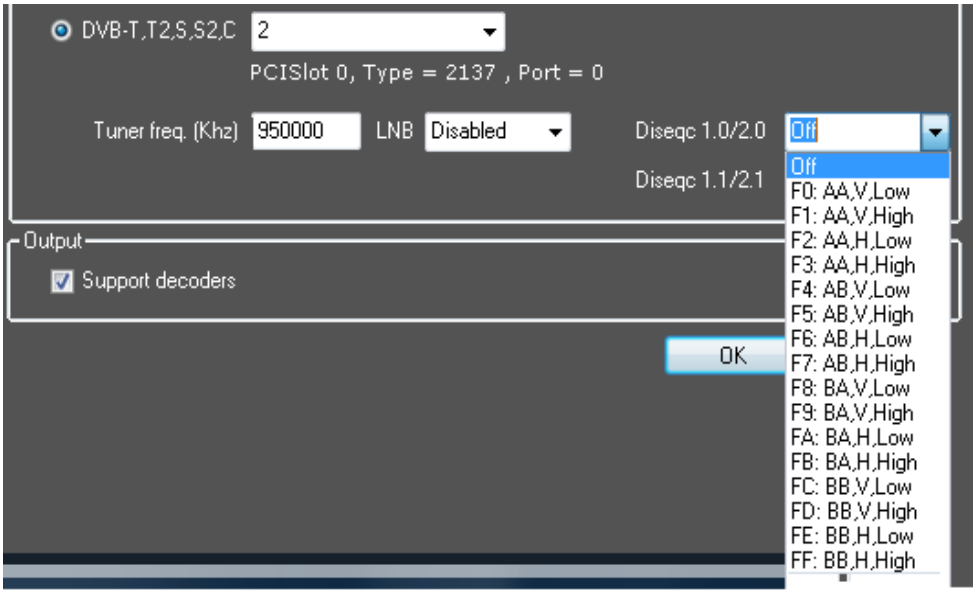


The mouse click at the button IF Calculator will trigger the IF frequency calculator window. The white indicated value is selectable by pressing the <Select> button.

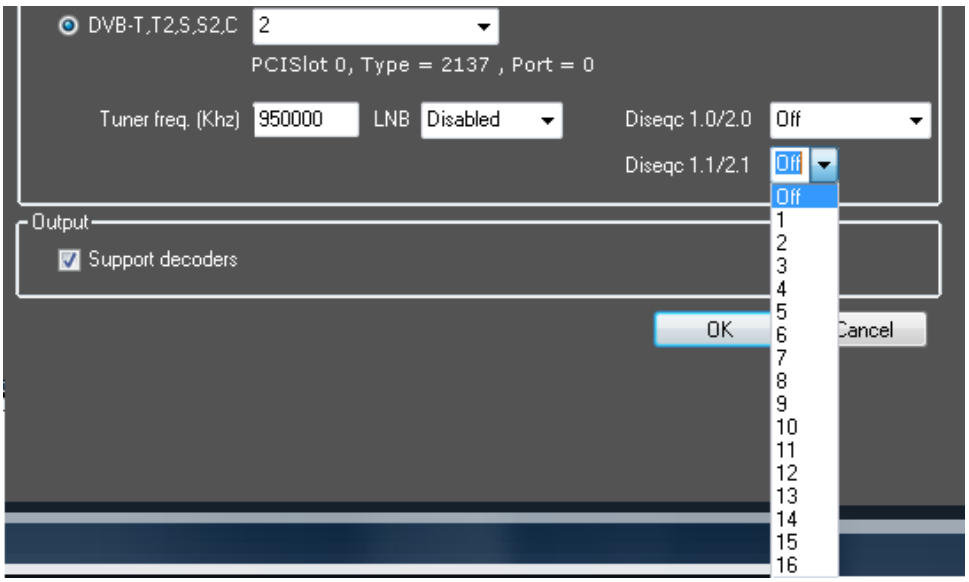
LNB Switch setting



Diseqc 1.0/2.0 setting



Diseqc 1.1/2.1 setting



Link Margin indication

Below are given the minimal carrier-to-noise ratio values required to lock the signal broadcast in DVB-S/S2 standard with QPSK/ 8 PSK/ 16 – 32 APSK modulation. C/N [dB] values differs because of FEC (Forward Error Correction) code rate.

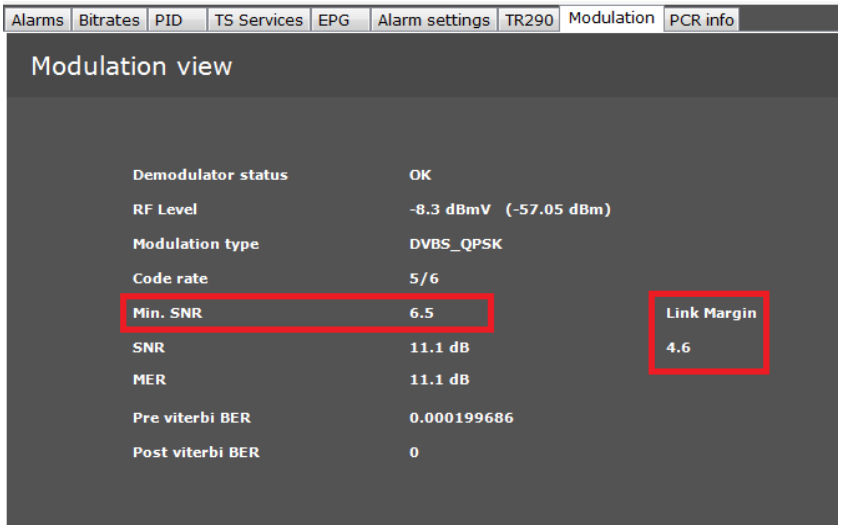
Minimum C/N at Modulation, FEC			
Standard	Modulation	FEC	C/N [dB]
DVB-S	QPSK	1/2	2,7
DVB-S	QPSK	2/3	4,4
DVB-S	QPSK	3/4	5,5
DVB-S	QPSK	5/6	6,5
DVB-S	QPSK	7/8	7,2
DVB-S2	QPSK	1/4	-2,4
DVB-S2	QPSK	1/3	-1,2
DVB-S2	QPSK	2/5	0
DVB-S2	QPSK	1/2	1
DVB-S2	QPSK	3/5	2,2
DVB-S2	QPSK	2/3	3,1
DVB-S2	QPSK	3/4	4
DVB-S2	QPSK	4/5	4,6
DVB-S2	QPSK	5/6	5,2
DVB-S2	QPSK	8/9	6,2
DVB-S2	QPSK	9/10	6,5

DVB-S2	8 PSK	3/5	5,5
DVB-S2	8 PSK	2./3	6,6
DVB-S2	8 PSK	3/4	7,9
DVB-S2	8 PSK	5/6	9,4
DVB-S2	8 PSK	8/9	10,6
DVB-S2	8 PSK	9/10	11
DVB-S2	16APSK	2/3	9
DVB-S2	16APSK	3/4	10,2
DVB-S2	16APSK	4/5	11
DVB-S2	16APSK	5/6	11,6
DVB-S2	16APSK	8/9	12,9
DVB-S2	16APSK	9/10	13,1
DVB-S2	32APSK	3/4	12,6
DVB-S2	32APSK	4/5	13,6
DVB-S2	32APSK	5/6	14,3
DVB-S2	32APSK	8/9	15,7
DVB-S2	32APSK	9/10	16,1
Source ETSI EN 302 307 & EN 300 421			

Table 1. C/N values in DVB-S/S2 system

In telecommunications, the carrier-to-noise ratio, often written CNR or C/N, is the signal-to-noise ratio (SNR) of a modulated signal. The term is used to distinguish the CNR of the radio frequency passband signal from the SNR of an analogue base band message signal after demodulation, for example an audio frequency analogue message signal. If this distinction is not necessary, the term SNR is often used instead of CNR, with the same definition.

source: ETSI, Wikipedia, satbroadcasts.com
based on: ETSI EN 300 421 V1.1.2: "Digital Video Broadcasting (DVB); Framing channel coding and modulation for 11/12 GHz satellite services"



The "Min. SNR" showed value is retrieved from a lookup table guide by Modulation type and Code rate collected out of the stream.

The Link Margin is the Actual SNR level minus the Min. SNR.

MIB adjustment

OID expansion

In Smart 2.6.x following items are added to the MIB:

Table	*Item*	*OID*
TS	internalTsID	.1.3.6.1.4.1.7829.5.1.2.1.1.354
Service	internalTsID	.1.3.6.1.4.1.7829.5.1.2.2.1.9
Service	internalSrvID	.1.3.6.1.4.1.7829.5.1.2.2.1.10
Component	internalTsID	.1.3.6.1.4.1.7829.5.1.2.3.1.15
Alarm	internalTsID	.1.3.6.1.4.1.7829.5.1.2.4.1.10
logmessageTrap	internal TsID	.1.3.6.1.4.1.7829.5.1.3.1000.15

This will enable following relations:

Trap	*Table*	*Relation based on:*
LogMessage	TS	internalTsID
LogMessage	Service	internalTsID, internalSrvID
LogMessage	Component	internalTsID, PID
LogMessage	Alarm	internalTsID, internalSrvID, PID, alarmID
EtrLevel	TS	internalTsID
EtrLevel	Service	internalTsID, internalSrvID

EtrLevel	PID	internalTsID, PID

Note: The new OID's are merged to the end of the initial OID's and should not interfere with existing setups. The new MIB file is available at request.

ANNEX 2

Information about NEW features in SMART DVB Product line

VERSION 2.7

Version 0.2
October 13th 2017

Introduction

The SMART DVB 10, 25, 50, 80, 90, XL and GATEWAY is introducing new standard functionality coming with Software release 2.7.x

11. Comprehended SoloControl support in SMART DVB.
12. User definable Global Alarm Audio decoder.
13. User definable Global automatic reset of Audio decoder.
14. User definable Global Alarm Video decoder.
15. User definable Global automatic reset of Video decoder.
16. User definable Global automatic reset of Video renderer, based at SyncOffset.
17. Upgrade to the "latest" Dektec drivers (September 2017).
18. New and changed "autosave" feature.

Note:

Upgrading from earlier versions than 2.7.x cannot be done without Dektec driver updates. Users with earlier versions, before 2.7, need to contact Dualz Solutions support for assistance (smartsupport@dualz-solutions.nl)

Comprehended SoloControl support in SMART

General explanation

SoloControl is a "thin client" application running on a Windows 7 or 10 professional Server, PC or Laptop.
SoloControl opens the control of a single Probe/Multiviewer in the network.
The User Interface (UI) is compatible with the host Probe/Multiviewer UI.
The introduced SoloControl version coming with software version 2.7 is almost with the complete control over the local Probe/Multiviewer.

Virtual KVM switch

With the SoloControl application there is no need any more for KVM, Remote Desk Top or VNC to control the settings or analyse you streams remotely. Showing the Multi-viewer output locally and control the Multi-viewer can be done from a separate location. Also Analysis of your Transport stream can be done simultaneously with the local Probe/Multiviewer.

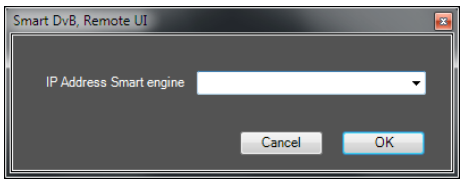
The SoloControl opens up the possibilities for:

- Desk control of Probe/Multi-viewers at remote screen
- Desk in-depth Analysis at remote screen
- Remote Configuration of Configuration Alarms and or Multiviewer setup
- Second/Third line support at remote screen

Security approach SoloControl

The approach of the SoloControl application is more secure than the KVM, RDP or VNC because there is no machine (server) control possible. The application is connected with the SMART Probe/Multiviewer application and is only exchanging propriety soap messages.

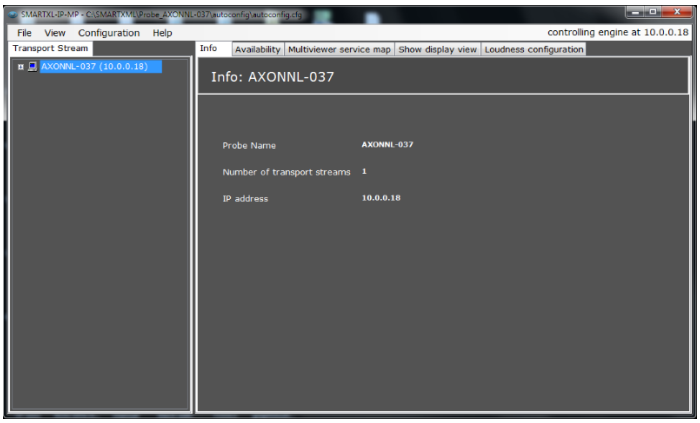
Activating Solo Control



After installing and starting the application entering the IP Address of Probe/Multiviewer will give you access.

In the pull down box earlier connections are remembered and selectable.

User Interface Solo Control



The UI of SoloControl will pop up and will give you the information which engine (Probe/Multiviewer you are controlling. The message is in right top corner.

The controls are the same as in the local UI.

It is also possible to use the Gateway/View and the local UI in parallel operation.

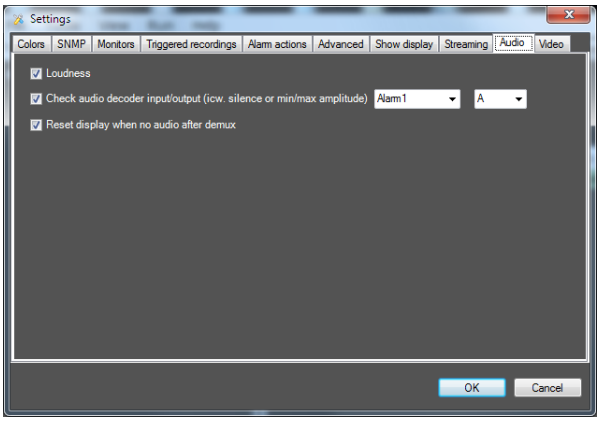
Functionality

- All the Analyze functions and features are available
- All the Monitoring and Alarm settings are available
- All the Application System settings are available
- All the Multiviewer creation and editing features are available
- All the local Probe Alarms are available

Audio

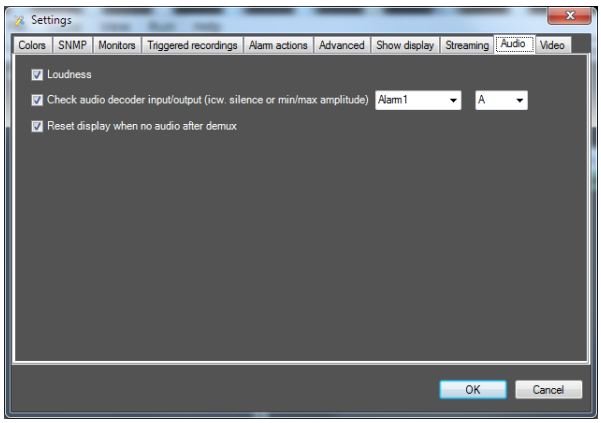
User definable Global Audio decoder Alarm

The User definable Global Audio decoder Alarm, when selected, checks the availability of the data at the input/output of the Audio decoder. The checks are in corporation with the Audio Silence and or Audio Min/Max level Alarms. The standard Alarming of the Audio Silence and Min/Max Level Alarms are based on the sample value coming from the decoder. In case of "No Samples" the Silence and level Alarms will not be triggered. When selecting the Global Audio decoder setting the selected Alarm level (1-5) and category (A-E) will display an Alarm/log when the decoder has "NO input/output" for the Audio decoder Components belonging to the Service.



User definable Global automatic reset of Audio decoder

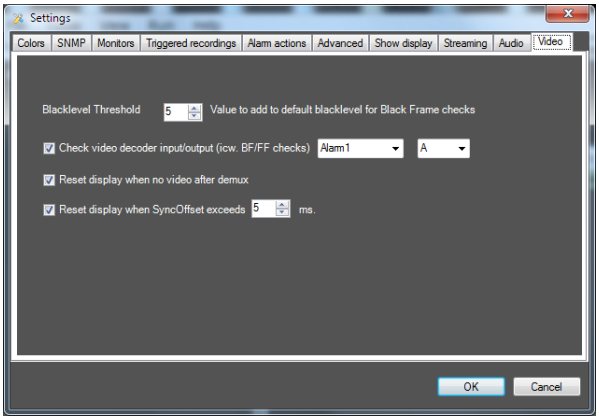
The User definable Global automatic reset, when selected, checks the availability of the data at the output of the de-multiplexer. In case of "No Samples" of Audio the automatic reset refreshes the data stream.



Video

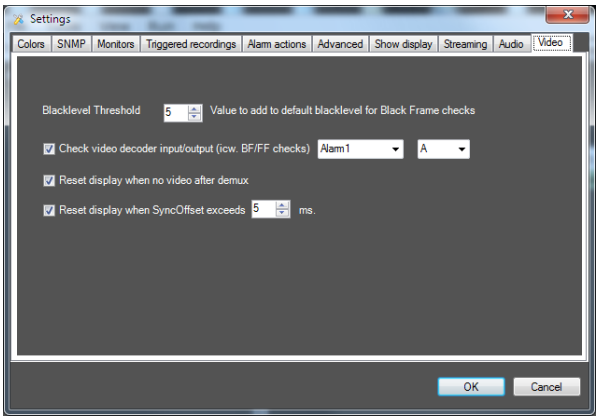
User definable Global of Video decoder Alarm

The User definable Global Video decoder Alarm, when selected, checks the availability of the data at the input/output of the Video decoder. The checks are in corporation with the Video Black and Freeze frame Alarms. The standard Alarming of the Video Black and Freeze frame Alarms are based on the sample value coming from the decoder. In case of “No Samples” the Video Black and Freeze frame Alarms will not be triggered. When selecting the Global Video decoder setting the selected Alarm level (1-5) and category (A-E) will display an Alarm/log when the decoder has “NO input/output” for the Video decoder Components belonging to the Service.



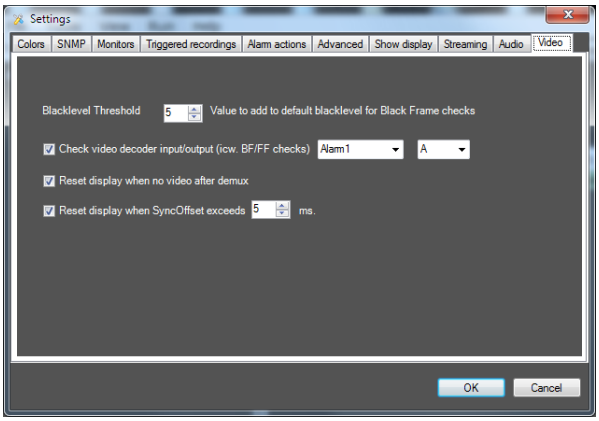
User definable Global of reset of Video decoder

The User definable Global automatic reset, when selected, checks the availability of the data at the output of the de-multiplexer. In case of “No Samples” of Video the automatic reset refreshes the data stream.



User definable Global of reset of Video renderer, based at SyncOffset

The User definable Global automatic reset, when selected, checks the SyncOffset of the data at the output of the render. In case of "SyncOffset" of Video the automatic reset refreshes the data stream. This function is the automatic variant of the "reset" option at the Video tile in ShowView and the Multiviewer.

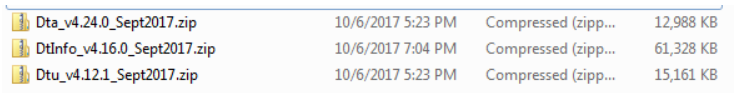


Note: The next renderer "reset" has a threshold of 30 seconds.

Driver update's

Update to the "latest" Dektec drivers September 2017

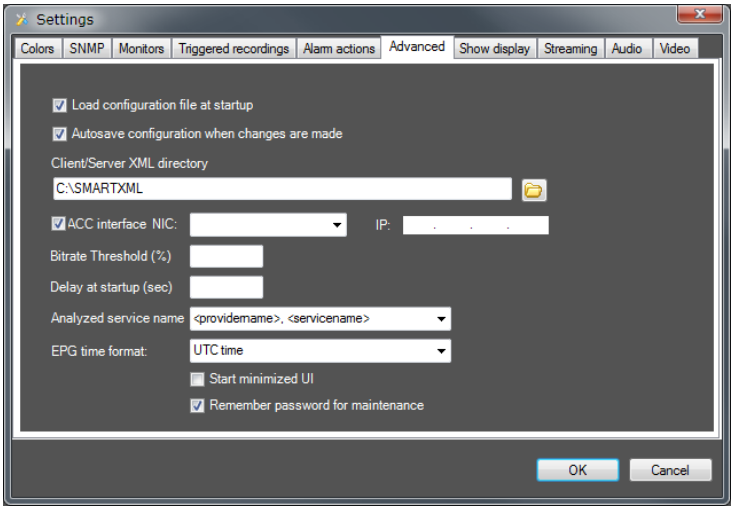
From SMART DVB version 2.7.x SMART DVB is compliant to the latest Dektec drivers:



AUTOSAVE

Extended "Autosave" configuration file(s)

SMART DVB had already the possibility to "auto save" the configuration settings. But the "old" function was overwritten by the newer configuration file. The new approach is explained below:



The auto load/save file will always be: <SMARTXML-share>\Probe_<ProbeName> \AutoConfig\autoconfig.xml

Fe: C:\SMARTXML\Probe_SMART001\autoconfig\autoconfig.xml

When an autosave occurs, a backup of previous file will be made. Old backups will be saved with the extensions .001 up to .009

Besides these 9 “last files” also a backup will be saved under:
- hh.xml (backup of configuration every hour of current day, when changes were made)
- yyyymmdd.xml (backup of configuration each day, when changes were made)

This ensures that there are backups of the configuration for every hour of the current day, and for every day, when changes were made.

The backup file folder will show the last 10 Day files, when changes were made.

ANNEX 3

Information about NEW features in SMART DVB Product line

VERSION 3.0

Version 0.1
February 08 2020

General

The SMART DVB Lite, 10, 25, 50, 80, 90, XL and GATEWAY is introducing new standard functionality coming with Software release 3.0.x

1. Introduction of SMART DVB Lite (Demo licenses).
2. Name change of SMART DVB in SMART DVB Pro.
3. Upgrade 3.0.x needs a new updated License key
4. SMART DVB Pro 64 bit Multi-viewer
5. Update your Hardware for optimal use of your SMART DVB Pro software
6. Upgrade to the “latest” Dektec drivers (September 2019).

Note:
Upgrading from earlier versions than 3.0.x cannot be done without Dektec drivers and Dualz License key update.
Users with earlier versions, before 3.0.x, need to contact Dualz Solutions support for assistance (smartsupport@dualz-solutions.nl)

Introduction SMART DVB Lite

SMART DVB Lite is a new product in the SMART DVB suite. The Lite version is a stand alone software package, based on the original SMART DVB Pro appliance software.

SMART DVB Lite is meant to install it yourself at your own windows OS based hardware.

SMART DVB Lite is a limited version of the SMART DVB Pro.

The limitation is based on:

- The non-connectivity to the Gateway ACC & SDC.
- The non-existing of add-on licenses:
  - Streaming SPTS
  - Loudness
  - Dolby AC3
  - Triggered recording
  - Gateway connection
  - Reporting function
  - Alarm collection
  - E-mail function
  - Solo Control
  - Multi Probe Control
  - Web server function
  - Multi-viewer 64 bit

- Multi-viewer Control UI
- Ad on TS Streams

SMART DVB Lite is also available in demo variety. The demo version is file based Transport Stream only.
The demo variety is available on request. Please mail to info@dualz-solutions.nl or request on the website www.dualz-solutions.nl

Name change SMART DVB to SMART DVB Pro

From version 3.0.x the appliance SMART DVB is named SMART DVB Pro.
SMART DVB Pro is an appliance and is a combined product of hardware and software

Upgrade to SMART DVB Pro needs new License key

From version 3.0.x the SMART DVB Pro needs a new license key. If you have the wish to upgrade from an earlier SMART DVB version please contact Dualz-solutions for support.

SMART DVB Pro 64 bit Multi-viewer

The new SMART DVB Pro multi-viewer is an additional separate executable. The Multi-viewer software is running at the Probe device and is automatically collecting and sharing settings and streams between both applications. The Pro multi-viewer has his own Multiviewer control UI.

Compatibility between multi-viewer V2.9 and V.3.x
The Pro multi-viewer is compatible with the earlier SMART DVB multi-viewer. Most of the “old” base settings will be translated to the Pro version. Only the new options needs to be adjusted

New features and advantages of Pro multi-viewer:

- Instant availability no render delay
- Each tile is having own process
- Multi Audio bar display, up to 16 bars
- Each tile has selection of number of audio displays
- Audio bar display Left, Right or on both sides
- In Audio bar PID number and or Language notification
- Audio Bar display sorted by:
  - PMT order
  - PID number
  - Language (Alphabet)
- Audio Bar scale adjustable
- Audio Bar Red and Yellow scale background adjustable in color and starting point

- Horizontal Audio bars are available
- Audio Bars are transparent if overlaying the Video (transparency is globally adjustable)
- Each multi-viewer tile has an option to have an UMD in Overlay on top on video or below the Tile. (Each tile has his induvial setting)
  The UMD %size, Transparency, background color and font color is globally adjustable.
- Each tile has Alarm border to indicate the Warning (RED, Attention (YELLOW) and No-Alarm status (GREEN). (you can globally change the colors and border size)
- Each tile has the option to switch on up to 4 tally indicators to indicate extra status attention or indicate the Service and TS alarm status.
- Globally definable time in seconds for flashing border for new Alarms. This creates more attention for new alarms on screen.
- Each tile will indicate additional messages on top of the tile in overlay in case of:
  - no decoder output
  - no demux output
  - scrambled video
  - PCR pid
  - no program
- Switching the Probe from “Run” to “Configuration” will not have impact on de Multi-viewer output (in case of working with separate screen for Probe and Multiviewer or running SoloControl of different PC)
  Adding or removing a tile will be direct after uploading the new setup in the Probe.
- Easy JSON file control for globally settings
- On screen options. Pressing right mouse click onto UMD or Audio Bar opens up a tile menu. In this menu you can select:
  - which Audio PID you want to listen or switch off
  - Which DVB Subtitling PID you want overlay on tile or switch off
  - Which TXT Subtitling PID you want overlay on tile or which TXT page you want or switch off
  - Switch to Full size screen. (double mouse click will you back to Multi-viewer again)
- Using the Multi-viewer control UI you can control the above function in a separate application which is run able on a windows 7/10 0S device connected to LAN of the Multiviewer.
  The Multi-viewerControl UI can also be used for multiple operators remotely or on the same desk. In combination with SoloControl you will have full control over the Probe to Analyse, monitor and config the MV remotely, without using VNC or RDP applications.
- Load balance option for selecting CPU or GPU processor to decode the Video.
  Default the GPU will handle the decoding to display the video tile by selecting induvial Tile in Preset editor you can load balance the GPU/CPU performance. (use in win 10 the Task manager with performance view to display the CPU and GPU load) In older OS version e.g. Win 7 you will need to install e.g. TechPowerUp GPU-Z tool to see what the GPU load is.

SMART DVB Pro 64 bit Multi-viewer hardware update support

- Dualz- solutions b.v. is offering to adjust or upgrade your SMART DVB 80, 90 or XL hardware. Please contact info@Dualz-solutions.nl

Request for upgrade to SMART DVB Pro V3.x.x

- Dualz- solutions b.v. is offering to upgrade your SMART DVB to SMART DVB Pro V3.x.x. Please contact info@Dualz-solutions.nl