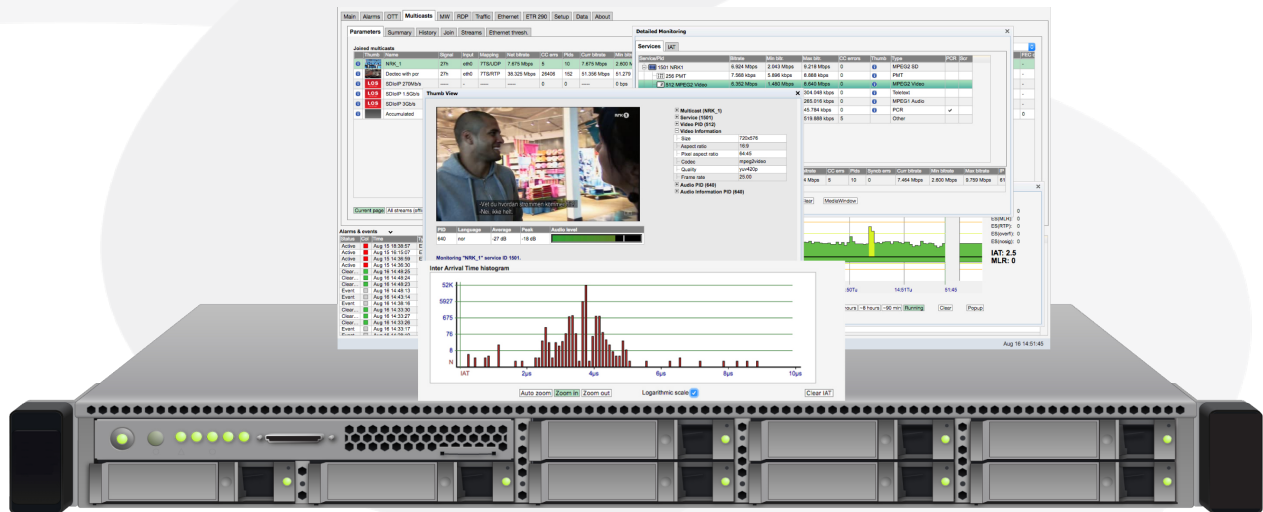




VB220-SW GigE Software Probe

Applies to software release v7.0

Form XXXX • March 2026

VB220-SW GigE Software Probe User's Manual
Revision 5805bfa7 (2026-03-20)

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Document Revision History

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March 2026	7.0	Updated manual to reflect changes in v7.0 software
February 2025	6.5	Updated manual to reflect changes in v6.5 software
August 2024	6.4	Updated manual to reflect changes in v6.4 software
March 2024	6.3	Updated manual to reflect changes in v6.3 software
June 2023	6.2	Updated manual to reflect changes in v6.2 software
February 2022	6.1	Updated manual to reflect changes in v6.1 software
November 2020	6.0	Updated manual to reflect changes in v6.0 software
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February 2019	5.5	Updated manual to reflect changes in v5.5 software
February 2018	5.4	Updated manual to reflect changes in v5.4 software
February 2017	5.3	Updated manual to reflect changes in v5.3 software
March 2016	5.2	Updated manual to reflect changes in v5.2 software
February 2015	5.1	Updated manual to reflect changes in v5.1 software
January 2014	5.0	Updated manual to reflect changes in v5.0 software

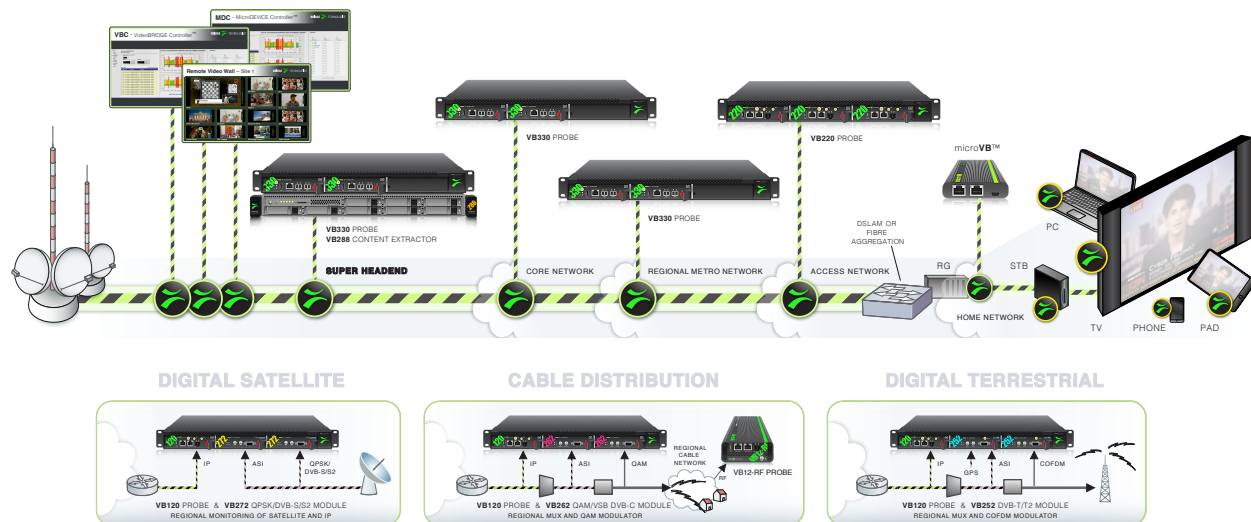
1 INTRODUCTION

1.1 About the Software Probe

1.1.1 Probe – Overview

The VB220-SW Software Probe enables full confidence monitoring of 2 Gbit/s spread across video interfaces, with optional upgrade to up to 10 Gbit/s. It provides detailed IP packet monitoring of up to 260 IP multicasts as well as T2MI analysis, L2TP analysis and monitoring of up to 200 Secure Reliable Transport (SRT) streams.

The OTT software option is available on the VB220-SW and enables monitoring of up to 50 adaptive bitrate channels in steps of 10 depending on license activated. Supported streaming formats include Apple™ HLS, Microsoft™ Smoothstream, RTMP, MPEG DASH, Adobe™ HDS and Nullsoft SHOUTcast™.



The ETR 290 software option performs extended ETSI TR 101 290 analysis, enabling detailed transport stream monitoring, including verification of PSI/SI and bitrate monitoring for individual services and service components.

A built-in web server in the probe allows remote signal monitoring using a standard web browser. This can be managed either through a separate Ethernet network, or by using the regular video/data network – both IPv4 and IPv6 are supported on the management interface.

The probe can also be managed via the VideoBRIDGE Controller – a centralized server management solution. The VBC adds management features like alarm aggregation and report functionality as well as centralized access and user roles.

The Software Probe is a server appliance, that can be installed onto any server that meets the minimum requirements specified in chapter 3.

In subsequent text the word probe is used as a generic reference to VB220-SW.

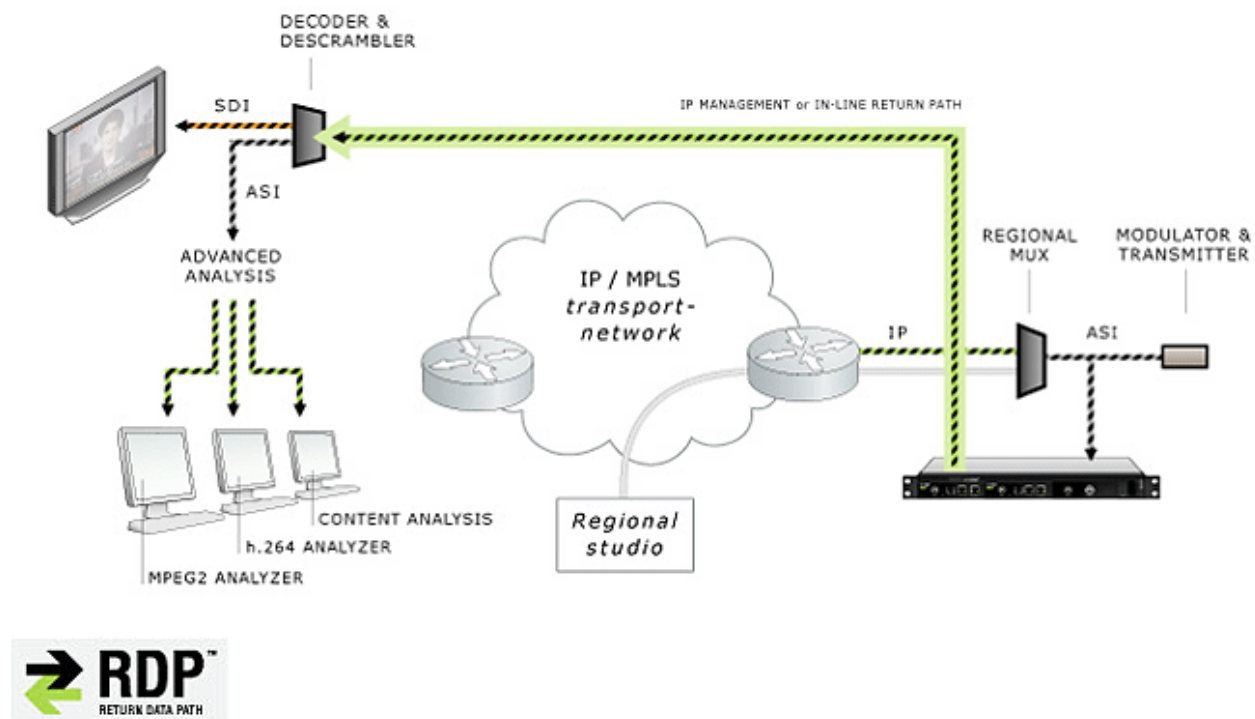
1.1.2 Software Probe – Functionality

An IP-based network is fully transparent with respect to signal contents quality, provided that the IP packets arrive, and provided that they arrive in time. The Software Probe therefore uses the patented MediaWindow to allow monitoring at-a-glance of packet loss and errors in inter-packet arrival time. This way the operator can conveniently ensure correct signal quality at IP-level.

The advanced Ethernet protocol analysis tool automatically detects all protocols carried over Ethernet past the port the Software Probe is connected to, and it displays statistics like percentage utilization of the interface and percentage of the different transported protocols. This gives the Software Probe a real-time sniffer capability.

The Software Probe allows the user to define a Return Data Path (RDP), using the regular video/data network or the management network to return a stream. A faulty signal can then be further analyzed at the studio premises, when necessary.

The recording functionality allows the user to record a stream, either triggered manually by the user or triggered by a user-defined alarm.



Full Service Monitoring (FSM) checks that vital system components like CA-servers are active.

Optional Ethernet TR 290 monitoring allows the operator to check parameters like transport stream sync and PSI/SI standards conformity. This option also performs further PSI/SI analysis, making it possible to view PSI/SI contents. PID and service bitrates are also continuously measured.

Optional OTT monitoring allows the operator to set up active testing of Over-the-top type signals as found in adaptive bitrate streaming architectures. Formats supported include Apple TM HLS, Microsoft TM Smoothstream, RTMP, MPEG DASH, Adobe TM HDS and Nullsoft SHOUTcastTM.

The Software Probe can be expanded through license options to monitor the T2MI protocol layer as found in DVB-T2 networks.

The Software Probe can also be licensed with an SCTE 35 option that allows monitoring and logging of splice time codes embedded in the transport streams.

The Content Extraction and Analysis option adds QoE monitoring, including freeze-frame, MOS and VMAF scoring, closed caption and audio level monitoring, thumbnail and metadata extraction, as well as Encoder Boundary Point monitoring. The Timeline view includes an analysis capability for an enormously data analysis technology that allows users to play through recorded data in an NLE-style Timeline display to observe correlations and patterns of errors occurring over any time period.

1.2 How to Use This Manual

This User's Manual is valid for software version 7.0 of the VB220-SW Software Probe.

Throughout this manual the term stream is often used rather than unicast or multicast. One stream may consist of one or more services, and refers to one IP stream received as a uni- or multicast or over an SRT connection. When the term multicast is used in this manual, it explicitly refers to a stream arriving over the network as a multicast or unicast, including unicasts that use the SRT protocol.

Chapter 2 **PRINCIPLE OF OPERATION** provides a simplified block-diagram overview of the probe.

Chapter 3 **INSTALLATION AND INITIAL SETUP** explains how to install the software on a server.

Chapter 4 **QUICK SETUP GUIDE** contains a quick setup guide; a step-by-step description of how to setup the Software Probe once the initial setup has been performed.

Chapter 5 **SOFTWARE PROBE GRAPHICAL USER INTERFACE** describes the graphical user interface (GUI) as seen when pointing a web browser to the Software Probe's IP address.

Chapter 6 **EXPERT PROBE GRAPHICAL USER INTERFACE** describes the expert view, which is used to configure and dive deeper into the features of the VB220-SW.

A **Appendix: VB220-SW Versus VBC Alarms** describes the alarm handling in the Software Probe versus the VideoBRIDGE Controller.

B Appendix: Monitoring Practices explains some useful monitoring practices.

C Appendix: OTT Profile Health explains the OTT profile health bar and timeline.

D Appendix: Network configuration gives a brief introduction to the server OS network configuration.

E Appendix: Enabling NTP time synchronization provides some basic information about setting up time synchronization.

F Appendix: SRT Streams provides a quick introduction to SRT (Secure Reliable Transport).

G Appendix: On-line License Activation outlines the on-line license activation procedure.

H Appendix: Software Maintenance briefly describes software maintenance licenses and how they are used.

I Appendix: Software Upload explains how to upgrade the software on the Software Probe.

Note that current version of the User's Manual can be obtained from Sencore ProCare support by emailing procare@sencore.com.

2 PRINCIPLE OF OPERATION

The VB220-SW Software Probe can utilize all the network interfaces on the host system. The user selects which interface to be used by the monitoring engine. Management of the Software Probe is configured in the operating system web server setup¹.

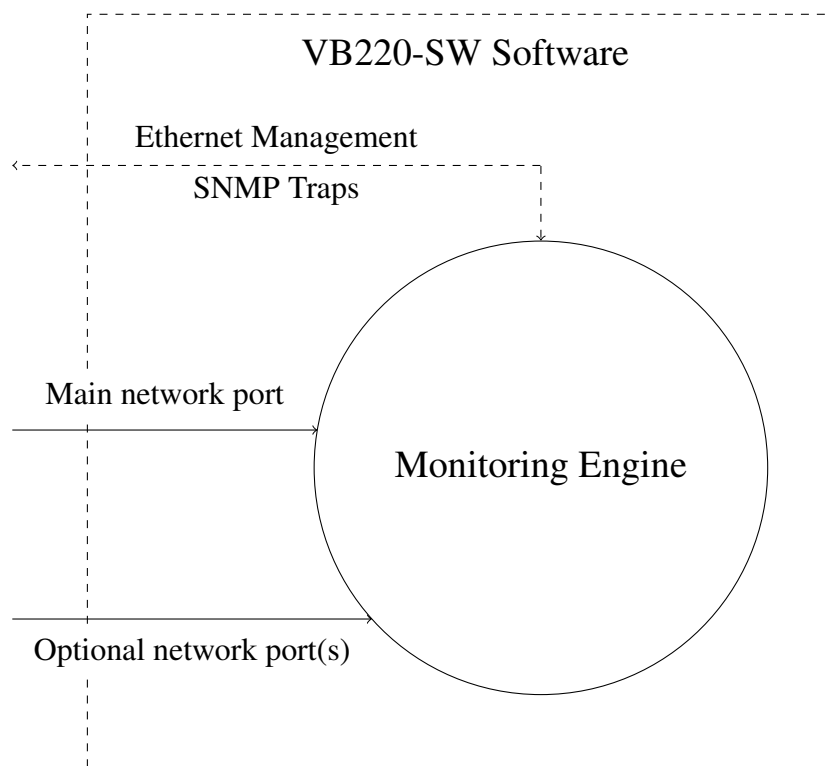


Figure 2.1: The VB220-SW Software – Principle of Operation

A simplified diagram of the alarm handling mechanisms of the Software Probe is shown in figure 2.2. The input signals are continuously analyzed, and measured data are checked against user-defined threshold values. If the data do not comply with the threshold values alarms will be generated. The overall alarm settings further make it possible to enable and disable alarms, thus defining which alarms should be reported in the Software Probe alarm list and sent as SNMP traps to an external management system.

¹<https://ubuntu.com/server/docs/how-to-configure-nginx>

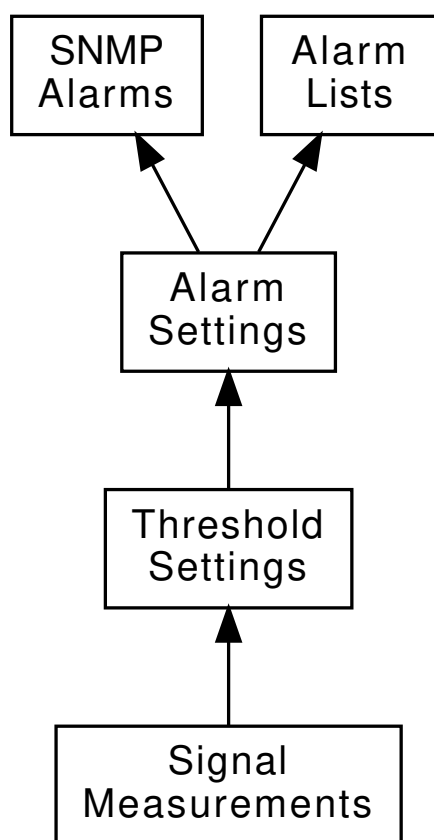


Figure 2.2: Simplified Diagram of the Alarm Handling in the Software Probe

3 INSTALLATION AND INITIAL SETUP

These instructions apply when installing the Software Image. The Appliance Server comes with the software pre-installed, please skip directly to chapter 3.4.

3.1 System Requirements

Please refer to the web site at <https://www.sencore.com/> for the currently recommended hardware. The Software Probe can be license upgraded to a higher bitrate independently of the hardware. It may thus be useful to obtain better hardware which allows for future license upgrade.

Supported platforms:

- Ubuntu 24.04 LTS for x86_64

Check the release notes available for the currently installed software version before updating to a new operating system release.

3.2 First-time Installation

Make sure that the server hardware or virtual environment matches the requirements and then follow the procedure outlined below.

The VB330 Appliance comes with the software already installed, and you can continue directly to chapter 3.3.

This manual details installation on Ubuntu Server 24.04 LTS. For more details, please refer to the Ubuntu Server installation guide¹.

3.2.1 Obtaining and preparing the installation media

Obtain the latest installation ISO image from Sencore. The same installation media is used for Ubuntu Server and Ubuntu Server Pro installations. If you have an Ubuntu Pro subscription, you can enter the subscription details during the installation procedure.

To install from a USB mass storage device, transfer the downloaded image to the device using a tool such as **dd** (macOS, Unix, Linux), **Rufus**² (Windows) or **Etcher**³ (macOS, Windows, Linux).

¹<https://ubuntu.com/server/docs/how-to>

²<https://rufus.ie/>

³<https://etcher.io/>

The Ubuntu documentation⁴ has a step-by-step guide on how to create a bootable USB stick, just remember to use the ISO file you just downloaded and not the one linked from the guide.

Once the USB device is prepared, please continue to chapter 3.2.4. For installation in a virtualized environment, please continue to chapter 3.2.2.

3.2.2 Deploying in a virtualized environment

It is also possible to deploy the software in a virtualized environment. For optimal performance, check the processor configuration of **cores per socket** on your host server and use the same configuration setting of cores per virtual sockets on the virtual machine.

For accurate measurements, you must configure the data network interface card(s) in **pass-through mode** on the host server. To reduce the chance of performance-related issues if you nevertheless need to use a virtual network interface, make sure each Software Probe has its own data interface(s).

If using the Software Probe with the multi-stream recording feature, we recommend creating a separate virtual disk and allocating this for recorded data. Mount the disk at `/opt/btech/probe/storage/recordings` and verify that it is identified as *Mounted filesystem* in the **Record – Dashboard** view.

If using the Software Probe with the Timeline feature, you may also want to create a virtual disk for Timeline data using `/opt/btech/probe/storage/database` as the mount point.

To install the software in the virtualized environment, please attach the downloaded ISO image to a virtual DVD-ROM unit and follow the steps in chapter 3.2.4. We recommended **disabling** any ‘Easy install’, ‘Unattended install’ or similarly worded option, and *not* selecting the operating system type when initially creating the new virtual machine instance in your virtualization environment. These options may override the installation instructions included in the provided installation image, causing an incomplete installation.

3.2.3 Obtaining and installing pre-built virtual images

Pre-built images for VMware (vSphere/Workstation/Player) are provided in OVA (Open Virtualization Format Archive) format. These images contains a system already installed according to the steps below, with VMware Tools already installed and activated.

To deploy the image, you need to import it to the virtualization host, please refer to the documentation of your virtualization environment for more details on how to do this.

If installed in a VMware vSphere environment, the machine should report back its network configuration to the host environment. Please allow some time for it to do so, and then continue to chapter 3.3.

⁴<https://ubuntu.com/tutorials/create-a-usb-stick-on-ubuntu>

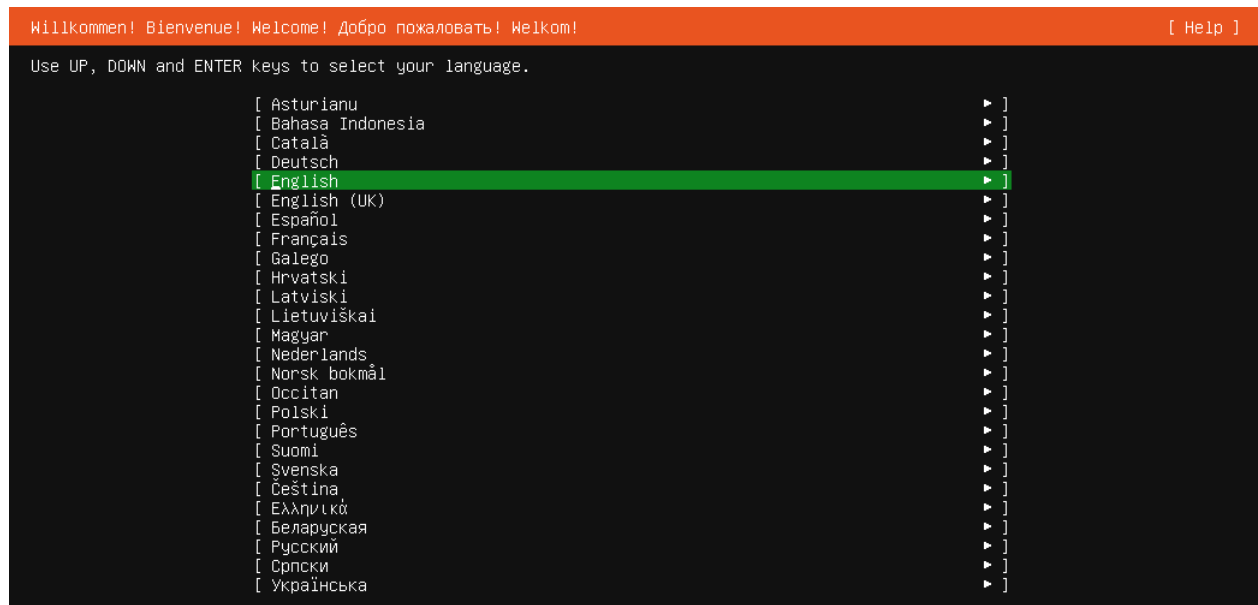


Figure 3.1: Welcoming screen

3.2.4 Installing from provided installation media

The installation media will install Ubuntu Linux Server 24.04 LTS on the server. The disks will be formatted and all contents lost. Make sure that any important data on the server has been backed up before beginning the procedure.

1. Boot the server and make sure that the primary boot device is set appropriately.

The installer will run, showing a screen similar to the one depicted in figure 3.1. Some of the steps described in the Ubuntu Server installation guide will be skipped over, with the appropriate settings applied. Please follow the on-screen prompts to install the system:

2. First select the language in which to run the installer, and then which keyboard layout to use to navigate the installer, selecting 'Done' to continue.

Please note that all screenshots and descriptions in this installation manual describe the English user interface, but all settings should be available independent of the language selected.

3. Configure your network devices as needed to reach the internet, see figure 3.2.

If a proxy is required on your network to reach the internet, provide the address in the next step. The connection will be tested and once ready, select 'Done' to continue.

The installer will be able to run without an internet connection, in this case select 'Continue without network'.

Post-installation network configuration can be performed using the **nmtui** utility, please refer to D Appendix: Network configuration for details.

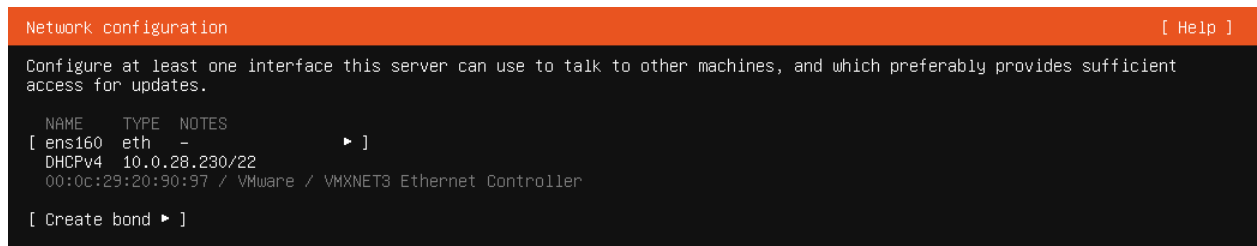


Figure 3.2: Network configuration

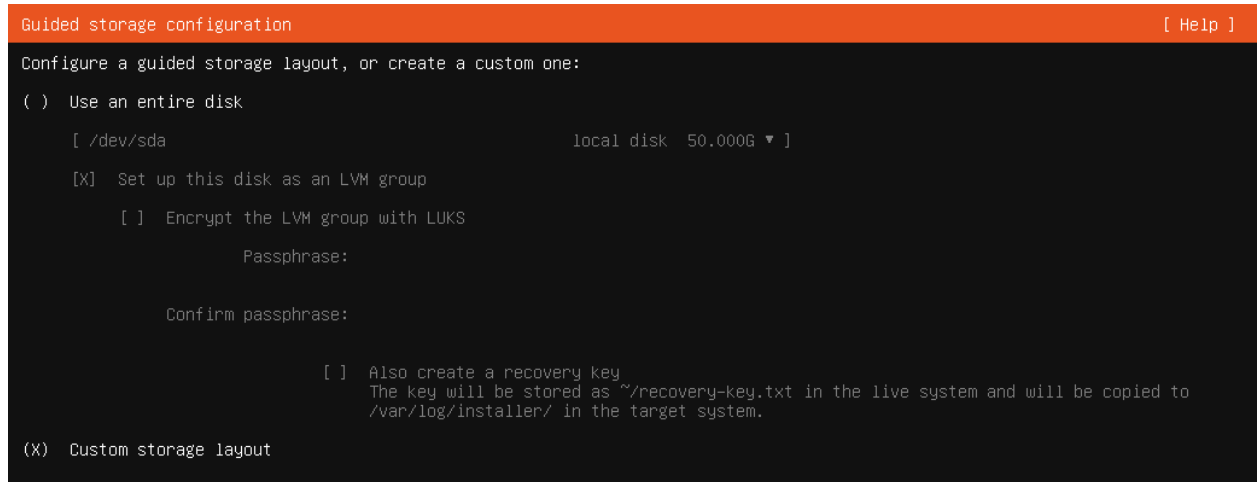


Figure 3.3: Select ‘Custom storage layout’

- Next, configure the partitioning. We recommend selecting ‘Custom storage layout’ (figure 3.3) and configuring the partitioning manually, as the automatic partitioning often leaves parts of the hard disk unused.

We recommend not using a swap partition when using the Software Probe, as this can interfere with the real-time operation of the software.

If you are installing on a system with pre-existing partitions, volumes and/or RAID devices, you will need to select ‘Delete’ on each of these in turn to remove them before continuing. If you are unable to remove specific partitions, highlight the disk itself and select ‘Reformat’ to clear all partitions on the disk. When installing from USB, the USB device will be displayed in this list. It will be marked as ‘in use’ and cannot be deleted.

- For the drive intended for the OS, select ‘Use As Boot Device’. Compare figure 3.4.
- Select ‘free space’ on the same device. In the pop-up menu, select ‘Add GPT Partition’ and create a partition of 1G, formatted as xfs at mount point /boot. Select ‘Create’ to create the partition, see figure 3.5.
- Again, select ‘free space’, open the pop-up menu and select ‘Add GPT partition’. Leave the Size field blank (to assign the maximum available), set format to ‘Leave unformatted’ and select ‘Create’ to create the partition, see figure 3.6.

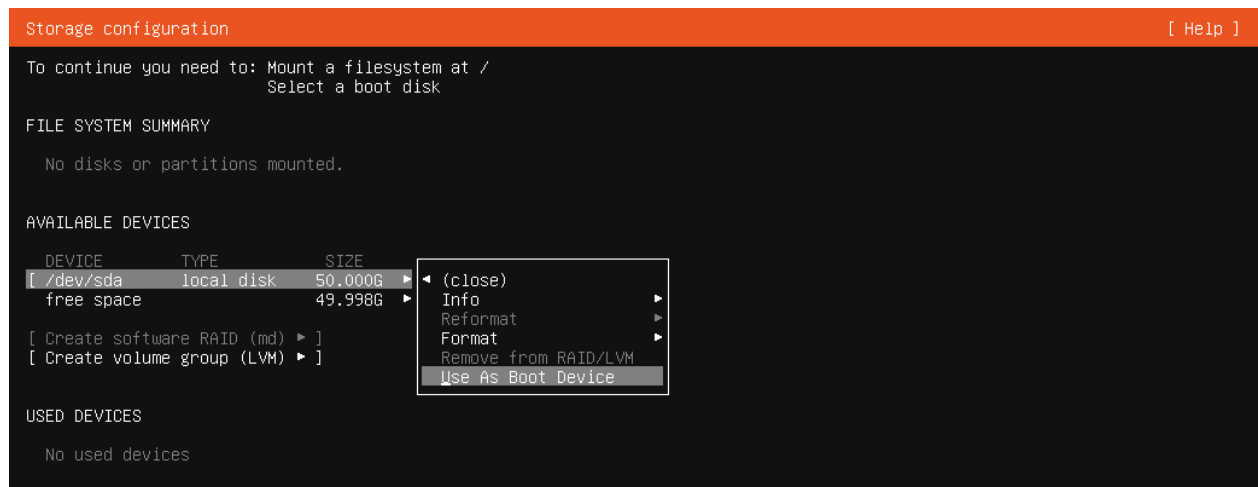


Figure 3.4: Select boot device



Figure 3.5: Create boot partition



Figure 3.6: Create space for volume group

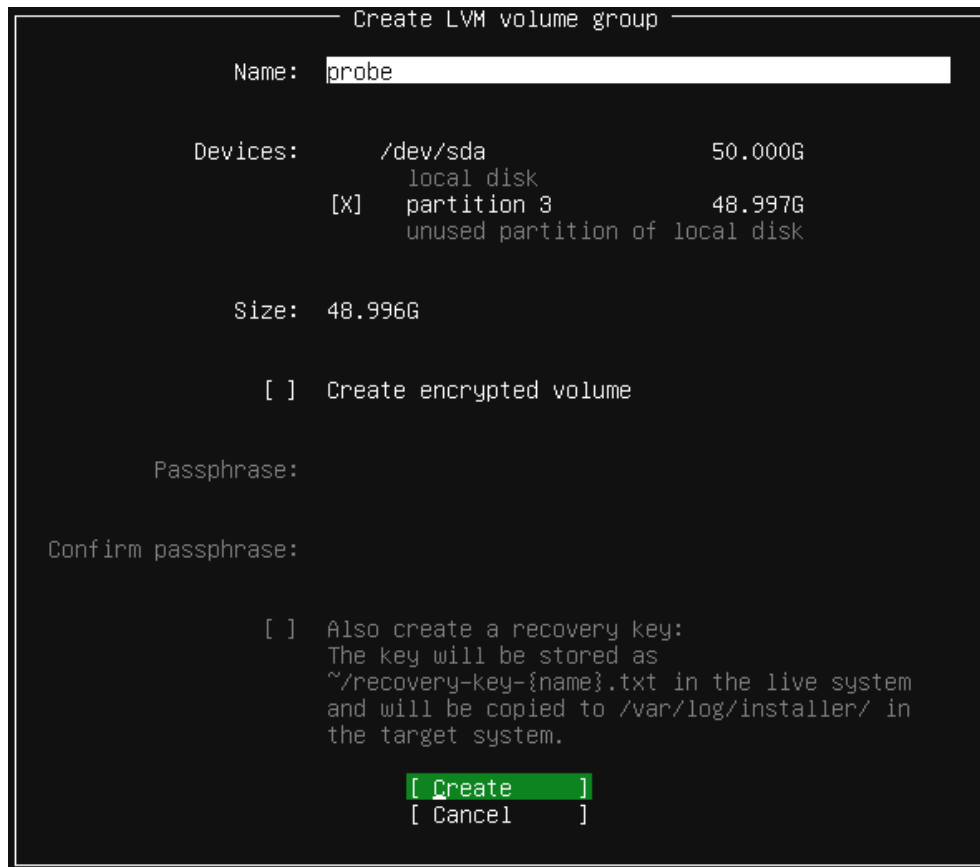


Figure 3.7: Create volume group

- Select 'Create volume group (LVM)', selecting the partition created in the previous step. Select 'Create' to create the LVM volume group, see figure 3.7.

- Next, determine the amount of storage to set aside for the multi-stream recording feature, and possibly also the Timeline feature, if licensed.

To create a Timeline storage volume on a pair of disks using RAID mirroring, only set up the multi-stream recording partition now, and instead use the 'Disk Manager' option in the administrative interface after finishing the installation.

Unless using dedicated disks, as a rule of thumb, we can assign half the disk to the system and half to the multi-stream recording feature, or one-third each to the system, multi-stream recording feature and Timeline feature.

By creating the volumes using logical volumes, they can easily be extended later by adding additional storage space.

- To create the volumes for the multi-stream recording and Timeline features, select 'free space' under the 'NN (new)' device (where *NN* is the name you gave it in the previous step) or select the second attached drive as described in 3.2.2. Select 'Create Logical Volume', naming it 'recordings' for multi-stream recording and 'database' for Timeline.

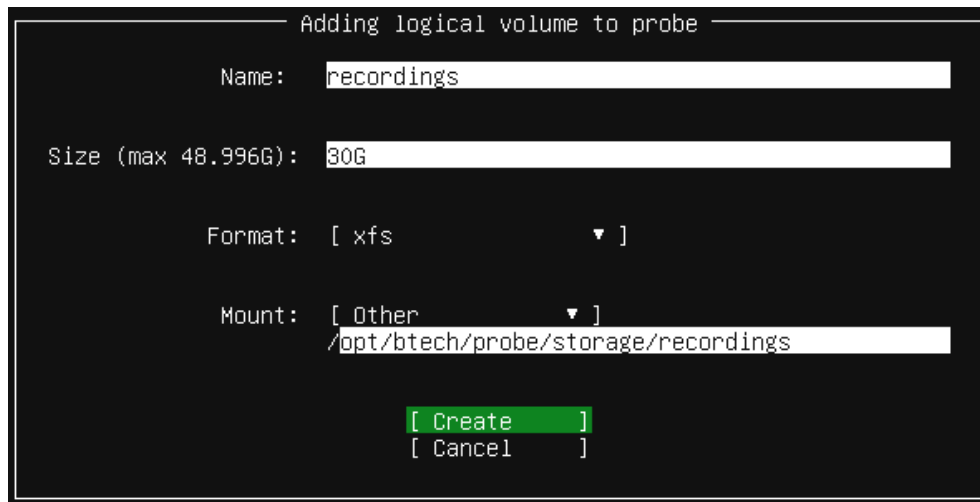


Figure 3.8: Create multi-stream recording volume

Assign the determined available space for the partition if creating a logical volume on the shared disk, or leave the size field blank to assign all available space if creating the volume on the second attached drive.

Set the format to 'xfs' and set the mount point by choosing 'Other' and selecting /opt/btech/probe/storage/recordings for multi-stream recording and /opt/btech/probe/storage/database for Timeline. The configuration should look similar to figure 3.8. Select 'Create' to create the logical volume.

- Select 'free space' under the 'NN (new)' device (where *NN* is the name you gave it in the previous step). Select 'Create Logical Volume'. Name it 'root', leaving the size field blank (to assign the maximum available), and setting format to 'xfs'.
The configuration should look similar to figure 3.9. Select 'Create' to create the logical volume.

- The storage configuration should look similar to figure 3.10. Accept it by selecting 'Done'.

Confirm that you want to apply the changes by selecting 'Continue'.

5. Next, create the administrative user and password, see figure 3.11. This is used later to log in to the administrative interface.
6. If you have an Ubuntu Pro subscription, enter it here, as seen in figure 3.12. Otherwise, select 'Skip for now'.

To attach an Ubuntu Pro subscription later, enter `pro attach` at the command line and follow the on-screen prompts.

7. To be able to log in remotely to the system, select 'Install OpenSSH server' in the SSH configuration screen depicted in figure 3.13.

Adding logical volume to probe

Name:

Size (max 18.996G):

Format: [xfs ▼]

Mount: [/ ▼]

[Create]

[Cancel]

Figure 3.9: Create root volume

Storage configuration [Help]

FILE SYSTEM SUMMARY

MOUNT POINT	SIZE	TYPE	DEVICE TYPE
[/	18.996G	new xfs	new LVM logical volume ▶]
[/boot	1.000G	new xfs	new partition of local disk ▶]
[/opt/btech/probe/storage/recordings	30.000G	new xfs	new LVM logical volume ▶]

AVAILABLE DEVICES

No available devices

[Create software RAID (md) ▶]

[Create volume group (LVM) ▶]

USED DEVICES

DEVICE	TYPE	SIZE
[probe (new)	LVM volume group	48.996G ▶]
recordings	new, to be formatted as xfs, mounted at /opt/btech/probe/storage/recordings	30.000G ▶]
root	new, to be formatted as xfs, mounted at /	18.996G ▶]
[/dev/sda	local disk	50.000G ▶]
partition 1	new, BIOS grub spacer	1.000M ▶]
partition 2	new, to be formatted as xfs, mounted at /boot	1.000G ▶]
partition 3	new, PV of LVM volume group probe	48.997G ▶]

[Done]

[Reset]

[Back]

Figure 3.10: Finishing partitioning setup

Profile configuration [Help]

Enter the username and password you will use to log in to the system. You can configure SSH access on a later screen, but a password is still needed for sudo.

Your name:

Your servers name:
The name it uses when it talks to other computers.

Pick a username:

Choose a password:

Confirm your password:

Figure 3.11: Create a log-in profile

Upgrade to Ubuntu Pro [Help]

Upgrade this machine to Ubuntu Pro for security updates on a much wider range of packages, until 2034. Assists with FedRAMP, FIPS, STIG, HIPAA and other compliance or hardening requirements.

[About Ubuntu Pro ▶]

() Enable Ubuntu Pro

(X) Skip for now

You can always enable Ubuntu Pro later using the 'pro attach' command.

Figure 3.12: Enable Ubuntu Pro

SSH configuration [Help]

You can choose to install the OpenSSH server package to enable secure remote access to your server.

[X] Install OpenSSH server

[X] Allow password authentication over SSH

[Import SSH key ▶]

AUTHORIZED KEYS

No authorized key

Figure 3.13: SSH configuration

You can import SSH keys to enable password-less installation using the ‘Import SSH key’ feature if the system has internet connectivity and you have an account with any of the supported services. Please note that you will still need to have set a password to use the Cockpit administrative interface.

8. The installation will now start. Once finished, there will be a button at the bottom of the screen saying ‘Reboot Now’. Remove the installation media and ensure that the system boots up properly.

The default installation does not provide any graphical user interface environment, and only a minimal set of command-line tools. Please refer to the Ubuntu Server documentation about how to unminimize it if necessary.

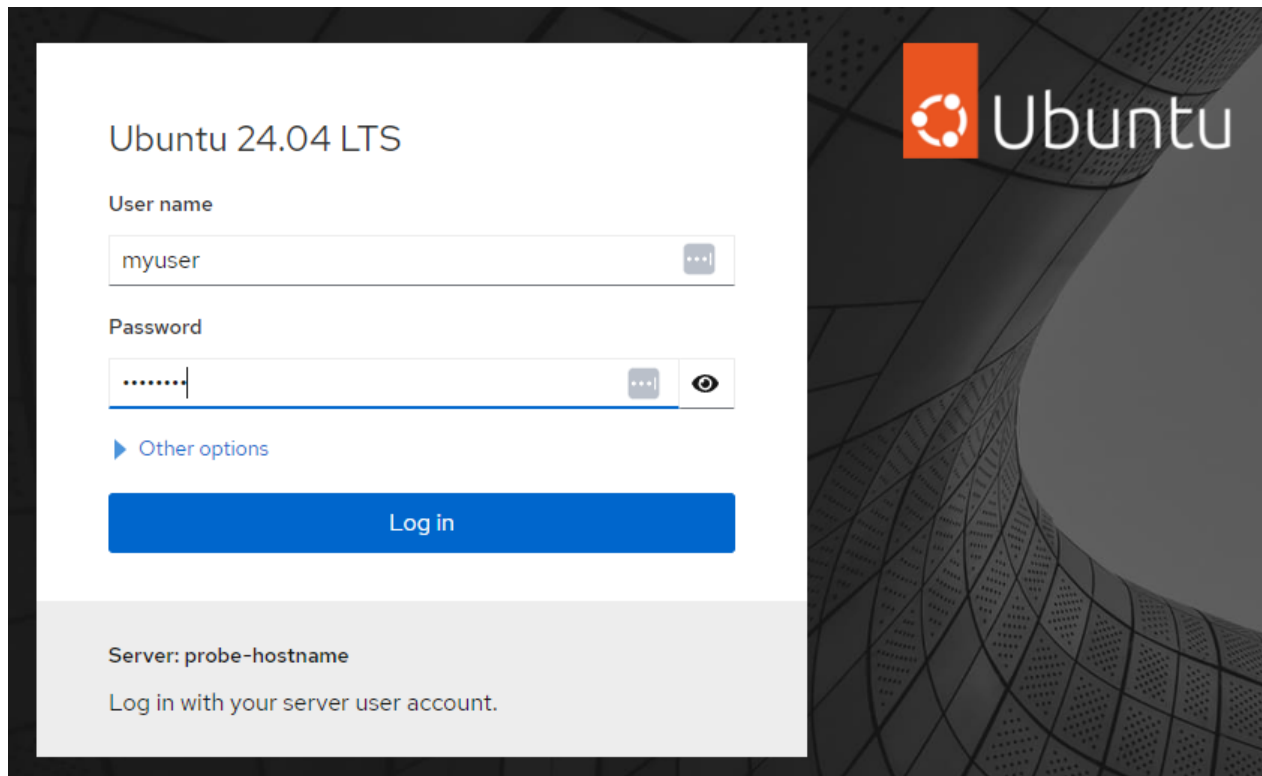


Figure 3.14: Cockpit administrative interface

We do not recommend running a graphical user interface environment on a system running the Software Probe.

3.3 Maintaining the underlying Operating System

The software installed on the system is using Ubuntu Linux Server as its base system. For information on how to maintain the operating system, including how to update it to install security patches, please refer to the Ubuntu Server system documentation.

An overview of Ubuntu Server documentation can be found at <https://ubuntu.com/server/docs/how-to>

The supported base operating system versions for Software Probe are detailed in chapter 3.1. We recommend keeping the base operating system updated; any known incompatibilities will be published in the release notes.

3.4 Verifying Correct Initial Setup and Software Activation

Once the software has been installed and restarted all further configuration takes place through the web interface.

When logging in to the pre-built images and the VB330 Appliance, the default password for the **admin** user is **elvis**. The same password is used for logging in remotely using Secure Shell (ssh) and the Cockpit administrative interface.

1. Launch a web browser application on the management system. One of the following browsers are recommended:
 - Google Chrome
 - Mozilla Firefox
 - Microsoft Edge
 - Apple Safari

2. Enter the selected IP address in your web browser to access the Software Activation page. If your host is using dynamic addressing, you can log in to the account created during installation and issue the command **ip addr** to display the address assigned to the system.

If you get a HTTPS certificate warning, just accept it.

The network settings should have been set when the operating system was installed. If the web browser is unable to reach the web server, check the server's network settings in the operating system.

3. The Cockpit administrative interface should be displayed inside the browser. Cockpit is password-protected and uses the system accounts for logging in. The page displayed should look similar to figure 3.14.
4. Most operations require that you obtain administrative access by clicking the button at the top of the screen after having logged in. When using the command shell (terminal), use the **sudo** command to run programs with administrative access.

If you have enabled the root account by setting a password for it, it will automatically have administrative access.

5. If this is a new server, and you need to obtain license keys for the purchased products, please contact your sales representative.
6. The Software Probe is not enabled by default on the newly installed server. To enable it, click the icon next to its name. This will open a detailed view with display details of the installed software, such as the installed version. If you have a license key that you want to enable and have not yet done so, enter the key in the field labeled **Apply license key** and click the **Add license** button.
7. Click the button labeled **Activate** and wait for it to finish. An activation message will be shown upon completion. If successful, the Software Probe should now be activated, and you will be presented with a link to the user interface. The next time you access the server using a web browser, you should be taken automatically to the enabled software.

Please note that it may take some additional time before the user interface of the activated product becomes available. If you receive an error trying to access it, please wait for a few minutes before trying again.

To return to the Cockpit administrative interface to make changes, open the **About — License** tab in the Software Probe user interface and click the link labeled **Manage server**.

It is **strongly recommended** that the system time is configured to be synchronized against an external NTP server. Please refer to E Appendix: Enabling NTP time synchronization for more information on configuring time synchronization.

3.5 Initial Setup Troubleshooting

If you are having trouble bringing up the Software Activation interface, or the Software Probe web based management interface, verify the following:

- Verify that the client machine and the Software Probe are configured on the same subnet and that they have different addresses, or, if you use different subnets, verify that the routing and gateways are set correctly on both the client machine and the Software Probe.
- Make sure that the IP address of the gateway and the network interface are not the same.
- Verify that the appropriate Ethernet link indicators of the PC and the Software Probe are lit.
- Verify that web browser proxy settings are not interfering.
- Verify that local firewall settings on the PC are not interfering.
- Try rebooting the server and make sure all services start as expected.
- Clear the browser's cache.
- Verify that the web server is running, by entering the command

```
systemctl status nginx
```

on the server's command line. If it is not running properly, check the system logs for hints by typing

```
journalctl -u nginx
```

- If you can reach the Cockpit administrative interface, but the Software Probe GUI is not working, enter the command `probehello` on the server's command line to verify that the VB220-SW services are running. If services are not running, try re-installing the VB220-SW.

Please refer to D Appendix: Network configuration for more information on server network configuration using the Cockpit administrative interface.

3.6 Upgrading From a Previous Version

You can either re-install the system as mentioned below, or by using one of the provided upgrade images.

3.6.1 Upgrading by Re-Installing the System

Sometimes it is necessary to upgrade the system by doing a full reinstall, for instance when upgrading to a new major operating system release. Please follow these steps to perform a full re-install:

1. Backup the system configuration (**Data — Configuration — Full configuration**).
2. If using a classic license key, you can export it using **About — License — Export current license and software maintenance keys**.
If using an on-line activated license and installing on the same server, the license will be transferred automatically. If transferring to a new server, you should release the license using **About — License — Manage license activation** before deactivating the old system.
3. Possibly back up the system network configuration by logging in to the machine and copying any files matching the wildcard `/etc/netplan/*.yaml` (Ubuntu 24.04), `/etc/NetworkManager/system-connections/*.nmconnection` (Rocky Linux 9 and Red Hat Enterprise Linux 9) or `/etc/sysconfig/network-scripts/ifcfg-*` (CentOS 7 or Red Hat Enterprise Linux 7) to a safe location (off the system).
4. Back up any storage data needed (see below).
5. Re-install the system as described above.
6. Activate the software and import or re-enter the license key, using the **Data — Configuration** and **About — License** views, respectively.
7. Import the configuration from **Data — Configuration — Import configuration XML**.
8. Import any network configuration if backed up as described above. Netplan on Ubuntu will not read network configuration files created by Red Hat Enterprise Linux, Rocky Linux or CentOS Linux.

Please note that classic license keys are no longer supported. Please see section 6.15.2 About — License on how to obtain the current hardware key and contact your sales representative to obtain a new license key before moving to a newer operating system.

Keeping Timeline Data and Recordings

If you are using the **Timeline** or **Record** features with permanent disks and you wish to keep the stored data, you must take care to avoid overwriting or clearing the associated storage if installing the new operating system on the same server.

Timeline data is stored in the `/opt/btech/probe/storage/data` (CentOS, Rocky and Red Hat systems) or `/opt/btech/probe/storage/database` (Ubuntu systems). Recordings are stored in `/opt/btech/probe/storage/recordings`.

If these directories are located on one or more separate disks or partitions, make a note of where they are mounted and make sure to keep these partitions intact when creating the new operating system partitions. Mount the partitions in the same locations on the new system to keep the associated data. The Software Probe will automatically detect the old data and make it available.

If any of the directories are located on the root file system, you will need to back the data up and restore it after re-installing. If you are moving the system to a new server, you must make provisions for copying or moving the data to the new server.

Copying the **Timeline** data from a system running CentOS Linux 7, Rocky Linux 9 or Red Hat Enterprise Linux 7 or 9 to a system using Ubuntu 24.04 is *not* supported at this time.

3.6.2 Upgrading From Version 6.4.0 or later

Please refer to chapter 6.14.2 and I Appendix: Software Upload for details on how to install the upgrade image.

3.6.3 Upgrading From Version 6.3.0 or earlier

Software Probe release 7.0 no longer supports the operating system used for these releases. Please see chapter 3.6.1 for details on how to re-install the system.

3.7 Upgrading To a Maintenance Release

Please refer to chapter 6.14.2 and I Appendix: Software Upload for details on how to upgrade to maintenance releases.

If the system has access to software updates over the internet, the Software Probe software will be upgraded along with the Ubuntu OS software. On-line upgrades will always install from the same major software release (i.e. 7.0), upgrades to a new major software release must be installed manually.

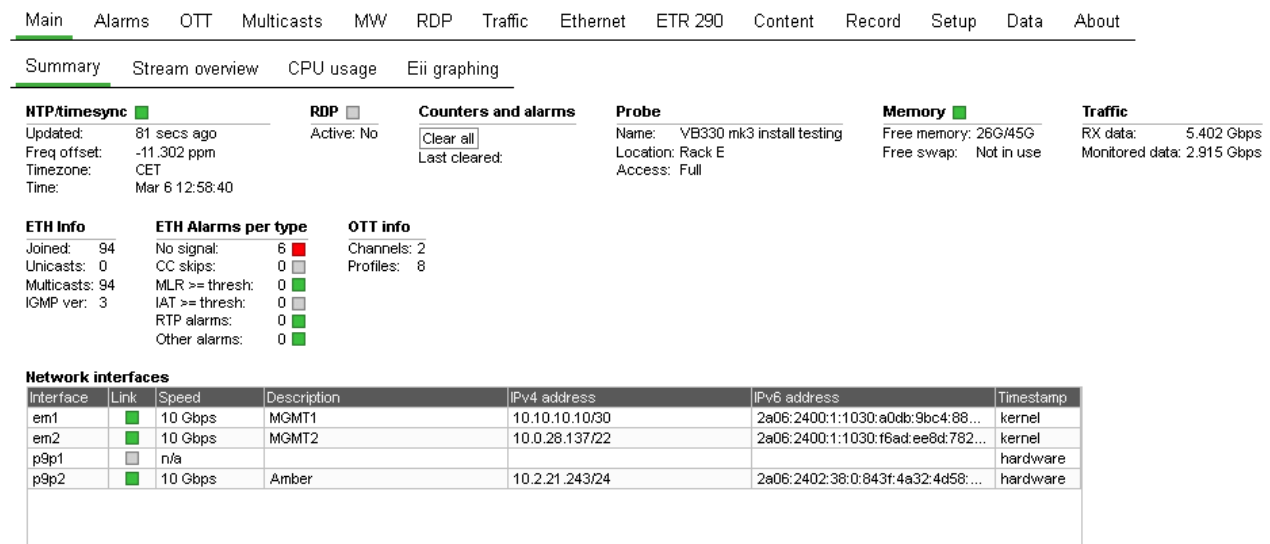


Figure 3.15: The VB220-SW Graphical User Interface

3.8 Accessing the User Interface

Once the software has been installed and activated all further configuration takes place through HTTP.

The following web browsers are supported for the management interface:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Apple Safari

The default management view should look similar to figure 3.15. If you have problems accessing the user interface, refer to chapter 3.5 for troubleshooting.

3.9 Accessing the administrative interface

To return to the administrative interface after activating the Software Probe, you can either navigate to the **About — License** view and follow the **Manage sever** link, or navigate your web browser to the address `https://<IP>/admin`, where <IP> is the IP address (or host name, if using DNS) of the server.

3.10 Deactivating

To deactivate Software Probe, you must first access the administrative interface (see the previous section) and make sure that it is not set to the default. Expand the product details heading and click the **Remove as default** button.

Once this is done, access the Software Probe user interface and de-activate it from the **About — License** view.

4 QUICK SETUP GUIDE

This quick setup guide is intended to provide a step-by-step explanation of how to setup a probe once the initial setup has been performed (as described in chapter 3).

All of the probe configuration options are available from the **Expert** view, which can be reached by selecting the **Expert** option in the navigation menu in the top left corner of the screen. More detailed instructions on how to configure the probe are found in chapter 6 of this manual.

The Return Data Path, Multi-Stream Recording and Full Service Monitoring features are not covered by this quick setup guide.

4.1 Basic Setup

1. Set appropriate parameters in the **Setup — Params** view.
2. Enabling Time synchronization is strongly recommended. Please see E Appendix: Enabling NTP time synchronization for further details on how to configure the date and time.
3. If access control is required, first log in as the **admin** user using the **Setup — Login** view, and then define users and password in the **Setup — Security** view.

Note: it is important to read the instructions in the associated sections of this manual, see chapters 5.6 and 6.13.9.

4.2 Input Signal Definitions

4.2.1 Multicasts

1. Define multicasts using the **Multicasts — Streams** view. You can also import multicast lists from another probe using the **Data — Configuration** view, or add them automatically either by using the multicast detect feature in the **Multicasts — Detect** view, or from SAP announced streams using the **Multicasts — SAP** view.

Note: Often upstream equipment will not transmit multicasts unless join messages have been received, and in this case it will usually not be possible to detect multicasts automatically.

Select predefined threshold templates that seem appropriate for the signal.

Note: The sequence of the multicast definitions will be reflected in monitoring, so order the multicasts correctly if required. Also note that ETR 290 monitoring for Ethernet streams is disabled by default, so if this is required, it will have to be enabled by the user (on a per-stream basis).

2. Define stream page name(s) in the **Setup — Pages** view (not strictly necessary).
3. Join multicasts in the **Multicasts — Join** view or in the **Multicasts — Streams** view.

4.2.2 OTT Input (OTT Engine Option Only)

1. Define the OTT channel manifest URLs and channel names in the **OTT — Channels** view. Leave the Threshold and VBC threshold settings at default values for now. Remember to tick the Enable box in the dialog box. If you have multiple OTT engines installed (1 to 5 are allowed) then select which engine to assign to the channel. Any number of OTT channels can be assigned to each OTT engine. Each engine works in parallel to each other.

Note: When monitoring both multicast (UDP) and OTT (TCP) traffic, we recommend using different network interfaces. Mixing the two traffic types on the same network can have unwanted impact on the monitored signals. The interface used for OTT traffic is controlled using the **Setup — Routing** view.

2. Define stream page name(s) in the **OTT — Settings** view (not strictly necessary).
3. Inspect the OTT monitoring progress using the **OTT — Active testing** dialog. Useful information on OTT monitoring can be found in Appendix C.

4.3 Monitoring

When input signal parameters have been set, the signals may be monitored.

For Ethernet multicasts the relevant monitoring views are **Streams**, **Alarms** and **MW** in the main graphical user interface, as well as the **Main**, **Alarms**, **Multicasts**, **MW**, **Traffic** and **Ethernet** views in the expert graphical user interface. If the probe is equipped with the ETR 290 and/or the OTT option then the views **ETR 290** and **OTT** are of relevance as well.

Ethernet monitoring hints are found in B Appendix: Monitoring Practices.

4.4 Adjusting Alarm Thresholds

When the probe inputs and streams have been defined using default thresholds, the result will usually be a number of more or less permanent alarms, some which may not be relevant under the current circumstances. In order for the user to get rid of unwanted alarms, the probe provides alarm filtering functionality in the form of alarm thresholds and alarm on/off selection.

Multicasts

By default Ethernet thresholds are set to raise alarms when service affecting errors occur, that are caused by the network. There may however be reasons for these thresholds to be altered, for instance to reflect receiver robustness in the case of IAT, or to reflect a TS into IP mapping different from the default (7TS/UDP). Creating a new threshold template is done either by copying an existing one and altering the copy, or by creating a new threshold template from scratch. The Ethernet thresholds are defined in the **Multicasts — Ethernet thresh.** view. These thresholds are associated with streams in the **Multicasts — Streams** view.

In addition to the miscellaneous thresholds, that affect only the streams with which they are associated, the **Alarm — Alarm setup** view allows the user to enable and disable alarms on an overall basis. You can also define the alarm severity levels for different alarms in this view.

OTT

When an OTT channel is defined the default OTT threshold template is assigned to it. To change threshold values create one or more new templates in the **OTT — Thresholds** view and assign them to OTT channels in the **OTT — Channels — Edit** view.

ETR 290

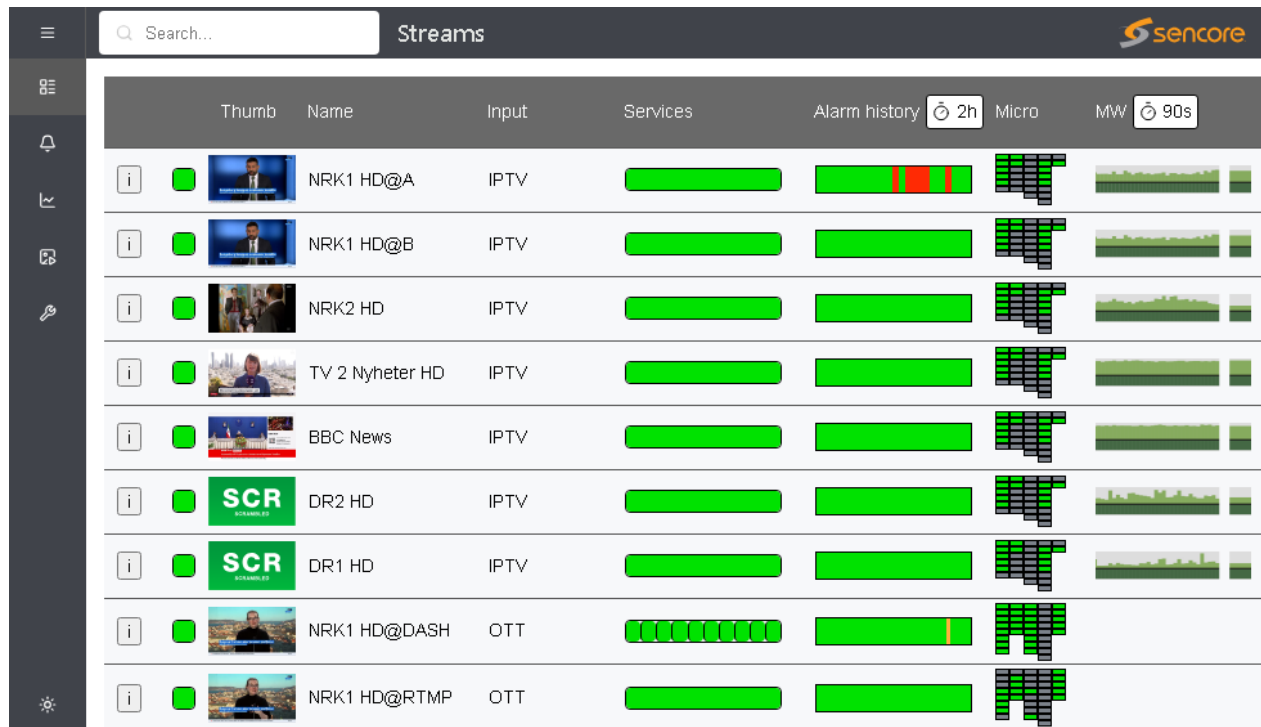
By default the streams configured in the probe will be set up to use the ETR 290 threshold named **Default**. This has the most important alarms enabled but have been adjusted to match real world systems and only alarm on more severe problems. The threshold named **ETSI TR 101 290** is based on the ETSI TR 101 290 guidelines and are fairly strict generating more alarms. The ETR 290 thresholds should be changed if there are tables that are not relevant for a system, or if the user requires alarm functionality that exceeds the ETR 290 guidelines. The ETR engines has a lot of powerful functionality not enabled by default, for instance the ability to raise alarms if the number of services present in a signal is lower than a preset limit.

The default PID and service thresholds do not affect alarming at all, they are completely transparent. The thresholds may be altered for instance in order to mask an alarm generated by an unreferenced PID or to ensure an alarm is raised if a service or PID bitrate is outside preset limits.

Creating a new threshold template is done either by copying an existing one and altering the copy, or by creating a new threshold template from scratch. The thresholds are defined in these views: **ETR 290 — ETR thresh.**, **ETR 290 — PID thresh.**, **ETR 290 — Service thresh.**

The thresholds are associated with streams in the **Multicasts — Streams — Edit** view.

5 SOFTWARE PROBE GRAPHICAL USER INTERFACE



The VB220-SW web interface is reached by pointing a web browser to the IP address of the Software Probe as shown in the screenshot above. The following web browsers are recommended:

- Google Chrome
- Mozilla Firefox
- Microsoft Edge
- Apple Safari

Note that different web browsers behave differently with respect to memory leaking, and if the VB220-SW GUI should be available at all times the browser should be selected carefully. A browser memory leak manifests itself as the browser responding more and more slowly, and this is corrected by closing down the application and restarting.

The interface is easy and intuitive to use. The interface is divided into analysis and monitoring/configuration. The analysis interface is what greets you first when you connect.

The navigation menu is located in the top left corner and can be made visible or hidden by clicking the navigation menu button, which is indicated with three horizontal lines ($\equiv$) and accessible from any page. The navigation menu consists of several different icons that will help you navigate to the preferred view. These views are documented below.

The web interface has been designed to be resizable in both vertical and horizontal directions with a minimum screen resolution of 1280×800 pixels. For operational use it is however highly recommended that a higher screen resolution is used.

Tool-tips are available for most buttons and labels. To access tool-tip information simply navigate your cursor towards a button or a label and leave it hovering for a second or two.

The VB220-SW web interface can be displayed in a dark or a light theme, where the dark theme is the default. Pressing the theme selector at the bottom left of the user interface switches between these two modes. The display mode is remembered across sessions, until the browser's session data is cleared. In this User's Manual, screenshots are taken using the light theme, to be friendlier on the environment when printing.

In this manual the term stream is generally used instead of the terms multicast and/or unicast. A stream may thus contain a single service or multiple services.

5.1 Streams



Thumb	Name	Input	Services	Alarm history 2h	Micro	MW 90m
	MDR Sachsen HD	IPTV				
	arte HD	IPTV				
	Kika HD	IPTV				
	ZDF HD	IPTV				
	Al Jazeera Englis...	IPTV				
	Radio Kiss Kiss Tv	IPTV				
	Cam	IPTV				
	HyperDeck	IPTV				
	NRK1 HD (2)	IPTV				
	DELUXE MUSIC	IPTV				
	NRK Super / NRK...	IPTV				
	Nasa TV UHD	IPTV				
	DVB-T	RF 1				
	Bip bop	OTT				

The **Streams** view is the default view and displays a list containing all monitored streams, across the different input types.

The intention of this page, together with the **Alarms** view, is to provide enough information for the operator to immediately see if there is anything seriously wrong with one or more input streams. To easily locate a specific stream, use the search field at the top of the display.

The following information is displayed for each stream:

Streams

- ①: Click the information icon to access stream details.
For multicasts, this will open the **Stream details** view, which is described below.
For OTT channels, this opens the **OTT details** view described in the following chapter.

Status bulb:	A bulb indicates the current status of the stream, i.e. the most severe alarm status: • Green: OK • Yellow: Warning • Orange: Error • Red: Major • Black/Dark red: Fatal
Thumb:	If thumbnail extraction has been enabled, a thumbnail is displayed for the stream if supported. Thumbnail decoding is a process asynchronous of the analysis and therefore should not be expected to be updated at the same time. The main purpose of the thumbnails is to provide brief information about the channel contents. If the stream is a multi-program transport stream (MPTS), the thumbnail displayed will cycle between all unencrypted services contained in the stream. For OTT channels, the profile selected in the Thumbnails tab of the OTT details pop-up is displayed.
Name:	The configured name of the stream or channel is displayed here.
Input:	Input type of the stream.
Services:	The stream health bar displays the current status for individual services (TS) or profiles (OTT) inside the stream. A Single Program Transport Streams (SPTS) or an OTT channel with a single profile will show only a single bulb in this column. Hover over the individual status bulbs with your cursor for information on which bulb represents which service or profile. Each bulb color represents the alarm severity level as configured under Alarms — Alarm setup.
Alarm history:	The alarm graph displays the alarm status over time in the form of a status timeline. The timeline bar shows the most severe alarm for all the services (TS) and profiles (OTT) inside the streams for a time span of 120 minutes, 24 hours or four days as selected by clock button at the top of the Alarm history column. The bar color is either green for OK or colored in accordance with the alarm severity if an alarm has occurred. Refer to section 6.2.2 for a description of the alarm color representation.
Micro:	This columns displays the status of the stream in a condensed view. For multicasts monitored by an ETR 290 engine, the MicroETR overview is displayed here. For more information on how to read the MicroETR, please see chapter 6.9.1). This field is blank if ETR 290 monitoring has not been enabled for this stream, or if the ETR 290 option has not been licensed. For OTT channels, a minimized view of the alarm overview from the the OTT Alarms view is displayed.

MW: This column displays a minimized version of the Media Window for the stream. Please see chapter 5.3 for full details on the Media Window display. The Media Window displays information for a time span of 90 seconds, 90 minutes, 8 hours, 24 hours or four days as selected by clock button at the top of the MW column. Media Window display is only available for multicast sources.

Note: ST 2022-7 combined streams are not shown in this view, information about these streams can be found in the **Expert** view under **Main — Stream overview** and **Multicasts — Paramaters**.

5.1.1 Stream details view

BBC News



PSI/SI
ETR
MW

PID	Type	Language	Content
1221	Teletext	eng	-
2091	H264 Video		SIZE 1920x1080 PIXEL ASPECT RATIO 1:1 SAMPLING FORMAT YCbCr 4:2:0 INTERLACED No COLOR PRIMARIES BT.709 MATRIX COEFFICIENTS BT.709 ASPECT RATIO 16:9 CODEC h264 FRAME RATE 25 fps RANGE Narrow range TRANSFER CHARACTERISTICS BT.709
2092	AC-3 Audio	eng	AUDIO CODEC ac3 LAYOUT stereo SAMPLE RATE 48000 CHANNELS 2 CHANNEL ORDER L, R

SID	Name	Provider	PIDs
5001	BBC News	Globecast	1221,2091,2092

Close Open in tab

This view presents a large thumbnail and detailed information about the selected multicast setup. If the stream is a multi-program transport stream (MPTS), the thumbnail displayed will cycle between all unencrypted services contained in the stream.

By clicking the **Open in tab** button, a new browser tab will appear. This separate tab can be used to display the selected channel even when navigating away from the probe. This also provides the ability to monitor media windows for several streams without starting several browser sessions. Clicking the **Close** button will close the pop-up view.

Below the thumbnail, several tabs are available, displaying different properties of the stream.

5.1.1.1 PSI/SI

This view displays information about the PIDs and services that make up the stream. The information is divided into two data tables.

<i>PID info</i>	
PID:	The PID for which the following parameters apply.
Type:	The type description of the associated PID.
Language:	The language for the content of the PID, if specified.
Content:	Detailed content of the data carried in the PID, if the probe has been configured to decode it. For video PIDs, the information displayed is the same as described in the Video tab of the service view pop-up. For audio PIDs, the information displayed is the same as described in the Audio tab of the service view pop-up. For subtitling PIDs, the information displayed is the same as described in the Captions tab of the service view pop-up.
<i>Service info</i>	
SID:	The service ID for which the following parameters apply.
Name:	The name of the multicast that is being displayed, as defined by the user.
Provider:	The service provider name as found in SDT. If service information is not available in SDT, or when in ATSC mode, this information is not available.
PIDs:	A list of the PIDs associated with this service.

5.1.1.2 ETR

PSI/SI

ETR

MW

☒ TS sync

☒ Sync byte

☒ PAT

☒ Continuity

☒ PMT

☐ Missing PID

☒ Transport

☒ CRC

☐ PCR

☐ PCR accur. (1 / 1)

☐ PTS

☐ CAT

☐ NIT

☐ SI Rep Rate

☐ Unref PID

☐ SDT

☐ EIT

☐ RST

☐ TDT

☐ CA system

☒ PID min. bitr.

☒ PID max. bitr.

☒ PID checks

☒ Service min. bitr.

☒ Service max. bitr.

☒ Service checks

☐ MIP

☐ Gold TS

☐ Time information

☐ T2MI

☒ Interface overflow

MON STATE

Currently monitored

MON START

10:34:16 (1 h, 54 m ago)

MON END

MON TIME

1 h, 54 m

TOTAL BITRATE

6.83 Mbps

EFFECTIVE BITRATE

6.83 Mbps

TS ID

7

NUM SERVICES

1

NUM PIDS

10

LAST CLEARED

10:34:16

LAST ERROR

Never

ETR THRESHOLD

Default

PID THRESHOLD

Default

SERVICE THRESHOLD

Default

VBC THRESHOLD

Default

GOLD TS THRESHOLD

[None]

This tab is displayed if the stream is being monitored by an ETR 290 engine, and shows an expanded view of the MicroETR available in the streams list, as well as detailed monitoring parameters.

The ETR 290 parameters are grouped into five different categories. The first three groups are defined in the ETSI TR 101 290 guidelines. The fourth category contains checks defined by Sencore allowing CA system checks, custom PID and service checks and the Gold TS reference checks. The last category contains checks of the input interfaces.

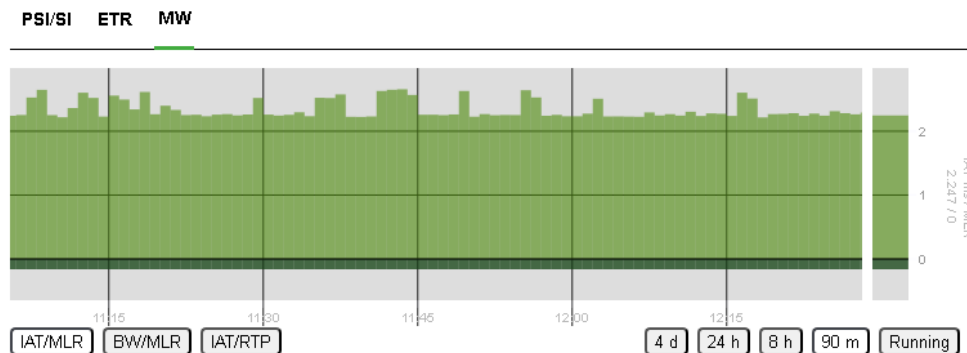
For each check a bulb indicates the current status of that parameter check: green indicates status OK, whereas red indicates an active alarm. When the probe has not yet received data relevant for a particular check, the corresponding bulb is white. Grey color indicates that the check has been deactivated (as set in **ETR 290 — ETR thr. — Edit**).

Monitoring details

Mon state:	Indicates whether the stream is being currently monitored or not. When the ETR engine is operating in round-robin mode, streams are not constantly monitored, please see chapter 6.9 for details.
Mon start:	Shows when the ETR 290 engine started monitoring the stream.
Mon end:	When in round-robin mode, shows when the ETR 290 stopped monitoring the stream.
Mon time:	Shows for how long the stream has been monitored.
Total bitrate:	The total bitrate of the transport stream (including null packets, bits/s).
Effective bitrate:	The effective bitrate of the transport stream (excluding null packets, bits/s).
TS ID:	The transport stream ID as specified in the PAT table.
Num services:	The number of services found in the transport stream.

Num PIDs:	Number of PIDs in the transport stream.
Last cleared:	Shows when status was last cleared for the stream.
Last error:	Shows when the ETR engine last reported an error for the stream.
ETR threshold:	The name of the service ETR threshold template assigned to the stream.
PID threshold:	The name of the service ETR PID threshold template assigned to the stream.
Service threshold:	The name of the service threshold template assigned to the stream.
VBC threshold:	The name of the VBC threshold template assigned to the stream.
Gold TS threshold:	The name of the Gold TS reference threshold assigned to the stream.

5.1.1.3 MW



This tab is only available for multicast sources and displays an expanded version of the Media Window for the stream. Please see chapter 5.3 for full details on the Media Window display.

Use the buttons in the lower left corner of the dialog to select between the different type of Media Window displays.

The Media Window displays information for a time span of 90 seconds, 90 minutes, 8 hours, 24 hours or four days as selected by clicking the time selection buttons in the lower right corner of the dialog.

5.2 Alarms

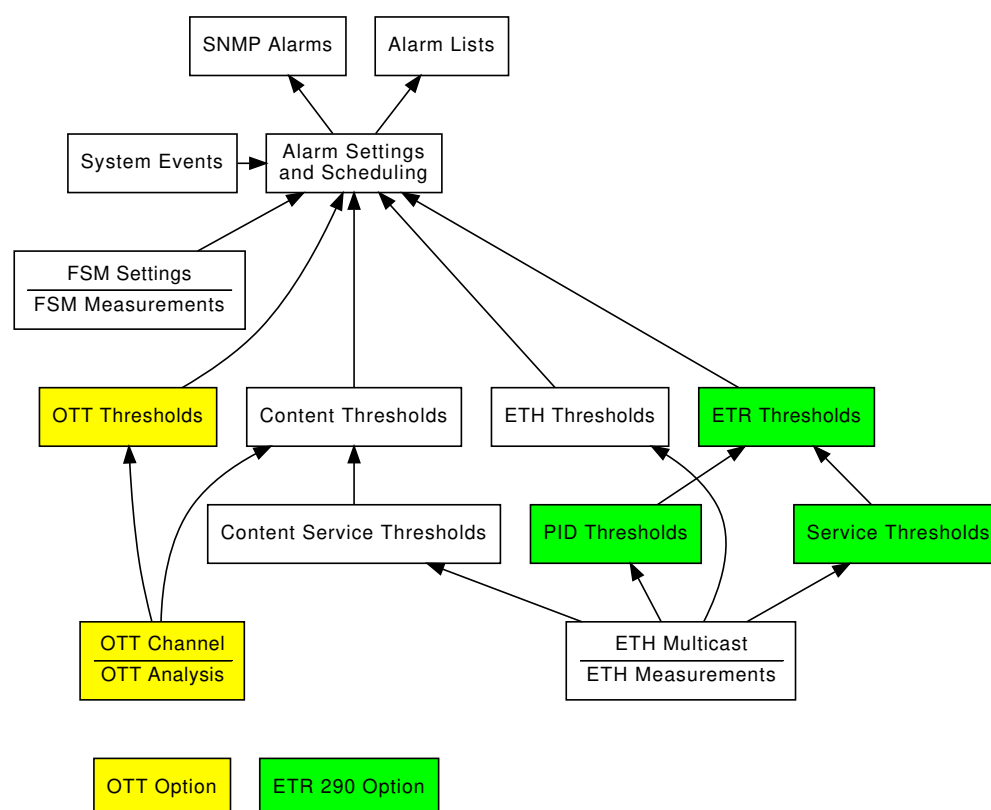


Figure 5.1: Alarm handling in the Software Probe.

Figure 5.1 shows an overview of the alarm handling in the Software Probe. It is useful to obtain an understanding of the alarm processing of the Software Probe – in particular how threshold settings and alarm setup will affect alarm handling.

The Software Probe continuously compares measurement data with user-defined thresholds in order to generate alarms. These alarms are further checked against the settings defined in the **Alarms — Alarm setup** view, and the resulting alarms are presented in the alarm lists. If configured to do so, these alarms will also be sent as SNMP traps to support third party management systems. Refer to Appendix: VB220-SW Versus VBC Alarms for a description of alarm handling in the VideoBRIDGE Controller.

The Software Probe distinguishes between events and alarms. The ETR software module will always generate alarms and the Systems software module will always generate events. The Ethernet software module will by default generate events for errors that are resolved within 1 second, otherwise it will generate alarms. This can be overridden by checking the ‘Treat Ethernet events as alarms’ box in the **Setup — Params** view. The OTT module generates alarms only.

5.2.1 Alarm list

Status ↑	Severity	Time	Type	Stream	Description
Active	■	2026-03-05 12:56:33	CNT	NRK1 HD@DASH	MOS below threshold (profile Video: avc1.4d4020 1280x720)
Cleared	■	2026-03-05 12:56:18	CNT	NRK1 HD@RTMP	Audio silence detected (profile RTMP Live) (Mar 5 12:56:08 - Mar 5 12:5...
Cleared	■	2026-03-05 10:31:01	CNT	NRK1 HD@MC:NRK1 HD	MOS below threshold (Mar 5 10:30:01 - Mar 5 10:31:01)
Cleared	■	2026-03-05 10:29:30	OTT	NRK1 HD@DASH	Fewer than minimum number of profiles (Mar 5 10:27:15 - Mar 5 10:29...
Cleared	■	2026-03-05 10:29:00	CNT	NRK1 HD:NRK1 HD	MOS below threshold (Mar 5 10:27:01 - Mar 5 10:29:00)
Cleared	■	2026-03-05 10:26:31	OTT	Audio wdr sportschau hls lig...	HLS playlist URLs unstable, switch to HLS mode "Monitor profile manife...
Cleared	■	2026-03-05 10:26:31	OTT	Audio wdr sportschau hls lig...	HLS playlist URLs unstable, switch to HLS mode "Monitor profile manife...
Cleared	■	2026-03-05 10:26:21	CNT	DELUXE MUSIC:DELUXE MU...	MOS below threshold (Mar 5 10:25:00 - Mar 5 10:26:21)
Cleared	■	2026-03-05 10:26:21	CNT	DELUXE MUSIC:DELUXE MU...	Wrong PAR. 32:17 (Mar 5 09:55:17 - Mar 5 10:26:21)
Cleared	■	2026-03-05 10:26:21	CNT	TV3 HD (N):TV3 HD (N)	MOS below threshold (Mar 5 09:27:01 - Mar 5 10:26:21)
Cleared	■	2026-03-05 10:26:21	CNT	UHD1 by ASTRA / HD+:UHD...	MOS below threshold (Mar 5 10:26:00 - Mar 5 10:26:21)
Cleared	■	2026-03-05 10:25:01	CNT	UHD1 by ASTRA / HD+:UHD...	MOS below threshold (Mar 5 10:17:01 - Mar 5 10:25:01)
Cleared	■	2026-03-05 10:23:58	CNT	SES UHD Demo Channel	IDR PTS gap outside of threshold (124 ms) (Mar 5 10:23:57 - Mar 5 10:...
Cleared	■	2026-03-05 10:20:55	CNT	SES UHD Demo Channel	IDR PTS gap outside of threshold (124 ms) (Mar 5 10:20:54 - Mar 5 10:...
Cleared	■	2026-03-05 10:20:01	CNT	DELUXE MUSIC:DELUXE MU...	MOS below threshold (Mar 5 10:17:01 - Mar 5 10:20:01)

Displaying 46 alarms

The **Alarms** view allows the user to see an updated list of current and past alarms. All alarm types and events are listed here. The search field at the top can be used to filter alarms by stream name or description. By default, the view shows the most recent active alarms first, but you can sort the list by any parameter in the columns.

For additional options, such as displaying an offline list or showing only a single alarm type, the **Alarm list** in the **Expert view** can be used. To configure alarm settings (for example, adjusting alarm severity), the **Alarm setup** is used.

Alarm list

Status: The status of the alarm, either "Active", "Cleared" or "Event".

Severity: The severity of the alarm, classified as either **OK**, **Warning**, **Error**, **Fatal** or **Event**. Each level is shown by a colored bulb, with the following mapping:

- Green: OK
- Yellow: Warning
- Orange: Error
- Red: Major
- Black/Dark red: Fatal

The severity level of an alarm can be changed in Alarm Setup.

Time: The timestamp indicating when the alarm was triggered. For cleared alarms the parameter shows the time range during which the alarm was active.

Type:	The alarm type category. They can either be: CNT Content alarms ETH Ethernet alarms ETR ETR 290 alarms FSM Full service monitoring & Microbitrate alarms LOG Event log OTT OTT alarms SYS System events
Stream:	The name of the stream that triggered the alarm.
Description:	A description detailing the alarm.

For more information about each alarm and their default configuration see **Alarm setup**.

5.3 MW (Media Window)



The **MW** Media Window view provides an at-a-glance status for each of the multicasts/unicasts being monitored. From the graphs it is easy to see the jitter characteristics of the signal and if there is packet loss or CC errors present in the signal. Periods of no signal are also displayed.

The measurements are always aggregated over a time interval – typically one second. The IAT(max) is the maximum time measured between two neighboring IP frames within the measurement time interval (the peak packet Inter-arrival time). IAT is expressed in milliseconds.

The MLR is the peak estimated number of lost MPEG-2 Transport Stream packets inside any second within the actual time period. The number of lost TS packets is derived from the continuity counters inside the TS packet headers.

A common scenario is to have 7 TS packets per UDP frame. Losing an IP packet will therefore usually (but not always) result in an MLR of 7 (not always the case because some TS packets such as null packets or PCR packets do not carry a valid CC field).

The patented Sencore VideoBRIDGE **Media Window** presents both jitter and packet loss measurements in one graph, with jitter (IAT) values growing upwards (+ve Y) and packet loss (MLR) growing downwards (-ve Y). Each sample along the x-axis corresponds to a measurement time-interval that depends on the range of the graph selected. Periods of no sync are also displayed in the graph.

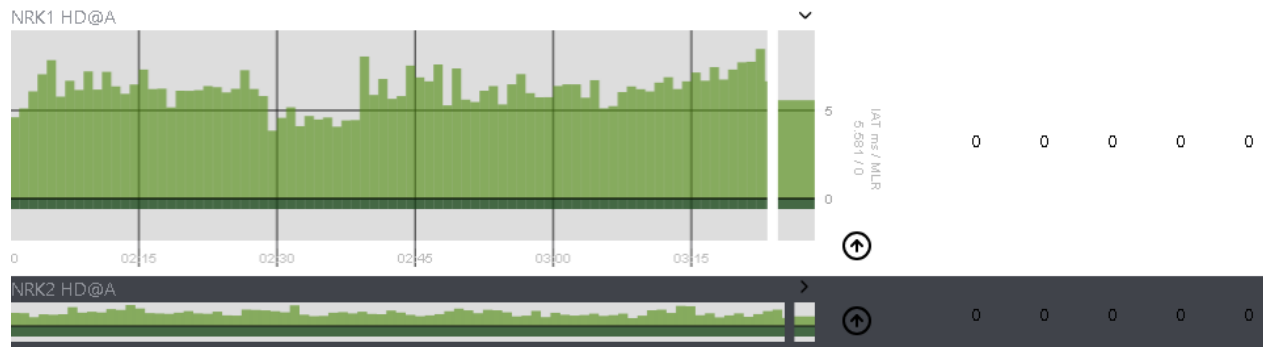
Error-second statistics for the graph-interval is displayed to the right.

The current graph value displayed as the column next to the **MW** provides the maximum MLR and IAT values measured during the last second.

Red color is used to indicate that within the period represented by the bar there has been one or more occurrences of no-signal. Orange is used to indicate error while yellow indicates warning. The error and warning thresholds are allocated to each multicast in the **Multicasts — Streams** view.

The **MW** displays all joined multicasts in the list by default. The drop-down menu at the bottom left can be used to choose only joined multicasts of one page (or switch back to **All pages**). The time window buttons allow selection of x-axis resolution in the graphs. Displaying either **MW** for the last 4 days, the last 24 hours, the last 8 hours, the last 90 minutes or a live stream by clicking 'Now'. The 'Now' graph goes back 90 seconds. The 24 hours view is selected as a default.

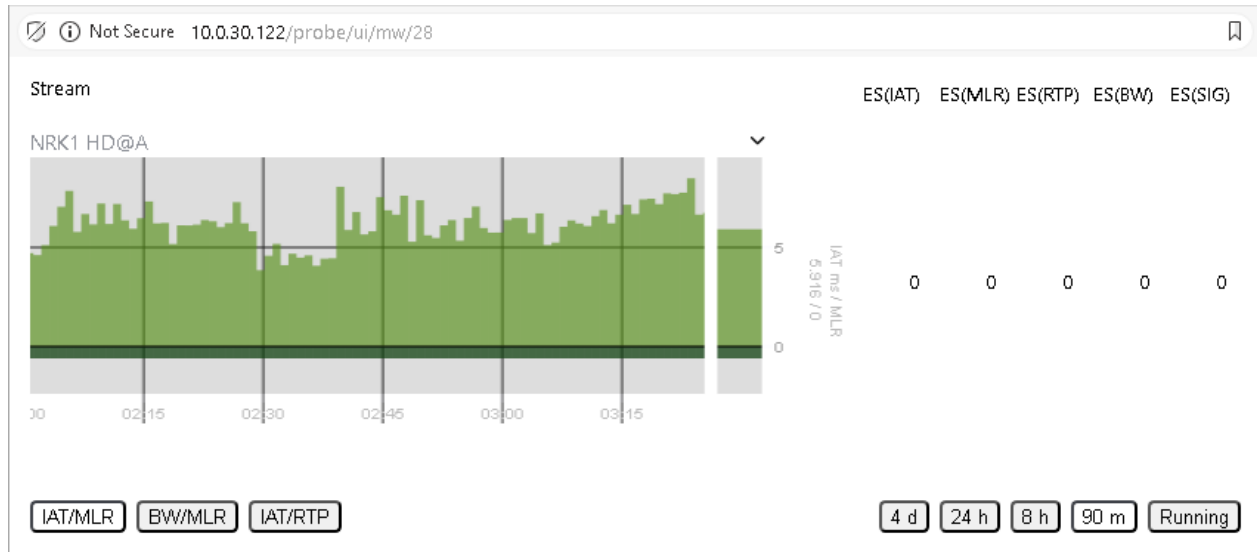
By choosing different resolutions the user can pinpoint more accurately when errors occurred.



Clicking one of the graphs will expand it. The expanded version of the **Media Window** reveals more details than the compressed version.

The search field at the top of the page can be used to filter the list by stream name.

5.3.1 Media Window — Selected channel

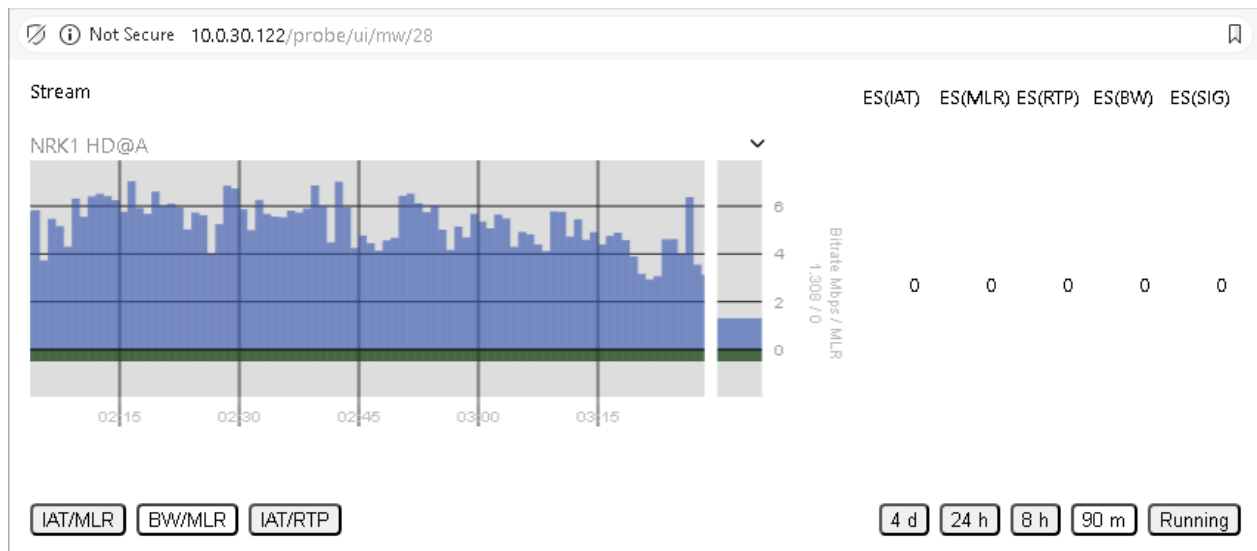


The **Media Window — Selected channel** view is activated by clicking the upward pointing arrow next to the graph. It will open a pop up that shows the **MW** for one stream only.

This separate window can be used to display the selected channel even when navigating away from the probe. This also provides the ability to monitor media windows for several streams without starting several browser sessions.

Clicking anywhere in the graph will shrink it. Clicking it again will expand it.

5.3.2 Media Window — Bandwidth graph

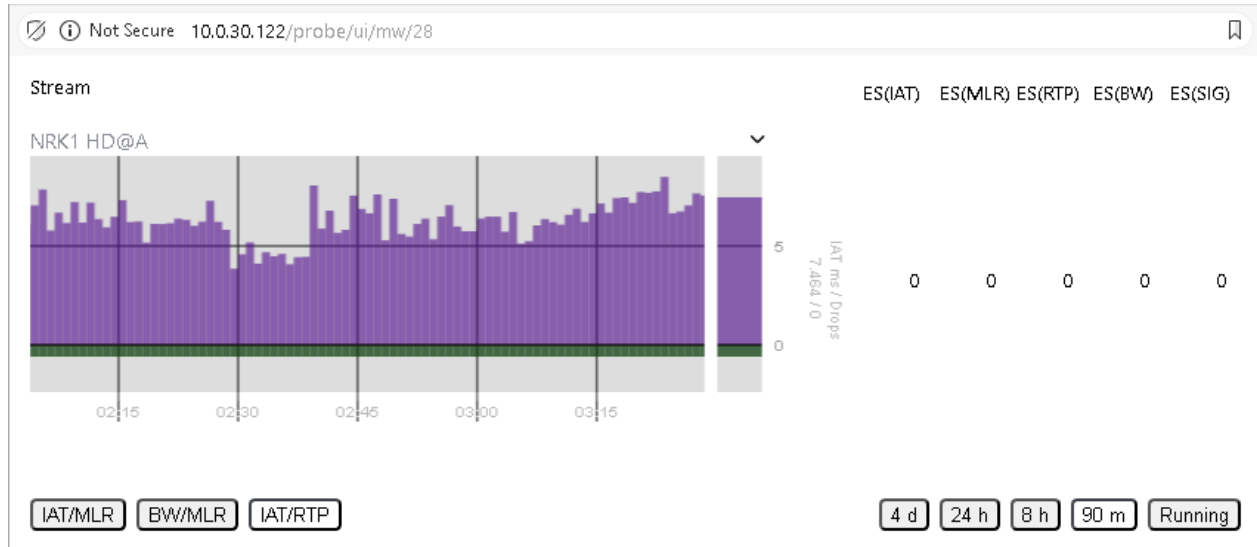


By clicking the **BW/MLR** button the graph displays the peak bandwidth as a function of time. The negative part of the composite graphs is still the packet loss (i.e. the MLR).

If the stream contains a transport stream (mapping TS/x) the bitrate corresponds to the **Multicasts** parameter **Net bitrate** (i.e. bitrate excluding null packets). Otherwise the bitrate is the UDP payload bitrate corresponding to the **Multicasts** parameter **Curr bitrate**.

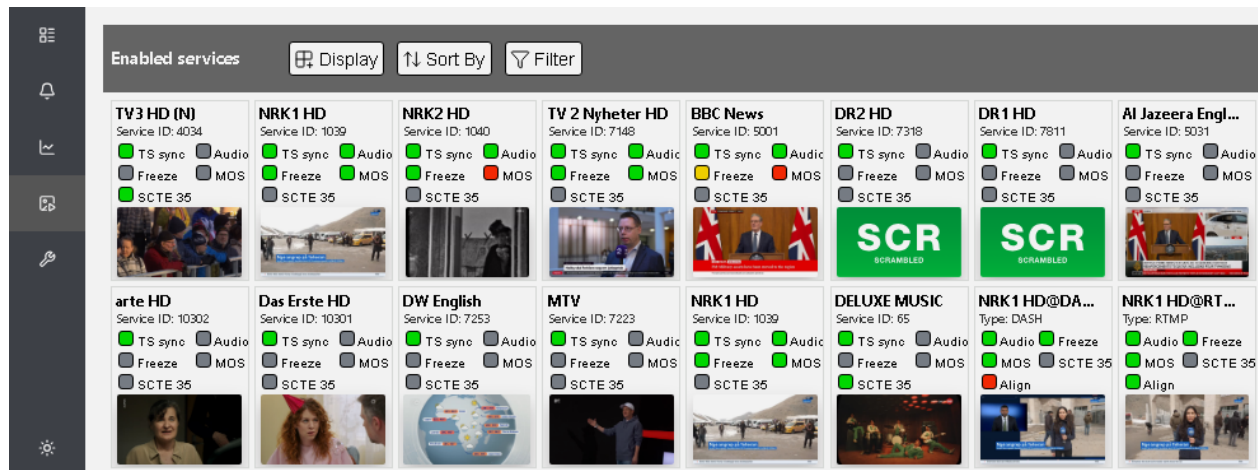
The bandwidth error threshold is configured in the **Multicasts — Ethernet thresh.** view.

5.3.3 Media Window — RTP drops



By clicking the **IAT/RTP** button the graph displays the packet jitter as a function of time. The composite graphs displays the RTP packet loss below the X-axis. If the monitored stream is not RTP encapsulated, IAT will be represented by grey color and there will never be any indication of packet loss in the graph.

5.4 Thumbnails



The **Thumbnails** view displays a mosaic of all decoded thumbnails. By default the *Normal* mode is used. Placeholder images will be displayed if thumbnail generation has not been enabled in the **Setup — Params** view or in the stream or channel configurations, indicating the type of service being received.

Use the **Display** button to switch between different display modes. If *Small* is selected, the **Thumbnails** view will display thumbnails and service names only, allowing more thumbnails to be displayed on the same page. In the *Compact* view, the service ID or OTT channel type is also displayed, as well as a row of bulbs indicating the content check status. Hover over the bulbs with your cursor for information on which bulb is which.

Selecting the *Normal* view, the bulbs are shown with an explanatory label. To display the name (as defined in the **Multicasts — Streams** and **OTT — Channels** views), select the **Stream info** view. Finally, the *Large* view displays the same information as the **Stream info** view, but with larger thumbnails.

Use the **Sort By** button to select the order in which to display the services. The *Default* sorting displays the thumbnail in the order they appear in the configuration, with multicasts being displayed first and OTT channels last. Selecting *Name* sorts all services by name, mixing the stream types.

Sorting by *Alarm severity* shows the services with the highest number of active alarms (as indicated by red bulbs) first. Only the alarms shown in this view are considered for sorting purposes. Finally, if *Source* is selected, the services are sorted by the name of the streams they are part of.

Use the **Filter** button to limit the number of streams to display. The VB220-SW makes it possible to filter by alarms (or lack thereof), to display only services that are producing thumbnails, or to display only services that are part of specific stream types. Additionally, you can also use the Search field at the top of the display to further limit the services being displayed.

If thumbnail extraction has not been enabled, or if the thumbnail extraction fails, an informational icon will be displayed instead, see **Thumbnail generation** below for details on the different icons.

The following information is displayed for each stream:

Thumbnails

Stream name:	The configured name of the stream or channel is displayed here. Shown in the <i>Stream info</i> and <i>Large</i> views.
Service name:	For TS services, this displays the name defined for the service in the SI service descriptor. If no SI is present in the stream the service ID will be shown. For OTT channels, the name of the channel is shown here.
Service ID:	For TS services, the ID of the selected service within a transport stream. Not shown in the <i>Compact</i> view.
Type:	For non-TS services, the service type is displayed. Not shown in the <i>Compact</i> view.
TS sync status:	For TS services, status bulbs are displayed indicating the current Transport stream sync status. The different bulb colors are: Green: the stream has TS sync. Red: the stream does not have TS sync.
Audio status:	If the probe has been licensed with the Content Extraction and Alarming option, status bulbs are displayed indicating the current audio alarm status for the streams. The audio threshold values are set as part of the content threshold template associated with each multicast or OTT channel (refer to the Content – Content thresh. view). The different bulb colors are: Grey: audio thresholds are disabled. Green: audio thresholds are enabled, and audio is currently normal. Yellow: audio thresholds are enabled, and we have detected an abnormal audio situation, but the timeout value has not been exceeded. Red: audio thresholds are enabled, and we have detected an abnormal audio situation and the timeout value has been exceeded, thus resulting in an alarm.

Freeze status:	Status bulbs are displayed indicating the current freeze-frame and color-freeze status for the streams. The freeze-frame error timeout values are set as part of the content threshold template associated with each multicast or OTT channel (refer to the Content – Content thresh. view). The different bulb colors are: White: Unknown (typically due to the VB220-SW being unable to decode video) Grey: freeze-frame detection is disabled. Green: freeze-frame detection is enabled, no freeze-frame is detected. Yellow: freeze-frame detection is enabled. Two consecutive equal frames have been detected, but the freeze-frame error timeout value has not been exceeded. Red: freeze-frame is enabled. Freeze-frame has been detected and the freeze-frame error timeout value has been exceeded, thus resulting in an alarm.
MOS status:	If the probe has been licensed with the Content Extraction and Alarming option, status bulbs are displayed indicating the current MOS average alarm status for the streams. The MOS average threshold values are set as part of the content threshold template associated with each multicast or OTT channel (refer to the Content – Content thresh. view). The different bulb colors are: Grey: MOS average thresholds are disabled. Green: MOS average thresholds are enabled, and the MOS average is above the configured threshold. Red: MOS average thresholds are enabled, and the MOS average has dropped below the configured threshold, thus resulting in an alarm.
SCTE 35 status:	If the probe has been licensed with the SCTE 35 Signaling Analysis and Logging option, status bulbs are displayed indicating the current SCTE 35 alarm status for the streams. The SCTE 35 alarming threshold values are set as part of the content threshold template associated with each multicast or OTT channel (refer to the Content – Content thresh. view). The different bulb colors are: Grey: SCTE 35 alarming thresholds are disabled. Green: SCTE 35 alarming thresholds are enabled, and no SCTE 35 alarms are active. Red: SCTE 35 alarming thresholds are enabled, and one or more SCTE 35 alarms are active. Additionally, if the service is currently in SCTE 35 cue out mode, the words “CUE OUT” are displayed under the thumbnail.

Alignment status: If the probe has been licensed with the Content Extraction and Alarming option, status bulbs are displayed indicating the current OTT alignment status for the streams. OTT alignment check is defined as part of the content threshold template associated with OTT channel (refer to the **Content – Content thresh.** view). The different bulb colors are:

Grey: Alignment check is disabled.

Green: Alignment check is enabled, and the OTT profiles are currently aligned.

Red: Alignment check is enabled, and the OTT profiles are currently not aligned; an alarm is active.

The **Thumbs Details** pop-up view is accessed by clicking a thumb in the **Thumbnails** view. These pop-up views are described in detail below. Note that thumbnails are only decoded automatically if the **Extract thumbnails** option has been enabled in the associated OTT or multicast setup, or if freeze-frame or color-freeze alarming (Content Extraction and Alarming option) has been enabled in the Content threshold template.

To display thumbnails for JPEG XS services, the JPEGXS-OPT license is required.

Clicking the **Close** button will close the view.

5.4.1 Service details view



Stream: Al Jazeera English HD

Transport stream ID	12
Name	Al Jazeera English HD
Type	multicast
Multicast address	239.255.2.39
Multicast port	5500
Bitrate	7.85 Mbps

Service: 5031

Service ID	5031
PSI/SI name	Al Jazeera English HD
Number of PIDs	4
Bitrate	7.72 Mbps

Status Video Audio All PIDs SCTE35

Name	Status description
Audio silence	Threshold: -50 LUFS
Audio too loud	Threshold: -5 LUFS
Audio phase	Threshold: -0.2
Freeze-frame	Consecutive frozen frames: 0
Color-freeze	Consecutive frozen frames: 0
MOS average	Running average: 3.3. Threshold: 3.2. Window: 10 min
SCTE 35 Gap	Test disabled
SCTE 35 placement	Test disabled
SCTE 35 placement gap	Test disabled

Close

This view presents a large thumbnail for the selected service of a a or multicast setup, as well as video and audio metadata. Service loudness and audio phase data are indicated in graphs for each audio component. The same pop-up can also be opened from the **Multicasts — Parameters** and **ETR 290 — Services** views. Clicking the **Close** button will close the pop-up view.

The pop-up consists of two parts, one shared part at the top displaying a the thumbnail and some details for the selected service, and a specific part at the bottom which differs depending on the selected tab. Which tabs are displayed depends on the contents of the stream and what monitoring thresholds are applied to it.

5.4.1.1 Service information

The top part of the dialog always show the thumbnail, if enabled, and stream and service metadata.

<i>Stream</i>	
Transport stream ID:	The ID of the selected stream as shown in the list of multicasts; non-TS services display / here.
Name:	The name of the multicast containing the selected service, as defined by the user.
Type:	The type of the stream containing the selected service; multicast, unicast or SRT Stream (a type of unicast).
Multicast address:	The multicast address of the stream containing the selected service. Multicasts only; not displayed for SRT streams.
Multicast port:	The port number of the multicast containing the selected service. Multicasts only; not displayed for SRT streams.
SRT Mode:	The SRT mode of operation selected to receive an SRT stream. SRT streams only; not displayed for multicasts.
SRT Latency:	The configured latency for the SRT connection. SRT streams only; not displayed for multicasts.
SRT Host:	The host address of the SRT stream source. SRT streams only; not displayed for multicasts. Not displayed in case of SRT mode 'Listener'.
SRT Port:	The port used to receive from the SRT stream source. SRT streams only; not displayed for multicasts.
Bitrate:	The total stream bitrate of the multicast containing the selected service (bits/s).
<i>Service</i>	
Service ID:	The service ID of the selected service; non-TS services display / here
PSI/SI Name:	The name of the selected service, as derived from PSI/SI; non-TS services display the multicast name here instead

Number of PIDs:	The number of PIDs or components associated with the selected service
Bitrate:	The total bitrate of the PIDs making up the selected service (bits/s)

5.4.1.2 Status

The **Status** tab displays the following service status information (bulbs will be green for status OK, red to indicate an active alarm and grey if the associated check has been disabled):

<i>Status description</i>	
Audio silence:	A bulb indicates the audio silence status with reference to the defined requirement. Threshold: The audio silence detection threshold (LUFS/LKFS) as defined in the stream threshold template associated with the service.
Audio too loud:	A bulb indicates the audio too loud status with reference to the defined requirement. Threshold: The audio peak detection threshold (LUFS/LKFS) as defined in the stream threshold template associated with the service.
Audio phase:	A bulb indicates the audio phase status with reference to the defined requirement. Threshold: The audio phase detection threshold as defined in the stream threshold template associated with the service.
Freeze-frame:	A bulb indicating the freeze-frame detection status. The freeze-frame error timeout value is set as part of the content threshold group associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Consecutive frozen frames: The number of consecutive equal frames that have been detected.
Color-freeze:	A bulb indicating the color-freeze detection status. The freeze-frame error timeout value is set as part of the content threshold group associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Consecutive frozen frames: The number of consecutive single color frames that have been detected.
MOS average:	A bulb indicating the MOS average status. The MOS averaging window is set as part of the content threshold group associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Running average: The current running average MOS score Threshold: The MOS average threshold as defined in the content threshold template associated with the service. Window: The window over which the MOS average is calculated.

SCTE 35 Gap:	If the probe has been licensed with the SCTE 35 Signaling Analysis and Logging option, this displays a status bulb indicating whether the SCTE 35 Command Gap alarm is active. The SCTE 35 alarming threshold values are set as part of the content threshold template associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Time since last event: The number of seconds since the last received SCTE 35 event is displayed here. Threshold: The SCTE 35 Command gap threshold as defined in the content threshold template associated with the service.
SCTE 35 Placements:	If the probe has been licensed with the SCTE 35 Signaling Analysis and Logging option, this displays a status bulb indicating whether the Too few SCTE 35 placement opportunities alarm is active. The SCTE 35 alarming threshold values are set as part of the content threshold template associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Placement opportunities last clock hour: The number of placement opportunities found during the previous clock hour, or N/A if the service was not monitored for the whole previous clock hour. Threshold: The SCTE 35 Minimum number of placement opportunities per clock hour threshold as defined in the content threshold template associated with the service.
SCTE 35 Placement Gap:	If the probe has been licensed with the SCTE 35 Signaling Analysis and Logging option, this displays a status bulb indicating whether the SCTE 35 placement gap alarm is active. The SCTE 35 alarming threshold values are set as part of the content threshold template associated with each multicast (refer to the Content — Content thresh. and Multicasts — Streams — Edit views). Time since last opportunity: The number of seconds since the start of the last placement opportunity is displayed here. Threshold: The SCTE 35 Maximum opportunity gap threshold as defined in the content threshold template associated with the service.

5.4.1.3 Video

Status	Video	Audio	All PIDs	SCTE35	
PID	Has PCR	Content	Last QoE information		
101	YES	SEE 3840x2160 SAMPLING FORMAT YCbCr 4:2:0 (10 bit) COLOR PRIMARIES BT.2020	ASPECT RATIO 16:9 FRAME RATE 50 Hz TRANSFER CHARACTERISTICS HLG (ARIB STD-B67)	PIXEL ASPECT RATIO 1:1 INTERLACED No MATRIX COEFFICIENTS BT.2020 non-constant lumin	CODEC hevc RANGE Narrow range MOS SCORE 4.0 UPDATED Mar 5 15:54:01

Close

Close

The **Video** tab displays the following detailed metadata:

<i>Video</i>	
PID:	The video PID of the selected service for MPEG-TS services, or the video component number for non-TS services
Has PCR:	Yes if the PID contains PCR, No if not
Size:	The video picture size of the selected service
Aspect ratio:	The video aspect ratio of the selected service, or “N/A” if no information is available
Pixel aspect ratio:	The video pixel aspect ratio of the selected service, or “N/A” if no information is available
Codec:	The video encoding format of the selected service
Sampling format:	The video sampling format of the selected service
Frame rate:	The video frame rate of the selected service (Hz)
Interlace:	Whether the video source is interlaced or not
Range:	Whether the range of visual content values in the video source are limited or not. Possible ranges: Full range, Narrow range
Color primaries:	The specific primary colors used to encode all colors in the video source. Possible color primaries: BT.709, BT.470 System M, BT.470 System B, G, ST 170, ST 240, Film, BT.2020, ST 428-1, ST 431-2, ST 432-1, EBU 3213
Transfer characteristics:	What transfer characteristics system the video source specifies to use to convert between RGB and Y’CbCr. Possible transfer characteristics systems: BT.709, Gamma 2.2, Gamma 2.8, ST 170, ST 240, Linear, Logarithmic, Logarithmic square root, xvYCC (IEC 61966-2-4), BT.2020 (10-bit), BT.2020 (12-bit), PQ, ST 428-1, HLG (ARIB-STD-B67)

Matrix coefficients: What matrix coefficients the video source specifies to use to convert between RGB and Y'CbCr.

Possible matrix coefficients: RGB, BT.709, FCC NTSC, BT.470 System B, G, ST 170, ST 240, YCgCo, BT.2020 non-constant luminance, BT.2020 constant luminance, ST 2085, Chromaticity-derived non-constant luminance, Chromaticity-derived constant luminance, ST ICtCp

Last QoE information

MOS score: Calculated picture quality score, on a scale from 1.0 to 5.0, where 5.0 is best.

Updated: Indicates the time when QoE scores were last generated.

Blockiness: Detected picture blockiness, in percent.
Only available when using the **Classic** QoE algorithm.

Blurriness: Detected picture blurriness, in percent.
Only available when using the **Classic** QoE algorithm.

Noisiness: Detected picture noisiness, in percent.
Only available when using the **Classic** QoE algorithm.

Brightness: Detected picture brightness, in percent.
Only available when using the **Classic** QoE algorithm.

Contrast: Detected picture contrast, in percent.
Only available when using the **Classic** QoE algorithm.

QoE scores are only shown when enabled through the assigned content threshold.

5.4.1.4 Audio

Status Video **Audio** All PIDs SCTE35

PID	Language	Channels	Codec	Rate	Loudness	Phase
5112	DEU	2 (stereo)	mp3	48.00 kHz		
5113	FRA	2 (stereo)	mp3	48.00 kHz		
5116	MUL	2 (stereo)	mp3	48.00 kHz		
5117	MIS	2 (stereo)	mp3	48.00 kHz		

Close

The **Audio** tab displays the following detailed metadata:

Audio

PID:	The audio PID of the selected service for MPEG-TS services, or the audio component number for non-TS services Note that there may be several audio PIDs or components associated with a service
Language:	The audio language, as derived from PSI/SI
Channels:	The number of audio channels represented by the audio PID or component
Codec:	The audio encoding format
Rate:	The audio sample rate (Hz)
Audio level:	If audio metadata extraction has been enabled for the channel, an audio level bar displaying the average audio level as a green bar referenced to the peak audio level, the peak level being indicated by a white line.
Loudness:	If loudness monitoring has been enabled for the channel, a loudness graph covering the last ten seconds will be shown here. Portions that fall outside the defined thresholds will be colored red.
Phase:	If audio metadata extraction has been enabled for the channel, a momentary audio phase measurement will be displayed here for stereo sources. A value of –1 indicates audio that is completely out of phase, whereas a value of +1 indicates audio that is completely in phase. If the audio phase monitoring has been enabled for the channel, a phase graph will be shown here instead. Portions that fall outside the defined thresholds will be colored red.
Bit depth:	The bit depth of the underlying Dolby E bitstream. Reported for Dolby E streams only.
Frame rate:	The audio frame rate of the selected service (Hz). Reported for Dolby E streams only.
CRC errors:	Total number of CRC errors detected in the Dolby E bitstream. Reported for Dolby E streams only.
Program configuration:	Audio channel configuration for the available programs in the decoded bitstream. Reported for Dolby E streams only.
Selected program:	Which program of the Dolby E bitstream being decoded. Reported for Dolby E streams only.

Audio information is only displayed if audio metadata extraction has been enabled in the assigned content thresholds. Audio information is updated periodically, and the initial display can take up to ten seconds. For more details on the content thresholds, please refer to the **Content — Content thresh.** view.

5.4.1.5 All PIDs

Status	Video	Audio	All PIDs	SCTE35
PID	Type	Has PCR	Language	Bitrate
5111	H264 Video	YES		6.95 Mbps
5112	MPEG1 Audio	NO	DEU	196.94 kbps
5113	MPEG1 Audio	NO	FRA	196.94 kbps
5116	MPEG1 Audio	NO	MUL	198.45 kbps
5117	MPEG1 Audio	NO	MIS	198.45 kbps
5114	Teletext	NO	DEU	195.44 kbps
1270	AIT	NO		10.52 kbps
1276	DSM-CC	NO		10.52 kbps
5115	Subtitling	NO	DEU	3.00 kbps
5118	Subtitling	NO	FRA	4.50 kbps
5119	Subtitling	NO	DEU	4.50 kbps
5198	Subtitling	NO	DAN	4.50 kbps

Close

The **All PIDs** tab contains an overview of all the PIDs that are associated with the selected service, including the PIDs displayed in other tabs. It displays the following metadata:

<i>All PIDs</i>	
PID:	The PID number service for MPEG-TS services, or the component number for non-TS services associated with a service
Type:	The type description of the associated PID
Has PCR:	Yes if the PID contains PCR, No if not
Language:	The language for the content of the PID, as derived from PSI/SI, if specified
Bitrate:	The bitrate of this specific PID inside the service (bit/s)

5.4.1.6 SCTE 35

Status	Video	Audio	All PIDs	SCTE35			
Time	Service	PID	Event ID	Command	Seg. type	Duration	
2026-03-05 14:31:55	65 DELUXE MUSIC	60	1073745729	Splice insert		79.00	
2026-03-05 14:33:09	65 DELUXE MUSIC	60	1073745729	Splice insert		NA	
2026-03-05 14:33:11	65 DELUXE MUSIC	60	1073745729	Splice insert		NA	
2026-03-05 14:33:13	65 DELUXE MUSIC	60	1073745729	Splice insert		NA	
2026-03-05 14:50:37	65 DELUXE MUSIC	60	1073745741	Splice insert		175.00	
2026-03-05 14:53:28	65 DELUXE MUSIC	60	1073745741	Splice insert		NA	
2026-03-05 14:53:30	65 DELUXE MUSIC	60	1073745741	Splice insert		NA	
2026-03-05 14:53:32	65 DELUXE MUSIC	60	1073745741	Splice insert		NA	
2026-03-05 15:08:32	65 DELUXE MUSIC	60	1073745753	Splice insert		98.40	
2026-03-05 15:10:06	65 DELUXE MUSIC	60	1073745753	Splice insert		NA	
2026-03-05 15:10:08	65 DELUXE MUSIC	60	1073745753	Splice insert		NA	
2026-03-05 15:10:10	65 DELUXE MUSIC	60	1073745753	Splice insert		NA	
2026-03-05 15:27:30	65 DELUXE MUSIC	60	1073745765	Splice insert		202.00	
2026-03-05 15:30:48	65 DELUXE MUSIC	60	1073745765	Splice insert		NA	
2026-03-05 15:30:50	65 DELUXE MUSIC	60	1073745765	Splice insert		NA	
2026-03-05 15:30:52	65 DELUXE MUSIC	60	1073745765	Splice insert		NA	
2026-03-05 15:47:19	65 DELUXE MUSIC	60	1073745777	Splice insert		106.40	
2026-03-05 15:49:01	65 DELUXE MUSIC	60	1073745777	Splice insert		NA	
2026-03-05 15:49:03	65 DELUXE MUSIC	60	1073745777	Splice insert		NA	
2026-03-05 15:49:05	65 DELUXE MUSIC	60	1073745777	Splice insert		NA	

Close

If SCTE 35 monitoring has been enabled for the channel, and SCTE 35 events have been received, the **SCTE 35** tab displays the last 20 SCTE 35 events received on the selected service. The following information is displayed for the events.

<i>SCTE 35</i>	
Time:	When the event occurred
Service:	The name of the service for which the event applies This is always the currently selected service
PID:	The PID carrying the SCTE 35 or SCTE 104 information. A service can have multiple SCTE 35 or SCTE 104 PIDs signaled in the PMT table(s)
Event ID:	ID of the specific event
Command:	Specifies whether it is a splice in (switch to local content/ads) or splice out event (switch back to the audio/video in the service) For messages with the splice command type 'Time signal' the Switch mode parameter will be empty and the Segment type parameter will contain the details
Seg. type:	The segmentation type found in the segmentation descriptor (if found)
Duration:	The time when a splice occurred to its end

Further SCTE 35 details can be found in the **Content — SCTE 35** view.

5.4.1.7 Captions

Status	Video	Audio	All PIDs	SCTE35	Captions
Time	Caption data				
2026-03-06 16:17:52	>>OKAY, BET YOU				
2026-03-06 16:17:54	CAN'T GUESS THIS ONE.				
2026-03-06 16:17:55	WHAT WILL HAPPEN IF A				
2026-03-06 16:17:58	DRAGON DRANK ANYTHING?				
2026-03-06 16:17:59	>>YOU DID?				
2026-03-06 16:18:01	>>YES -				

Close

If caption monitoring has been enabled for the channel, and caption events have been received, the last six caption events for the service are displayed. For more details on these events, compare the **Content — Captions** view.

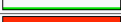
Status	Video	Audio	All PIDs	SCTE35	Captions
PID	Type	Language	Size	Select	
5115	Subtitling	deu	1280x720	Selected	
5118	Subtitling	fra	1280x720	Change	
5198	Subtitling	dan	1280x720	Change	

Close

In the case of DVB Subtitling, the subtitles are overlaid on the thumbnail image. The subtitle track to display can be selected in the dialog view using the **Change** button. For DVB Subtitling, the **Captions** tab displays the following detailed metadata:

Subtitles	
PID:	The subtitle PID of the selected service for MPEG-TS services, or the subtitle component number for non-TS services Note that there may be several subtitle PIDs or components associated with a service
Type:	The subtitling standard
Language:	The language of the subtitle, as defined in the MPEG-TS Program Map Table (PMT)
Size:	The video picture size of the selected subtitle

5.4.2 OTT details view

Profiles Manifest Alarms Thumbnails Alignment												
Channel		Health (120 min.)		Profiles		Profile status		Format				
NRK1 HD@DASH				10				DASH				
Profile	Type	Profile Health (120 min.)	Profile bps	Actual bps	Download bps	Duration	DL time	First byte	DL size	Encryption	HTTP header	
Video: avc1.4d40...	Live		7.0 Mbps	6.7 Mbps	1.8 Gbps	9.6 s	35.2 ms	5.2 ms	8.0 MB	No	File	
Video: avc1.4d40...	Live		5.0 Mbps	4.8 Mbps	1.9 Gbps	9.6 s	24.9 ms	5.0 ms	5.8 MB	No	File	
Video: avc1.4d40...	Live		4.0 Mbps	3.9 Mbps	1.7 Gbps	9.6 s	22.2 ms	4.8 ms	4.6 MB	No	File	
Video: avc1.4d40...	Live		3.0 Mbps	2.9 Mbps	1.5 Gbps	9.6 s	19.0 ms	4.4 ms	3.5 MB	No	File	
Video: avc1.4d40...	Live		2.0 Mbps	2.0 Mbps	1.4 Gbps	9.6 s	13.8 ms	4.5 ms	2.4 MB	No	File	
Video: avc1.4d40...	Live		1.0 Mbps	965.6 kbps	1.1 Gbps	9.6 s	8.7 ms	4.7 ms	1.2 MB	No	File	
Video: avc1.4d40...	Live		500.0 kbps	503.8 kbps	686.0 Mbps	9.6 s	7.0 ms	4.7 ms	604.6 kB	No	File	
Audio: mp4a.40....	Live		189.4 kbps	192.7 kbps	233.0 Mbps	9.6 s	7.9 ms	6.3 ms	231.2 kB	No	File	
Audio: mp4a.40....	Live		188.2 kbps	192.7 kbps	273.5 Mbps	9.6 s	6.8 ms	5.2 ms	231.2 kB	No	File	
Audio: mp4a.40....	Live		93.3 kbps	96.5 kbps	144.6 Mbps	9.6 s	6.4 ms	4.4 ms	115.8 kB	No	File	

This view presents profile and manifest metadata, as well as video and audio metadata and thumbnails for the selected channel. The same pop-up can also be opened from the **OTT — Active testing** view. Clicking the **Close** button will close the pop-up view.

5.4.2.1 Profiles

The **Profiles** view in this pop-up consists of two tables detailed below:

The following information relevant for the overall OTT channel is shown in the first part of the **Details — Profiles** pop-up window:

<i>Channel</i>	
Channel:	The channel name defined by the user and linked to a URL in the OTT — Channels view. A bulb indicates the current status of the channel, i.e. the most severe profile status.
Channel health:	A timeline graph display of a combined bitrate and alarm representation for the channel. This shows the most severe alarm or download speed for all monitored profiles. The individual profiles graphs are shown below. The timeline can display the last 120 minutes, 24 hours or four days, and the graph resolution is one minute for the two hour graph, twelve minutes for the 24 hour graph or 48 minutes for the four day graph.
Profiles:	The number of profiles associated with a channel.

Profile status:	The channel health bar displays the current status for individual channel profiles. Profiles are separated by vertical black lines. Colors indicate profile alarm status: • Green: OK • Yellow: Warning • Orange: Error • Red: Major • Black/Dark red: Fatal
Format:	The channel format is shown here (Apple HLS , Microsoft Smooth Streaming , Adobe HDS , MPEG DASH , SHOUTcast or RTMP).

In the same view below the table for the overall channel a more detailed view per **channel profile** is shown with the following information in it:

<i>Profiles</i>	
Profile:	The name of the OTT profile as flagged in the manifest files.
Type:	Live for live content or VoD for stored content. The distinction between the two is done based on whether the profile sequence numbers update or not.
Profile health:	A timeline graph display of a combined bitrate and alarm representation for individual profiles. Refer to Appendix C for a description of these graphs. The timeline can display the last 120 minutes, 24 hours or four days, and the graph resolution is one minute for the two hour graph, twelve minutes for the 24 hour graph or 48 minutes for the four day graph.
Profile bps:	The profile nominal bandwidth as flagged in the manifest files.
Actual bps:	The actual profile bitrate, i.e. the segment size (megabits) divided by the segment length (seconds). The actual profile bitrate should match the manifest bitrate specification within limits defined by the user in the OTT thresholds template associated with a channel. Otherwise an alarm will be raised.
Download bps:	The download bitrate, i.e. the segment size (megabits) divided by the download time (seconds).
Duration:	The profile segment duration (seconds) specified in the manifest file.
DL time:	The actual profile segment download time (seconds).
First byte:	The time (in seconds) before the first payload data byte was received.
DL size:	The actual profile segment size (bytes) as downloaded.
Encryption:	Yes or No depending on whether the content for that profile is encrypted or not.
HTTP header:	The current HTTP header of the last segment downloaded for that profile.

5.4.2.2 Manifest

Profiles

Manifest

Alarms

Thumbnails

Alignment

Channel	Profiles	Format	Manifest size		Manifest file	Manifest URL	HTTP Header
 NRK1 HD@DASH	10	DASH	4.4 kB		File	Link	File
Profile	Type	Profile bps	Seq. age	Manifest size	Manifest file	Manifest URL	HTTP Header
 Video: avc1.4d4020 1280...	Live	7.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d401f 1280...	Live	5.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d401f 1280...	Live	4.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d401f 1024...	Live	3.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d401f 768x...	Live	2.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d4015 480x...	Live	1.0 Mbps	9	N/A	N/A	N/A	N/A
 Video: avc1.4d4015 480x...	Live	500.0 kbps	9	N/A	N/A	N/A	N/A
 Audio: mp4a.40.2 eng	Live	189.4 kbps	9	N/A	N/A	N/A	N/A
 Audio: mp4a.40.2 eng	Live	188.2 kbps	9	N/A	N/A	N/A	N/A
 Audio: mp4a.40.2 eng	Live	93.3 kbps	9	N/A	N/A	N/A	N/A

Close

The **Manifest** view shows health information on the overall manifest file for the channel as well as for the manifest files for the individual profiles for the formats were such are available.

Channel

Channel:	The channel name defined by the user and linked to a URL in the OTT — Channels view. A bulb indicates the current status of the channel, i.e. the most severe profile status.
Profiles:	The number of profiles associated with a channel.
Format:	The channel format is shown here (Apple HLS , Microsoft Smooth Streaming , Adobe HDS , MPEG DASH , SHOUTcast or RTMP).
Manifest size:	The size in bytes of the main/top manifest file for the overall channel.
Manifest file:	Clickable URL for displaying the manifest file as text for the overall channel.
Manifest URL:	A clickable link to the current main/top manifest file for the overall channel.
HTTP header:	The current HTTP header of the main/top manifest file for the overall channel.

Just below the channel manifest information in the same window is the detailed manifest information per profile. This view contains the following information:

Profiles

Profile:	The name of the OTT profile as flagged in the manifest files.
Type:	Live for live content or VoD for stored content. The distinction between the two is done based on the contents of the manifest file.

Profile bps:	The profile nominal bandwidth as flagged in the manifest files.
Seq.age:	The profile sequence shows how long it has been since the manifest was updated in whole seconds. The profile sequence age is only reported for Live profiles.
Manifest size:	The size in bytes of the manifest file for a particular profile, for formats where such a file is available.
Manifest file:	Clickable URL for displaying the manifest file as text for this particular profile, or “N/A” for formats where such a file is not available.
Manifest URL:	Clickable URL to the profile manifest file, for formats where such a file is available.
HTTP header:	URL to HTTP header in text form for a particular profile manifest file, or “N/A” for formats where such a file is not available.

5.4.2.3 Alarms

Profiles
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Alignment

Transport alarms

- Speed warning
- Speed error
- Timeout
- Resolve
- Connect
- Send
- Recv
- Profile stream type

HTTP alarms

- No body
- HTTP error
- HTTP 3XX
- HTTP 4XX
- HTTP 5XX

XML alarms

- Manifest size
- Actual bitrate
- Static
- Parse
- Segment missing
- Min. profiles
- Timesync
- Unknown

Content alarms

- Freeze-frame
- Color-freeze
- Profile alignment
- Audio silence
- Audio too loud
- Audio out of phase
- MOS below avg.
- Wrong DAR
- Wrong PAR

SCTE35 Alarms

- Event gap
- Too few placement opp.
- Opportunity gap
- Start event missing
- End event missing

Status	Color	Time	Type	Alarm id	Stream	Description
Active	Red	Mar 5 12:57:13	Content	4900	NRK1 HD@DASH	Wrong PAR, 4:3 (since Mar 5 12:56:08) (profile Video: avc1.4d4015 480x360)
Active	Red	Mar 5 12:57:13	Content	4900	NRK1 HD@DASH	Wrong PAR, 4:3 (since Mar 5 12:56:08) (profile Video: avc1.4d401f 768x576)
Active	Red	Mar 5 12:57:13	Content	4900	NRK1 HD@DASH	Wrong PAR, 4:3 (since Mar 5 12:56:08) (profile Video: avc1.4d4015 480x360)
Cleared	Green	Mar 6 10:29:19	Content	4950	NRK1 HD@DASH	MOS below threshold (profile Video: avc1.4d4020 1280x720) (Mar 6 10:13:...
Cleared	Green	Mar 6 10:23:19	Content	4950	NRK1 HD@DASH	MOS below threshold (profile Video: avc1.4d401f 768x576) (Mar 6 10:21:1...
Cleared	Green	Mar 6 10:21:39	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:21:18) (Mar 6 1...
Cleared	Green	Mar 6 10:17:19	Content	4950	NRK1 HD@DASH	MOS below threshold (profile Video: avc1.4d401f 768x576) (Mar 6 10:15:1...
Cleared	Green	Mar 6 10:14:49	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:14:10) (Mar 6 1...
Cleared	Green	Mar 6 10:04:10	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:03:58) (Mar 6 1...
Cleared	Green	Mar 6 10:03:29	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:03:10) (Mar 6 1...
Cleared	Green	Mar 6 10:02:49	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:02:39) (Mar 6 1...
Cleared	Green	Mar 6 10:02:19	Content	5100	NRK1 HD@DASH	One or more profiles are out of alignment (since Mar 6 10:02:09) (Mar 6 1...

The **Alarms** view gives an at-a-glance overview of any active OTT alarms for the selected channel. The alarms are divided into different columns, depending on their alarm type. This division, and the order of the alarms inside each column, is replicated in the **Micro** alarm overview shown in the **Streams** view. An alarm log for the selected channel is also provided here.

The alarms are the same ones as explained for the **Alarms — Alarm setup** view, see chapter 6.2.2 for more information.

5.4.2.4 Thumbnails

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Alignment

Video: avc1.4d4020 1280x720



Profile to decode:

Auto

Video information

Size	1280x720
Aspect ratio	16:9
Pixel aspect ratio	1:1
Codec	h264
Sampling format	YCbCr 4:2:0
Frame rate	50 Hz
Range	Narrow range
Color primaries	BT.709
Transfer characteristics	BT.709
Matrix coefficients	BT.709

Last QoE information

MOS algorithm	mos2
Updated	2026-03-06 10:39:00
MOS score	3.6
MOS running average	3.5
VMAF score	100%

Segment information

Engine ID	1
Profile name	Video: avc1.4d4020 1280x720
Bitrate	7.0 Mbps
Stream type	Live
Sequence number	19741577130

Close

The **Thumbnails** view will provide information about the current thumbnails in the channel.

The quality of the content in the selected profile can be viewed in the thumbnail section, and the user may alter the selected profile in the drop down list. *Auto* will select the profile with the highest bitrate and video data.

The section on the right hand side provides specific decoder and segment information.

Video information

Size:	The video picture size of the selected profile
Aspect ratio:	The video aspect ratio of the selected profile
Pixel aspect ratio:	The video pixel aspect ratio of the selected profile
Codec:	The video encoding format of the selected profile
Sampling format:	The video sampling format of the selected profile

Frame rate:	The video frame rate of the selected profile (Hz)
Range:	Whether the range of visual content values in the video source are limited or not. <i>Possible ranges:</i> Full range, Narrow range
Color primaries:	The specific primary colors used to encode all colors in the video source. <i>Possible color primaries:</i> BT.709, BT.470 System M, BT.470 System B, G, ST 170, ST 240, Film, BT.2020, ST 428-1, ST 431-2, ST 432-1, EBU 3213
Transfer characteristics:	What transfer characteristics system the video source specifies to use to convert between RGB and Y'CbCr. <i>Possible transfer characteristics systems:</i> BT.709, Gamma 2.2, Gamma 2.8, ST 170, ST 240, Linear, Logarithmic, Logarithmic square root, xvYCC (IEC 61966-2-4), BT.2020 (10-bit), BT.2020 (12-bit), PQ, ST 428-1, HLG (ARIB-STD-B67)
Matrix coefficients:	What matrix coefficients the video source specifies to use to convert between RGB and Y'CbCr. <i>Possible matrix coefficients:</i> RGB, BT.709, FCC NTSC, BT.470 System B, G, ST 170, ST 240, YCgCo, BT.2020 non-constant luminance, BT.2020 constant luminance, ST 2085, Chromaticity-derived non-constant luminance, Chromaticity-derived constant luminance, ST ICtCp

Last QoE information

MOS algorithm:	Shows which of the QoE algorithms that has been selected. See chapter 6.10.6 for more information on the available QoE algorithms.
Updated:	Indicates the time when QoE scores were last generated.
Blockiness:	Detected picture blockiness, in percent. Only available when using the Classic QoE algorithm.
Blurriness:	Detected picture blurriness, in percent. Only available when using the Classic QoE algorithm.
Noisiness:	Detected picture noisiness, in percent. Only available when using the Classic QoE algorithm.
Brightness:	Detected picture brightness, in percent. Only available when using the Classic QoE algorithm.
Contrast:	Detected picture contrast, in percent. Only available when using the Classic QoE algorithm.

MOS score:	Calculated picture quality score, on a scale from 1.0 to 5.0, where 5.0 is best.
MOS running average:	If MOS average alarming has been enabled, the current MOS running average is displayed here
MOS average window:	If MOS average alarming has been enabled, the averaging window is displayed here
VMAF score:	If enabled in the OTT thresholds, a VMAF score is calculated for each of the profiles, with the highest-bitrate profile used as the reference.

QoE scores are only shown when enabled through the assigned content thresholds and are only calculated for the profile with the highest bitrate. To measure the quality loss between profiles, enable VMAF scoring and use the measurements displayed in the **Alignment** view.

Audio Information

Codec:	The audio encoding format
Sample rate:	The audio sample rate
Channels:	The number of audio channels represented by the audio PID
Layout:	The audio channel layout

Audio information is only displayed if audio metadata extraction has been enabled in the content thresholds for the channel.

Segment Information

Engine ID:	The OTT engine monitoring the selected channel.
Profile name:	The name of the OTT profile as flagged in the manifest files.
Bitrate:	Bitrate rate of the a segment.
Streamtype:	The type of the stream detected; live or video on demand.
Sequence number:	The current sequence number being analyzed. This is either signaled in the channel manifest (HLS, HDS, DASH, Smooth Streaming), or generated by the VB220-SW(RTMP, SHOUTcast).

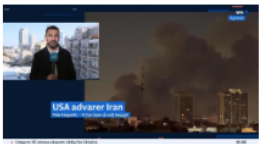
5.4.2.5 Alignment

Profiles
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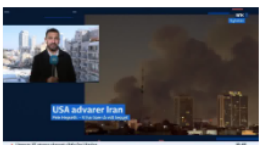
Profile: Video: avc1.4d4020 1280x720

Sequence number : 19745141130
 Bitrate : 7.000 Mbps
 Size : 1280x720
 FPS : 50
 VMAF score : 100.00 %



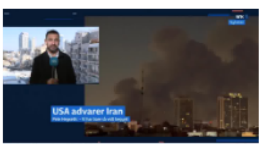
Profile: Video: avc1.4d401f 1280x720

Sequence number : 19745141130
 Bitrate : 5.000 Mbps
 Size : 1280x720
 FPS : 25
 VMAF score : 97.43 %



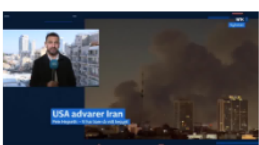
Profile: Video: avc1.4d401f 1280x720

Sequence number : 19745141130
 Bitrate : 4.000 Mbps
 Size : 1280x720
 FPS : 25
 VMAF score : 97.22 %



Profile: Video: avc1.4d401f 1024x576

Sequence number : 19745141130
 Bitrate : 3.000 Mbps
 Size : 1024x576
 FPS : 25
 VMAF score : 92.20 %



Profile: Video: avc1.4d401f 768x576

Sequence number : 19745137530
 Bitrate : 2.000 Mbps
 Size : 768x576
 FPS : 25
 VMAF score : 100.00 %

The **Alignment** view shows the user all the profiles for a selected channel with thumbnails and corresponding data.

Profile Alignment Information

Profile: The name of the OTT profile as flagged in the manifest files. The first profile listed is always the one with the highest signaled bitrate.

Sequence number: The segment or sequence number for the current thumbnail. This is either signaled in the channel manifest (HLS, HDS, DASH, Smooth Streaming), or generated by the VB220-SW(RTMP, SHOUTcast).

If the sequence differ between profiles, the thumbnails are not generated from the same segment for all profiles, and may therefor appear to be out of synchronization.

Please note that VMAF scoring and alignment testing is only performed when the profiles sequence numbers inside each adaptation set are in alignment.

Bitrate:	The signaled bitrate for this profile (bits/s).
Size:	Indicates the original video size (pixels).
FPS:	The video frame rate (Hz).
VMAF score:	If enabled in the OTT thresholds, a VMAF score is calculated for each of the profiles, with the highest-bitrate profile used as the reference.
Audio:	If loudness monitoring has been enabled for the channel, the audio channel layout will be shown here.

The current version of the VMAF algorithm and model (denoted as VMAF 2.3.1), released as part of the VMAF Development Kit open source software, uses the following elementary metrics fused by Support Vector Machine (SVM) regression: **Visual Information Fidelity (VIF)**, **ADM (previously known as Detail Loss Metric)**, **Motion**

Software Probe release 7.0 utilizes metrics described above for its QoE scoring.

5.4.3 Thumbnail generation

The probe will try to generate thumbnail pictures for all streams. MPEG-2, H.264/MPEG-4, H.265/HEVC, JPEG 2000 and JPEG XS video formats in standard definition, high definition or ultra-high definition are supported in MPEG-2 transport streams. To display thumbnails for JPEG XS services, the JPEGXS-OPT license is required. Thumbnails are not generated for SMPTE ST 2022-7 combined streams.

For OTT channels, thumbnail decoding is available for **non-encrypted** HLS, HDS, DASH, Smooth Streaming and RTMP channels, as well as AES128 and SAMPLE-AES encrypted HLS channels, and fixed key CENC encrypted DASH.

The thumbnail update rate will depend on how the streams are coded and if they are standard definition, high definition or ultra-high definition.

If the probe is unable to generate a thumbnail from the signal, it will present one of the following icons:

	Shown if no data is received for the stream. There should be a match between presenting this icon and a No-signal alarm; however since the alarm and thumbnail mechanisms work independently of each other they have been given different names (loss of signal and no signal).
	Shown while the thumbnail engine is trying to decode a thumbnail picture and more precise status information has not yet been obtained. This icon is typically displayed after probe reboot or if new streams have recently been joined.
	Shown if the service does not carry a video PID — which is the case for radio services.

	The stream contains no service, as signaled in PSI/SI.
	The signal cannot be decoded due to excessive CC errors or RTP packet drops.
	The signal cannot be decoded because the Transport Error Indicator bit (TEI) is set.
	The signal cannot be decoded because the video bitstream contains errors. It might be possible to create thumbnails from this stream by enabling the “Ignore bitstream errors” checkbox in the content thresholds associated with the stream.
	The probe does not support thumbnail generation for this protocol mapping.
	The signal is recognized as being MPEG-2 encoded but the thumbnail extractor is unable to correctly decode a thumbnail picture.
	The signal is recognized as being MPEG-4/H.264 encoded but the thumbnail extractor is unable to correctly decode a thumbnail picture.
	The signal is recognized as being MPEG-H/H.265 encoded but the thumbnail extractor is unable to correctly decode a thumbnail picture.
	The signal is recognized as being JPEG 2000 encoded but the thumbnail extractor is unable to correctly decode a thumbnail picture.
	The signal is recognized as being JPEG XS encoded but the thumbnail extractor is unable to correctly decode a thumbnail picture. To display thumbnails for JPEG XS services, the JPEGXS-OPT license is required.
	This icon is shown if the probe is unable to receive or analyze the PMT PID. Only streams with PSI information can have thumbnails decoded since the probe does not support a manual specification of the video PID.
	The probe can only generate a thumbnail picture if the video data is not scrambled.
	The stream is configured to be interpreted as MABR.

For OTT channels, an icon indicating the stream type will be displayed if thumbnail extraction has not been enabled, or if the thumbnail extraction fails.

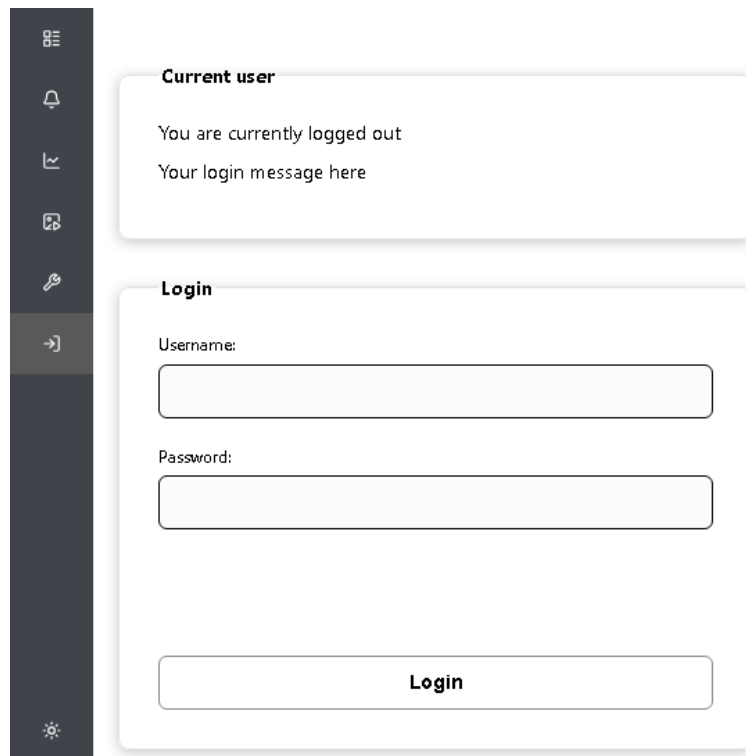
5.5 Expert



Selecting **Expert** in the main menu opens the Expert Graphical User Interface, which gives access to Software Probe configuration and additional features.

The contents of the Expert Graphical User Interface is described in detail in chapter 6.

5.6 Login



Current user

You are currently logged out

Your login message here

Login

Username:

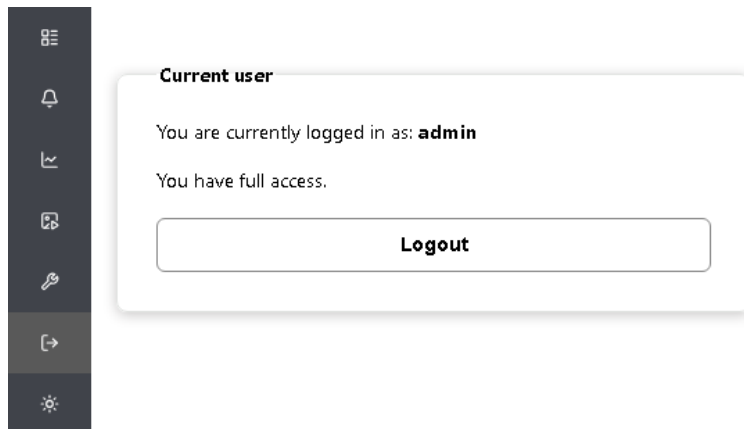
Password:

Login

The VB220-SW is by default configured with access control disabled, allowing all users access to all features without having to log in. In this case, the **Login** view is not displayed.

When access control is activated, anyone with access to the VB220-SW will first be presented with the **Login** view, requiring the user to log in before being able to access the user interface. Log-in is performed by providing the correct username and password.

Note: When logged in from the VBC, the VBC user's access rights apply, see chapter 6.13.9.2 for details.



Once logged in, the **Logout** view is available from the navigation menu. It will display the user name of the currently logged in user, and allows you to log out from the user interface. Once logged out, only the **Login** view is again available.

5.6.1 Configuring access control

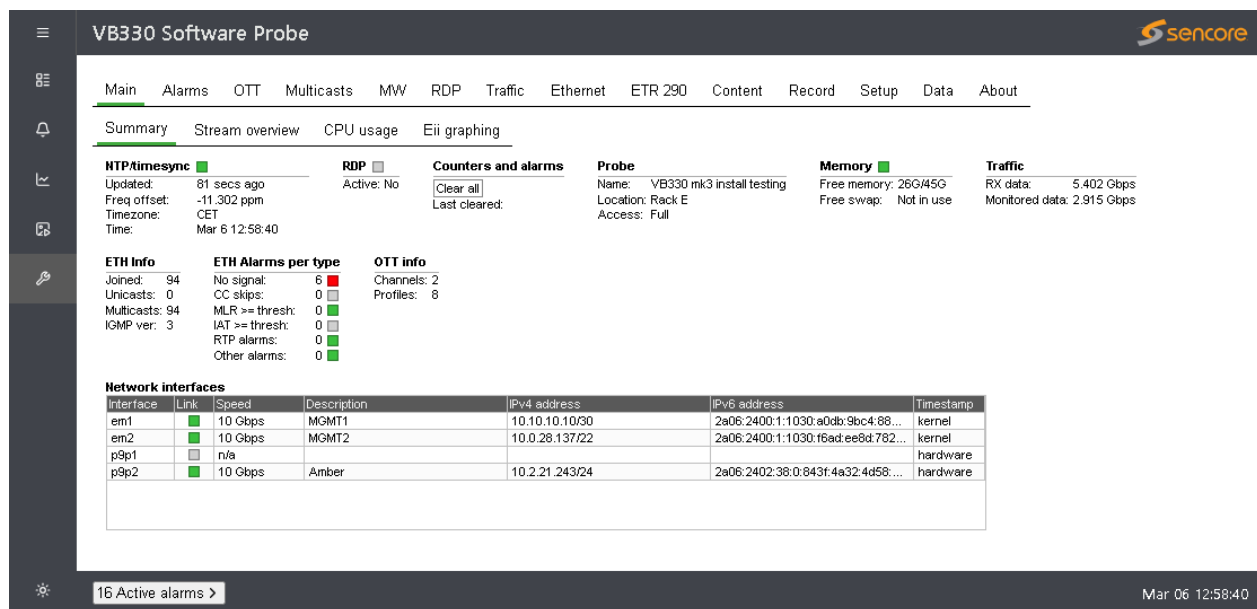
No matter how the access control settings are configured, only the **admin** user can change the access control settings. These settings are available in the **Expert** view by navigating to **Setup — Security**. When access control is disabled, you first need to log in using the **Setup — Login** view before accessing any of these settings.

The default user name and password to is **admin** and **elvis**. The operator should define a new password for the “admin” user in the **Setup — Security — Password** view.

To restrict access, the **Setup — Security — Authentication** view can be used to set up log-in that restricts all access to the user interface. A firewall can be used to allow or deny certain addresses, please refer to the operating system instructions¹ for more details on how to configure the firewall.

¹<https://ubuntu.com/server/docs/how-to>

6 EXPERT PROBE GRAPHICAL USER INTERFACE



VB330 Software Probe

Main | Alarms | OTT | Multicasts | MW | RDP | Traffic | Ethernet | ETR 290 | Content | Record | Setup | Data | About

Summary | Stream overview | CPU usage | Eii graphing

NTP timesync ■
Updated: 81 secs ago
Freq offset: -11.302 ppm
Timezone: CET
Time: Mar 6 12:58:40

RDP ■
Active: No
Clear all
Last cleared:

Counters and alarms
Channels: 2
Profiles: 8

Probe
Name: VB330 mk3 install testing
Location: Rack E
Access: Full

Memory ■
Free memory: 26G/45G
Free swap: Not in use

Traffic
RX data: 5.402 Gbps
Monitored data: 2.915 Gbps

ETH info
Joined: 94
Unicasts: 0
Multicasts: 94
IGMP ver: 3

ETH Alarms per type
No signal: 6 ■
CC skips: 0 ■
MLR >= thresh: 0 ■
IAT >= thresh: 0 ■
RTP alarms: 0 ■
Other alarms: 0 ■

OTT info
Channels: 2
Profiles: 8

Network interfaces

Interface	Link	Speed	Description	IPv4 address	IPv6 address	Timestamp
em1	■	10 Gbps	MGMT1	10.10.10.10/30	2a06:2400:1:1030:a0db:9bc4:88...	kernel
em2	■	10 Gbps	MGMT2	10.0.28.137/22	2a06:2400:1:1030:16ad:ee6d:762...	kernel
p9p1	■	n/a				hardware
p9p2	■	10 Gbps	Amber	10.2.21.243/24	2a06:2402:38:0:843f:4a32:4d58:...	hardware

16 Active alarms > Mar 06 12:58:40

The **Expert** view provides access to more in-depth analysis and to the Software Probe configuration options. It can be reached by selecting the **Expert** option in the navigation menu in the top left corner of the screen.

The Expert UI can be navigated by using the tabs, which are always available just below the Software Probe title bar. Some of the pages have their own tabs for accessing nested pages. The bottom frame of the interface is always the **alarm list**. The alarm list is by default hidden, showing only the number of active alarms, and can be displayed and hidden again by clicking the **Active alarm** button.

Note: Some of the screenshots in this section are taken from a previous software release. While the look of these pages has changed, the information displayed and documentation is still valid for this release.

6.1 Main

6.1.1 Main — Summary

Main
Alarms
OTT
Multicasts
MW
RDP
Traffic
Ethernet
ETR 290
Content
Record
Setup
Data
About

Summary
Stream overview
CPU usage
Eii graphing

NTP/timesync ■
Updated: 81 secs ago
Freq offset: -11.302 ppm
Timezone: CET
Time: Mar 6 12:58:40

RDP ■
Active: No
Clear all
Last cleared:

Counters and alarms

Probe
Name: VB330 mk3 install testing
Location: Rack E
Access: Full

Memory ■
Free memory: 26G/45G
Free swap: Not in use

Traffic
RX data: 5.402 Gbps
Monitored data: 2.915 Gbps

ETH Info
Joined: 94
Unicasts: 0
Multicasts: 94
IGMP ver: 3

ETH Alarms per type
No signal: 6 ■
CC skips: 0 ■
MLR >= thresh: 0 ■
IAT >= thresh: 0 ■
RTP alarms: 0 ■
Other alarms: 0 ■

OTT info
Channels: 2
Profiles: 8

Network interfaces

Interface	Link	Speed	Description	IPv4 address	IPv6 address	Timestamp
em1	■	10 Gbps	MGMT1	10.10.10.10/30	2a06:2400:1:1030:a0db:9bc4:88...	kernel
em2	■	10 Gbps	MGMT2	10.0.28.137/22	2a06:2400:1:1030:f6ad:ee8d:782...	kernel
p9p1	■	n/a				hardware
p9p2	■	10 Gbps	Amber	10.2.21.243/24	2a06:2402:38:0:843f:4a32:4d58:...	hardware

The **Summary** view gives an overview of the current status of the monitored streams and the probe itself. The following parameters are shown:

NTP/timesync

(Bulb): The NTP/timesync bulb indicates whether the VB220-SW clock is locked to an external time reference signal. Green indicates that the VB220-SW is locked to an external reference whereas grey indicates that the VB220-SW runs in unlocked mode or the status is unknown.

Updated: The time since the last time synchronization update.

Freq offset: Indicates the measured frequency offset for the system clock.

Timezone: The time zone relative to UTC. Configured in the OS.

Time: The current local time.

We recommend using the standard operating system tools for configuring the system clock, and to use Chrony as the network time client. Please refer to the operating system instructions¹ for further details on how to configure the date and time.

RDP

(Bulb): The RDP bulb indicates whether RDP is active or not. Green indicates RDP active whereas grey indicates that RDP is currently not active.

Active: The RDP active state is either *yes* or *no*, *yes* indicating that RDP relaying or alarm triggered recording mode has been selected by the operator in the **RDP** view.

¹<https://ubuntu.com/server/docs/how-to>

Counters and alarms

Clear all: Click the **Clear all** button to reset all counters, graphs and alarms. All VB220-SW measurement and alarm history is cleared. Note that it is not possible to undo this operation.

Last cleared: The time the **Clear all** button was last clicked. If no time is indicated the counters have not been cleared since VB220-SW startup/reboot time.

Probe

Name: The VB220-SW name as defined by the operator in the **Setup — Params** view.

Location: The VB220-SW location as defined by the operator in the **Setup — Params** view.

Access: The access rights of the current user. Access rights are either full access or read only access, and are defined by the operator in the **Setup — Security** view.

Memory

Free memory: The available free memory.

Free swap: The available free swap memory.
We recommend not using a swap partition when using the Software Probe, as this can interfere with the real-time operation of the software. If swap is disabled “Not in use” is displayed here.

Traffic

RX data: The total bitrate of received data traffic

Monitored data: The total bitrate of multicasts and unicasts monitored (analyzed) by the probe

ETH info

Joined: The number of joined streams (multicasts and unicasts)

Unicasts: The number of unicasts currently being joined/monitored by the probe

Multicasts: The number of multicasts currently being joined/monitored by the probe

IGMP ver: The IGMP version currently used by the probe. IGMPv2 is used unless the operator has enabled IGMPv3 in the **Setup — Params** view.

ETH alarms per type

No signal: The number of currently active Ethernet ‘No signal’ alarms

CC skips:	The number of currently active Ethernet ‘CC skips’ alarms
MLR>=thresh:	The number of currently active Ethernet MLR alarms, i.e. the total number of ‘MLR>= warning-threshold’ and ‘MLR>= alarm-threshold’ alarms
IAT>=thresh:	The number of currently active Ethernet IAT alarms, i.e. the total number of ‘IAT>= warning-threshold’ and ‘IAT>= alarm-threshold’ alarms
RTP alarms:	The number of currently active RTP alarms, i.e. the total number of ‘RTP packet drop’, ‘RTP duplicates’ and ‘RTP out of order’ alarms
Other alarms:	The total number of currently active Ethernet alarms not included in the alarm figures specified above

OTT info

Channels:	The number of enabled OTT channels.
Profiles:	The total number of profiles in the enabled OTT channels.

At the very bottom of the Summary page, an overview of the Ethernet network interfaces on the VB220-SW are displayed.

Network interfaces

Interface:	The ID of the selected network interface.
Link:	Indicates whether the interface is connected.
Speed:	Shows the current bitrate for the interface.
Description:	Provides a human-readable description of the interface, if available ² .
IPv4 address:	Lists the IPv4 address and netmask of the network interface, if set.
IPv6 address:	Lists the IPv6 address and netmask of the network interface, if set.
Timestamp:	Indicates whether the network interface supports hardware timestamping for precise measurements, or if kernel timestamping is used.

²A description can be set using the command `ip link set interfacename alias "Description"`

6.1.2 Main — Stream overview

[Summary](#)
[Stream overview](#)
[CPU usage](#)
[Eii graphing](#)

Select stream IPTV: Al Jazeera English HD@A
 Filter Filter...
hits:195/195

Alarms for selected stream
All alarms
IPTV alarms
OTT alarms
Content alarms
ETR alarms

Status	Col	Time	Type	Stream	Description
Recent items: 0					

Details for selected stream
Multicasts
Multicasts setup



Stream: Al Jazeera English HD@A

Transport stream ID	12
Name	Al Jazeera English HD@A
Type	multicast
Multicast address	239.255.2.39
Multicast port	5500
Bitrate	7.94 Mbps

Service: 5031

Service ID	5031
PSI/SI name	Al Jazeera English HD
Number of PIDs	4
Bitrate	7.72 Mbps

Status
[Video](#)
[Audio](#)
[All PIDs](#)
[SCTE35](#)

Name	Status description
☒ Freeze-frame	Consecutive frozen frames: 0
☐ Color-freeze	Test disabled

Menu links
 OTT threshold
Ethernet threshold
Content threshold
Content service threshold
ETR threshold
PID threshold
Service threshold
Gold TS thresholds

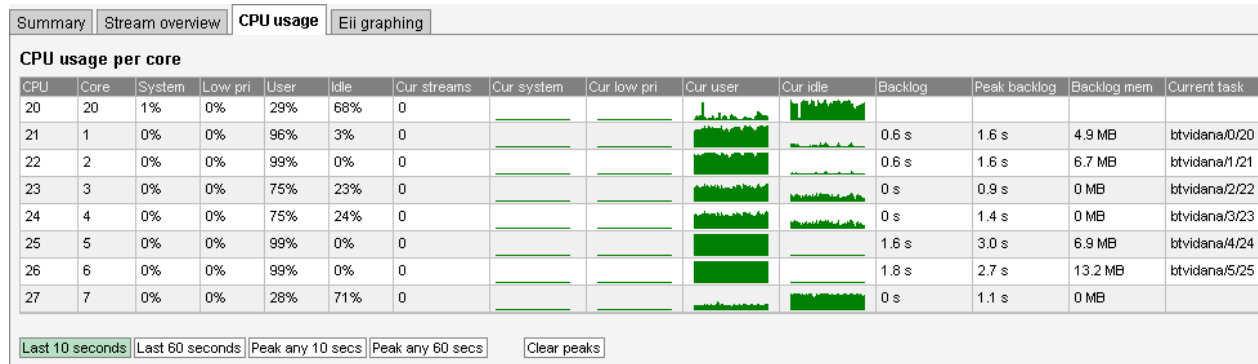
The **Stream overview** offers an easy way to get an overview of the status of a single channel by collecting the relevant information views from various parts of the probe and displaying them all in one place. This page is opened when clicking a channel alarm in any of the alarm list. When using the probe in conjunction with a the VideoBRIDGE Controller, this page is also displayed when clicking on a stream mentioned in the VBC user interface.

Use the **Select stream** drop-down to select a stream to display. By entering a stream name in the **Filter** box, only streams matching this filter will be show in the drop-down.

The list of active alarms for the selected channel is displayed on top, followed by different information depending on the kind of the stream selected. Please refer to the **Multicasts**, **ETR 290** and **OTT** chapters for detailed documentation on the various information views.

Use the **Menu links** buttons at the bottom of the page to open the thresholds assigned to the currently displayed stream.

6.1.3 Main — CPU usage



The **CPU usage** view is meant for troubleshooting performance issues in case of excessively high traffic load.

Three internal performance indicators (System, User and Idle) are displayed as percentage numbers and also graphed for the last minute. Issues can potentially arise if the System indicator becomes high (>80%).

The **CPU usage** view displays CPU usage of the Software Probe. To view the CPU usage averaged over the last 10 seconds click the **Current** button. To view the usage averaged over the last 60 seconds click the **Last 60 seconds** button. Clicking the **Peak any 10 secs** or **Peak any 60 seconds** button will display the historical maximum value for an averaging period of 10 s and 60 s respectively. To clear peak values click the **Clear peaks** button. Click the **Advanced** button to open the **Advanced CPU settings** view.

The length of the queues for multicast video analysis are displayed in the **Backlog** column, with the highest recorded value in the **Peak backlog** column. If these values keep growing, the probe is not able to keep up with the amount of data it has been set to monitor, and will eventually start dropping data to catch up again. Please refer to appendix B.5 for more details. Additionally, the currently running process (at the time of update) on each CPU core is displayed in the **Current task** column.

6.1.3.1 Advanced CPU settings

Summary
Stream overview
CPU usage
Eii graphing

Advanced CPU settings

Change network queue distribution

Distribution of streams to network queues is normally different between each time the probe is restarted. In some rare circumstances, this can cause one of the CPU cores to become overloaded as too many streams are assigned to queues handled by the same CPU core.

By clicking the **Redistribute queues** button, a new queue distribution is generated. Once you have found a distribution that works for your configuration, check the **Use this distribution at boot** and press the **Apply** button to avoid a new distribution from being applied the next time the probe is rebooted.

Please note: This might not be supported by all network cards. Redistributing the network queues might cause a gap in analysis.

c1:cd:61:10:6f:c0:a2:94:e2:ef:fc:a8:9d:34:ef:19:e6:a3:86:6d:56:24:5a:38:52:4e:f5:66:a1:04:31:62:d1:92:
Redistribute queues

Last redistributed: May 4 12:52:56

Use this distribution at boot ☐

Apply changes
CPU usage...

The **Advanced CPU settings** view can be opened by clicking the **Advanced** button in the **Main — CPU usage** view, and is meant for manually overriding the automatic CPU allocation settings.

During normal operation, incoming network streams are allocated automatically to different CPU cores. The RSS (Receiving Side Scaling) hash key is randomized by the operating system at boot, and in some rare circumstances, this can cause one or more of the CPU cores to have too many streams assigned to the queues handled by these CPU cores.

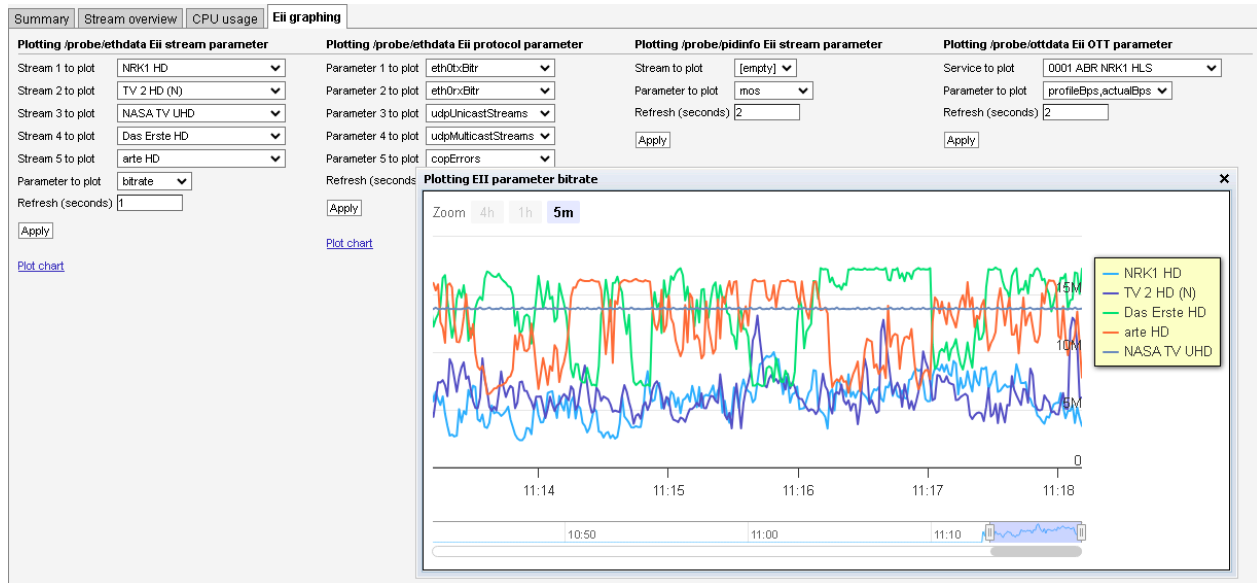
By clicking the **Redistribute queues** button, a new random RSS hash key is generated and streams are redistributed accordingly. Once you have found a hash key that works for your current configuration, you can check **Use this distribution at boot** and click **Apply changes** to configure the Software Probe to use this RSS hash key on start.

Some network card drivers do not support changing this value.

Changing the RSS hash key may cause gaps in the analysis.

Click the **CPU usage** button to return to the **Main — CPU usage** view.

6.1.4 Main — Eii graphing



Eii is short for External Integration Interface and constitutes a set of XML files accessible through the VB220-SW web server interface for machine access to measurement data.

Portions of the Eii interface are available in this view for simple trend graphing over arbitrary long time by the web browser.

The screenshot shows the bandwidth of two IP streams being graphed by sampling the Eii interface every 2 seconds. The graph is stored in the client web browser for as long as the graph window remains open. The graph starts again with zero history if the window is closed and then opened again.

Eii stream parameter

Using the **Eii stream parameter** plot, it is possible to plot parameters from up to five IP streams. Select the streams in the **Stream N to plot** (where N is 1 through to 5) drop-downs and the parameter in the **Parameter to plot** drop-down.

Eii stream parameters

bitrate:	Bitrate (bits per second)
rtp_drops:	Number of dropped IP frames due to network errors
iat_avg:	Average Inter-Arrival Time
cc_errs:	The number of discontinuities detected

Refresh (seconds) selects how often samples are read and plotted on the graph. Click **Apply** to store the parameters and then click the **Plot chart** link to open the chart.

Eii protocol parameter

Using the **Eii protocol parameter** plot, it is possible to plot up to five network interface parameters. Select the parameters in the **Parameter N to plot** (where N is 1 through to 5) drop-downs.

<i>Eii protocol parameters</i>	
vlanTaggedPerc:	Percentage of frames being VLAN tagged
ipFragPerc:	Percentage of frames being IP fragmented
eth0txBitr:	Total TX bitrate including units on first data interface
eth0rxBitr:	Total RX bitrate including units on first data interface
udpUnicastBitr:	Bitrate of the unicast traffic
udpMulticastBitr:	Bitrate of the multicast traffic
udpUnicastStreams:	Number of UDP unicast streams present
udpMulticastStreams:	Number of UDP multicast streams present
copPayloadBitr:	Bitrate of FEC protected payload
copFec1Bitr:	Bitrate of the FEC columns
copFec2Bitr:	Bitrate of the FEC rows
copCorrected:	IP packets correctable by the FEC
copUncorrected:	IP packets not correctable by the FEC
copErrors:	FEC packets with errors

Refresh (seconds) selects how often samples are read and plotted on the graph. Click **Apply** to store the parameters and then click the **Plot chart** link to open the chart.

Pidinfo Eii stream parameter

Using the **Pidinfo Eii stream parameter** plot, it is possible to plot content analysis results for any streams that have QoE monitoring enabled. Select the channel in the **Stream to plot** drop-down and the parameter in the **Parameter to plot** drop-down.

Only streams which have QoE enabled are listed in the Stream drop-down.

<i>Pidinfo Eii parameters</i>	
mos	Composite MOS value, on the scale 1–5
blocking	Detected picture blockiness, scaled 0–1, where 1 is the best (no blocking).
blurriness	Detected picture blurriness, scaled 0–1, where 1 is the best (no blurring).
noisiness	Detected picture noisiness, scaled 0–1, where 1 is the best (no noise).
brightness	Detected picture brightness, scaled 0–1, where 0 is dark and 1 is bright.
contrast	Detected picture contrast, scaled 0–1.

Eii OTT parameter

Using the **Eii OTT parameter** plot, it is possible to plot analysis parameters from any of the monitored OTT channel. Select the channel in the **Service to plot** drop-down and the parameter in the **Parameter to plot** drop-down.

<i>Eii OTT parameters</i>	
profileBps,actualBps:	Plots both the profileBps and actualBps parameters
profileBps:	Bitrate of this profile as listed in meta-data (bits per second)
actualBps:	Bitrate of this profile calculated from downloaded segment (bits per second)
chunkDur:	Last segment length (seconds)
firstByte:	Time to first byte (milliseconds)
downloadDur:	Time to download segment (seconds)
chunkSize:	Size of downloaded segment (bytes)

Refresh (seconds) selects how often samples are read and plotted on the graph. Click **Apply** to store the parameters and then click the **Plot chart** link to open the chart.

Please refer to the separate Eii documentation for further details.

6.2 Alarms

6.2.1 Alarms — All Alarms

Main	Alarms	OTT	Multicasts	MWV	RDP	Traffic	Ethernet	ETR 290	Content	Record	Setup	Data	About
All alarms													
Ethernet alarms													
FSM & MBR alarms													
OTT alarms													
Content alarms													
ETR alarms													
System alarms													
Event log													
Alarm setup													
Flash alarms													
#	Status	Col	Time	Type	Stream	Description							
1	Active	■	Mar 25 11:23:07	ETR	IPTV: arte HD	Pid 18 EIT: Event Information Table error							
2	Active	■	Mar 25 11:22:23	ETR	IPTV: arte HD	Service 10302 arte HD: Pid 5115 Subtitling: Presentation Time Stamp error							
3	Active	■	Mar 25 11:22:06	ETR	IPTV: arte HD	Service 10302 arte HD: Pid 5198 Subtitling: Presentation Time Stamp error							
4	Active	■	Mar 25 11:22:06	ETR	IPTV: arte HD	Service 10302 arte HD: Pid 5118 Subtitling: Presentation Time Stamp error							
5	Active	■	Mar 25 11:22:00	ETR	IPTV: ZDF HD	Service 11110 ZDF HD: Pid 6132 Private data: Presentation Time Stamp error							
6	Active	■	Mar 25 11:21:22	ETR	IPTV: MDR Sachsen HD	Service 10352 MDR Sachsen HD: Pid 5335 Subtitling: Presentation Time Stamp error							
7	Active	■	Mar 25 11:19:57	ETR	IPTV: ZDF HD	Service 11110 ZDF HD: Pid 6131 Subtitling: Presentation Time Stamp error							
8	Active	■	Mar 25 11:18:22	ETR	IPTV: BBC World News Europe HD	Pid 18 EIT: Event Information Table error							
9	Active	■	Mar 25 11:12:44	ETR	IPTV: Das Erste HD	Service 10301 Das Erste HD: Pid 5105 Subtitling: Presentation Time Stamp error							
10	Active	■	Mar 25 11:11:49	ETR	IPTV: DELUXE MUSIC	Service 65 DELUXE MUSIC: Pid 60 SCTE 35: PID is missing							
11	Active	■	Mar 25 11:08:13	ETR	IPTV: Comedy Central Austria	Pid 18 EIT: Event Information Table error							
12	Active	■	Mar 25 11:01:56	ETR	IPTV: KiKA HD	Service 11160 KiKA HD: Pid 6631 Subtitling: Presentation Time Stamp error							
13	Active	■	Mar 25 10:48:05	ETR	IPTV: ZDF HD	Pid 18 EIT: Event Information Table error							
14	Active	■	Mar 25 10:30:13	ETR	IPTV: KiKA HD	Pid 18 EIT: Event Information Table error							
15	Active	■	Mar 25 09:42:10	CNT	Cam: Cam	Freeze-frame detected (since Mar 25 09:40:09)							
16	Active	■	Mar 24 19:29:50	ETR	IPTV: MDR Sachsen HD	Service 10352 MDR Sachsen HD: Pid 5331 H264 Video: Program Clock Reference accuracy error							
17	Active	■	Mar 24 04:06:08	ETR	IPTV: BBC Earth HD	Service 7190 HISTORY 2 HD: Pid 1317 H264 Video: Program Clock Reference accuracy error							
18	Active	■	Mar 24 03:53:27	OTT	0036 ABR Disney SS	Lagging behind (lost segments between 2911783718458666 and 2911783872058666) since last round							
19	Active	■	Mar 24 00:00:50	SYS		Auto deletion of recordings imminent. Less than 4GB usable disk							
20	Active	■	Mar 23 22:18:20	ETR	IPTV: HyperDeck	Pid 16: Network Information Table error							
21	Active	■	Mar 23 22:18:20	ETR	IPTV: Cam	Pid 16: Network Information Table error							
22	Active	■	Mar 23 22:18:20	ETR	IPTV: TLC Sverige HD	Pid 16: Network Information Table error							
23	Active	■	Mar 23 22:18:20	ETR	IPTV: Animal Planet HD	Pid 16: Network Information Table error							
24	Active	■	Mar 23 22:18:20	ETR	IPTV: Eurosport 1 HD (N)	Pid 16: Network Information Table error							
25	Active	■	Mar 23 22:18:20	ETR	IPTV: TV 2 Sport 2 HD	Pid 16: Network Information Table error							
26	Active	■	Mar 23 22:18:20	ETR	IPTV: BBC Earth HD	Pid 16: Network Information Table error							
27	Active	■	Mar 23 22:18:20	ETR	IPTV: HISTORY HD	Pid 16: Network Information Table error							
28	Active	■	Mar 23 22:18:20	ETR	IPTV: Nat Geo HD (N)	Pid 16: Network Information Table error							
29	Active	■	Mar 23 22:18:20	ETR	IPTV: Discovery HD (N)	Pid 16: Network Information Table error							
30	Active	■	Mar 23 22:18:20	ETR	IPTV: TLC Norge HD	Pid 16: Network Information Table error							
Recent items: 30													
View list offline													
Auto-refresh list													
Flush alarms													
Export...													

The **Alarms** view gives the user the possibility of viewing alarms according to type or as one combined list. The individual alarm lists can hold the number alarms indicated below independently of each other, meaning that one may become full without affecting the other lists.

<i>Alarm list capacity</i>	
Ethernet alarms (ETH)	10000 alarms
Full Service Monitoring and Microbitrate (FSM)	100 alarms
Over The Top Television (OTT)	2500 alarms
ETSI TR 101 290 Analysis (ETR)	10000 alarms
Content (CNT)	2500 alarms
System alarms (SYS)	2500 alarms
Event log (LOG)	2500 events

If **Auto-refresh list** is selected, the alarm list will be continuously updated with new alarms. Active alarms are always located at the top of the list.

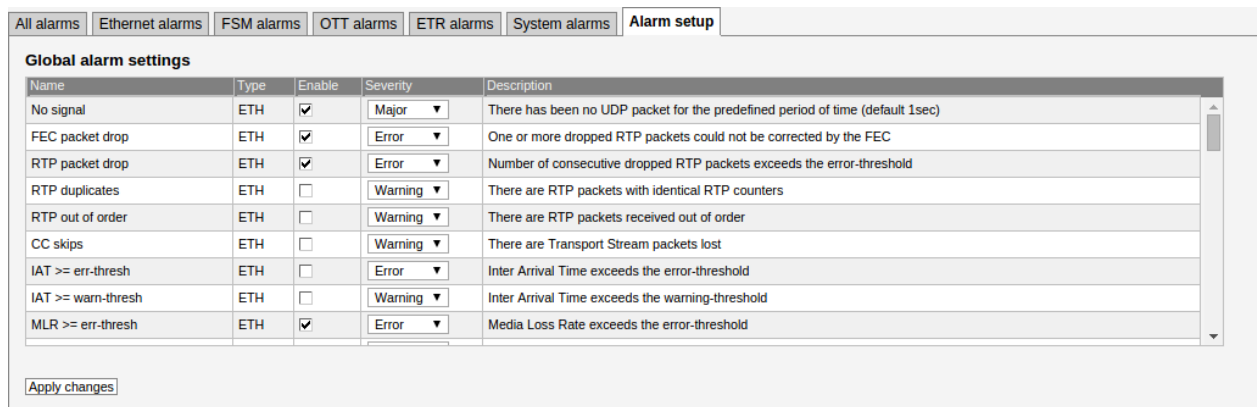
Clicking the **View list offline** button gives the user the opportunity to view the complete alarms and events list. By clicking one of the blue information icons leftmost in the offline list, a detailed alarm

description can be viewed. The search field in the upper right corner of the view allows the user to type a text string and the alarm list is updated to display only streams and alarms matching the specified text. To update the offline alarm list click the **Auto-refresh list** button and then go back to the offline mode.

Clicking the blue link text of any alarm in the alarm list opens the **Main — Stream overview** for the channel in the alarm. The alarm lists can be deleted by clicking the **Flush alarms** button. However it should be noted that this action will permanently clear the alarm lists — they cannot be restored.

The **Export** button enables export of the corresponding alarm list as an XML file. This file will open in a new window.

6.2.2 Alarms — Alarm setup



The screenshot shows the 'Alarm setup' tab in a web interface. It contains a table titled 'Global alarm settings' with columns: Name, Type, Enable, Severity, and Description. The table lists various alarms with their respective settings. Below the table is an 'Apply changes' button.

Name	Type	Enable	Severity	Description
No signal	ETH	☒	Major	There has been no UDP packet for the predefined period of time (default 1sec)
FEC packet drop	ETH	☒	Error	One or more dropped RTP packets could not be corrected by the FEC
RTP packet drop	ETH	☒	Error	Number of consecutive dropped RTP packets exceeds the error-threshold
RTP duplicates	ETH	☐	Warning	There are RTP packets with identical RTP counters
RTP out of order	ETH	☐	Warning	There are RTP packets received out of order
CC skips	ETH	☐	Warning	There are Transport Stream packets lost
IAT >= err-thresh	ETH	☐	Error	Inter Arrival Time exceeds the error-threshold
IAT >= warn-thresh	ETH	☐	Warning	Inter Arrival Time exceeds the warning-threshold
MLR >= err-thresh	ETH	☒	Error	Media Loss Rate exceeds the error-threshold

Apply changes

The **Alarm setup** represents the final filtering stage for VB220-SW alarms. The user selects whether an alarm should be enabled or ignored, and associates an error severity level with each alarm. When changes have been made to alarm settings click the **Apply changes** button for changes to take effect.

Figure 5.1 gives an overview of the total alarm handling of a Software Probe. The settings in the **Alarm setup** view are represented by the **Alarm Settings** box in this figure.

Note that the probe alarm handling will also depend on the threshold template settings defined by the user in the **Multicasts — Ethernet thresh.**, **ETR 290 — ETR thresh.**, **ETR 290 — PID thresh.**, **ETR 290 — Service thresh.**, and **OTT — Thresholds** views.

Also note that only enabled alarms are shown in the alarm lists and forwarded as SNMP traps. Enabling or disabling Software Probe alarms does however not affect the alarms presented by the VBC. Refer to Appendix: VB220-SW Versus VBC Alarms for a description of the VB220-SW versus VBC alarm handling.

The following alarm severity levels may be selected:

OK:	If enabled, the alarm will be present in the alarm list, color green
Warning:	If enabled, the alarm will be present in the alarm list, color yellow

Error:	If enabled, the alarm will be present in the alarm list, color orange
Major:	If enabled, the alarm will be present in the alarm list, color red
Fatal:	If enabled, the alarm will be present in the alarm list, color black

The following alarms and events are configured:

<i>ETH (Ethernet) alarms</i>		
No signal:	There has been no UDP packet for the predefined period of time (default 1sec)	Default: Enabled, severity Major
RTP packet drop:	Number of consecutive dropped RTP packets exceeds the error-thresholds – only available if RTP headers are present	Default: Enabled, severity Error
RTP duplicates:	Number of RTP packets with identical RTP counters – only available if RTP headers are present	Default: Disabled, severity Warning
RTP out of order:	There are RTP packets received out of order – only available if RTP headers are present	Default: Disabled, severity Warning
CC skips:	Number of transport stream discontinuities due to packet loss. Note that the CC skips number does not necessarily equal the number of lost packets, as several consecutive packets lost will be counted as one CC skip.	Default: Disabled, severity Warning
IAT >= err-thresh:	The Inter-packet Arrival Time exceeds the error threshold	Default: Disabled, severity Error
IAT >= warn-thresh:	The Inter-packet Arrival Time exceeds the warning threshold	Default: Disabled, severity Warning
MLR >= err-thresh:	The Media Loss Rate exceeds the error-threshold	Default: Enabled, severity Error
MLR >= warn-thresh:	The Media Loss Rate exceeds the warning-threshold	Default: Disabled, severity Warning
TTL changed:	The Time-To-Live field is changing	Default: Enabled, severity Error
TOS changed:	The Type-Of-Service field is changing	Default: Enabled, severity Error
Multiple mcast sources:	There are multiple multicast sources	Default: Enabled, severity Error
Mcast source changed:	The multicast source changed to one of the valid multicast sources specified by the operator	Default: Enabled, severity Error

Bitrate overflow:	The net stream bitrate exceeds the maximum bitrate Ethernet threshold value specified by the operator	Default: Enabled, severity Error
Bitrate underflow:	The net stream bitrate goes below the minimum bitrate Ethernet threshold value specified by the operator	Default: Enabled, severity Error
MSYNC data missing:	The MSYNC Data Loss Rate exceeds the error threshold	Default: Enabled, severity Error
MSYNC no mapping acquired:	The stream is configured as an MSYNC stream, but no MSYNC packets were received	Default: Enabled, severity Major

FSM (Full service monitoring & Microbitrate) alarms

Full service monitoring:	No reply was obtained within timeout period for the configured FSM service	Default: Enabled, severity Major
Microbitrate bursting:	Raised if the bitrate of the user-interval exceeds the Burst threshold setting	Default: Enabled, severity Warning
Microbitrate excessive ES bursting:	Raised whenever the bitrate of the user-interval exceeds the Burst threshold for ES threshold number of seconds during the last ES Alarm window seconds	Default: Enabled, severity Error
Full service monitoring:	No reply was obtained within timeout period for the configured FSM service	Default: Enabled, severity Major

LOG (Event log)

[Log config events]:	Log configuration related events, such as config uploads	Default: Enabled, severity OK
[Log startup events]:	Log startup related events (currently not used)	Default: Enabled, severity OK
[Log stream events]:	Log stream related events, such as manual resets of monitoring for ETR	Default: Enabled, severity OK
[Log other events]:	Log other events (currently not used)	Default: Enabled, severity OK

CNT (Content) alarms

Freeze-frame detected:	The service has frozen frames	Default: Enabled, severity Major
-------------------------------	-------------------------------	----------------------------------

Color-freeze detected:	The service has frozen in one color	Default: Enabled, severity Major
SCTE 35 event gap:	The service has not received SCTE 35 or SCTE 104 data for longer than the threshold	Default: Enabled, severity Error
Too few SCTE 35 placement opportunities:	The service has not had enough placement opportunities signaled in SCTE 35 or SCTE 104 for the previous clock hour	Default: Enabled, severity Error
SCTE 35 placement gap:	The service has not had SCTE 35 or SCTE 104 placement opportunities for longer than the threshold	Default: Enabled, severity Error
SCTE 35 end event without start:	A SCTE 35 or SCTE 104 end segmentation descriptor message was received in a Time signal event, without the corresponding start segmentation descriptor message having been received.	Default: Enabled, severity Error
SCTE 35 start event without end:	A SCTE 35 or SCTE 104 start segmentation descriptor message was received in a Time signal event, without the corresponding end segmentation descriptor message being received within the defined timeout.	Default: Enabled, severity Error
SCTE 35 minimum pre-roll time:	A SCTE 35 event is received too close to the splice time.	Default: Enabled, severity Error
SCTE 35 maximum pre-roll time:	A SCTE 35 event is received too far from the splice time.	Default: Enabled, severity Error
Audio silence detected:	The service has silent audio tracks	Default: Enabled, severity Major
Audio too loud detected:	The service has too loud audio tracks	Default: Enabled, severity Major
Audio out of phase detected:	The service has audio tracks that are out of phase	Default: Enabled, severity Major
EBP PTS gap:	The PTS gap between two subsequent EBPs is outside of the min and max thresholds	Default: Enabled, severity Major

EBP group PTS skew:	The PTS skew between the stream's and the group reference's EBP is outside of the threshold	Default: Enabled, severity Major
IDR PTS gap:	The PTS gap between two subsequent IDR frames is outside of the min and max thresholds	Default: Enabled, severity Major
IDR group PTS skew:	The PTS skew between the stream's and the group reference's IDR frames is outside of the threshold	Default: Enabled, severity Major
EBP and IDR PTS unaligned:	The difference between the IDR frame and EBP PTSs is outside of the threshold	Default: Enabled, severity Major
MOS below threshold:	The average MOS for the service is below the configured threshold	Default: Enabled, severity Major
Wrong DAR:	The stream has wrong Display Aspect Ratio	Default: Enabled, severity Major
Wrong PAR:	The stream has wrong Pixel Aspect Ratio	Default: Enabled, severity Major
Caption service missing:	The service has less caption services than specified in the threshold	Default: Enabled, severity Major
Bad caption quality:	The received caption data was corrupt	Default: Enabled, severity Major
<i>ETR (ETR 290) alarms</i>		
TS Sync:	No TS Sync (no signal)	Default: Enabled, severity Major
Sync byte:	Sync byte error, sync byte not 0x47	Default: Enabled, severity Major
PAT:	Program Association Table error	Default: Enabled, severity Major
Continuity:	Continuity counter error	Default: Enabled, severity Major
PMT:	Program Map Table error	Default: Enabled, severity Major
Missing PID:	PID is missing	Default: Enabled, severity Major
Transport:	Transport stream error indicator is set	Default: Enabled, severity Major

CRC:	Table checksum error	Default: Enabled, severity Major
PCR:	Program Clock Reference error	Default: Enabled, severity Major
PCR Accuracy:	Program Clock Reference accuracy error (PCR jitter)	Default: Enabled, severity Major
PTS:	Presentation Time Stamp error	Default: Enabled, severity Major
CAT:	Conditional Access Table error	Default: Enabled, severity Major
NIT:	Network Information Table error	Default: Enabled, severity Major
SI Rep Rate:	Wrong repetition rate for SI tables	Default: Enabled, severity Major
Unref PID:	PID is unreferenced	Default: Enabled, severity Major
SDT:	Service Description Table error	Default: Enabled, severity Major
EIT:	Event Information Table error	Default: Enabled, severity Major
RST:	Running Status Table error	Default: Enabled, severity Major
TDT:	Time Date Table error	Default: Enabled, severity Major
MGT:	Master Guide Table error (ATSC mode)	Default: Enabled, severity Major
VCT:	Virtual Channel Table error (ATSC mode)	Default: Enabled, severity Major
PIM/PNM:	PIM/PNM error (ATSC mode)	Default: Enabled, severity Major
RRT:	Region Rating Table error (ATSC mode)	Default: Enabled, severity Major
ATSC EIT:	ATSC EIT Table error (ATSC mode)	Default: Enabled, severity Major
STT:	System Time Table error (ATSC mode)	Default: Enabled, severity Major
ETT:	Extended Text Table error (ATSC mode)	Default: Enabled, severity Major

CA System:	CA System error	Default: Enabled, severity Major
PID min. bitr.	PID minimum bitrate below threshold	Default: Enabled, severity Major
PID max. bitr.	PID maximum bitrate exceeds threshold	Default: Enabled, severity Major
PID checks:	PID check error	Default: Enabled, severity Major
Service min. bitr.	Service minimum bitrate below threshold	Default: Enabled, severity Major
Service max. bitr.	Service maximum bitrate exceeds threshold	Default: Enabled, severity Major
Service checks:	Service check error	Default: Enabled, severity Major
MIP:	Megaframe Insertion Packet error	Default: Enabled, severity Major
Reference:	Reference check error (comparing the stream with a Gold TS)	Default: Enabled, severity Major
Gold TS:	Error found while comparing the stream with the stored Gold TS snapshot	Default: Enabled, severity Major
Interface overflow:	Input interface overflow error. Means that the probe is overloaded and can not properly analyze the signals.	Default: Enabled, severity Major
Modulation:	Unexpected modulation parameter:	Default: Enabled, severity Major

SYS (System) events

[Critical system errors]:	Critical system errors preventing the Software Probe from operating correctly	Default: Enabled, severity Fatal
[System errors]:	Enable this to view all system errors	Default: Enabled, severity Major
[System warning]:	Enable this to view all system warnings	Default: Enabled, severity Error
[System info]:	Enable this to view system information messages	Default: Enabled, severity OK

There is a multitude of system alarms which are reported under the above headings and the configuration applies to them as a group. See section 6.2.5 for a partial list of possible system alarms.

OTT Alarms

The number of profiles changed:	The number of profiles flagged in the manifest file changed	Default: Enabled, severity 'Warning'
Profile stream type changed:	The stream type of the profile changed in the manifest	Default: Enabled, severity 'Warning'
Minimum profiles	The channel has less profiles than specified in the threshold	Default: Enabled, severity Warning
Wrong profile type	The channel has profiles of a different type than specified in the threshold	Default: Enabled, severity Warning
Download bitrate low:	The download duration time exceeds the OTT bitrate threshold. The bitrate threshold is part of the OTT threshold template defined in the OTT — Thresholds view. A threshold template is assigned to a stream in the OTT — Channels view.	Default: Disabled, severity Warning
Download bitrate too low:	The download duration time exceeds the OTT segment duration time	Default: Enabled, severity Error
Manifest size:	The manifest file size exceeds the OTT manifest size threshold	Default: Enabled, severity Warning
Actual bitrate:	The actual measured bitrate does not match the profile bitrate specified in the manifest file	Default: Enabled, severity Warning
Download timeout:	The download time exceeds twice the segment duration time	Default: Enabled, severity Major
Address resolve error:	Unable to resolve address name	Default: Enabled, severity Error
Connection failed:	Connection failed	Default: Enabled, severity Error
Send error:	Could not send data to host	Default: Enabled, severity Error
Receive error:	Could not receive data from host	Default: Enabled, severity Major
Empty reply:	Response did not contain any data in body	Default: Enabled, severity Major
HTTP error:	Invalid HTTP response	Default: Enabled, severity Major

HTTP redirect error:	HTTP 3xx redirection error	Default: Enabled, severity Major
HTTP client error:	HTTP 4xx client error	Default: Enabled, severity Major
HTTP server error:	HTTP 5xx server error	Default: Enabled, severity Major
Static manifest:	Manifest file unchanged for longer than configured threshold	Default: Enabled, severity Major
Mis-alignment detected:	One or more profiles are out of visual alignment	Default: Enabled, severity Major
Manifest parse error:	Failed to parse manifest file. Invalid format	Default: Enabled, severity Major
Segment error:	Expected segment missing from manifest	Default: Enabled, severity Major
Unknown manifest:	Cannot recognize manifest XML format	Default: Enabled, severity Fatal

6.2.3 Alarms — Event log

All alarms	Ethernet alarms	FSM & MBR alarms	OTT alarms	Content alarms	ETR alarms	System alarms	Event log	Alarm setup	Flash alarms
#	Time	Type	Stream	Description					
1	Jan 21 15:22:54	LOG	SAT2: 1.2G inp2	Measurement status cleared when tuning the stream					
2	Jan 21 15:22:19	LOG	SAT4: 1.1G inp4	Monitoring reset from GUI by user admin					
3	Jan 21 15:22:15	LOG	SAT2: 1.1G inp2	Measurement status cleared from GUI by user admin					
4	Jan 21 15:21:59	LOG	SAT4: 1.1G inp4	Measurement status cleared when tuning the stream					
5	Jan 21 15:21:54	LOG	SAT3: 1.1G inp3	Monitoring restarted due to config change					
6	Jan 21 15:21:44	LOG	SAT2: 1.1G inp2	Measurement status cleared when tuning the stream					
7	Dec 27 14:11:03	LOG		Configuration uploaded from 192.168.50.14					

The Event log displays the events logged by the probe. These are events that happen which are not errors in any way, such as configuration uploads or logging of monitoring resets for ETR streams.

When **View list offline** is enabled filter buttons will be shown on the top of list. These allows filtering of the events based on their type:

- Regular events
- Config events
- Startup events
- Stream events

All alarms	Ethernet alarms	FSM & MBR alarms	OTT alarms	Content alarms	ETR alarms	System alarms	Event log	Alarm setup	Flash alarms
☐ Regular events ☐ Config events ☐ Startup events ☐ Stream events									
#	Time	Type	Stream	Description					
1	Jan 21 15:25:14	LOG	SAT2: 1.2G_inp2	Measurement status cleared when tuning the stream					
2	Jan 21 15:24:39	LOG	SAT4: 1.1G_inp4	Measurement status cleared when tuning the stream					
3	Jan 21 15:24:04	LOG	SAT2: 1.1G_inp2	Measurement status cleared when tuning the stream					
4	Jan 21 15:23:29	LOG	SAT4: 1.2G_inp4	Measurement status cleared when tuning the stream					
5	Jan 21 15:22:54	LOG	SAT2: 1.2G_inp2	Measurement status cleared when tuning the stream					
6	Jan 21 15:22:19	LOG	SAT4: 1.1G_inp4	Monitoring reset from GUI by user admin					
7	Jan 21 15:22:15	LOG	SAT2: 1.1G_inp2	Measurement status cleared from GUI by user admin					
8	Jan 21 15:21:59	LOG	SAT4: 1.1G_inp4	Measurement status cleared when tuning the stream					
9	Jan 21 15:21:54	LOG	SAT3: 1.1G_inp3	Monitoring restarted due to config change					
10	Jan 21 15:21:44	LOG	SAT2: 1.1G_inp2	Measurement status cleared when tuning the stream					
11	Dec 27 14:11:03	LOG		Configuration uploaded from 192.168.50.14					

Items found: 11

[View list offline](#) [Auto-refresh list](#) [Flush alarms](#) [Export...](#)

To enable/disable logging of ETR stream events go to the **Setup — ETR** view.

6.2.4 Alarms — Flash Alarms (requires DATA-LOG-OPT)

All alarms	Ethernet alarms	FSM alarms	OTT alarms	ETR alarms	System alarms	Alarm setup	Flash alarms
Status	Col	Time	Type	Stream	Description		
Event	☐	2015 Jan 27 14:36:20	ETH	10.0.81.121:1234	MLR >= error-threshold (9 >= 8)		
Active	☒	2015 Jan 27 14:36:20	ETH	10.0.81.121:1234	CC skips:10 discontinuities:3 - counting		
Event	☐	2015 Jan 27 14:35:31	ETH	10.0.81.121:1234	MLR >= error-threshold (15 >= 8)		
Event	☐	2015 Jan 27 14:35:31	ETH	10.0.81.121:1234	CC skips:15 discontinuities:2		
Event	☐	2015 Jan 27 14:35:15	ETH	10.0.81.121:1234	MLR >= error-threshold (15 >= 8)		
Event	☐	2015 Jan 27 14:35:15	ETH	10.0.81.121:1234	CC skips:15 discontinuities:2		
Event	☐	2015 Jan 27 14:35:08	ETH	10.0.81.121:1234	MLR >= error-threshold (16 >= 8)		
Event	☐	2015 Jan 27 14:35:08	ETH	10.0.81.121:1234	CC skips:16 discontinuities:3		
Event	☐	2015 Jan 27 14:35:03	ETH	10.0.81.121:1234	MLR >= error-threshold (16 >= 8)		
Event	☐	2015 Jan 27 14:35:03	ETH	10.0.81.121:1234	CC skips:16 discontinuities:3		
Event	☐	2015 Jan 27 14:34:46	ETH	10.0.81.121:1234	MLR >= error-threshold (16 >= 8)		
Event	☐	2015 Jan 27 14:34:46	ETH	10.0.81.121:1234	CC skips:16 discontinuities:3		
Cleared	☒	2015 Jan 27 14:34:28	ETH	10.0.81.121:1234	CC skips:444 discontinuities:88 (Jan 27 14:34:26 - Jan 27 14:34:28)		
Event	☐	2015 Jan 27 14:34:26	ETH	10.0.81.121:1234	MLR >= error-threshold (437 >= 8)		
Active	☒	2015 Jan 27 14:34:26	ETH	10.0.81.121:1234	CC skips:443 discontinuities:87 - counting		
Event	☐	2015 Jan 27 14:34:22	ETH	10.0.81.121:1234	MLR >= error-threshold (16 >= 8)		

[Search](#) [Clear filter](#) [Older](#) [Newer](#) [Oldest](#) [Newest](#) [Export...](#) Total flash alarms: 192 Position: 48% Displayed: 100

The DATA-LOG option enables the **Flash alarms** tab. This alarm list contains the last 20,000 alarms and keeps them on the hard disk so that they survive reboots and power-outages. This opens up a lot of possibilities for probes that cannot be reached while doing measurements and for probes that need to be powered down and consulted elsewhere. It also severely increases the size of the alarm list allowing browsing of older alarms.

6.2.5 System alarms

This section contains a partial list of system alarms that may be raised by the Software Probe.

System alarms

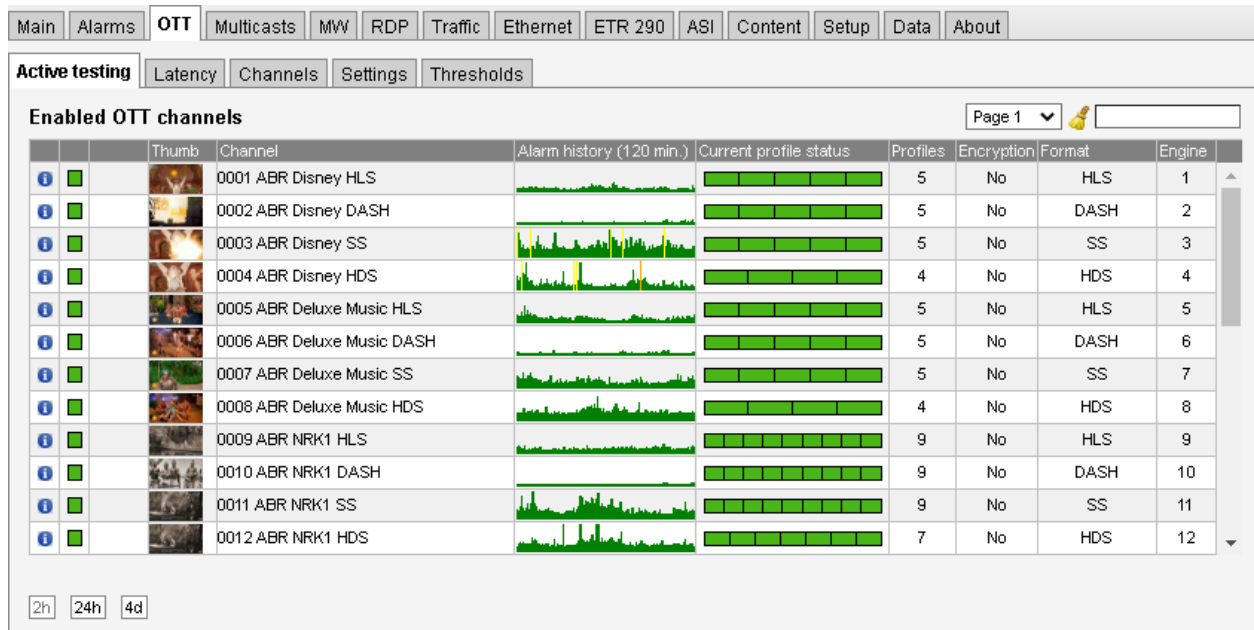
System time is wrong The system time does not agree with the time stamp of the license activation. Please refer to G Appendix: On-line License Activation for more details.

License expires in N hours	The current license activation is about to expire and the system is not able to connect to the internet to refresh it automatically. Please refer to G Appendix: On-line License Activation for more details.
Stopped processes	One or more of the required system processes have stopped. This can be due to an intermittent software failure (bug), in which case the alarm should go away after a little while. If the problem persists, this might indicate that the system is overloaded; try reducing load to see if the problem clears. This alarm is sometimes raised during system start-up if one of the processes is slow to start. As long as the alarm goes away in a few minutes, this is only an indication that the system might be running slow due to high load.
Packet Errors on interface	The VB220-SW has detected problems with the attached Ethernet connection. Verify cables and connectors.
Timeline storage capacity below critical level	The file system mounted for Timeline does not have enough free space to continue storing data. Free up space by changing the settings in the Content — Setup view.
NN% disk free for Timeline storage	The file system mounted for Timeline has fallen below the configured warning threshold. Free up space by changing the settings in the Content — Setup view.
Auto deletion of recordings imminent. Less than NN GB usable disk.	The amount of free space on the file system mounted for Recordings is getting close to the configured minimum level. Free up space or change the settings in the Record — Setup view. You can protect important recordings from being removed automatically, in the Record — Recordings view. Please refer to chapter 6.11.7 for more details.
Recordings stopped due to disk usage	The file system mounted for Recordings does not have enough free space to continue storing data, and the VB220-SW is not able to remove previous recordings to make more space available. Free up space or change the settings in the Record — Setup view.
Recordings stopped due to limited free memory	The system does not have enough memory to keep buffering the streams configured for triggered recordings. Free up memory by changing the buffer sizes in the Record — Thresholds view.
No disk free	The internal disk is full, please clear contents to ensure correct operation.

RAID system reports error	The system has a supported RAID installed, and the controller reports an error. Please refer to the RAID documentation in the OS and system documentation for more information.
Write error saving config file	The VB220-SW configuration file could not be saved. If the problem persists, you should export a full configuration using the Data — Configuration to avoid loss of data.
Trap queue is full	The VB220-SW is creating so many simultaneous alarms that it is unable to forward them as traps over SNMP. If the problem persists, try to reduce the load or disable unimportant alarms, or use the Eii to fetch alarm information.
Content analysis overloaded	The content analysis engine is overloaded. Please refer to B.5 Content Thresholds for more details.
Data queue overflow	The named data queue is receiving more data than the VB220-SW is able to process. This usually means that this part of the system is overloaded. Try reducing load to see if the problem goes away.

6.3 OTT (Option)

6.3.1 OTT — Active testing



The OTT option enables monitoring of up to 50 OTT channels. Up to 5 OTT engines (depends on license) can operate in parallel, and each engine licensed allows any channels to be analyzed. Each engine analyses channels in series and can be configured with any number of channels up to the maximum allowed by the license. Make sure you have the necessary bandwidth available for the channels you are analyzing, see B.10 OTT Bandwidth requirements.

The Software Probe will parse a channel's manifest file, and for a live channel one of the latest segments in each OTT profile's segment sequence will be analyzed. The engine then moves on to the next OTT channel in the channel list defined by the user. For a VoD channel the OTT engine will analyze all segments in the VoD file, one in each round-robin loop.

If manifest file parsing or segment analysis reveals an error, an alarm will be raised. Note that some alarms depend on user-defined threshold values. Alarms must also be enabled in the **Alarm — Alarm setup** view.

The page to display can be selected from a drop-down menu.

The following OTT information is displayed in the Active testing view:

OTT channels

Status bulb: A bulb indicates the current status of the channel, i.e. the most severe profile status.

Thumb:	If thumbnail extraction has been enabled, a thumbnail is displayed for the channel if supported. Thumbnail decoding is a process asynchronous of the channel analysis and therefore should not be expected to be updated at the same time. The main purpose of the thumbnails is to provide brief information about the channel contents. If thumbnail extraction has not been enabled, or if the thumbnail extraction fails, an icon indicating the stream type will be displayed instead.
Channel:	The channel name defined by the user and linked to a URL in the OTT — Channels view.
Alarm history:	A timeline graph display of a combined bitrate and alarm representation for the channel. This shows the most severe alarm or download speed for all monitored profiles. The individual profiles graphs can be found in the OTT Profiles view. The timeline can display the last 120 minutes, 24 hours or four days. To switch between the graphs, press the “24h”, “2h” or “4d” button on the left under the channel list. Each bar color represents the alarm severity level as configured under Alarms — Alarm setup.
Current profile status:	The channel health bar displays the current status for individual channel profiles. Profiles are separated by vertical black lines. Colors indicate profile alarm status: • Green: OK • Yellow: Warning • Orange: Error • Red: Major • Black/Dark red: Fatal
Profiles:	The number of profiles associated with a channel.
Encryption:	Scrambling information is resolved from the profile manifest. If the profile is scrambled the encryption field will read <i>Yes</i> . If the profile is transmitted in clear the encryption field will read <i>No</i> .
Format:	The channel format is resolved from the manifest files, and is shown here (Apple HLS , Microsoft Smooth Streaming , Adobe HDS , MPEG DASH , SHOUTcast or RTMP).
Engine:	Indicates which OTT engine is assigned to what channel. The Software Probe can be licensed with anywhere from 1 up to 5 OTT engines. Each engine is capable of handling any number of channels.

Click the blue information button on a channel to open the details window. This window provides detailed information about the status and alarms on all the profiles for the selected channel. The

pop-up window is identical to the one displayed in the **Thumbnails** view. For more details, see chapter 5.4.2.

6.3.2 OTT — Engine usage

Active testing Engine usage Channels Settings Thresholds

OTT engine usage overview

This shows an overview of the amount of channels assigned per engine. Channels that are spending close to 100% in network transfers may need to skip over segments to keep up with the channel. For more details, see the User's Manual.

Engine	Channels	Profiles	HLS	DASH	SS	HDS	SHOUTcast	RTMP	QTT	Cur network	Input
1	4	44	4	0	0	0	0	0	0		Data SFP
2	0	0	0	0	0	0	0	0	0		Data SFP
3	1	3	1	0	0	0	0	0	0		Data SFP
4	0	0	0	0	0	0	0	0	0		Data SFP
5	0	0	0	0	0	0	0	0	0		Data SFP
6	0	0	0	0	0	0	0	0	0		Data SFP
7	0	0	0	0	0	0	0	0	0		Data SFP
8	0	0	0	0	0	0	0	0	0		Data SFP
9	0	0	0	0	0	0	0	0	0		Data SFP
10	0	0	0	0	0	0	0	0	0		Data SFP
11	4	12	3	0	1	0	0	0	0		Data SFP
12	1	0	0	1	0	0	0	0	0		Data SFP
13	1	0	0	0	1	0	0	0	0		Data SFP
14	1	0	0	0	0	0	0	0	0		Data SFP
15	1	1	0	0	0	0	0	1	0		Data SFP
16	1	1	0	0	0	0	1	0	0		Data SFP
17	0	0	0	0	0	0	0	0	0		Data SFP
18	0	0	0	0	0	0	0	0	0		Data SFP
19	2	4	1	1	0	0	0	0	0		Data SFP
20	1	1	1	0	0	0	0	0	0		Data SFP
21	1	1	1	0	0	0	0	0	0		Data SFP
22	0	0	0	0	0	0	0	0	0		Data SFP
23	1	1	1	0	0	0	0	0	0		Data SFP
24	2	2	1	0	0	0	0	0	0		Data SFP

The **Engine usage** view is meant for troubleshooting performance issues in case of OTT engine overload. An overview of the number of channels and their associated number of profiles and stream types are displayed per OTT engine.

In addition, a graph indicating the amount of time each engine is spending doing network traffic is displayed. The Y axis of the network graph is percent, with a full bar indicating that the engine is spending all its time performing network requests. When this happens, it is likely that the engines will not be able to monitor all segments of the monitored channels.

When an overloaded engine is unable to keep up with the channel it may raise *Lagging behind N segments since last round* (for formats using sequential segment numbering) or *Lagging behind (lost segments between M and N) since last round* (for formats using, for instance, time-based segment numbering) alarm, indicating that a number of segments have rolled out of the playlist of segments specified in the manifest while the engine was busy downloading data.

Please refer to the OTT section of B Appendix: Monitoring Practices for suggestions on how to configure the OTT engines.

6.3.3 OTT — Channels

Active testing	Latency	Channels	Settings	Thresholds
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OTT channel configuration

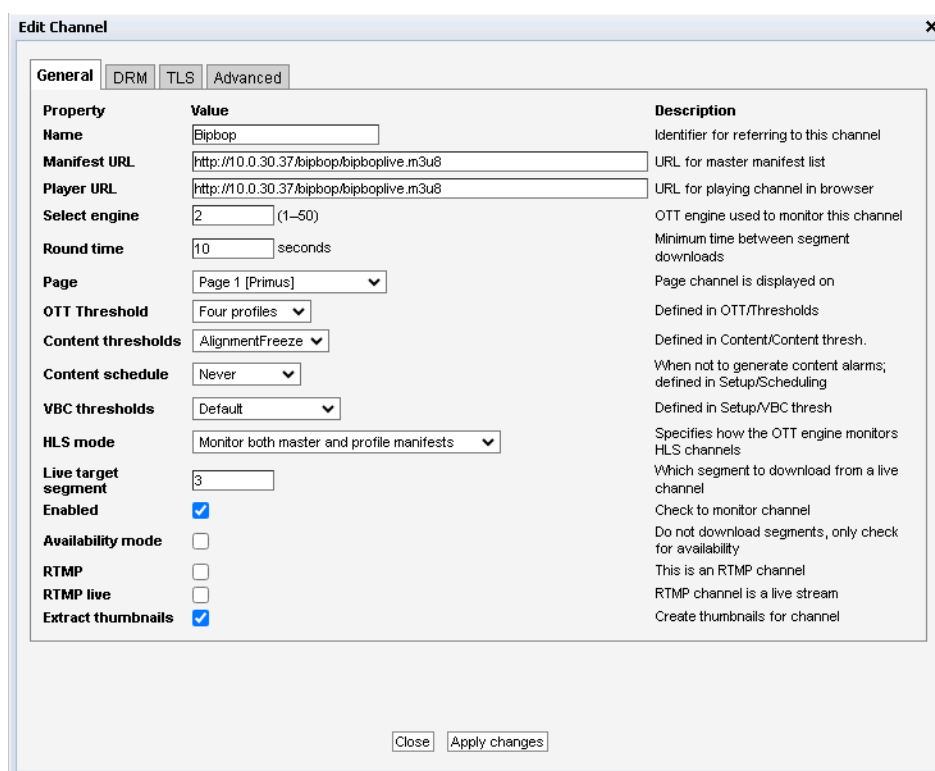

Name	URL	Threshold	Engine	Mode	Enabled	Edit
WaterfallCam@cache	http://10.0.30.8/abr/0/0/hls/WaterfallCam/playlist.m3u8	Default	1	Normal	✓	Edit
Bip bop	http://10.0.30.37/bipbop/bipbopall.m3u8	Default	2	Normal	✓	Edit
Silent Black	http://10.0.30.37/silent_black_stream/manifest.m3u8	Default	3	Normal	✓	Edit
Silent Green	http://10.0.30.37/silent_green_stream/manifest.m3u8	Default	4	Normal	✓	Edit
Silent Both	http://10.0.30.37/silent_alternating_stream/manifest.m3u8	Default	5	Normal	✓	Edit
Silent Complexity	http://10.0.30.37/silent_btech_stream/manifest.m3u8	Default	6	Normal	✓	Edit

Channels: 6

The OTT Channel Configuration list shows OTT channels configured by the user.

To add a channel to the list click the **Add new channel** button. This will open the **Edit channel** pop-up view, allowing the user to define channel parameters. A channel entry can be selected by clicking the channel; the list entry will be highlighted. Several list entries can be selected by using regular *Ctrl + click* functionality. Clicking the **Duplicate selected** button will open the **Edit channel** pop-up view with all channel parameters duplicated, except the channel name. Clicking **Delete selected** will delete the highlighted list entry. Clicking **Distribute selected** will distribute the selected channels across the licensed OTT engines (the VB220-SW can be licensed with up to 5 OTT engines). Clicking **Edit selected** will open the **Edit channel** pop-up view associated with the highlighted channel. Batch editing is supported; this is convenient if a new threshold template should be assigned to a number of channels or if monitoring of several channels should be enabled or disabled. Select the channels and click the **Edit selected** button. Parameters differing between channels will be indicated in the **Edit selected** pop-up view by an asterisk wildcard symbol.

The search field in the upper right corner of the view allows the user to type a text string, and the OTT channel list is updated to display only channels matching the specified text.



Property	Value	Description
Name	Bipbop	Identifier for referring to this channel
Manifest URL	http://10.0.30.37/bipbop/bipboplive.m3u8	URL for master manifest list
Player URL	http://10.0.30.37/bipbop/bipboplive.m3u8	URL for playing channel in browser
Select engine	2 (1-50)	OTT engine used to monitor this channel
Round time	10 seconds	Minimum time between segment downloads
Page	Page 1 [Primus]	Page channel is displayed on
OTT Threshold	Four profiles	Defined in OTT/Thresholds
Content thresholds	AlignmentFreeze	Defined in Content/Content thresh.
Content schedule	Never	When not to generate content alarms; defined in Setup/Scheduling
VBC thresholds	Default	Defined in Setup/VBC thresh
HLS mode	Monitor both master and profile manifests	Specifies how the OTT engine monitors HLS channels
Live target segment	3	Which segment to download from a live channel
Enabled	☒	Check to monitor channel
Availability mode	☐	Do not download segments, only check for availability
RTMP	☐	This is an RTMP channel
RTMP live	☐	RTMP channel is a live stream
Extract thumbnails	☒	Create thumbnails for channel

General

Name: A name should be assigned to each OTT channel. The name will be used throughout the VB220-SW's user interface when referring to this channel.

Manifest URL: The URL of the OTT channel.

Player URL: In this field you can enter the URL to a web page which will open the OTT channel in your browser. If entered, a 'play' button will be displayed in the **Active testing** view, which will open the selected URL in a new browser tab.

Select engine: A number between 1 and 5, depending on license activated, indicating which OTT engine the channel uses.

Round time: Sets the minimum round time of this OTT channel, in seconds (default: 15 seconds). If processing all the profiles of a single channel takes less time than this, it waits until this amount of seconds has passed since it started the round before starting to process through its channels again. The round time setting does not apply to channels for which real-time audio analysis have been enabled.
Note: The round time may not be set to a value less than 2 seconds.

Page: Choose which Active Testing page this channel should be displayed on. Having too many channels on the same page can cause the page reloading to stutter.

OTT Threshold:	The OTT threshold that should be assigned to the OTT channel. OTT thresholds that have been defined in the OTT — Thresholds view are available for selection from the drop-down menu.
Content thresholds:	The Content thresholds specify content alarming options. Selectable Content thresholds templates are defined in the Content — Content thresh. view.
Content schedule:	The scheduling scheme that should be assigned to the content monitoring for the OTT channel. Scheduling schemes that have been defined in the Setup — Scheduling view are available for selection from the drop-down menu. Scheduling allows masking content alarms at predefined time periods.
VBC thresholds:	The alarm threshold template used to configure when alarms are generated towards the VBC server.
Live target segment:	This specifies which segment, counted from the bottom of the list, the VB220-SW should download when doing active testing on a live channel.
Enabled:	Check the 'Enabled' check box to start monitoring the OTT service.
Availability mode:	If this option is enabled, the engine will only check for segment presence but not download the entire file. This also disables thumbnail generation.
RTMP:	Check this check box if the channel is an RTMP channel.
RTMP live:	Check this check box if the RTMP channel is a live service.

HLS mode: This setting determines how the OTT engine monitors the manifests and URLs. The HLS mode applies only to HLS channels and is ignored by all other channels. The following options are available:

- **Monitor both master and profile manifests**

This option monitors both the master and profile manifests. It uses the playlist URLs to identify the different profiles. This is the default option.

- **Monitor profile manifests only**

This option makes the OTT engine only download the master manifest once. After the initial download, it will only re-download it if one of the profiles gets an error or the connection reset timeout occurs.

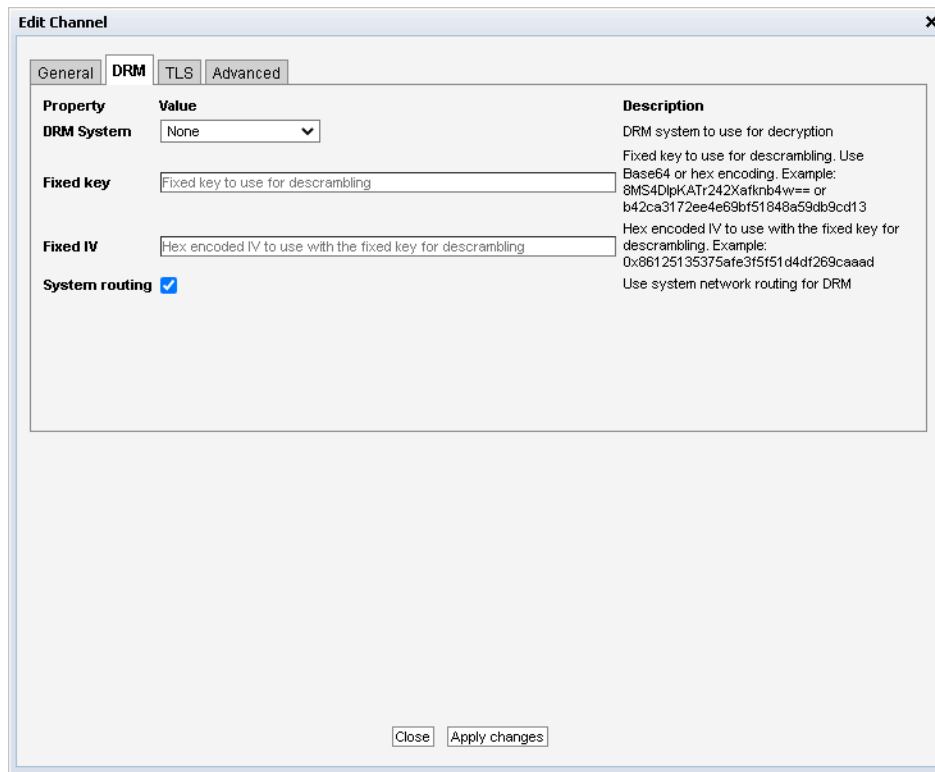
This option can be used if the server hosting the manifest is generating a unique session for each download of the master manifest, for instance by changing the profile playlist URLs between each download.

- **Monitor both, but allow unstable URLs**

This option also monitors both the master and profile manifests, but it doesn't use the playlist URLs to identify profiles. This option can also be used in cases where an OTT channel has unstable URLs.

Extract thumbnails: If the thumbnail option is enabled thumbnails will be available for the selected channels in the Active testing and Thumbnails sections.

Alignment: If the alignment option is enabled the alignment section will be available. If the Content Extraction and Alarming option is licensed, alignment checking is enabled in the Content threshold and this setting is not visible.



Property	Value	Description
DRM System	None	DRM system to use for decryption
Fixed key	Fixed key to use for descrambling	Fixed key to use for descrambling. Use Base64 or hex encoding. Example: 8MS4DlpKATr242Xafknb4w== or b42ca3172ee4e69bf51848a59db9cd13
Fixed IV	Hex encoded IV to use with the fixed key for descrambling	Hex encoded IV to use with the fixed key for descrambling. Example: 0x86125135375afe3f5f51d4df269caaad
System routing	☒	Use system network routing for DRM

DRM

DRM system: If this channel is encrypted using a Verimatrix VCAS server, selecting the **Verimatrix VCAS 3.7** or **Verimatrix VCAS 4.3** option and entering the IP address or hostname of the VCAS server's encoder interface in the **DRM hostname** field will allow descrambling of the encrypted segments. See **OTT descrambling with Verimatrix** for more info.

If this channel is encrypted using an Irdeto server, select the **Irdeto** option and configuring access to the Irdeto server will allow descrambling of the encrypted segments.

Select **None** option for streams that are not encrypted, or where you have a fixed key or IV available.

Fixed key: The key that will be used to descramble the segments for this channel. Using this field will override any key found during manifest parsing.

For HLS, use a Base64 encoded string, like this:

8MS4DlpKATr242Xafknb4w==

For DASH, use a hex encoded string, like this:

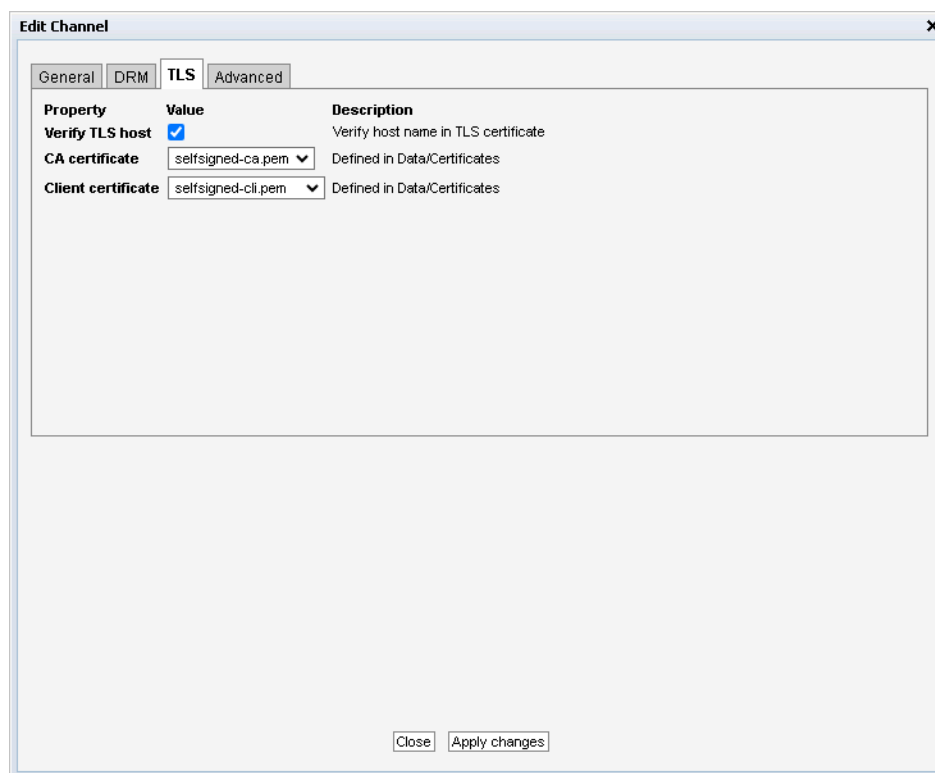
b42ca3172ee4e69bf51848a59db9cd13

Fixed IV: The IV to be used during descrambling of the HLS segments. Using this field will override any IV found or calculated during manifest parsing.

Use a 0x-prefixed hex encoded string, like this:

0x86125135375afe3f5f51d4df269caaad

DRM hostname:	If used with a DRM system, configure enter the IP address or hostname of the DRM server here.
DRM username:	When using the Irdeto DRM system, add the username used to log in to the Irdeto server here.
DRM password:	When using the Irdeto DRM system, add the password used to log in to the Irdeto server here.
Account ID:	When using the Irdeto DRM system, this should be set to the ID of the account that this channel is configured to. Please refer to the Irdeto User Manual for more details.
Content ID:	When using the Irdeto DRM system, this should be set to the ID of the channel on the Irdeto server. Please refer to the Irdeto User Manual for more details.
Crypto Period:	When using the Irdeto DRM system, this should be set to match the configuration on the Irdeto server. Please refer to the Irdeto User Manual for more details.
System routing:	If enabled, the request for the DRM system or linked key uses the system routing table. If disabled, the request uses the routing configured for the associated OTT engine.



Property	Value	Description
Verify TLS host	☒	Verify host name in TLS certificate
CA certificate	selfsigned-ca.pem	Defined in Data/Certificates
Client certificate	selfsigned-cli.pem	Defined in Data/Certificates

Close Apply changes

TLS

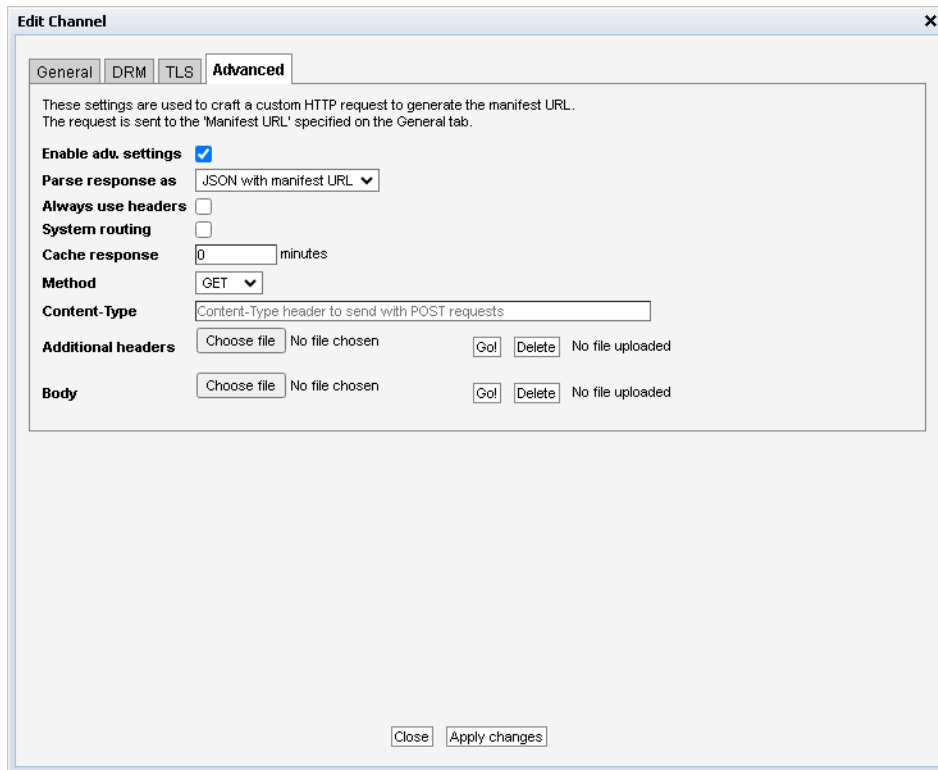
Verify TLS host If the channel is requested over a TLS connection, enabling this option verifies that the presented server certificate is valid for the host name used for the request.

This setting can be enabled without having the CA certificate available.

CA certificate If the channel is requested over a TLS connection, selecting a CA certificate here verifies that the presented server certificate is trusted by it. Certificates are uploaded in the **Data — Certificates** view.

Client certificate If a client certificate is selected here, and the channel is requested over a TLS connection, the Software Probe will present this certificate in outgoing network requests.

Enable this setting for mTLS (mutual TLS). Certificates are uploaded in the **Data — Certificates** view.



Advanced

Enable adv. settings: Check this box to enable the advanced manifest settings. If unchecked, all settings on this page are ignored.

Parse response as: Determines how to parse the response returned when requesting the **Manifest URL**. See below for an explanation of the settings.

Always use headers: If enabled, any headers specified in **Additional headers** configured below will be sent with all requests. If disabled, the additional headers will only be sent in the advanced manifest request.

System routing:	If enabled, the request for the advanced manifest URL uses the system routing table. If disabled, the request uses the routing configured for the associated OTT engine.
Cache response:	Defines for how long the advanced manifest response should be cached. If set to a non-zero value, the server is not queried again for the same URL until at least the configured number of minutes has passed. If the value for <i>Reset connection after</i> under OTT — Settings is lower, that value takes precedence.
Method:	Determines which HTTP method to use when requesting the top-level manifest file. Supported methods are GET and POST .
Content-Type:	When requesting the manifest using the HTTP POST , use this Content-Type for the submitted request body.
Additional headers:	To provide additional custom request headers or overwrite the default headers when requesting the top-level manifest file, create a text file containing the headers and upload them here.
Body:	When requesting the manifest using the HTTP POST , upload the file to submit here.

The advanced manifest options can be used in instances where the master manifest file is not directly available to download, or if additional parameters or an alternative HTTP method is required to access it.

If your channel needs several steps of authentication or other web service calls before supplying clients with an URL to the master manifest, you can make an “in-between” web service which the VB220-SW sends all required info to do the authentication and/or channel look-ups through this interface. Set **Parse response as** to *JSON with manifest URL* and have the in-between service return a JSON file with an “url” parameter containing the URL to the master manifest file.

If your channel just needs additional headers and/or an alternative HTTP method to return the master manifest, set **Parse response as** to *Normal manifest*. Enable **Always use headers** if the additional headers are to be supplied in all requests, and not only the request for the top-level manifest.

6.3.4 OTT — Settings

Active testing Engine usage Channels **Settings** Thresholds

OTT engine settings

Reset connection after: minutes

Routing interface		Routing interface	
Engine 1	Default OTT interface ▼	Engine 2	Default OTT interface ▼
Engine 3	Default OTT interface ▼	Engine 4	Default OTT interface ▼
Engine 5	Default OTT interface ▼	Engine 6	Default OTT interface ▼
Engine 7	Default OTT interface ▼	Engine 8	Default OTT interface ▼
Engine 9	Default OTT interface ▼	Engine 10	Default OTT interface ▼
Engine 11	Default OTT interface ▼	Engine 12	Default OTT interface ▼
Engine 13	Default OTT interface ▼	Engine 14	Default OTT interface ▼
Engine 15	Default OTT interface ▼	Engine 16	Default OTT interface ▼
Engine 17	Default OTT interface ▼	Engine 18	Default OTT interface ▼
Engine 19	eth2 - Data SFP ▼	Engine 20	Default OTT interface ▼
Engine 21	Default OTT interface ▼	Engine 22	Default OTT interface ▼
Engine 23	Default OTT interface ▼	Engine 24	Default OTT interface ▼

Page name		
Page 1	Primus	Page 2
Page 4	Set the name for page 4	Page 5
Page 7	Set the name for page 7	Page 8
Page 10	Set the name for page 10	Page 11
Page 13	Set the name for page 13	Page 14
Page 16	Set the name for page 16	Page 17
Page 19	Set the name for page 19	Page 20
Page 22	Set the name for page 22	Page 23

Page name		
Page 3	Set the name for page 3	Page 6
Page 9	Set the name for page 9	Page 12
Page 15	Set the name for page 15	Page 18
Page 21	Set the name for page 21	Page 24

The **Settings** view makes it possible to change global and per-engine OTT monitoring parameters. Press **Apply** to confirm changes made.

Settings

Reset connection after: Configures the VB220-SW OTT engines to reset the connections after the specified number of minutes. This is useful for cases where the server has a limit for how long a session can live. By resetting before that limit a new session is created and the problem is avoided.

Routing interface: Selects the interface on which to connect to the OTT server. This defaults to the interface selected in the **Setup — Routing** view, but can be overridden for each engine. The routing applies to all channels monitored by this engine.

Page name: This setting allows names to be associated with different pages. Individual channels can be assigned to different pages in the **OTT — Channels** view, to facilitate easier navigation in the different OTT views.

6.3.5 OTT — Thresholds

Active testing
Latency
Channels
Settings
Thresholds

Threshold presets

Name	Refs	Type	Bitrate error	Bitrate warn	Min. actual	Max. actual	Manifest ad	Manifest size	Min. profiles	Edit
Default	0	Any	100	80	50	200	60	500.000 kB	0	Edit
Strict	0	Any	100	80	80	200	60	500.000 kB	2	Edit
Live	7	Live	100	80	-1	-1	60	500.000 kB	0	Edit
VoD	0	VoD	100	80	-1	-1	60	500.000 kB	0	Edit

Thresholds: 4

Add new threshold
Duplicate selected
Delete selected
Edit selected

The OTT **Threshold presets** list shows OTT threshold templates configured by the user.

To add a threshold template to the list click the **Add new threshold** button. This will open the **Edit threshold** pop-up view, allowing the user to define threshold parameters. A threshold template entry can be selected by clicking the threshold template; the list entry will be highlighted. Several list entries can be selected by using regular *Ctrl + click* functionality. Clicking the **Duplicate selected** button will open the **Edit threshold** pop-up view with all threshold template parameters duplicated, except the threshold template name. Clicking **Delete selected** will delete the highlighted list entry. Clicking **Edit selected** will open the **Edit threshold** pop-up view associated with the highlighted threshold template. Batch editing is supported. Select the threshold templates and click the **Edit selected** button. Parameters differing between templates will be indicated in the **Edit selected** pop-up view by an asterisk wildcard symbol.

The search field in the upper right corner of the view allows the user to type a text string, and the threshold list is updated to display only thresholds matching the specified text.

Actual bitrate media type:	The profile types that the actual bitrate alarm applies to. If set to <i>Any</i> , the actual bitrate is checked for all profiles.
Sequence age:	The maximum time a manifest can remain unchanged before a manifest age alarm is raised.
Manifest size:	The maximum detected size of the manifest before a manifest size alarm is raised. Manifests larger than this will not be analyzed. Also applies to profile manifests, where applicable.
Min. profiles:	Minimum number of profiles in the selected channel before an alarm is raised.
Ignore X profiles:	When any of these are checked, all alarms are disabled for profiles of the corresponding media types.
Download ignored profiles:	If this is unchecked, no segments will be downloaded for profiles which are ignored above.

6.4 Multicasts

6.4.1 Multicasts — Parameters

MainAlarmsOTT**Multicasts**MWRDPTrafficEthernetETR 290SetupDataAbout

ParametersSummaryHistoryJoinStreamsEthernet thresh.

Joined multicasts

Userdefined parameters1-10: Page 1 Training

Thumb	Name	Signal	Page	CPU	Input	Mapping	Net bitrate	CC errs	Pids	Curr bitrate	Min bitrate	Max bitrate	IP packets	Dst address
	NRK_1	34h	1	2	B	7TS/UDP	8.944 Mbps	0	5	8.944 Mbps	2.362 Mbps	8.968 Mbps	75707518	239.255.0.1:5500
	NRK_2	34h	1	3	B	7TS/UDP	4.232 Mbps	0	5	4.232 Mbps	2.357 Mbps	8.960 Mbps	64174782	239.255.0.2:5500
	TV2_NORWAY	34h	1	4	B	7TS/UDP	4.456 Mbps	0	5	4.456 Mbps	735.248 kbps	8.752 Mbps	47296409	239.255.0.3:5500
	TVNORGE	34h	1	5	B	7TS/UDP	3.144 Mbps	0	5	3.144 Mbps	2.228 Mbps	4.968 Mbps	40174174	239.255.0.4:5500
	STAR	34h	1	7	B	7TS/UDP	2.921 Mbps	1	5	2.921 Mbps	1.977 Mbps	3.035 Mbps	32200974	239.255.0.6:5500
	CNN_EUROPE	34h	1	4	B	7TS/UDP	2.644 Mbps	0	5	2.644 Mbps	2.168 Mbps	4.030 Mbps	40653886	239.255.0.10:5500
	MTV_NORDIC	34h	1	6	B	7TS/UDP	4.176 Mbps	0	6	4.176 Mbps	4.152 Mbps	4.192 Mbps	49091959	239.255.0.12:5500
	DISCOVERY_WORLD	34h	1	7	B	7TS/UDP	3.672 Mbps	0	5	3.672 Mbps	3.656 Mbps	3.721 Mbps	43331102	239.255.0.13:5500
	TV2 ZEBRA	34h	1	4	B	7TS/UDP	4.760 Mbps	0	5	4.760 Mbps	728.576 kbps	8.752 Mbps	47616019	239.255.0.31:5500
	BBC HD	34h	1	4	B	7TS/UDP	12.424 Mbps	0	12	12.424 Mbps	12.408 Mbps	12.744 Mbps	146618770	239.255.0.159:5500
	Accumulated	34h		1	n/a		51.373 Mbps	1	58	51.373 Mbps	3.480 Mbps	59.084 Mbps		

Current page

All streams (offline)

Clear counters

Export...

Fields...

+1

-1

The **Multicasts — Parameters** view displays detailed information about each stream.

The user selects which group of measurements should be displayed. Selections are *IP parameters*, *TS parameters*, *Ethernet parameters*, *RTP and FEC parameters*, *MSYNC parameters*, *SRT parameters*, *User-defined parameters* and *Statistical parameters*. If *User-defined parameters* is selected, the **Multicasts** view displays parameters selected by the user in the **Multicasts — Parameters — Fields** view.

For each page the *Accumulated* row at the bottom of the multicast list displays accumulated values for all streams associated with the page. The accumulated *Min bitrate* and *Max bitrate* is the minimum and maximum value of the *Accumulated* current bitrate.

Parameters

Summary

History

Join

Streams

Ethernet thresh.

Joined multicasts

Userdefined parameters

1-10: Page 1 Training

Thumb	Name	Signal	Page	CPU	Input	Mapping	Net bitrate	CC errs	Pids	Curr bitrate	Min bitrate	Max bitrate	IP packets	Dst address
	NRK_1	34h	1	2	B	7TS/UDP	6.744 Mbps	0	5	6.744 Mbps	2.362 Mbps	8.968 Mbps	75918222	239.255.0.1:5500
	NRK_2	34h	1	3	B	7TS/UDP	5.424 Mbps	0	5	5.424 Mbps	2.357 Mbps	8.960 Mbps	64316858	239.255.0.2:5500
	TV2_NORWAY	34h	1	4	B	7TS/UDP	3.520 Mbps	0	5	3.520 Mbps	735.248 kbps	8.752 Mbps	47403979	239.255.0.3:5500
	TVNORGE	34h	1	5	B	7TS/UDP	2.992 Mbps	0	5	2.992 Mbps	2.228 Mbps	4.968 Mbps	40285019	239.255.0.4:5500
	STAR	34h	1	7	B	7TS/UDP	2.576 Mbps	1	5	2.576 Mbps	1.977 Mbps	3.035 Mbps	32277174	239.255.0.6:5500
	CNN_EUROPE	34h	1	4	B	7TS/UDP	3.680 Mbps	0	5	3.680 Mbps	2.168 Mbps	4.030 Mbps	40760389	239.255.0.10:5500
	MTV_NORDIC	34h	1	6	B	7TS/UDP	4.168 Mbps	0	6	4.168 Mbps	4.152 Mbps	4.192 Mbps	49213393	239.255.0.12:5500
	DISCOVERY_WORLD	34h	1	7	B	7TS/UDP	3.680 Mbps	0	5	3.680 Mbps	3.656 Mbps	3.721 Mbps	43438289	239.255.0.13:5500
	TV2_ZEBRA	34h	1	4	B	7TS/UDP	3.080 Mbps	0	5	3.080 Mbps	728.576 kbps	8.752 Mbps	47747551	239.255.0.31:5500
	BBC HD	34h	1	4	B	7TS/UDP	12.600 Mbps	0	12	12.600 Mbps	12.408 Mbps	12.744 Mbps	146981565	239.255.0.159:5500
	Accumulated	34h		1	n/a		48.464 Mbps	1	58	48.464 Mbps	3.480 Mbps	59.084 Mbps		

<

>

Current page

All streams (offline)

Clear counters

Export...

Fields...

+1

-1

When the **Current page** button is clicked it is possible to select the page from a drop-down menu. The associated thumbnails are shown in the leftmost column of the list of measurements. Click one of the small thumbnails to view a larger thumbnail that is updated more frequently. Note that it is possible to disable probe thumbnail extraction in the **Setup — Params** view.

When **All streams (offline)** is clicked a complete list of measurements for all joined streams is displayed. A search field allows the user to type a text string and the multicast list is updated to display only multicasts matching the specified text. Note that monitoring parameters and thumbs will not be updated in **All streams (offline)** mode.

Peak and aggregate measurements are cleared when the **Clear counters** or **Clear counters all pages** button is clicked. Clicking this button also restarts the ETR monitoring for the streams have this enabled.

Clicking the **Export** button will allow export of the measurement data as an XML file that is opened in a new window.

Parameters									
Summary History Join Streams Ethernet thresh.									
Joined multicasts									
Last 4d Last 24h Last 8h Last 20m Last 1m Statistical parameters 1-10: Page 1 Training									
Name	ES(IAT)-24h	ES(MLR)-24h	ES(RTP)-24h	ES(overfl)-24h	ES(nosig)-24h	Peak(IAT)-24h	Sum(MLR)-24h	Peak(bitr)-24h	
NRK_1	0	0	0	0	0	5.3 ms	0	8.900 Mbps	
NRK_2	0	0	0	0	0	5.6 ms	0	8.900 Mbps	
TV2_NORWAY	0	0	0	0	0	36.1 ms	0	8.700 Mbps	
TVNORGE	0	0	0	0	0	10.3 ms	0	4.900 Mbps	
STAR	0	0	0	0	0	9.4 ms	0	3.000 Mbps	
CNN_EUROPE	0	0	0	0	0	25 ms	0	4.000 Mbps	
MTV_NORDIC	0	0	0	0	0	4.3 ms	0	4.100 Mbps	
DISCOVERY_WORLD	0	0	0	0	0	5.6 ms	0	3.700 Mbps	
TV2 ZEBRA	0	0	0	0	0	33.7 ms	0	8.500 Mbps	
BBC HD	0	0	0	0	0	1.5 ms	0	12.700 Mbps	
Accumulated									

Current page All streams (offline) Clear counters Export... Fields... +1 -1

Clicking a stream brings up the **Detailed monitoring** pop-up described later in this section.

In **All streams (offline)** mode a search field allows the user to type a text string and the multicast list is updated to display only multicasts matching the specified text.

Parameters									
Setup									
Joined multicasts									
Last 4d Last 24h Last 8h Last 20m Last 1m Statistical parameters									
Name	ES(IAT)-24h	ES(MLR)-24h	ES(RTP)-24h	ES(overfl)-24h	ES(nosig)-24h	Peak(IAT)-24h	Sum(MLR)-24h	Peak(bitr)-24h	
NRK_1	0	2	0	0	0	7.1 ms	5	9.30 Mbps	
NRK_2	0	0	0	0	0	4.9 ms	0	9.30 Mbps	
TVNORGE	0	0	0	0	0	4.7 ms	0	5.20 Mbps	
STAR	8	9	0	0	0	433.9 ms	243	4.40 Mbps	
CNN_EUROPE	0	0	0	0	0	57.5 ms	0	4.20 Mbps	
TRAVEL_CHANNEL	0	0	0	0	0	6.6 ms	0	3.30 Mbps	
DISCOVERY_WORLD	0	0	0	0	0	7.7 ms	0	3.60 Mbps	
ANIMAL_PLANET	0	0	0	0	0	14.8 ms	0	5.40 Mbps	
BBC_LIFESTYLE	0	0	0	0	0	7.6 ms	0	4.20 Mbps	
BBC_ENTERTAINMEN	0	0	0	0	0	3.7 ms	0	4.20 Mbps	
BBC_WORLD	0	6	0	0	0	5.3 ms	75	3.90 Mbps	
BOOMERANG	0	0	0	0	0	22.9 ms	0	4.60 Mbps	
TCM_NORDIC	0	0	0	0	0	33.9 ms	0	4.40 Mbps	
CARTOON_NORDIC	0	0	0	0	0	22.6 ms	0	4.70 Mbps	
TV2 ZEBRA	0	0	0	0	0	10.6 ms	0	8.70 Mbps	
DISCOVERY_SCIENCE	0	0	0	0	0	8 ms	0	3.60 Mbps	
DISNEY_CHANNEL	0	1	0	0	0	4.4 ms	20	4.60 Mbps	
DISNEY_XD	0	1	0	0	0	4.4 ms	22	4.30 Mbps	
TV2 FILMKANALEN	0	0	0	0	0	10.6 ms	0	7.70 Mbps	

Current page All streams (offline) Refresh Clear counters all pages Export... Trim ch-list

Click the **Trim ch-list** button to unjoin streams with current status ‘No signal’, thereby removing them from the list. The **Statistical parameters** view lists sum or peak values for parameters over the interval indicated by the selected time button (Last 4d, Last 24h, Last 8h, Last 20m, Last 1m).

6.4.1.1 Parameter columns

Following is a listing explaining the meaning of the columns which may be shown for the joined multicasts view at **Multicasts — Parameters**. The columns displayed may be selected in see **Multicasts — Parameters — Fields**.

<i>Common parameters</i>	
①:	Click the information icon to access the Detailed Monitoring pop-up view.
Thumb:	If thumbnail extraction has been enabled, a thumbnail is displayed for each unencrypted stream. Click the small thumbnail to view a larger image that is updated more frequently. If thumbnail extraction has not been enabled, or if the thumbnail extraction fails, an informational icon will be displayed instead, see chapter 5.4.3 for details on the different icons.
Name:	The stream name specified by the user in the Edit Multicast view
Signal:	Time since last signal loss
Mon start:	Time since monitoring started, either by joining a stream or by clicking the "Clear counters" button
Page:	The page associated with the multicast
CPU:	CPU core monitoring this multicast
Input:	Network interface used to receive this multicast
Mapping:	For MPEG-2 Transport streams, the number of MPEG-2 packets mapped into each RTP, UDP or SRT packet is displayed here. For SMPTE 2022-7 combined streams, “ST 2022-7” is displayed. For MABR streams, when MSYNC packets are detected, “MSYNC<version>/<protocol>” is displayed, where “<version>” is either 1 or 3 and “<protocol>” is either UDP or RTP. For other unsupported RTP streams, “RTP data” is displayed.
<i>IP parameters</i>	
Curr bitrate:	Instantaneous MPEG-2 Transport Stream bitrate including null packets (PID 8191). The instantaneous bitrate is measured over a time period of 1000 ms, and is calculated from the size of the RTP, L2TP or UDP payloads.
Min bitrate:	The minimum current bitrate measurement
Max bitrate:	The maximum current bitrate measurement
IP packets:	The number of IP packets received
Dst address:	Multicast/unicast destination address : port

TOS:	Type-Of-Service (also called Differentiated Services Field)
TTL:	Time-To-Live
VLAN ID:	Native VLAN ID of this stream
Src address:	Multicast/unicast source address : port
Joined src:	The source address of the originally joined multicast.
IAT avg:	Average Inter-Arrival Time. The average time between consecutive IP frames (in milliseconds). Recalculated each second. For SMPTE ST 2022-7 combined streams, the path differential (PD) is shown instead, with the sign indicating which of the paths is ahead of the other.
IAT min:	The Minimum Inter-Arrival Time is the minimum registered time between two consecutive IP frames carrying video. Units are in milliseconds. For SMPTE ST 2022-7 combined streams, the minimum path differential is shown instead.
IAT max:	The Maximum Inter-Arrival Time is the maximum registered time between two consecutive IP frames carrying video. Units are in milliseconds. The Max-IAT is a measure of the maximum amount of network-induced packet jitter present. IP packet jitter affects video quality and should be minimized. For SMPTE ST 2022-7 combined streams, the maximum path differential is shown instead.

TS parameters

Net bitrate:	Instantaneous MPEG-2 Transport Stream bitrate excluding null packets (PID 8191). The instantaneous bitrate is measured over a time period of 1000 ms. No bitrate is reported for SMPTE ST 2022-7 combined streams.
CC errs:	The number of times a discontinuity has been detected for all the MPEG-2 Transport Stream continuity counters. This value is the total number of discontinuities detected for all PIDs present. Note that this value does NOT represent the number of MPEG-2 TS packets lost because any continuity counter mismatch detected for an IP-frame will increase CC errs by one. CC errors are serious as they will in practice usually result in visual video artifacts ('blocking') if occurring on the video PIDs. CC errors can be due to an erroneous input signal to the streaming head-end (e.g. from satellite rain fading or changes in the uplink). Alternatively, CC errors can arise from IP packets being dropped in the network.
PIDs:	Number of PIDs in the MPEG2-TS
Synch errs:	Number of transport stream packets with wrong synchbyte (0x47)
#Services:	The number of services found in the multicasts

Ethernet parameters

Src MAC:	Source MAC address
Dst MAC:	Destination MAC address

RTP Parameters

RTP drops:	Accumulated number of dropped IP-frames due to network errors. Only available for multicasts that carry RTP information, and for L2TP streams that carry sequence numbers. When running video inside an RTP wrapper it is possible to exactly deduce the number of dropped IP frames due to network issues. This is possible as a result of the 16-bit sequence counter inside the RTP header. The following sequence will generate an RTP drops of +3: ..., 10, 11, 12, 16, 17, 18, ...
RTP dups:	Accumulated number of duplicate IP-frames. Only available for multicasts that carry RTP information, and for L2TP streams that carry sequence numbers. Duplicate IP-frames in the network can occur under normal circumstances and does not necessarily indicate network problems. The following sequence will generate an RTP dups of +2: ..., 10, 11, 12, 12, 12, 13, 14, ...
RTP ooo:	Accumulated number of times a packet has been found to be out of order. Only available for multicasts that carry RTP information. An out-of-order situation is defined to have occurred when the current sequence number is lower than the previous one. The following sequence will generate an RTP ooo of +2 (since there are two occurrences): ..., 10, 11, 15, 12, 16, 17, 13, 14, 18, 19, ...
RTP lag:	The maximum number of packet positions an out-of-order packet has been moved relative to its correct position. So for example 1,2,3,5,6,7,8,4,9,10 will result in an RTP lag of 4. The RTP lag is a good measure of how big a packet re-ordering buffer is needed in the receiving equipment to re-order packets.
Min hole size:	Minimum number of consecutive dropped RTP packets. The sequence 1,2,3,10,11,12,15 gives a min hole size of 2.
Max hole size:	Maximum number of consecutive dropped RTP packets. The sequence 1,2,3,10,11,12,15 gives a max hole size of 6.
Min hole sep:	Minimum number of RTP packets separating any holes. The sequence 1,2,3,10,11,12,15 gives a min hole sep of 3.
Num holes:	Number of packet loss sequences. The sequence 1,2,3,10,11,12,15 gives a num holes of 2.
FEC mode:	The CoP3 FEC mode.
FEC drops:	Number of RTP packet drops in the main stream that the FEC could not correct.
C-FEC drops:	Number of IP packets in the column-FEC streams dropped.
R-FEC drops:	Number of IP packets in the row-FEC streams dropped.

Statistical parameters: MPEG-2 transport stream parameters

ES(IAT):	Number of seconds during selected period with Inter-packet Arrival Time higher than associated Ethernet IAT warning threshold.
ES(MLR):	Number of seconds during selected period with Media Loss (corresponding to number of seconds with CC-errors).
ES(RTP):	Number of seconds during selected period with RTP packet drops.
ES(overfl):	Number of seconds during selected period with bitrate overflow.
ES(nosig):	Number of seconds during selected period without signal.
Peak(IAT):	Peak Inter-packet Arrival Time during selected period.
Sum(MLR):	Sum of Media Loss during selected period (equals number of TS packets lost).
Peak(bitr):	Peak stream bitrate during selected period.

MSYNC parameters

MSYNC URI	URI of of the MSYNC object being decoded as given from the object URI field of the Object Info MSYNC packet.
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Detailed Monitoring

The **Detailed Monitoring** pop-up is activated by clicking a stream line in the monitoring list.

The current parameters for the selected stream are displayed in the bottom of the dialog, as in the **Joined multicasts** list.

Clicking the **Clear** button will clear all information about the selected stream, including PSI/SI analysis data. Clicking the **MediaWindow** button will open the Media Window **Selected channel** view. This is described in section 6.5.

Detailed Monitoring — Services

Detailed Monitoring

Services | Event log | IAT

Service/Pid	Bitrate	Min bitr.	Max bitr.	CC errors	Thumb	Type	PCR	Scr
3 KELO TV	12.164 Mbps	8.206 Mbps	15.691 Mbps	0		ATSC service		
49 MPEG2 Video	11.568 Mbps	7.616 Mbps	15.085 Mbps	0		MPEG2 Video	✓	
52 AC-3 Audio	394.416 kbps	390.728 kbps	400.008 kbps	0		AC-3 Audio		
53 AC-3 Audio	197.208 kbps	195.360 kbps	200.000 kbps	0		AC-3 Audio		
48 PMT	4.512 kbps	4.096 kbps	6.016 kbps	0		PMT		
4 UTV	3.450 Mbps	1.076 Mbps	6.212 Mbps	0		ATSC service		
65 MPEG2 Video	3.249 Mbps	876.736 kbps	6.006 Mbps	0		MPEG2 Video	✓	
68 AC-3 Audio	197.208 kbps	195.320 kbps	200.000 kbps	0		AC-3 Audio		
64 PMT	4.512 kbps	4.096 kbps	6.016 kbps	0		PMT		
5 ION	2.404 Mbps	1.022 Mbps	6.150 Mbps	0		ATSC service		
Other PIDs	138.472 kbps	75.448 kbps	673.016 kbps	0		Other		

Name	Signal	Page	CPU	Input	Mapping	Net bitrate	CC errs	PIDs	Syncb errs	#Services	Curr bitrate	Min bitrate
KELO inp 1 stream 1	432s	5	17	enp...	7TS/RTP	18.121 Mbps	0	36	0	3	19.400 Mbps	19.376 Mbps

Close Clear MediaWindow

The Software Probe is continuously gathering detailed information for the selected multicast. The VB220-SW will continue updating the detailed information for the selected multicast until another is selected.

The **Detailed Monitoring — Services** view lists detected MPEG-2 TS services (by analyzing the PSI/SI tables), providing the following aggregate information for each service:

Service/Pid:	For each service, the service-name or service-id is obtained from the PSI/SI tables. PIDs that do not belong to a service are denoted 'Other PIDs'. The service ID is presented in square brackets.
Bitrate:	Service bitrate in bits per second
Min bitr.:	Minimum service bitrate in bits per second
Max bitr.:	Maximum service bitrate in bits per second
CC errors:	Number of Continuity Counter occurrences
Thumb:	Click the icon to access the Thumb pop-up view, explained below
Type:	The list entry service type or PID type
PCR:	This field will be checked if the corresponding PID carries PCR
Scr:	This field will be checked if the corresponding PID is scrambled

Detailed Monitoring — Event Log

Detailed Monitoring

Services **Event log** IAT

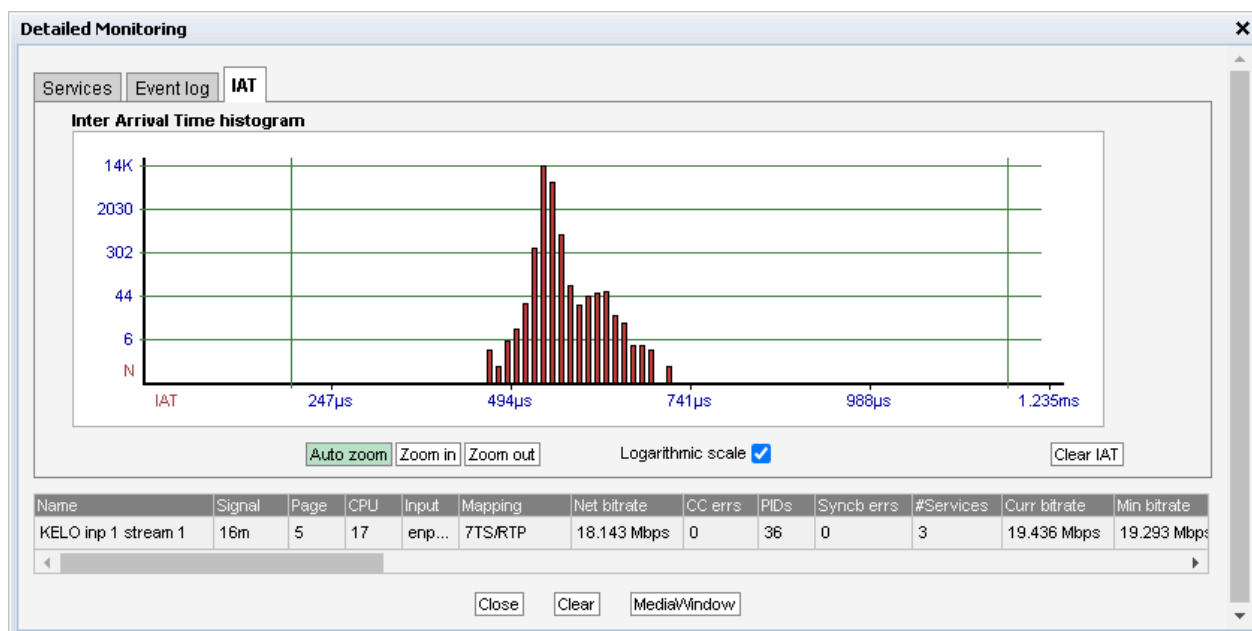
Time	Type	Description	Count
2020-11-04 13:45:41	SIGNAL	First packet received	2
2020-11-03 16:30:49	SIGNAL	First packet received	2
2020-10-30 07:55:41	SIGNAL	First packet received	2
2020-10-29 10:10:38	SIGNAL	First packet received	2
2020-10-29 09:45:38	SIGNAL	First packet received	2
2020-10-28 22:55:41	SIGNAL	First packet received	2
2020-10-28 21:50:41	SIGNAL	First packet received	2
2020-10-28 07:30:45	SIGNAL	First packet received	2
2020-10-28 05:25:47	SIGNAL	First packet received	2
2020-10-27 20:50:44	SIGNAL	First packet received	2
2020-10-27 08:49:46	SIGNAL	First packet received	2

Name	Signal	Page	CPU	Input	Mapping	Net bitrate	CC errs	PIDs	Syncb errs	#Services	Curr bitrate	Min bitrate
KELO inp 1 stream 1	505s	5	17	enp...	7TS/RTP	18.122 Mbps	0	24	0	3	19.417 Mbps	19.358 Mbps

Close Clear MediaWindow

The event log contains informative text that may prove helpful for diagnosing transport and bitstream level errors.

Detailed Monitoring — IAT



In the **Detailed Monitoring — IAT** view, the **Inter Arrival Time** histogram shows the accumulated number of IAT measurements within each presented interval. Vertical green lines indicate the maximum and minimum IAT values. By clicking the IAT range buttons it is possible to change the zooming of the graph. If the **Auto zoom** button is pressed the diagram will auto-scale to always include the minimum and maximum IAT readings.

The IAT histogram is a very useful and intuitive measure of how well the network is performing in terms of forwarding real-time traffic. A predictable and tightly bunched graph indicates small levels of network jitter. An unbound graph indicates network jitter issues typically brought forward by traffic congestion or misconfigured routers. Clicking the **Clear IAT** button will clear the IAT graph.

Note that for variable bitrate streams the IAT histogram will show a very different IAT distribution compared to the histogram for a constant bitrate stream. The histogram in the screenshot above displays the IAT distribution for a CBR stream.

For SMPTE ST 2022-7 combined streams, the path differential (PD) is shown instead.

Detailed Monitoring — MSYNC

Detailed Monitoring												
Services		Event log		IAT		MSYNC						
#	Object URI	Size	Received	Age	Object ID							
12	test_object_2959	656.01 k	463 / 463	33 s	0xb8f							
11	test_object_2960	434.79 k	307 / 307	28 s	0xb90							
10	test_object_2961	151.39 k	107 / 107	24 s	0xb91							
9	test_object_2962	696.74 k	492 / 492	23 s	0xb92							
8	test_object_2963	66.07 k	47 / 47	17 s	0xb93							
7	test_object_2964	612.08 k	432 / 432	17 s	0xb94							
6	test_object_2965	250.47 k	177 / 177	12 s	0xb95							
5	test_object_2966	36.01 k	26 / 26	10 s	0xb96							
4	test_object_2967	38.90 k	28 / 28	9 s	0xb97							
3	test_object_2968	202.47 k	143 / 143	9 s	0xb98							
2	test_object_2969	68.48 k	49 / 49	7 s	0xb99							
1	test_object_2970	90.04 k	64 / 64	7 s	0xb9a							
*	test_object_2971	457.19 k	323 / 323	6 s	0xb9b							
14	test_object_2957	122.04 k	87 / 87	40 s	0xb8d							
13	test_object_2958	639.71 k	452 / 452	39 s	0xb8e							

Name	Signal	Page	CPU	Input	Mapping	Net bitrate	CC errs	PIDs	Syncb errs	#Services	Curr bitrate	Min bitrate
NC_233.26.74.1	76s	1	8	enp...	MSYNC3/RTP	991.704 kbps	0	0	0	0	991.704 kbps	991.544 kbps

Close Clear MediaWindow

When MSYNC monitoring is enabled for a stream, this view displays a list of the objects received. To enable MSYNC monitoring, the stream may be configured as *MSYNC* in **Multicasts — Streams — Edit**.

The probe retains a list of the last 15 objects received for each stream configured as *MSYNC*. As new objects are received, they are appended to the bottom of the list. When the probe has filled up the list, it starts writing new objects from the first row again, thereby overwriting the oldest objects. This facilitates viewing the objects which have been received within the last update. In addition it makes reading the lines easier as only the minimum amount of rows are changed between each view update.

The following columns are defined:

Object receive order. The most recently received object is indicated with an asterisk (*). The oldest object received is 14.

Object URI	The URI of the object as given from the object URI field of the Object Info MSYNC packet. If the file contains control information, i.e. the object type field of the Object Info MSYNC packet is equal to control or Media manifest, the URI is displayed as a link and the content of the object may be downloaded. The size of the file which the probe keeps is limited to 1 MiB. If the file was not received in its entirety, there will be gaps in the file.
Size	The size of the object as specified by the object size field of the Object Info MSYNC packet.
Received	Number of packets received / Number of packets in the object. Any difference between these two numbers indicates packet loss. The number of packets in the object is given by the number of MSYNC packets field of the Object Info MSYNC packet.
Age	The age of the object. This is calculated as the difference between the current time and the reception time of the Object Info MSYNC packet.
Object ID	The id of the object as given from the object identifier field of every MSYNC packet.

The **Thumb View** pop-up is accessed by clicking an information icon in the **Detailed Monitoring — Services** view. The pop-up window is identical to the one displayed in the **Thumbnails** view. For more details, see chapter 5.4.1.

6.4.2 Multicasts — Parameters — Fields

Parameters
Summary
History
Detect
Join
Streams
Ethernet thresh.

Custom monitoring parameter selection

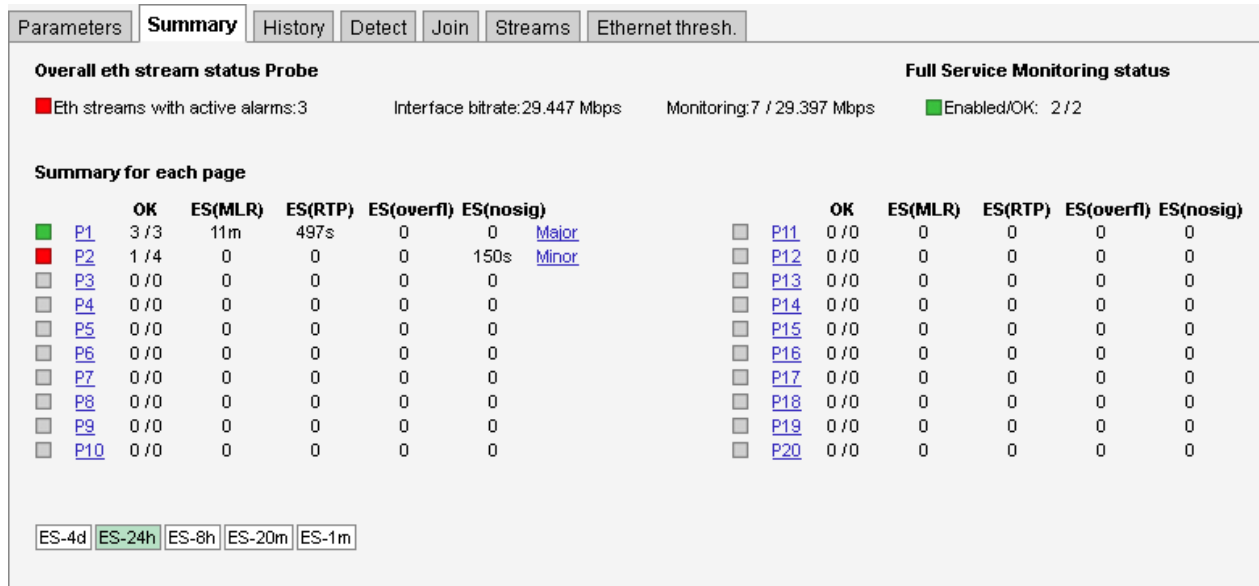
Common	Display in list	Description
Thumb	☒	Thumbnail
Name	☒	Name of stream (i.e. channel)
Signal	☒	Time since last signal loss
Page	☐	Which page a multicast is assigned to
CPU	☐	Which CPU core stream is processed on
Input	☒	Ethernet input of stream
Mapping	☒	How MPEG packets are mapped into RTP or UDP packets
IP		
	Display in list	Description
Curr bitrate	☒	Instant bitrate (last 1000 ms) of UDP payload
Min bitrate	☒	Min Curr bitrate
Max bitrate	☒	Max Curr bitrate
IP packets	☐	Number of IP packets
Dst address	☒	Multicast/unicast destination address : port
...	☐	

Apply

Select parameters that are to be displayed in list. List will load faster if fewer parameters are selected.

The **Multicasts — Parameters — Fields** view enables selection of the parameters to be displayed in the **Multicasts — Parameters** view. They are only in effect when *User-defined parameters* is selected as shown in **Multicasts — Parameters**. Note that thumbnails must also be enabled in the **Setup — Params** view for thumbnail availability.

6.4.3 Multicasts — Summary



The screenshot shows the 'Summary' tab of the 'Multicasts' section. At the top, there are tabs for 'Parameters', 'Summary', 'History', 'Detect', 'Join', 'Streams', and 'Ethernet thresh.'. Below the tabs, the 'Overall eth stream status Probe' section displays a red square icon, 'Eth streams with active alarms:3', 'Interface bitrate:29.447 Mbps', 'Monitoring:7 / 29.397 Mbps', and a green square icon with 'Full Service Monitoring status' and 'Enabled/OK: 2 / 2'. The 'Summary for each page' section contains two tables of data for parameters P1 through P20. Each row includes a color-coded square (green for OK, red for Major, grey for disabled), the parameter name, and five numerical values: OK, ES(MLR), ES(RTP), ES(overfl), and ES(nosig). At the bottom, there are buttons for time ranges: 'ES-4d', 'ES-24h' (selected), 'ES-8h', 'ES-20m', and 'ES-1m'.

	OK	ES(MLR)	ES(RTP)	ES(overfl)	ES(nosig)
P1	3 / 3	11m	497s	0	0
P2	1 / 4	0	0	0	150s
P3	0 / 0	0	0	0	0
P4	0 / 0	0	0	0	0
P5	0 / 0	0	0	0	0
P6	0 / 0	0	0	0	0
P7	0 / 0	0	0	0	0
P8	0 / 0	0	0	0	0
P9	0 / 0	0	0	0	0
P10	0 / 0	0	0	0	0

	OK	ES(MLR)	ES(RTP)	ES(overfl)	ES(nosig)
P11	0 / 0	0	0	0	0
P12	0 / 0	0	0	0	0
P13	0 / 0	0	0	0	0
P14	0 / 0	0	0	0	0
P15	0 / 0	0	0	0	0
P16	0 / 0	0	0	0	0
P17	0 / 0	0	0	0	0
P18	0 / 0	0	0	0	0
P19	0 / 0	0	0	0	0
P20	0 / 0	0	0	0	0

The intention of this page, together with the **alarm list**, is to provide enough information for the operator to immediately see if there is anything seriously wrong with one or more Ethernet input streams. The overall status for the Full Service Monitoring (FSM) is also shown.

Throughout this view the bulb colors indicate the most severe active alarm. They may be green (no alarm), yellow (warning), orange (error) or red (major). The bulb color is based on user-defined alarm severity settings for each alarm. A grey bulb indicates that monitoring is disabled.

The following Ethernet parameters are shown:

Eth streams with active alarms:	Shows the number of streams that are presently in an alarm state (0–260). Note that the number of alarms counted refers to default settings, and alarms disabled by the user will still be counted.
Interface bitrate:	This is the total bitrate sensed on the data/video interface(s). It should be greater than or equal to the Monitoring bitrate.
Monitoring:	This is the total number of Ethernet streams monitored (0–260) and the total bitrate for these streams.
Full Service Monitoring status:	The number of enabled FSM services / number of OK FSM services

The probe is capable of monitoring up to 260 streams simultaneously. The probe splits streams into pages for easy handling. Each of the 30 predefined pages can be given a name and have a user-defined number of streams associated.

Part of the page-status is error-second statistics for the fundamental parameters **MLR**, **RTP**, **overfl** and **nosig** summed across all streams belonging to that page.

The error-second statistics interval is selected by clicking the buttons. For example, clicking the **ES-8h** button will present error-seconds for the last 8 hours. If 10 streams for a page have been without signal for the last 8 hours, the **nosig** will show as 80hours.

The following parameters are presented (note that the error second values are accumulated from probe boot time, and they will only be cleared by reboot or by clicking the **Clear all** counters button in the **Main** view):

‘Bulb’: The bulb indicates the most severe active alarm for any of the streams on the page. Active alarms are located on top of the alarm list. The alarm severity is reflected by the color of the associated icon.
Next to the bulb is a link that will lead to the **Monitoring page** if pressed. The Monitoring page will present error-second statistics for each stream individually.

OK: Shows how many of the streams monitored on this page are without active alarms

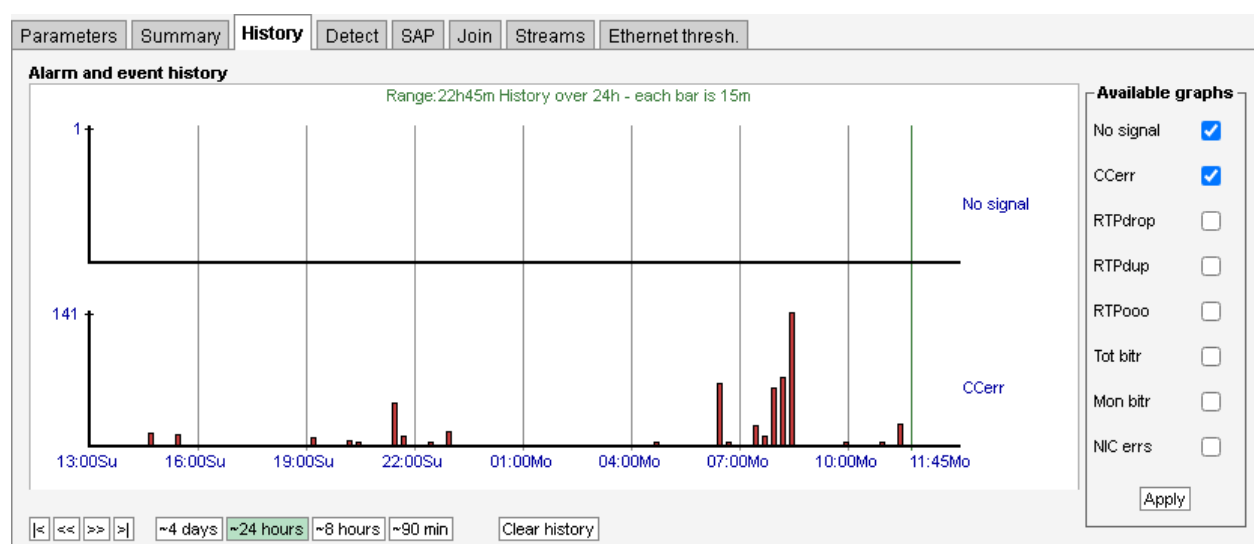
ES(MLR): Number of seconds in selected period with continuity counter errors in the MPEG2 transport stream (which corresponds to the number of seconds with non-zero Media Loss Rate).

ES(RTP): Number of seconds in selected period with RTP packet-drop

ES(overfl): Number of seconds in selected period with bitrate overflow

ES(nosig): Number of seconds in selected period where no signal (i.e. no data) was received

6.4.4 Multicasts — History



The probe keeps statistical Ethernet information for the last 4 days for visual inspection in the **history timeline view**.

Each bar in the histogram corresponds to a number of events that occurred within a certain time interval. The interval that each bar represents depends on the scale, from 1 minute (when 90 min is selected) to 1 hour (when 4 days is selected).

Clicking the **Clear history** button will reset all history graphs.

Tool-tip information is available for each bar and shows the time-interval for the bar and its exact value. For example, the tool-tip information ‘13:15-13:30:2’ means that within the time interval 13:15–13:30 there were 2 occurrences.

The histogram is updated every minute.

Any subset of the following parameters can be selected, click the **Apply** button for changes to take effect:

No signal:	The number of streams that reported the ‘No signal’ alarm during the interval represented by the bar.
CCerr:	The number of times a discontinuity has been detected for all the MPEG-2 Transport Stream continuity counters in the interval represented by the bar. This parameter corresponds to the sum of CC errs reported by all streams.
RTPdrop:	Accumulated number of dropped IP-frames due to network errors in the interval represented by the bar. This parameter corresponds to the sum of RTP drops reported by all streams.
RTPdup:	Accumulated number of duplicate IP-frames in the interval represented by the bar. This parameter corresponds to the sum of RTP dups reported by all streams.
RTPooo:	Accumulated number of times a packet has been found to be out of order in the interval represented by the bar. This parameter corresponds to the sum of RTP ooo reported by all streams.
Tot bitr:	Bitrate sensed on the data/video interface(s).
Mon bitr:	Bitrate on the data/video interface(s) corresponding to joined multicasts.
NIC errs:	Detected NIC errors. NIC errors are most likely caused by a bad cable or a misconfigured router. A NIC error may impact packet loss measurements such as CC errors and RTP errors.

Note that the history graphs show the sum for all streams being analyzed across all pages. So for example, if two streams experience **No signal** at the same time the **No signal** graph will increase by 2.

6.4.5 Multicasts — Detect

Please see chapter 6.7.2 on page 149.

6.4.6 Multicasts — SAP

Parameters	Summary	History	Detect	SAP	Join	Streams	Ethernet thresh.
Dst address	Src address	Name	Interface	Joined	User	Mapping	
239.255.0.2	10.0.81.13	FEM HD	eth0	no	SAP	TS/RTP	
239.255.0.3	10.0.81.13	VOX HD	eth0	no	SAP	TS/RTP	
239.255.0.4	10.0.81.13	TVNorge HD	eth0	yes	SAP	TS/RTP	
239.255.0.5	10.0.81.13	TV 2 News HD	eth0	no	SAP	TS/RTP	
239.255.0.6	10.0.81.13	C More Golf HD	eth0	no	SAP	TS/RTP	
239.255.0.8	10.0.81.13	Nat Geo HD (N)	eth0	no	SAP	TS/RTP	
239.255.0.10	10.0.81.13	239.255.0.10:5500 Not Present(7:B (TP C13):7007)	eth0	no	SAP	TS/RTP	
239.255.0.12	10.0.81.16	4Music	eth0	no	SAP	TS/RTP	
239.255.0.20	10.0.81.16	CNBC Europe	eth0	no	SAP	TS/RTP	
239.255.0.23	10.0.81.13	TLC Sverige HD	eth0	no	SAP	TS/RTP	
239.255.0.24	10.0.81.13	239.255.0.24:5500 Not Present(7:B (TP C13):7084)	eth0	no	SAP	TS/RTP	
239.255.0.26	10.0.81.13	239.255.0.26:5500 Not Present(7:B (TP C13):7006)	eth0	no	SAP	TS/RTP	
239.255.0.27	10.0.81.13	TLC Norge HD	eth0	no	SAP	TS/RTP	

[Live view](#)
[View list offline](#)
[Add selected to stream list](#)
[Add all to stream list](#)

The **SAP** view displays streams announced using the Session Announcement Protocol, detected by the VB220-SW.

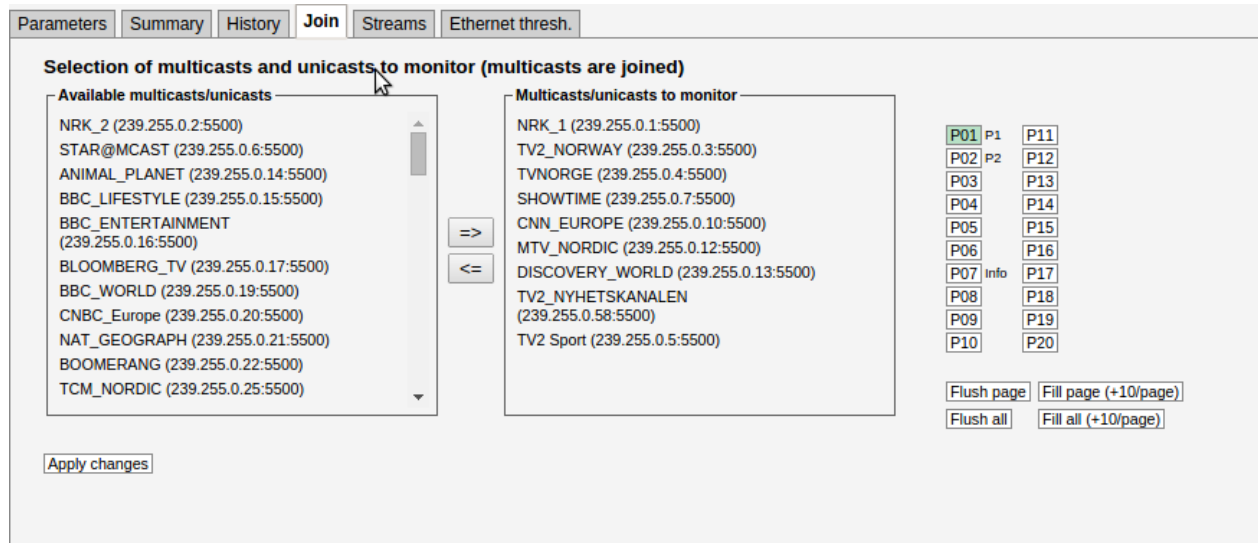
As long as **Enable SAP discovery** is enabled in the **Setup — Params** view, the VB220-SW will continuously try to detect streams. Click the **View list offline** button to view the stream list in offline mode. Click the **Refresh** button to update the stream list in offline mode.

The source address makes it possible for the Software Probe to distinguish between multicasts with the same destination IP address and port, provided that **Source specific multicasts** has been enabled in the **Setup — Params** view.

If the stream is currently joined by the Software Probe (i.e. the VB220-SW is currently monitoring the stream), the **Joined** field is set to yes.

Detected streams can be added to the VB220-SW's stream list by selecting streams and clicking the **Add selected to stream list**. To add all detected streams the **Add all to stream list** button can be pressed.

6.4.7 Multicasts — Join



In order for the defined Ethernet multicasts to be monitored by the probe, they must be joined. The **Multicasts — Join** view and the **Multicasts — Streams** view allow the user to select which multicasts that are joined by the probe.

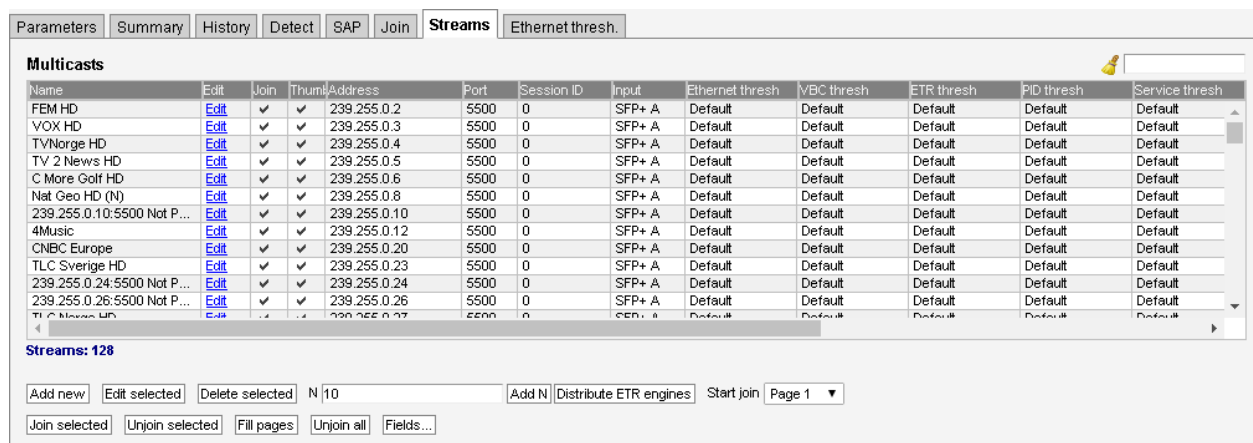
Streams defined in the **Multicasts — Streams** view will appear as available streams on the left hand side of the arrows in this view. Select streams to be monitored by clicking them and moving them to the right hand side of this view using the arrow. Changes should be confirmed by clicking the **Apply changes** button.

The probe can join a maximum of 260 uni/multicasts, these may be freely associated with the 30 probe pages.

The streams will be presented in the Joined multicasts list in the **Multicasts — Parameters** view.

It is possible to flush or fill the multicasts/unicasts to monitor list by clicking the corresponding button. Note that these operations will take effect immediately; it is not necessary to click **Apply changes** for multicasts to be joined or unjoined.

6.4.8 Multicasts — Streams



Name	Edit	Join	Thumbnail	Address	Port	Session ID	Input	Ethernet thresh	VBC thresh	ETR thresh	PID thresh	Service thresh
FEM HD	Edit	☒		239.255.0.2	5500	0	SFP+ A	Default	Default	Default	Default	Default
VOX HD	Edit	☒		239.255.0.3	5500	0	SFP+ A	Default	Default	Default	Default	Default
TVNorge HD	Edit	☒		239.255.0.4	5500	0	SFP+ A	Default	Default	Default	Default	Default
TV 2 News HD	Edit	☒		239.255.0.5	5500	0	SFP+ A	Default	Default	Default	Default	Default
C More Golf HD	Edit	☒		239.255.0.6	5500	0	SFP+ A	Default	Default	Default	Default	Default
Nat Geo HD (N)	Edit	☒		239.255.0.8	5500	0	SFP+ A	Default	Default	Default	Default	Default
239.255.0.10:5500 Not P...	Edit	☒		239.255.0.10	5500	0	SFP+ A	Default	Default	Default	Default	Default
4Music	Edit	☒		239.255.0.12	5500	0	SFP+ A	Default	Default	Default	Default	Default
CNBC Europe	Edit	☒		239.255.0.20	5500	0	SFP+ A	Default	Default	Default	Default	Default
TLC Sverige HD	Edit	☒		239.255.0.23	5500	0	SFP+ A	Default	Default	Default	Default	Default
239.255.0.24:5500 Not P...	Edit	☒		239.255.0.24	5500	0	SFP+ A	Default	Default	Default	Default	Default
239.255.0.26:5500 Not P...	Edit	☒		239.255.0.26	5500	0	SFP+ A	Default	Default	Default	Default	Default
TI C More HD	Edit	☒		239.255.0.27	5500	0	SFP+ A	Default	Default	Default	Default	Default

Streams: 128

[Add new](#)
[Edit selected](#)
[Delete selected](#)

[Add N](#)
[Distribute ETR engines](#)
[Start join](#)

[Join selected](#)
[Unjoin selected](#)
[Fill pages](#)
[Unjoin all](#)
[Fields...](#)

In this view the operator can define multicasts available to the probe and associate a name with each multicast address. This name will be used by the probe when referring to the multicast. If no name has been defined the probe will use the multicast address:port notation.

It is possible to add, delete or edit several entries simultaneously. Several entries are selected by using the regular *Ctrl + click* or *Shift + click* functionality. When adding new entries the current dialogue values will be used as the template with the values for Name and Address incremented for each.

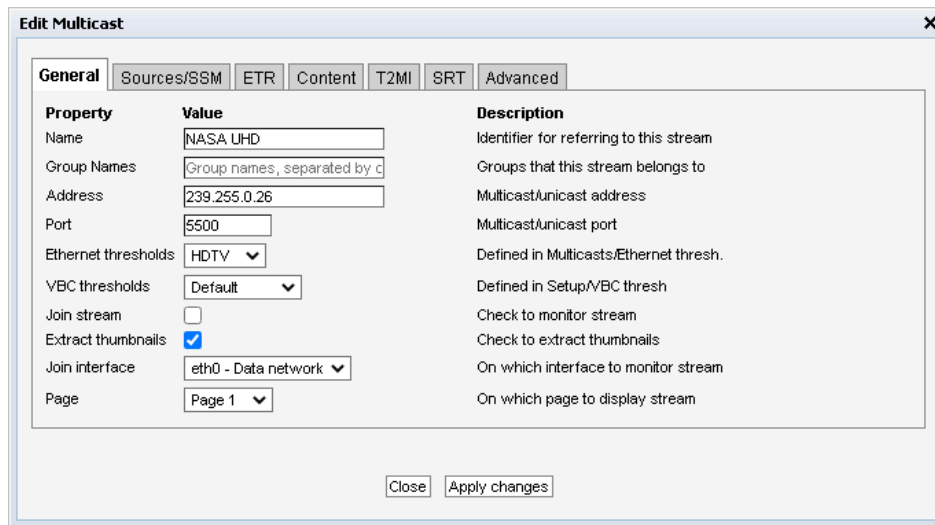
Note that both multicast and unicast addresses can be entered here.

The **Distribute ETR engines** button will distribute the selected streams, with ETR disabled, on the unused ETR engines. An ETR engine is considered unused if no stream with ETR enabled is assigned to it.

The search field in the upper right corner of the view allows the user to type a text string, and the multicast list is updated to display only streams matching the specified text.

Clicking **Add new** or selecting one or more multicasts and clicking **Edit selected** will open the **Multicast — Streams — Edit** pop-up view. When multicasts have been defined, clicking **Join selected** will join the selected multicasts and enable monitoring. The probe will only analyze joined multicasts. Clicking **Join all** will join all multicasts in the list (up to the licensed maximum number of channels). Unjoining one or more multicasts is done by selecting multicasts and clicking **Unjoin selected** or by clicking **Unjoin all**.

When the Edit button is clicked it is possible to define the following multicast parameters (note that some parameters are only relevant and selectable when the probe is equipped with the correct options):



Property	Value	Description
Name	NASA UHD	Identifier for referring to this stream
Group Names	Group names, separated by c	Groups that this stream belongs to
Address	239.255.0.26	Multicast/unicast address
Port	5500	Multicast/unicast port
Ethernet thresholds	HDTV	Defined in Multicasts/Ethernet thresh.
VBC thresholds	Default	Defined in Setup/VBC thresh
Join stream	☐	Check to monitor stream
Extract thumbnails	☒	Check to extract thumbnails
Join interface	eth0 - Data network	On which interface to monitor stream
Page	Page 1	On which page to display stream

General

Name: A name should be assigned to each unicast/multicast. The name will be used throughout the VB220-SW user interface when referring to this stream. It may also be used by an external management system like the VideoBRIDGE Controller.

To enable SMPTE ST 2022-7 monitoring, create two streams with the same name, but with a different class name, for each of the paths, and enable **SMPTE ST 2022-7 monitoring** on the **Advanced** tab. The class name is everything added after @ in the name.

Group Names: A comma separated list of groups this stream belongs to. The first group in this list will be used as the stream's group for EBP monitoring. See section 6.10.3.

Address: The IP address of the unicast or multicast. For a SRT, T2MI inner or SMPTE ST 2022-7 combined stream, enter a dummy address that falls within the range 224.0.0.0 to 239.255.255.255.

Port: The port number of the unicast or multicast. For a SRT, T2MI inner or SMPTE ST 2022-7 combined stream, enter a dummy port number.

Ethernet thresholds: The Ethernet thresholds specify various error limits. Selectable Ethernet thresholds templates are defined in the **Multicasts — Ethernet thresh.** view. For a T2MI stream select a dummy threshold template.

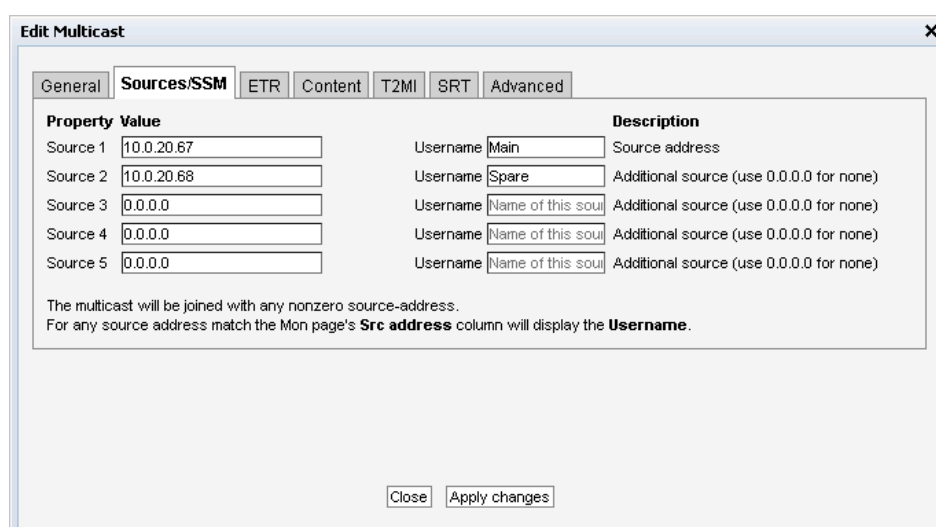
VBC thresholds: The VBC thresholds specify various error limits to be used by VideoBRIDGE Controller to generate alarms. These thresholds are only relevant if the VideoBRIDGE Controller is used. VBC threshold templates are defined in the **Setup — VBC thresh.** view.

Join stream: Check the ‘Join stream’ check box to join a multicast or unicast. Only joined streams are analyzed. A stream may also be joined from the **Multicasts — Join** or **Multicasts — Streams** views, and the status of this check box will be updated accordingly.

Extract thumbnails: When enabled, the probe will generate thumbnails for this multicast. In order to enable this option, *Extract thumbnails* also needs to be enabled in the **Setup — Params** view

Join interface: Select which interface to join the selected multicast. The data interface(s) are listed.

Page: For easy navigation, each stream can be assigned a specific page. The names of the pages are defined in **Setup — Pages**.



Edit Multicast

General Sources/SSM ETR Content T2MI SRT Advanced

Property	Value	Description
Source 1	10.0.20.67	Username Main Source address
Source 2	10.0.20.68	Username Spare Additional source (use 0.0.0.0 for none)
Source 3	0.0.0.0	Username Name of this source Additional source (use 0.0.0.0 for none)
Source 4	0.0.0.0	Username Name of this source Additional source (use 0.0.0.0 for none)
Source 5	0.0.0.0	Username Name of this source Additional source (use 0.0.0.0 for none)

The multicast will be joined with any nonzero source-address.
For any source address match the Mon page's **Src address** column will display the **Username**.

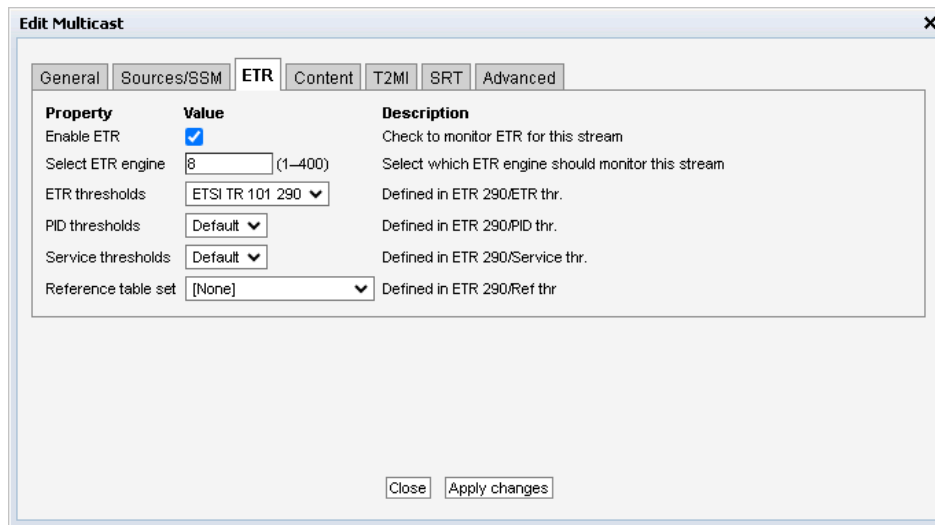
Close Apply changes

Sources/SSM

Source 1: If a zero source address is specified for a multicast it will be joined without a source. This allows both source specific multicasts and non-source specific multicasts to co-exist in the same network and be joined by the VB220-SW.

Source 2–5: Additional SSM source addresses may be specified to enable back-up solutions. Note that it is the operator’s responsibility to ensure that a multicast is only transmitted by one SSM source at any time.

Username: For each of the sources listed it is possible to specify a name for this source. In the **Multicasts — Parameters** view, this name will be displayed in the **Src address** column instead of the source IP address. This can be used to easier distinguish between the main and backup transmitters etc.



Property	Value	Description
Enable ETR	☒	Check to monitor ETR for this stream
Select ETR engine	8 (1–400)	Select which ETR engine should monitor this stream
ETR thresholds	ETSI TR 101 290	Defined in ETR 290/ETR thr.
PID thresholds	Default	Defined in ETR 290/PID thr.
Service thresholds	Default	Defined in ETR 290/Service thr.
Reference table set	[None]	Defined in ETR 290/Ref thr

ETR (ETR290 Option)

Enable ETR: ETR monitoring of a stream will not take place unless it is enabled by this setting. This parameter is only relevant if the probe is ETR enabled. ETR monitoring is not supported for SMPTE ST 2022-7 combined streams.

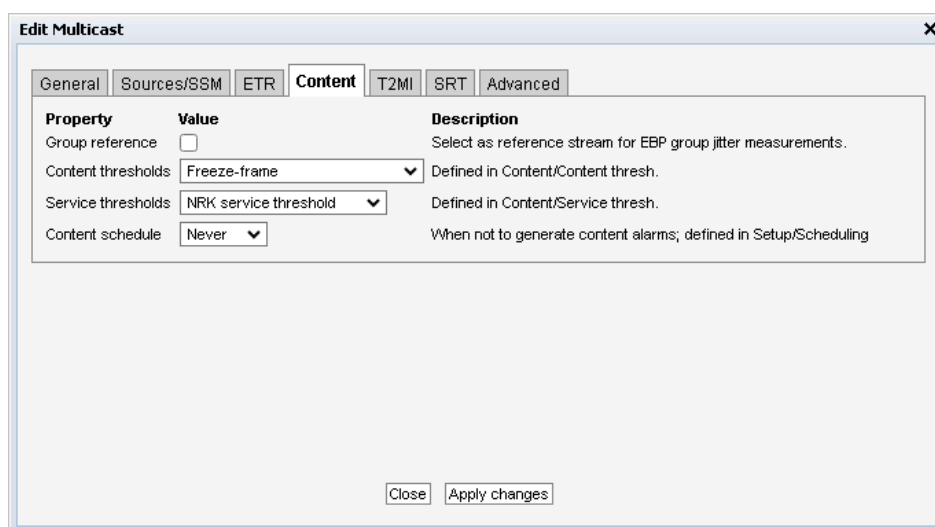
Select ETR engine: If the probe is licensed for several Ethernet ETR engines the user may select which engine should be used to analyze the stream. The default ETR engine selection is IPTV1. It is also possible to use the **Distribute ETR engines** button described above to assign streams to engines.

ETR thresholds: The ETR thresholds specify various error limits and alarm conditions. Selectable ETR thresholds templates are defined in the **ETR 290 — ETR thresh.** view. The round-robin cycling time is also defined by this threshold template. This parameter is only relevant if the probe is ETR enabled.

PID thresholds: The PID thresholds specify various error limits and alarm conditions. Selectable PID thresholds templates are defined in the **ETR 290 — PID thresh.** view. This parameter is only relevant if the probe is ETR enabled.

Service thresholds: The Service thresholds selection defines various error limits and alarm conditions. Selectable service thresholds templates are defined in the **ETR 290 — Service thresh.** view. This parameter is only relevant if the probe is ETR enabled.

Reference table set: The Reference table set selection is used to compare the tables in the transport stream with a set of stored tables. These tables are defined in the **ETR 290 — Gold TS thresholds** view.



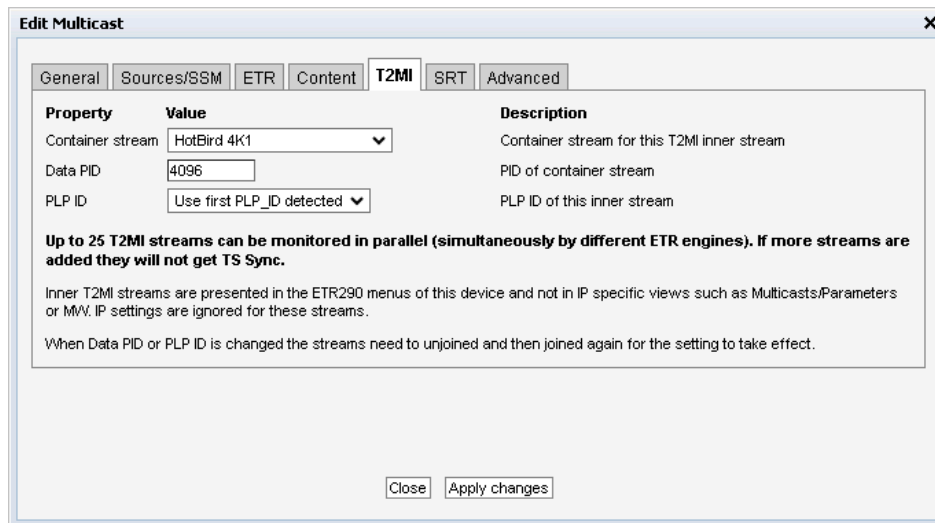
Content

Group reference: This option is used to set a group reference for EBP and IDR frame PTS skew measurements. A group reference's name will be emboldened in the **Content — EBP/IDR** view.

Content thresholds: The Content thresholds specify content alarming options. Selectable Content thresholds templates are defined in the **Content — Content thresh.** view.

Service thresholds: The Content service threshold group that should be assigned to the multicast. Content service threshold groups that have been defined in the **Content — Service thresh.** view are available for selection from the drop-down menu.

Content schedule: The scheduling scheme that should be assigned to the content monitoring for the multicast. Scheduling schemes that have been defined in the **Setup — Scheduling** view are available for selection from the drop-down menu. Scheduling allows masking content alarms at predefined time periods. The schedules can be overridden for specific services using Content service thresholds.



Edit Multicast

General Sources/SSM ETR Content **T2MI** SRT Advanced

Property	Value	Description
Container stream	HotBird 4K1	Container stream for this T2MI inner stream
Data PID	4096	PID of container stream
PLP ID	Use first PLP_ID detected	PLP ID of this inner stream

Up to 25 T2MI streams can be monitored in parallel (simultaneously by different ETR engines). If more streams are added they will not get TS Sync.

Inner T2MI streams are presented in the ETR290 menus of this device and not in IP specific views such as Multicasts/Parameters or MW. IP settings are ignored for these streams.

When Data PID or PLP ID is changed the streams need to be unjoined and then joined again for the setting to take effect.

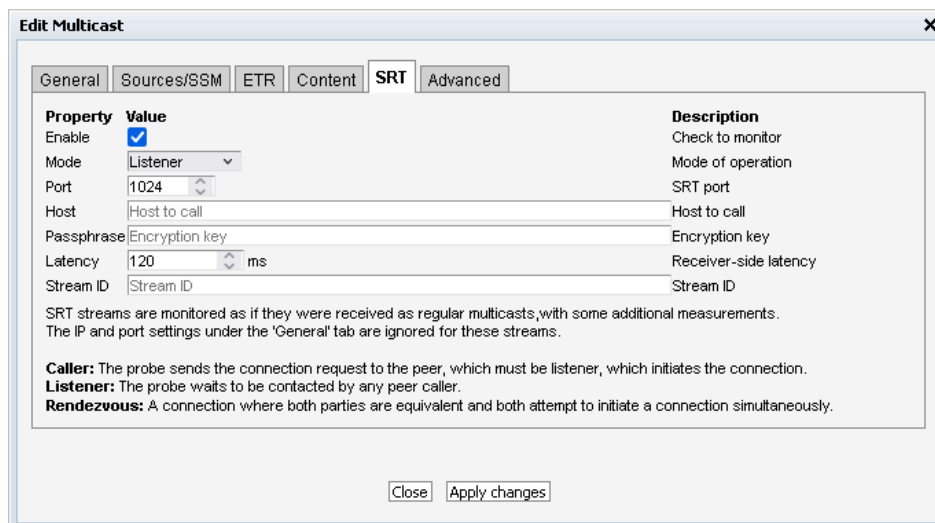
Close Apply changes

T2MI (T2MI Option)

Container stream: For a T2MI inner stream the container stream (outer stream) must be specified. Select the container stream from the drop-down menu. For streams other than T2MI inner streams (none) should be selected.

Data PID: The container stream PID carrying the inner stream

PLP ID: The PLP ID for the inner stream. Select a fixed PLP ID value from the drop-down menu or specify that the first detected PLP ID should be used.



Edit Multicast

General Sources/SSM ETR Content **SRT** Advanced

Property	Value	Description
Enable	☒	Check to monitor
Mode	Listener	Mode of operation
Port	1024	SRT port
Host	Host to call	Host to call
Passphrase	Encryption key	Encryption key
Latency	120 ms	Receiver-side latency
Stream ID	Stream ID	Stream ID

SRT streams are monitored as if they were received as regular multicasts, with some additional measurements. The IP and port settings under the 'General' tab are ignored for these streams.

Caller: The probe sends the connection request to the peer, which must be listener, which initiates the connection.
Listener: The probe waits to be contacted by any peer caller.
Rendezvous: A connection where both parties are equivalent and both attempt to initiate a connection simultaneously.

Close Apply changes

SRT

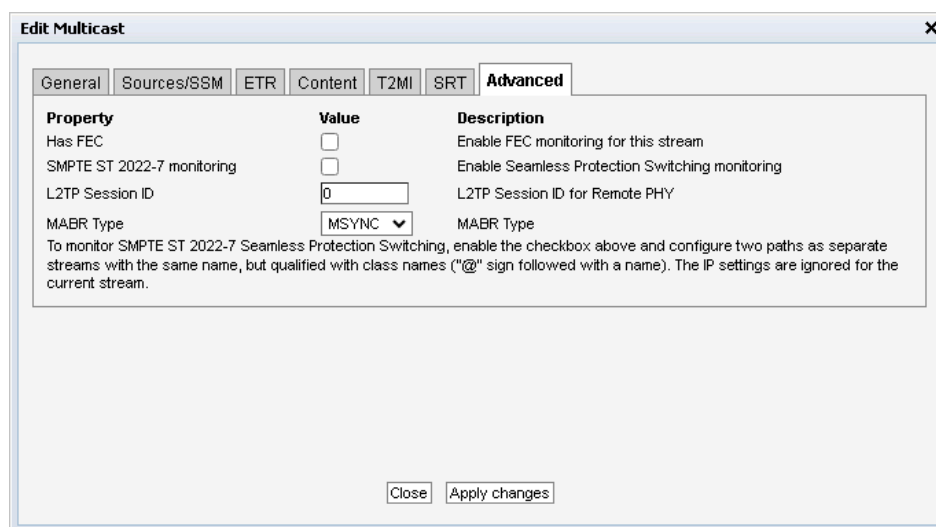
Enable: Enable to monitor SRT stream

Mode: The mode of operation the probe should use; either a *Listener*, a *Caller* or *Rendezvous*.

Port:	The port number to receive the SRT stream through.
Host:	The host address of the SRT stream source. (ignored for Listener mode)
Passphrase:	In case the SRT stream you want to receive is encrypted. If left blank the stream is assumed to be unencrypted.
Latency:	Defines the minimum receiver buffering delay before analyzing the video content in an SRT data packet. A larger value gives a larger window of time for the SRT protocol to retransmit lost packets, and vice versa.
Stream ID:	A free-form string sent by a caller to the opposing listener during connection initiation. Will have no effect if set on Rendezvous or Listener mode.

The probe currently supports up to 200 concurrent SRT receive sessions. When operating SRT in **Listener** mode the probe will await an external caller to connect to the specified UDP port before data reception occurs. Select the network interface to listen on under the **General** tab.

More information on SRT streams can be found in F Appendix: SRT Streams.



Advanced

Has FEC:	The stream carries COP3 (SMPTE ST 2022-5) Forward Error Correction. If enabled, statistics about FEC drops and correctable errors will be reported for the stream.
SMPTE ST 2022-7 monitoring:	This is a Seamless Protection Switching (SMPTE ST 2022-7) combined stream.
Session ID:	The session ID of the L2TP stream is specified here (or 0 if not used). It is used together with the multicast address to identify the L2TP stream.

MABR Type: The MABR kind. Possible values are: *Disabled* and *MSYNC*. When the setting is *Disabled*, the stream is decoded normally. When set to *MSYNC*, the stream is interpreted as MSYNC. If the stream may be decoded as MSYNC, the MSYNC objects received are stored and listed in **Detailed Monitoring — MSYNC**.

Seamless Protection Switching (SMPTE ST 2022-7) monitors the same stream transmitted twice. The probe verifies that the two streams combined do not have packet loss and the jitter between the two streams. When two multicast/unicast streams are selected, the probe will report errors report errors if the same RTP packets are missing from both streams. Errors are also reported if the timing between the two stream exceeds the threshold settings.

To enable SMPTE ST 2022-7 monitoring, set up a combined stream with the **SMPTE ST 2022-7 monitoring** checkbox enabled. The IP settings are ignored for this stream. Then set up the two path streams, giving the same name, but with different class names. The class name is everything added after @ in the name.

The VB220-SW supports monitoring as a receiver class C for SBR streams, as defined in SMPTE ST 2022-7:2019.

L2TP (remote PHY) streams are mapped into multicasts. In order to identify the correct stream the multicast address is entered in the **General** tab and the session ID of the L2TP stream is specified here. The port number is not used, and will be shown as 0.

To identify available L2TP session IDs, join the stream first and then use the **Multicasts — Detect** view to see the session IDs that are available. Both IPv4 and IPv6 is supported.

If the L2TP stream carries valid sequence numbers, dropped or duplicated frames will be analyzed by the Software Probe in a manner similar to RTP streams.

6.4.9 Multicasts — Ethernet thresh.

Parameters
Summary
History
Detect
SAP
Join
Streams
Ethernet thresh.

Threshold presets

Search...

These thresholds are used to scale graphs, generate probe alarms and to determine when an error-second has occurred

Name	Refs	IAT:MLR er...	IAT:MLR w...	Max bitrate	Min bitrate	No signal ms	RTP drops	SRT drops	Timeline	Edit
Default	0	50:8	45:1	30	0.1	1000	1	1		Edit
TV	27	50:8	45:1	30	0.1	1000	1	1	✓	Edit
Radio	8	150:8	130:1	1	0.1	1000	1	1	✓	Edit
HDTV	31	30:8	20:1	50	1	1000	1	1	✓	Edit

Thresholds: 4

Add new threshold
Duplicate selected
Delete selected
Edit selected

Thresholds are used to determine when to actually raise an alarm upon detection of an error. The Ethernet thresholds are used for generating Ethernet probe alarms as well as for calculating error-seconds. Error seconds and ETH probe alarms are issued whenever measurements exceed the defined threshold levels for a parameter. Ethernet thresholds are also used to scale some graphs like the MediaWindow graphs. The alarm level of each of these alarms is set in the **Alarms — Alarm setup** view. Note that it is also possible to disable alarms in the **Alarms — Alarm setup** view.

The **Multicasts — Ethernet thresh.** view makes it possible to define threshold values that operate at stream level. Thresholds are associated with each stream in the **Multicasts — Streams — Edit** view. There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold** button. A pop-up window will appear allowing the user to define alarm conditions. Another way of creating a user-defined threshold template is by highlighting one of the threshold templates already defined and then click the **Duplicate highlighted** button.

Deleting a threshold template is done by highlighting the threshold template that should be removed and clicking **Delete selected**. It is possible to delete or edit several entries simultaneously. Several entries are selected by using the regular *Ctrl + click* or *Shift + click* functionality. Click the **Edit** button to edit one or more selected threshold templates. Note that the predefined ‘Default’ threshold template cannot be deleted or changed.

In the threshold presets list the ‘Refs’ column displays how many streams are associated with each stream threshold template.

Edit Threshold

Name

TV-VBR

Parameter	Threshold	Format	Corresponding probe alarm(s)
IAT:MLR error	200:8	n:n:n	IAT >= err-thresh, MLR >= err-thresh
IAT:MLR warning	100:1	n:n:n	IAT >= warn-thresh, MLR >= warn-thresh
Max bitrate	20	Mbit/s	Bitrate overflow
Min bitrate	0.1	Mbit/s	Bitrate underflow
No signal	1000	ms	No signal
RTP drop limit	1	n	RTP packet drop
SRT drop limit	1	n	SRT packet drop
Ignore PID loss	Comma-separate	p1,p2,...	CC skips, MLR >= thresh
Store in timeline	☒		

PIDs listed in **Ignore PID loss** will have packet loss ignored in the MediaWindow, Ethernet History graph and Ethernet alarms.

If IAT or bitrate thresholds are set to 0, they will be ignored.

Close

Apply changes

Ethernet thresholds

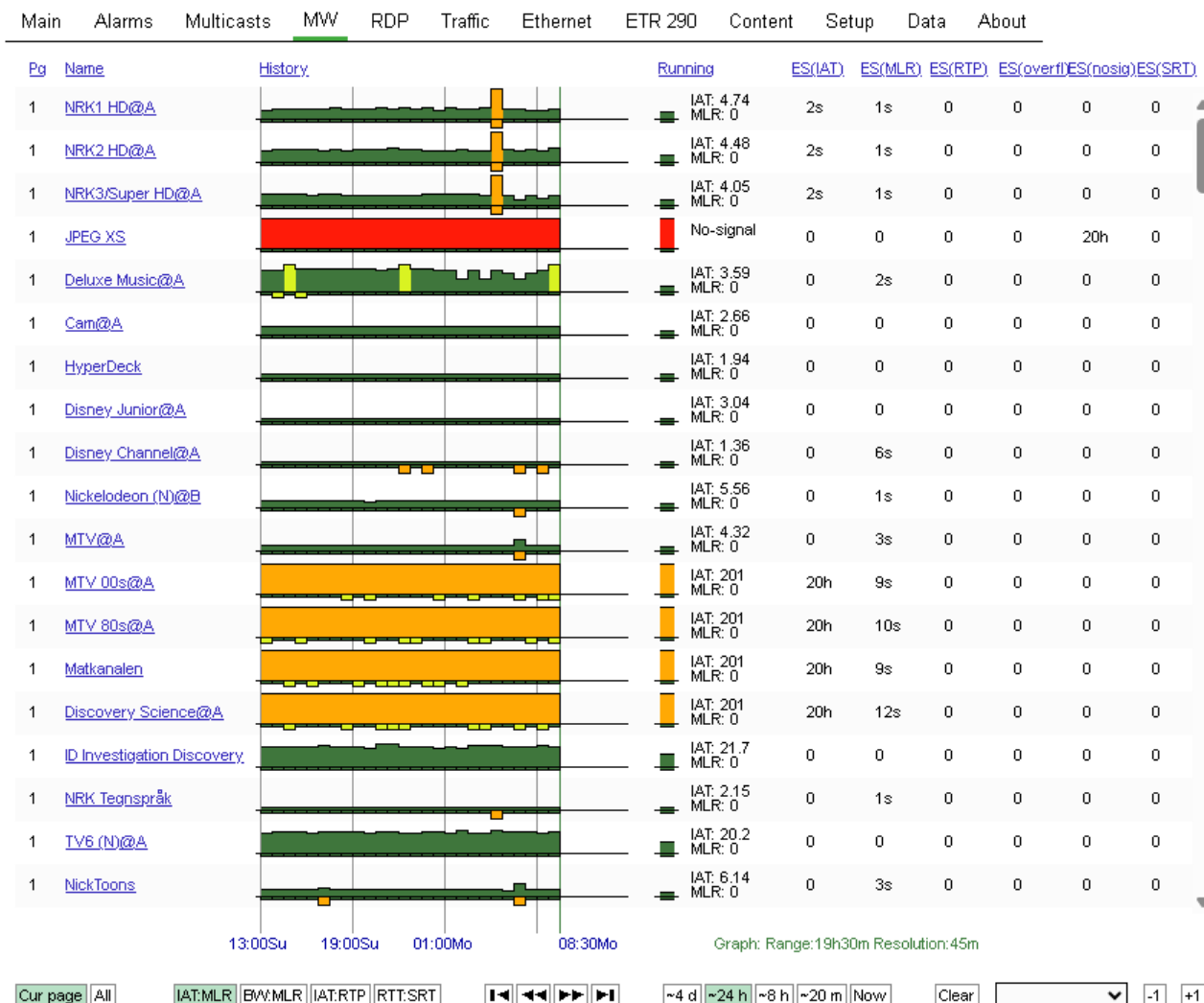
Name: A text string that identifies the Ethernet threshold

IAT:MLR error:	This threshold contains error limits for IAT (Inter-packet Arrival Time) and MLR (Media Loss Rate). The IAT limit, in milliseconds, is the first parameter (before the colon), the MLR limit, in number of TS packets, is the last parameter. If the IAT limit is exceeded the alarm ‘IAT >= err-thresh’ will be raised. If the MLR limit is exceeded the alarm ‘MLR >= err-thresh’ will be raised. The severity (and hence the color used in the MediaWindow view) for IAT:MLR errors depend on the severity assigned to these alarms in the Alarms — Alarm setup view. Note that error seconds based on MLR are counted regardless of this threshold if one or more packets are missing.
IAT:MLR warning:	This threshold contains warning limits for IAT (Inter-packet Arrival Time) and MLR (Media Loss Rate). The IAT limit, in milliseconds, is the first parameter (before the colon), the MLR limit, in number of TS packets, is the last parameter. If the IAT limit is exceeded the alarm ‘IAT >= warn-thresh’ will be raised. If the MLR limit is exceeded the alarm ‘MLR >= warn-thresh’ will be raised. The severity (and hence the color used in the MediaWindow view) for IAT:MLR errors depend on the severity assigned to these alarms in the Alarms — Alarm setup view.
Max bitrate:	The maximum bitrate in Mbit/s. An alarm will be raised if the stream bitrate exceeds the maximum bitrate.
Min bitrate:	The minimum bitrate in Mbit/s. A value of 0 will never generate an alarm. A value of 0.1 Mbit/s will generate an alarm if the minimum bitrate threshold is less than 0.1 Mbit/s.
No signal:	Number of milliseconds without receiving any signal before the ‘No signal’ alarm is raised
RTP drop limit:	If the number of lost RTP packets exceeds the RTP drop limit an alarm will be raised. Note that error seconds based on packet drops are counted regardless of this threshold. For RTP MSYNC streams this threshold is also used to raise the ‘MSYNC data missing’ alarm. If the MSYNC stream is not RTP encapsulated then the ‘MSYNC data missing’ alarm will be raised if the number of IP packets received for the MSYNC object is less than the number of packets signaled by the MSYNC protocol.
SRT drop limit:	If the number of lost SRT packets exceeds the SRT drop limit an alarm will be raised. Note that error seconds based on packet drops are counted regardless of this threshold. If the SRT stream is also using RTP signalling, SRT packet drops will also cause RTP drops.

Ignore PID loss: A comma separated list of PIDs for which the probe should ignore packet loss. Packet loss that affects these PIDs will not result in an error-second count, and the ETR monitoring engine will not count these errors.

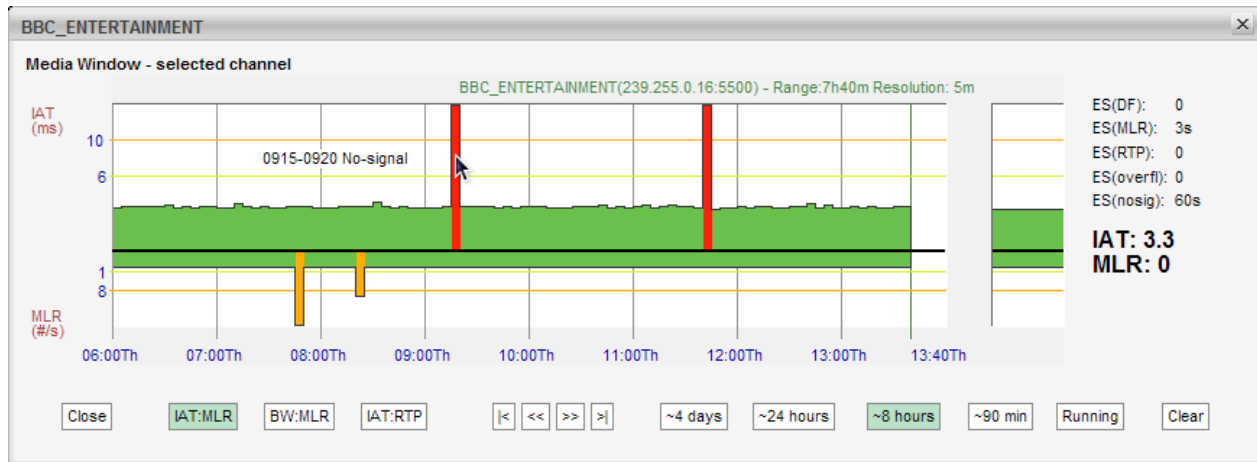
Store in timeline: If enabled, the IAT (inter-packet Arrival Time), MLR (Media Loss Rate), RTP drops and bandwidth is stored for display in the **Content — Timeline** view.
Even if not enabled, data for up to four days can be displayed in the **MW (Media Window)** view.

6.5 MW (Media Window)



The **Media Window** in **Expert view** is very similar to the one in the **MW view**. This view also contains support for **SRT** and the measurements can be cleared from this view. By clicking the clear button the measurements are cleared from this view only.

The user determines whether only multicasts associated with the currently selected page should be displayed (by clicking the **Cur page** button), or if all joined multicasts should be presented in one list (by clicking the **All** button). The time window buttons allow selection of x-axis resolution in the graphs, and by using the arrow buttons it is possible to move the timeline to view an error incident more accurately. Clicking **Clear** will clear all graphs. Note that clearing graphs cannot be undone. Clicking the **+1** button will display the next page. Clicking the **-1** button will display the previous page.

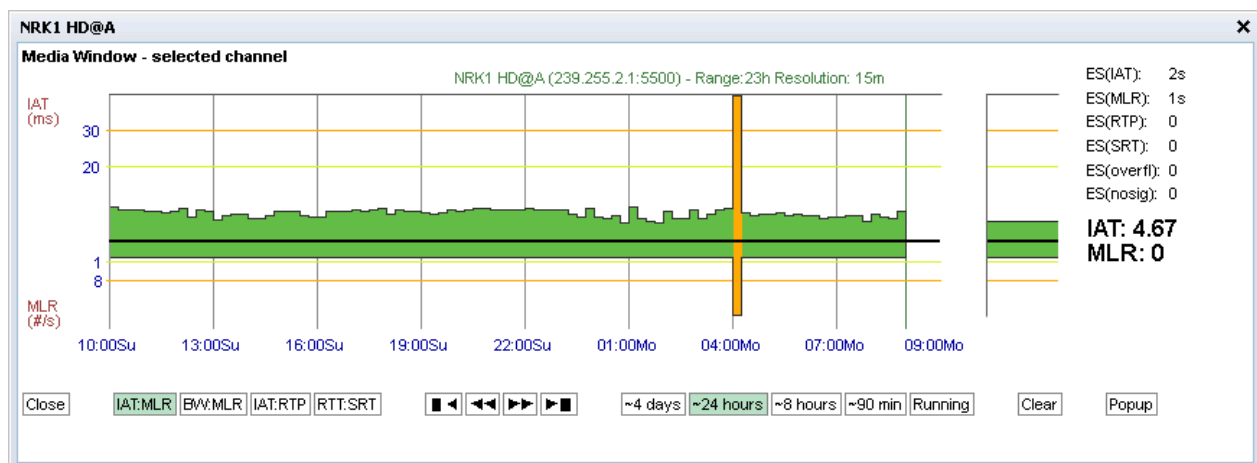


This view includes the following time-span options: **4 days**, **24 hours**, **8 hours**, **20 minutes**, and **Now**. When **Now** is selected, the view shows the most recent **96 seconds**.

Note that with **Now** active, the interval tooltip displays *minutes and seconds* (rather than hours and minutes). Consequently, a timestamp such as **0827 – 0830** refers to the current hour, specifically from **8 minutes 27 seconds** to **8 minutes 30 seconds** past the hour.

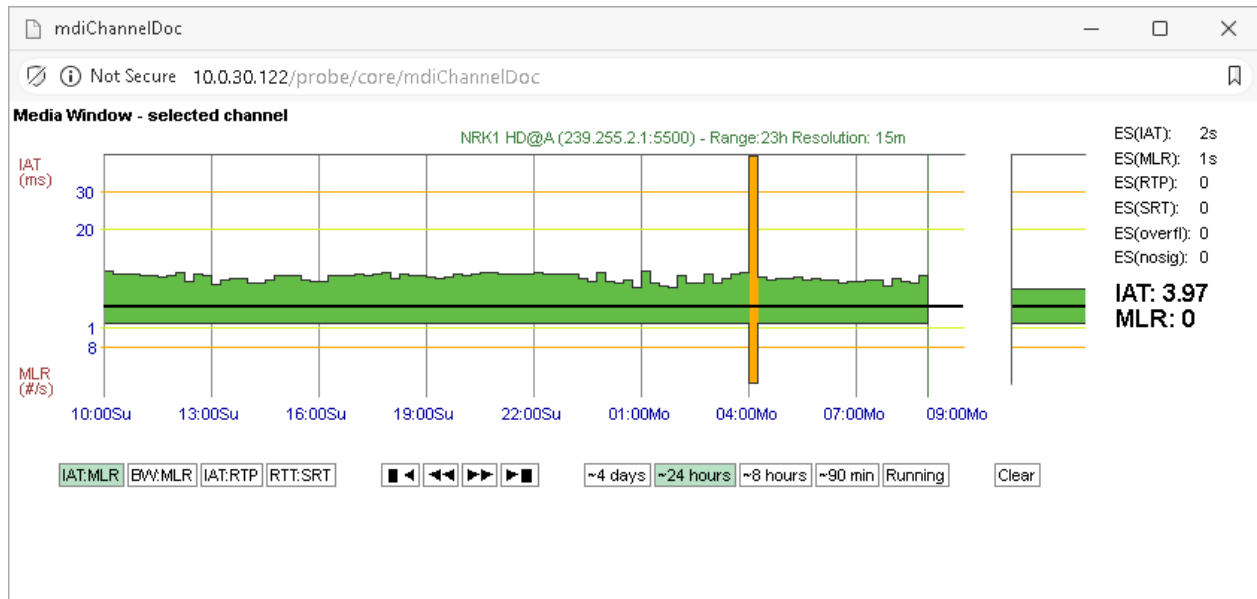
By zooming and panning the user can pinpoint more accurately when errors occurred. In the above diagram diagram tool-tip reveals that 'No signal' occurred between 9:15 and 9:20.

6.5.1 Media Window — Selected channel



The **Media Window — selected channel** view is activated by clicking a multicast label in the **MW** page. Clicking anywhere in the running graph will zoom in, unless you already are at the maximum zoom level.

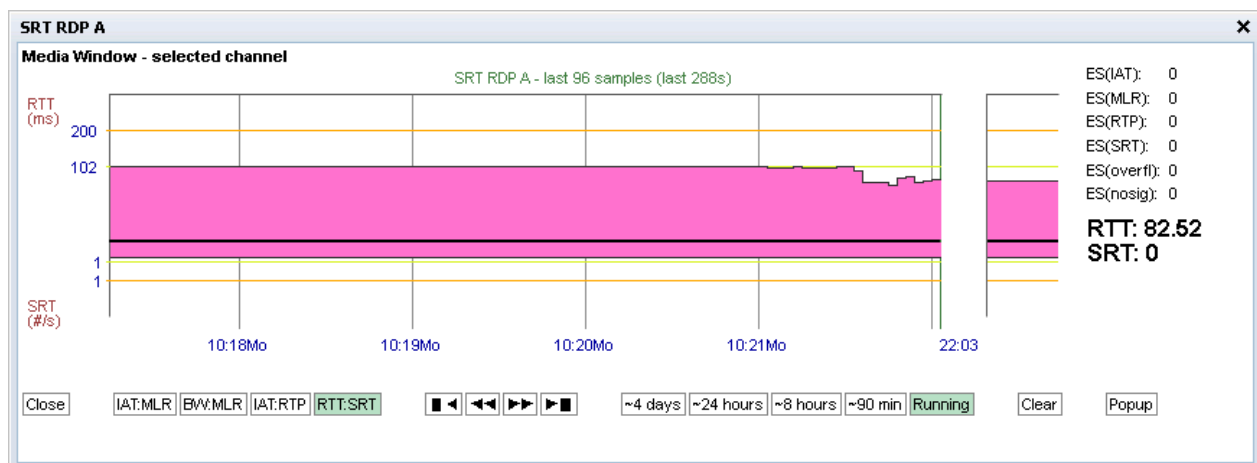
This high-resolution version of the **Media Window** reveals more details than the compressed version. There are 3 times more samples along the X-axis, and the graph indicates visually the error and warning thresholds. Note that the time windows of the regular **Media Window** and **Media Window — selected channel** are not exactly the same, even if the same time window has been selected for both views.



By clicking the **Popup** button will open a pop-up with similar features as the **MW view pop-up**.

The **BW:MLR** and **IAT:RTP** buttons will open a graph with the same information as **MW BW/MLR** and **MW IAT/MLR**, respectively.

6.5.2 Media Window — SRT Round-Trip Time Graph

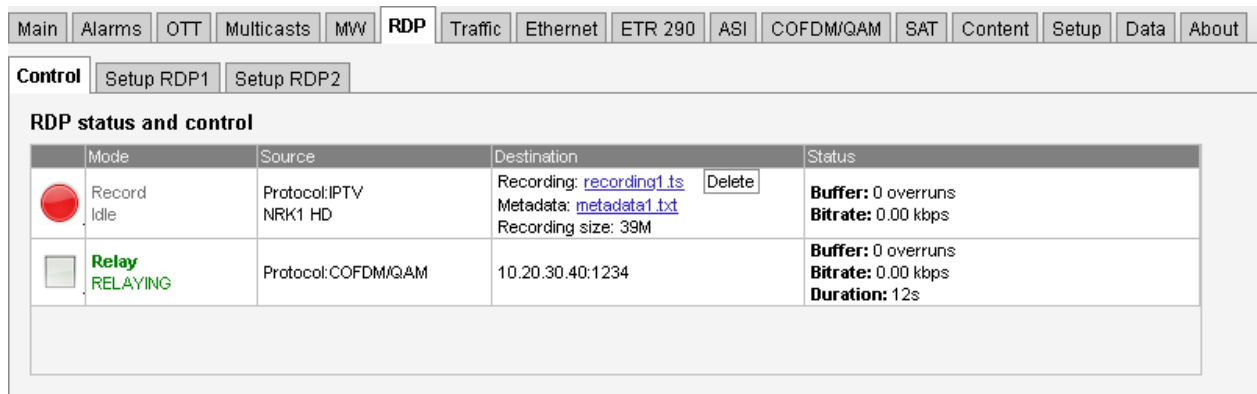


By clicking the **RTT:SRT** button the graph displays the SRT round-trip time as a function of time. The negative part of the composite graph displays unrecoverable SRT packets. If the monitored stream is not using an SRT encapsulation, both graphs are shown in grey and the text ‘Not SRT’ is shown for the live data.

6.6 RDP (Return Data Path)

The Return Data Path feature enables forwarding of streams from any probe interface to another destination IP address. Stream may also be recorded to file, either directly or triggered by alarms. The probe supports forwarding of two streams in parallel. For more advanced recording functionality see the multistream recording feature.

6.6.1 RDP — Control



Mode	Source	Destination	Status
 Record Idle	Protocol: IPTV NRK1 HD	Recording: recording1.ts Metadata: metadata1.txt Recording size: 39M Delete	Buffer: 0 overruns Bitrate: 0.00 kbps
 Relay RELAYING	Protocol: COFDM/QAM	10.20.30.40:1234	Buffer: 0 overruns Bitrate: 0.00 kbps Duration: 12s

Click the icons in the **Control** view to activate or de-activate an RDP engine. There are different icons for controlling RDP engines depending on whether they are configured to relay or record. The state of each RDP engine is restored after a reboot.

For recordings and triggered recordings the last recording is made available in the Destination column along with the metadata file. The metadata file contains basic information about the recording such as the recording size, list of PIDs and CC-errors for each PID. In the case of triggered recording, the alarm causing the recording is also included. Pressing the Delete button deletes the recording. For triggered recordings the number of recordings is stated in the Status column. Pressing the Delete button resets this counter. The buffer utilization is stated as a percentage and should never approach 100% for correct relaying or recordings.

6.6.2 RDP — Setup

Control
Setup RDP1
Setup RDP2

Mode
Mode: Record

Input
Source interface: Ethernet
Source stream: NRK1 HD
Content: Complete stream
Selected PIDs: *

Relay
IPv4-address: 10.0.30.122
Port: 7777
TTL: 64
Timeout (minutes): 0
Encapsulation: SRT
Relay via interface: eth0 - Data RJ45

Record
Rec timeout (sec): 60
Rec size (MB): 100
Protect: Do not protect
Alarm trigger 1: TS sync
Alarm trigger 2: Sync byte
Alarm trigger 3: Continuity

SRT Transmit
Mode: Listener
Passphrase:
Latency setting (ms): 120

For some parameter changes to take effect, RDP must be restarted

Apply changes

Each of the RDP engines is configured separately. First the Mode is selected. Depending on the mode either the Relay or Record settings needs to be configured. The Input selects the stream or interface to relay or record.

These are the settings:

<i>Mode and Input</i>	
Mode:	Select whether this RDP engine should relay, record or trigger-record.
Source interface:	The source interface drop-down menu allows selection of available input signals.
Source Stream:	When Ethernet input is selected the user selects the stream to forward or record. Ethernet streams being joined/monitored by the probe are available for selection.
Content:	The user selects the service to be relayed or recorded, or alternatively selects that the complete stream should be used. The PIDs associated with the service are automatically displayed in the ‘Selected PIDs’ field, and these may be edited if required.
Selected PIDs:	The user can specify the PIDs to be selected, default is all PIDs. Typically PAT and PMT PIDs should be forwarded in addition to video and audio PIDs, however this depends on the equipment receiving the forwarded stream.

When mode **Relay over IP** has been selected, the RDP parameters are:

<i>Relay</i>	
IPv4-address:	The unicast address or multicast address to forward to. Multicast addresses are in the range 224.0.0.0 – 239.255.255.255.
Port:	The port to forward to. The combination of IP address and port fully describes the destination address.
TTL:	The Time-To-Live flagging of the relayed signal. The default value is 64.
Timeout:	The relaying period in minutes. If the value 0 is selected, no timeout applies, and relaying will continue until it is stopped manually.
Encapsulation:	The encapsulation format of the relayed stream. UDP , RTP or SRT may be selected.
Relay via interface:	The available interfaces for forwarding the stream are listed.

When mode **Record** or **Trigger recording** has been selected the options are:

<i>Record</i>	
Rec timeout:	The maximum recording time in seconds. This setting enables the user to limit recordings of low-bitrate streams.
Rec size:	The total file size of the recording. When in alarm trigger mode the resulting recording will consist of a fixed sized portion of data before the alarm is raised and the remaining recording from data after the trigger occurred.
Protect:	When in alarm trigger mode the user may select to protect a recording from being overwritten due to a new alarm occurrence. The user may select between ‘Never overwrite’, ‘Do not protect’, ‘30 seconds’, ‘60 seconds’ and ‘5 minutes’.
Alarm trigger 1–3:	Select a maximum of three different alarms that should trigger recording. Note that a recording will start upon a transition from status <i>OK</i> to status <i>alarm</i> . Alarms that have been disabled in the Alarm — Alarm setup view will be shown in brackets – these will never trigger a recording.

The maximum recording size depends on the amount of free disk on the probe, up to a maximum of 1500 Mbyte.

When encapsulation **SRT** has been selected the SRT Transmit options are:

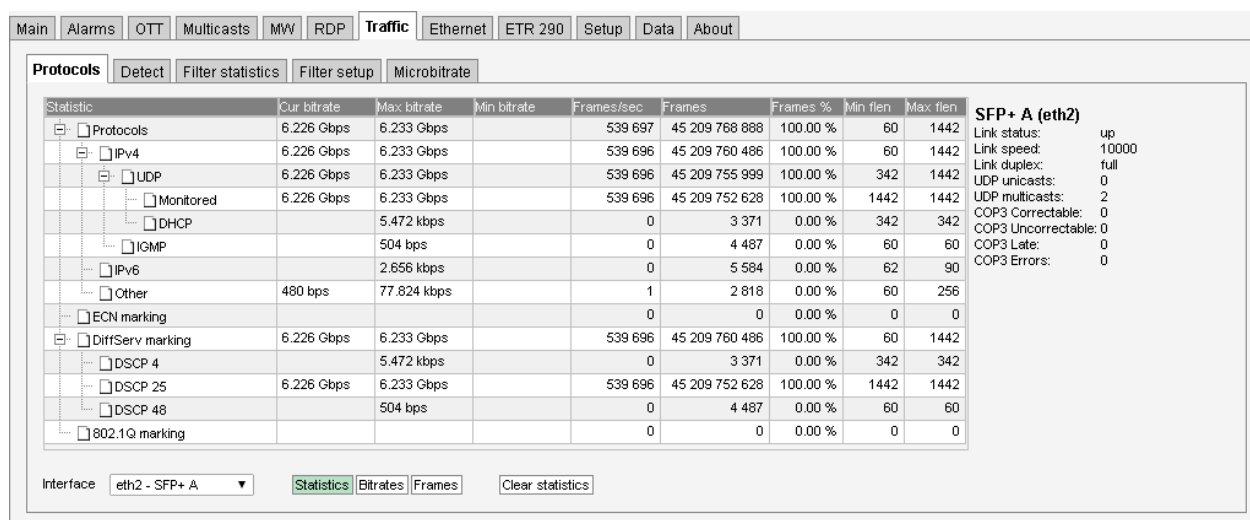
<i>SRT configuration options</i>

Mode:	SRT can be connected using one of three connection modes: Caller: the probe sends the connection request to the peer, which must be listener , to initiate the connection. Listener: the probe waits to be contacted by any peer caller . Rendezvous: the probe and the peer (which must be in rendezvous mode as well) both attempt to initiate a connection simultaneously.
Passphrase:	Specifies a passphrase to encrypt the forwarded stream.
Latency setting:	The latency value (milliseconds) insisted upon by the sender side as a minimum value for the receiver.

Please refer to appendix F for more details on SRT.

6.7 Traffic

6.7.1 Traffic — Protocols



The screenshot displays the 'Protocols' view in the Sencore software. The top navigation bar includes tabs for Main, Alarms, OTT, Multicasts, MW, RDP, Traffic, Ethernet, ETR 290, Setup, Data, and About. The 'Traffic' tab is selected, and within it, the 'Protocols' sub-tab is active. The main area shows a table of statistics for various protocols. The table has columns for Statistic, Cur. bitrate, Max. bitrate, Min. bitrate, Frames/sec, Frames, Frames %, Min. len, and Max. len. The protocols listed include IPv4, UDP, DHCP, ICMP, IPv6, ECN marking, DiffServ marking, DSCP 4, DSCP 25, DSCP 48, and 802.1Q marking. To the right of the table, there is a section for 'SFP+ A (eth2)' showing link status (up), link speed (10000), link duplex (full), UDP unicasts (0), UDP multicasts (2), COP3 Correctable (0), COP3 Uncorrectable (0), COP3 Late (0), and COP3 Errors (0). At the bottom, there is a dropdown menu for the interface (currently set to 'eth2 - SFP+ A') and buttons for 'Statistics', 'Bitrates', 'Frames', and 'Clear statistics'.

The **Protocols** view allows monitoring of IP traffic on the selected port in terms of the protocols used.

The interface can be selected using the drop-down at the bottom of the page. Clicking the **Clear statistics** button will reset displayed values.

The following measurements are presented, depending on which statistic is selected:

<i>Statistics</i>	
Statistic:	The protocol for which the following measurements apply
Cur bitrate:	The current total bitrate for this protocol (measured over the last 1s period)
Max bitrate:	The maximum bitrate during any 1s period

Min bitrate:	The minimum non-zero bitrate during any 1s period
Frames/sec:	Traffic speed in number of IP packets per second
Frames:	Number of Ethernet frames
Frames %:	Percentage of total number of frames
Min flen:	Minimum Ethernet frame length
Max flen:	Maximum Ethernet frame length

Bitrates

Statistic:	As above
Cur bitrate:	As above
Bitrates:	A graph displaying the bitrate over time, displaying the last five minutes
Bitrate graph:	Click the bitrate graph button to display a detailed bitrate graph for the specified protocol

Frames

Statistic:	As above
Frames/sec:	Traffic speed for this protocol expressed in number of IP packets per second
Frames:	A graph displaying frames per second over time, displaying the last five minutes
Frames graph:	Click the frames graph button to display a detailed frames per second graph for the specified protocol

Interface statistics

Link status:	Displays whether the interface is up or down
Link speed:	Displays the interface speeds, as bits per second
Link duplex:	Indicates whether the interface is operating at full or half duplex
UDP unicasts:	The number of detected UDP unicasts
UDP multicasts:	The number of detected UDP multicasts
COP3 Correctable:	Total count of dropped payload IP packets that are correctable by the FEC
COP3 Uncorrectable:	Total count of dropped payload IP packets that cannot be corrected by the FEC
COP3 Late:	Payload or FEC packets are received slightly too late according to the buffer model and may result in errors in another implementation of the specifications. The number of packets with this error.

COP3 Errors: Either the L/D parameters are not consistent across the streams or payload/FEC packets are received too late or too early according to the buffer model. The number of packets with these errors.

6.7.2 Traffic — Detect

Protocols

Detect

Filter statistics

Filter setup

Microbitrate

Multicast scan

Detected UDP traffic

	Dst address	Src address	Name	Interface	Joined	Session ID	Mapping	Signal	RTP drops	CC errors	Bitrate	CPU
	239.255.2.1:5500	10.0.76.119:5500	NRK1 HD	eth0	yes		7TS/RTP	44h	24025	39557	7.824 M...	2
	239.255.2.1:5502	10.0.76.119:5500		eth0	no		n/a	-	-	-	-	2
	239.255.2.2:5500	10.0.76.119:5500	NRK2 HD	eth0	yes		7TS/RTP	44h	24509	40073	3.513 M...	2
	239.255.2.2:5502	10.0.76.119:5500		eth0	no		n/a	-	-	-	-	2
	239.255.2.2:5504	10.0.76.119:5500		eth0	no		n/a	-	-	-	-	2
	239.255.2.3:5500	10.0.76.119:5500	NRK3/Super HD	eth0	yes		7TS/RTP	44h	22192	38353	7.042 M...	2
	239.255.2.50:5500	10.0.76.119:5500	Hyperdeck_p1	eth0	yes		7TS/RTP	44h	25123	25684	6.368 M...	2
	239.255.2.51:5500	10.0.76.119:5500	CamHD	eth0	yes		7TS/RTP	44h	24866	22958	6.291 M...	2

8 detected streams

Live view

View list offline

(All)

Include source address ☐

Add selected to stream list

Add all to stream list

Export...

The **Traffic Detect** view displays all UDP traffic sensed by the probe. Note that generally the upstream switch or router will not output streams that are not joined by downstream equipment, i.e. usually only joined streams will be available for monitoring.

If the unicast/multicast destination address is known to the probe (i.e. listed in the **Multicasts — Streams** view) the stream's **Name** is looked up, otherwise a generic name is used.

When the **Traffic — Detect** view is entered after probe booting, the probe will continuously try to detect streams. Click the **View list offline** button to view the stream list in offline mode. Click the **Refresh** button to update the stream list in offline mode.

The source address makes it possible for the probe to distinguish between multicasts with the same destination IP address and port, provided that **Source specific multicasts** has been enabled in the **Setup — Params** view.

If the stream is currently joined by the probe (i.e. the probe is currently monitoring the stream), the **Joined** field is set to yes.

Detected streams can be added to the probe's stream list by selecting streams and clicking the **Add selected to stream list**. If the checkbox **Include source address** is checked, the detected source address is added to the configuration, which will instruct the probe to request the stream as a source specific multicast; this setting can be configured globally in **Setup — Params**. To add all detected streams the **Add all to stream list** button can be pressed. Only streams not already in the probe's stream list are considered. Clicking the **Export** button will generate an XML-file that opens in a new window.

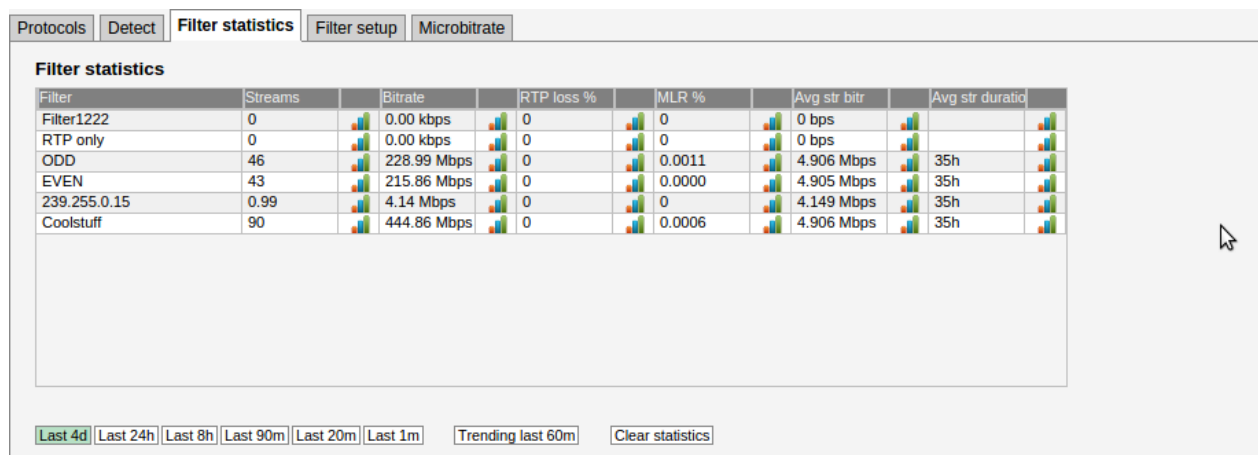
A drop down menu allows filtering of detected streams, making it possible to view streams of a specific type only. Stream types are defined in the **Traffic — Filter setup** view. If the AEO option is

enabled for the probe the Detect list will contain the following additional columns: Mapping, signal, RTP drops, CC errors and Bitrate. These parameters are the same as on the **Multicasts** page.

①:	Click the blue information icon to pop up the detailed stream info if the stream is already monitored.
Dst address:	The multi- or unicast address
Src address:	The stream source address
Name:	The stream name, as defined in the Multicasts — Streams view. A generic name will be used for multi- or unicasts not defined by the user.
Interface:	The stream source network interface (physical or VLAN)
Joined:	If the stream is joined by the probe this field will read 'Yes'.
Session ID:	The session ID of the L2TP stream is specified here (or 0 if not used). It is used together with the multicast address to identify the L2TP stream.
Mapping:	The transport stream to IP mapping. Typically seven transport stream packets are mapped into one IP packet.
Signal:	The duration of stream availability
RTP drops:	The number of detected RTP drops for the stream. This is only valid if the stream is RTP encapsulated.
CC errors:	The number of detected continuity counter errors for the stream.
Bitrate:	The stream bitrate
CPU:	The probe CPU used to analyze the stream (1-7)

Please note that the **Multicast scan** and the **Detect** features are mutually exclusive, so it is necessary to click the **Exit scan mode** in the **Multicast scan** view to resume population of the **Detect** list.

6.7.3 Traffic — Filter statistics

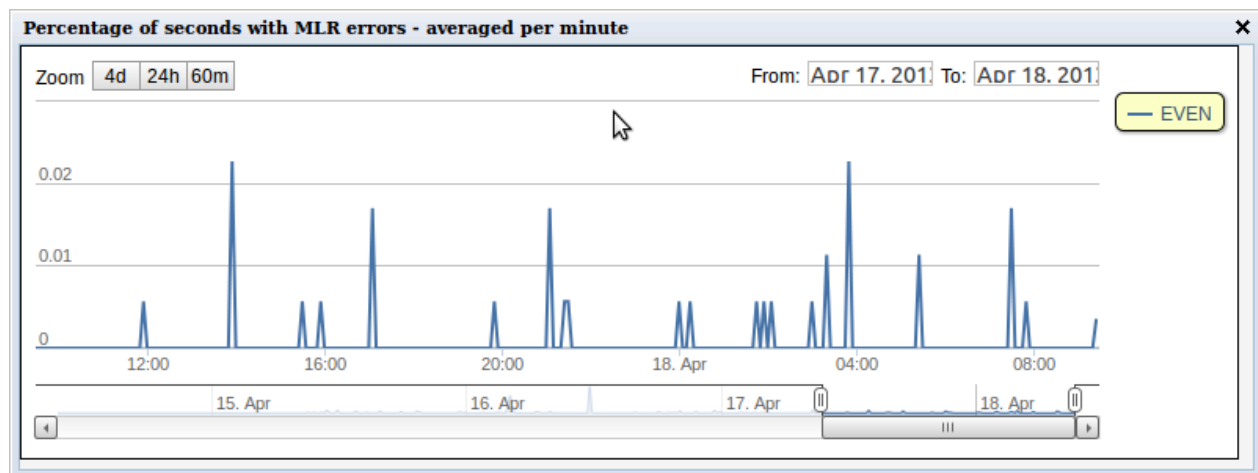


The **Traffic — Filter statistics** view makes it possible to view statistics for different stream types. Stream types are defined by the user in the **Traffic — Filter setup** view.

Statistics is displayed for a time period selected by clicking one of the time duration buttons.

<i>Filter statistics:</i>	
Filter:	The filter name, as defined by the user in the Traffic — Filter setup view.
Streams:	The number of streams matching the associated filter, averaged over the selected time duration.
Bitrate:	The total summed bitrate for streams matching the associated filter.
RTP loss %:	Percentage of time an average stream that matches the filter experiences RTP packet loss inside selected time period. Example: If the Last 1m period is selected and there are totally three streams caught by filter: • stream A: present for 60 seconds, 4 RTP error seconds • stream B: present for 30 seconds, 0 RTP error seconds • stream C: present for 30 seconds, 5 RTP error seconds $\text{RTP loss \%} = 9\text{ES} / 120\text{s}$ $\text{RTP loss \%} = 9\text{ES} / 3\text{streams} / 120\text{s} * 100\% = 7.5\%$
MLR %:	Percentage of time an average stream that matches the filter experiences MLR inside selected time period. The calculation is similar to that for RTP loss %.
Avg str bitr:	The average bitrate for streams matching the associated filter.
Avg str duration:	The stream duration is calculated for each stream by identifying the stream's average stream alive counter inside the selected time period, then multiply by 2. The stream alive counter is the number of seconds the stream has existed. This gives accurate results for streams that begin within the selected time period, but may give up to twice the real bitrate for streams that begin (long) before the selected period. Examples: a stream exists for 100 seconds, and begins within the selected period. The calculation becomes: Stream duration = $(1+2+\dots+100)/100*2 = 101$ If the same stream started 50 seconds before the selected period, the calculation becomes: Stream duration = $(51+52+\dots+100)/50*2 = 151$

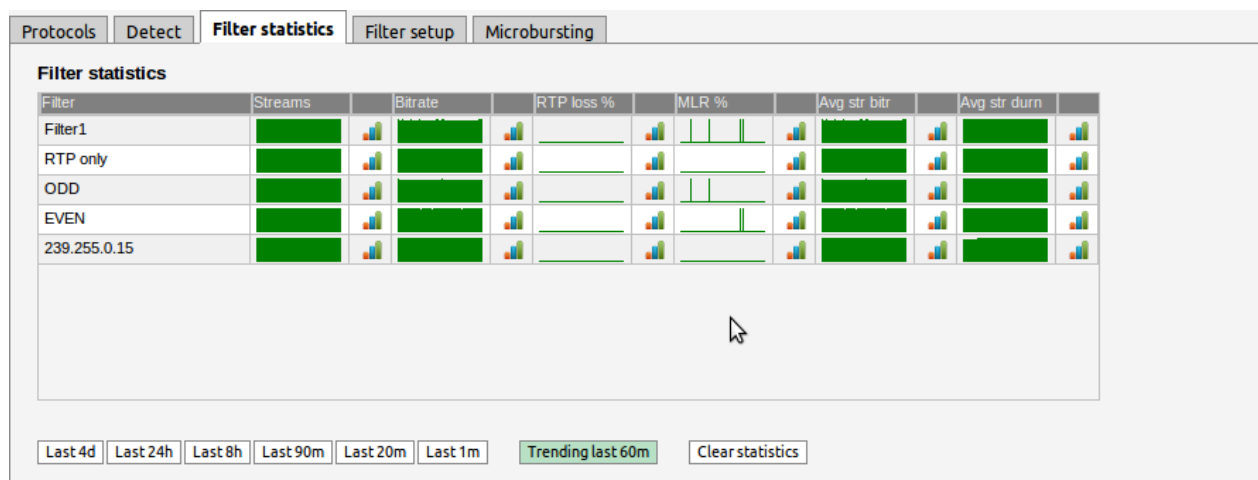
Clicking the icon next to each value brings up the detailed graph window.



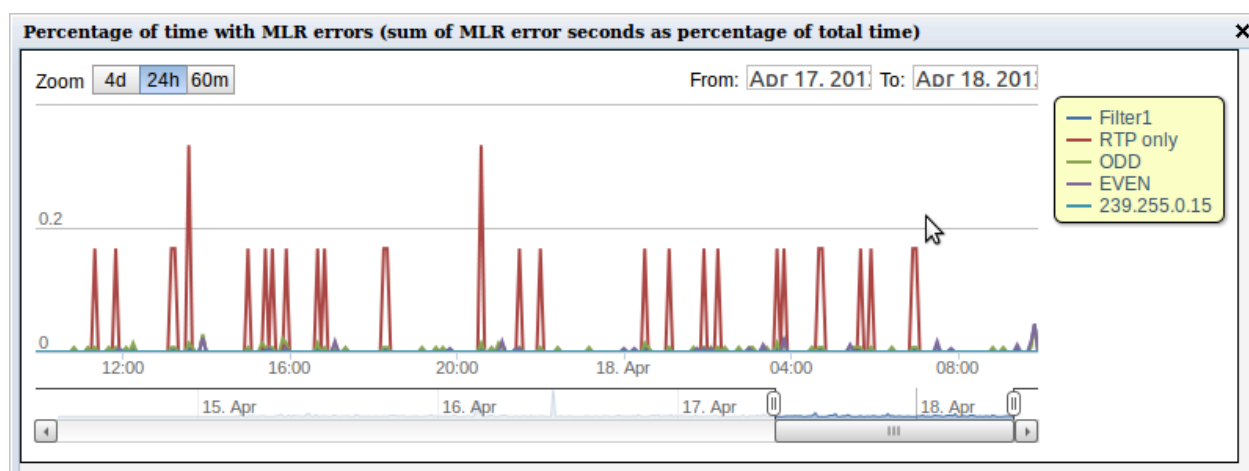
The detailed graph window displays up to 4 days of history.

Trending

Clicking the **Trending last 60m** button will present at-a-glance trending graphs for each parameter for the last 60 minutes.



Clicking a graph icon displays the corresponding detailed graph for the selected filter. Clicking the trend graphs itself will bring up the same detailed graph but will plot all the filters so that they can easily be compared.



The detailed trending graph above displays MLR errors for all filters.

6.7.4 Traffic — Filter setup

Protocols

Detect

Filter statistics

Filter setup

Microbitrate

Statfilter settings

Name	Enabled	Streams	Cast	RTP	VLAN	IP dst	IP src	UDP dst	UDP src	UDP payload	Edit
Filter1222	✓	0	Only unicasts	-	-	-	-	-	-	-	Edit
RTP only	✓	0	-	Only with RTP	-	-	-	-	-	-	Edit
ODD	✓	47	-	-	-	Require match	-	-	-	-	Edit
EVEN	✓	44	-	-	-	Require match	-	-	-	-	Edit
239.255.0.15	✓	1	-	-	-	Require match	-	-	-	-	Edit
Coolstuff	✓	91	-	-	-	Require match	-	-	-	-	Edit
Filter7		0	-	-	Only untagged	-	-	-	-	-	Edit
Filter8		0	-	-	-	-	-	-	-	-	Edit
Filter9		0	-	-	-	-	-	-	-	-	Edit
multicast_monitorin		0	Only multicast	-	-	-	-	-	-	N TS/UDP	Edit

Filters:10

Edit selected

The **Traffic — Filter setup** view makes it possible to define stream filter requirements affecting the **Traffic — Detect** and **Traffic — Filter statistics** views. Ten filters can be defined and enabled by the user.

Statfilter settings:

Name: A text string defining the filter

Enabled: Only enabled filters are in use

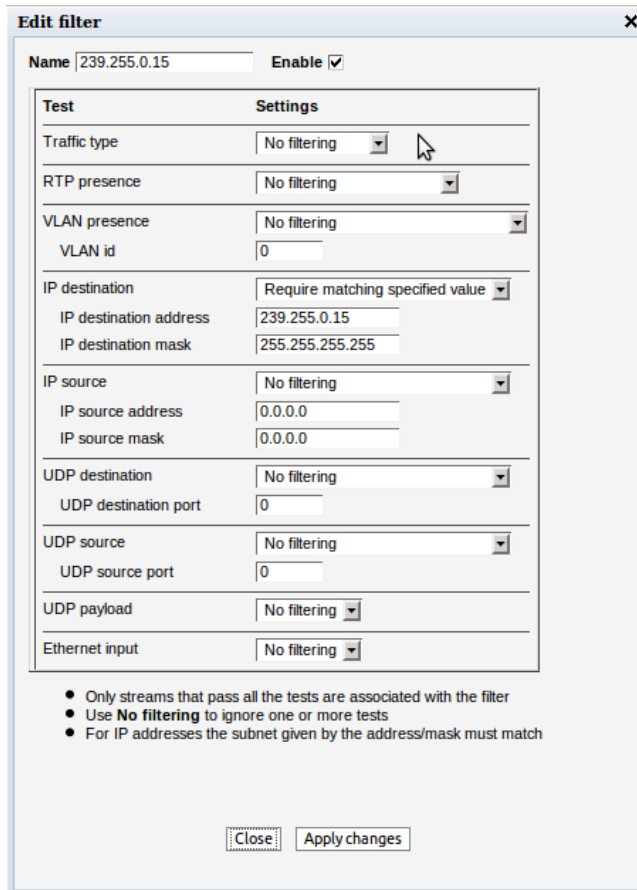
Streams: The number of streams matching filter requirements

Cast: The type of stream: *No filtering*, *Only unicasts* or *Only multicasts*

RTP: The RTP mode: *No filtering*, *Only with RTP header* or *Only without RTP header*

VLAN: VLAN selection mode: *No filtering*, *Only tagged traffic*, *Only untagged traffic* or *Require matching specified value* (a specific VLAN ID).

IP dst:	The IP destination address mode: <i>No filtering</i> or <i>Require matching specified value</i> (a specific IP address/netmask)
IP src:	The IP source address mode: <i>No filtering</i> or <i>Require matching specified value</i> (a specific IP address/netmask)
UDP dst:	The UDP destination mode: <i>No filtering</i> or <i>Require matching specified value</i> (a specific UDP port number)
UDP src:	The UDP source mode: <i>No filtering</i> or <i>Require matching specified value</i> (a specific UDP port number)
UDP payload:	The UDP payload mapping type: <i>No filtering</i> , <i>7 TS/UDP</i> or <i>N TS/UDP</i> (any integer number of TS to UDP mapping)
Edit:	Click the Edit link to edit filter settings.



Edit filter [X]

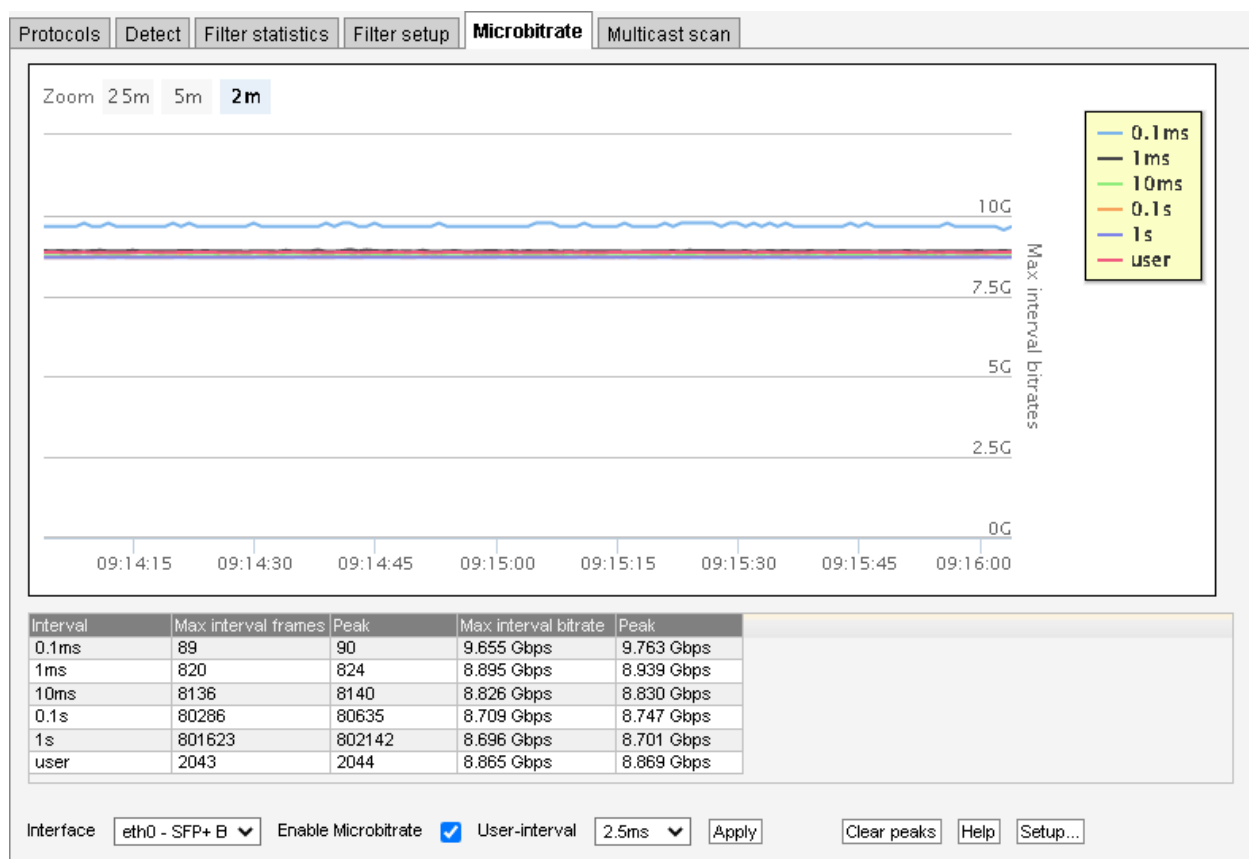
Name: 239.255.0.15 Enable: ☒

Test	Settings
Traffic type	No filtering
RTP presence	No filtering
VLAN presence	No filtering
VLAN id	0
IP destination	Require matching specified value
IP destination address	239.255.0.15
IP destination mask	255.255.255.255
IP source	No filtering
IP source address	0.0.0.0
IP source mask	0.0.0.0
UDP destination	No filtering
UDP destination port	0
UDP source	No filtering
UDP source port	0
UDP payload	No filtering
Ethernet input	No filtering

- Only streams that pass all the tests are associated with the filter
- Use **No filtering** to ignore one or more tests
- For IP addresses the subnet given by the address/mask must match

[Close] [Apply changes]

6.7.5 Traffic — Microbitrate



The Microbitrate feature allows sampling of bitrate at various sampling intervals. When enabling this feature, each Ethernet frame is timestamped in hardware on probe ingress. This timestamp is used to calculate bitrates at various sampling intervals. Due to quantisation error, the 0.1ms interval may show higher peak values than the theoretical maximum.

The **Interval** is the sampling interval of each bitrate calculation. There are six intervals tracked simultaneously, the five pre-defined intervals and the **user-interval**. The **User-interval** is a user-given sampling interval shown in the graph and used for microbitrate alarming.

The **Max interval frames** is the max number of frames within one interval last second. The **Max interval bitrate** is the max sum of Ethernet frame sizes inside one interval last second converted to bits per second. This number should always be bigger or equal for shorter intervals.

Click the legends in the graph to show or hide graphs.

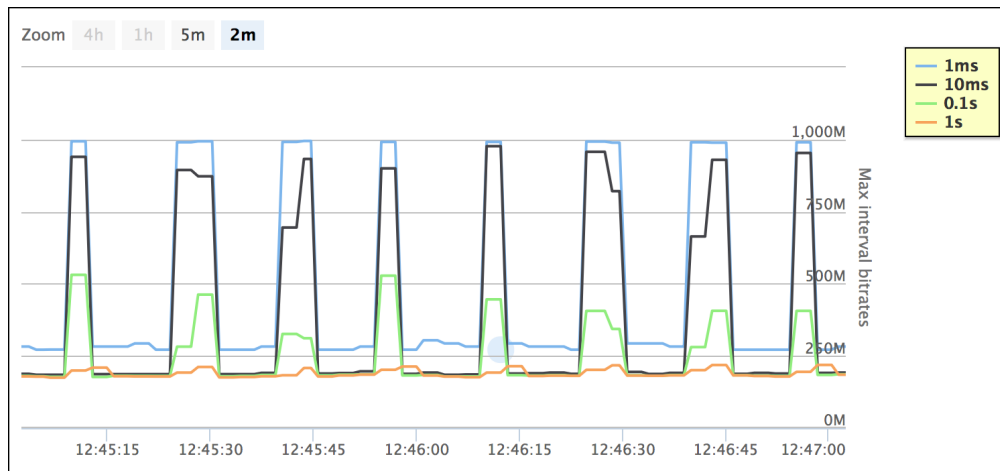


Figure 6.1: OTT traffic example

Figure 6.1 is a typical OTT traffic graph where the client periodically requests limited amounts of data at maximum speed resulting in traffic that is bursting near line-speed for short intervals while the average bitrate for larger intervals is only a fraction. This traffic shape is challenging for network equipment since it demands all remaining capacity up to line speed.

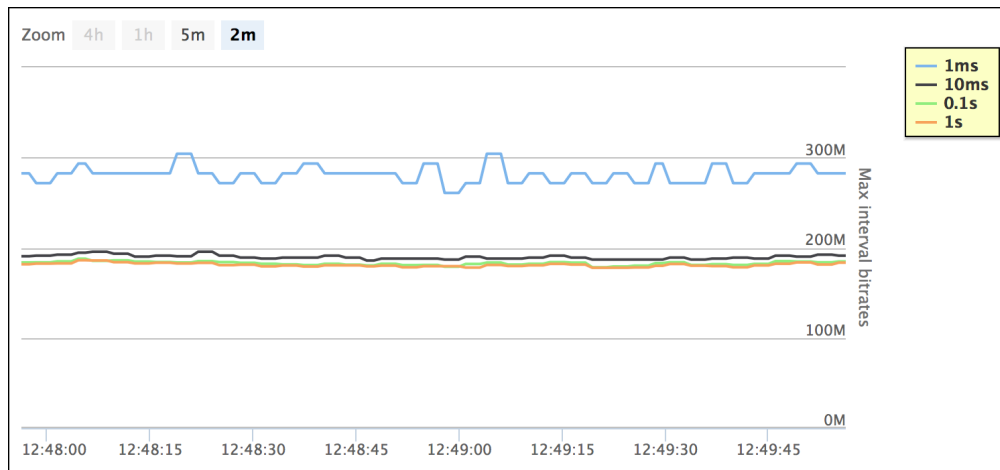


Figure 6.2: Multicast traffic example

For multicast type traffic the traffic pattern will look more like the graph in figure 6.2. Here the bitrate is much more steady even for short intervals. The network never experiences near line-speed bursting since each stream is bitrate controlled by the sender.

Microbitrate Setup

Protocols
Detect
Filter statistics
Filter setup
Microbitrate
Multicast scan

Microbitrate bursting alarm setting

Burst threshold
8000
Bitrate required (Mbps) to trigger alarm

Microbitrate excessive ES bursting alarm settings

ES Alarm window
3600
Error second window (seconds) to count burst errors

ES threshold
10
Number of ES required in window to trigger alarm

These alarms are based on the sampling interval specified for the user-graph.

Apply changes

There are two alarms defined for Microbitrate:

- Microbitrate bursting
- Microbitrate excessive ES bursting

These alarms are both associated with the user-interval, which is a user-specified graph sampling interval.

If the bitrate of the user-interval exceeds the **Burst threshold** setting, the **Microbitrate bursting** alarm will be raised.

Sometimes this will yield a lot of alarms, so a second alarm has been defined. Whenever the bitrate of the user-interval exceeds the **Burst threshold** for **ES threshold** number of seconds during the **last ES Alarm window** seconds, the **Microbitrate excessive ES bursting** alarm is raised.

In fast networks it is useful to increase the **Simultaneous joins** to a larger number.

Please note that the **Multicast scan** and the **Detect** features are mutually exclusive, so it is necessary to click the **Exit scan mode** to resume population of the **Detect** list.

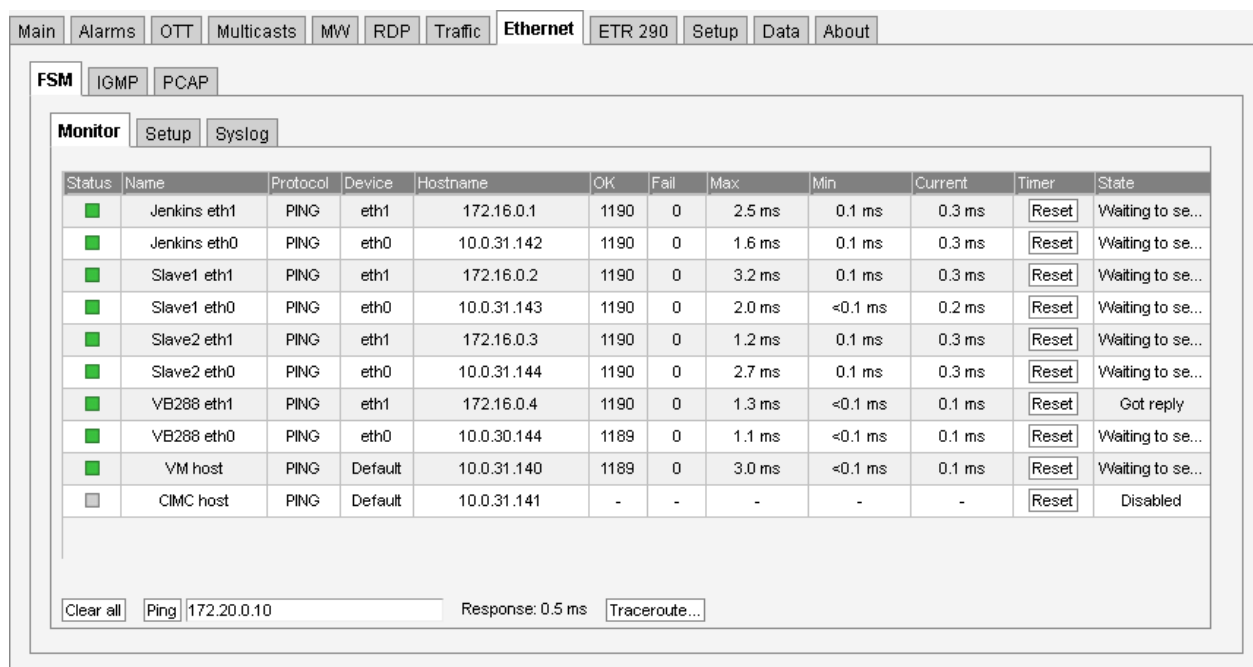
6.8 Ethernet

6.8.1 Ethernet — FSM

Full Service Monitoring (FSM) allows easy validation of any server reachable by the probe via Ethernet. The servers may be probed by either sending an ICMP Echo Request packet (also known as Ping) or performing an HTTP Get request.

Up to 10 services may be defined and each service will be checked at regular intervals. Any errors will be logged. An error is defined as no reply within 5 seconds for the Ping option or no, or incorrect, reply within 5 seconds for the HTTP option. If there are more consecutive errors than a fails threshold value an alarm will be raised.

6.8.1.1 Ethernet — FSM — Monitor



The screenshot shows the 'Ethernet' tab in the software interface, specifically the 'FSM Monitor' section. It displays a table with columns for Status, Name, Protocol, Device, Hostname, OK, Fail, Max, Min, Current, Timer, and State. The table lists several services being monitored via PING, including Jenkins, Slave1, Slave2, VB288, and VM host. The 'Status' column shows green squares for active services and a grey square for a disabled service (CIMC host). The 'State' column shows 'Waiting to se...' for most services and 'Got reply' for VB288 eth1. Below the table, there are buttons for 'Clear all', 'Ping', a text input field with '172.20.0.10', 'Response: 0.5 ms', and 'Traceroute...'.

Status	Name	Protocol	Device	Hostname	OK	Fail	Max	Min	Current	Timer	State
■	Jenkins eth1	PING	eth1	172.16.0.1	1190	0	2.5 ms	0.1 ms	0.3 ms	Reset	Waiting to se...
■	Jenkins eth0	PING	eth0	10.0.31.142	1190	0	1.6 ms	0.1 ms	0.3 ms	Reset	Waiting to se...
■	Slave1 eth1	PING	eth1	172.16.0.2	1190	0	3.2 ms	0.1 ms	0.3 ms	Reset	Waiting to se...
■	Slave1 eth0	PING	eth0	10.0.31.143	1190	0	2.0 ms	<0.1 ms	0.2 ms	Reset	Waiting to se...
■	Slave2 eth1	PING	eth1	172.16.0.3	1190	0	1.2 ms	0.1 ms	0.3 ms	Reset	Waiting to se...
■	Slave2 eth0	PING	eth0	10.0.31.144	1190	0	2.7 ms	0.1 ms	0.3 ms	Reset	Waiting to se...
■	VB288 eth1	PING	eth1	172.16.0.4	1190	0	1.3 ms	<0.1 ms	0.1 ms	Reset	Got reply
■	VB288 eth0	PING	eth0	10.0.30.144	1189	0	1.1 ms	<0.1 ms	0.1 ms	Reset	Waiting to se...
■	VM host	PING	Default	10.0.31.140	1189	0	3.0 ms	<0.1 ms	0.1 ms	Reset	Waiting to se...
■	CIMC host	PING	Default	10.0.31.141	-	-	-	-	-	Reset	Disabled

Clear all Ping 172.20.0.10 Response: 0.5 ms Traceroute...

The following parameters are continuously monitored for each service:

Status: Red = active alarm, Green = no alarm

Name: User defined service name

Protocol: Type of protocol. HTTP or Ping

IP address:	IP address. Must be numeric, host name is not accepted
OK:	Total number of valid checks
Fail:	Total number of invalid checks
Max:	Maximum response time recorded
Min:	Minimum response time recorded
Current:	The current (most recent) response time
Timer:	Button to reset and immediately restart the service
State:	Current state of the service. The states are: 'Disabled', 'Waiting to send', 'Waiting for reply', 'Got reply' and 'Reset'.

For convenience a manual ping field is located below the status table. By entering a valid IP address or host name and clicking the **Ping** button an arbitrary server may be pinged.

The **Clear all** button will clear accumulated data for all enabled FSM services, but active alarms will not be removed.

Clicking the **Traceroute** button will open a new window, allowing the user to trace the network route to a specified IP address.

FSM
IGMP
PCAP

Traceroute
Provide arguments (--help for help):

```

traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 38 byte packets
1 10.0.205.1 (10.0.205.1) 1.405 ms 1.379 ms 1.398 ms
2

```

6.8.1.2 Ethernet — FSM — Setup

Full Service Monitoring Setup					
Name	Protocol	Hostname	Device	Enabled	Edit
Jenkins eth1	PING	172.16.0.1	eth1	✓	Edit
Jenkins eth0	PING	10.0.31.142	eth0	✓	Edit
Slave1 eth1	PING	172.16.0.2	eth1	✓	Edit
Slave1 eth0	PING	10.0.31.143	eth0	✓	Edit
Slave2 eth1	PING	172.16.0.3	eth1	✓	Edit
Slave2 eth0	PING	10.0.31.144	eth0	✓	Edit
VB288 eth1	PING	172.16.0.4	eth1	✓	Edit
VB288 eth0	PING	10.0.30.144	eth0	✓	Edit
VM host	PING	10.0.31.140	Default	✓	Edit
CLMC host	PING	10.0.31.141	Default		Edit

Each of the 10 FSM services may be defined or edited by clicking on the corresponding **Edit** button in the left hand table.

The probe supports ping and generic HTTP GET protocols for online status verification of arbitrary targets. After completing configuration of the selected service **Apply changes** must be pressed to save and apply the changes.

Edit Service

Enable ☒

Name

Protocol

Device

Probe cycle seconds

Fails threshold successive failures

Hostname

Comment

Protocol specific parameters

ICMP echo request: If reachable, the target service will respond

Edit Service

Enable ☒

Name

Protocol

Device

Probe cycle seconds

Fails threshold successive failures

Hostname

Comment

Protocol specific parameters

HTTP: Validate presence and content of HTTP server-based services.

Http://10.0.30.10

Expect word reply

Last reply [Show content](#)

Port

Support cookies ☐

These fields are common for both the ping and the HTTP GET protocols:

Enable: Enable by checking toggle button.

Name:	User-defined name of service
Protocol:	Select between ping and HTTP.
Device:	Ethernet interface to use for this service.
Probe cycle:	Time interval in seconds to wait between each activation. A value below 30 is not recommended.
Fails threshold:	The number of consecutive errors needed to raise an alarm
Hostname:	The IP address for the target. Host names are supported for HTTP.
Comment:	Optional comment field – maximum 100 characters

These fields are specific for the HTTP GET protocol:

http://<IP address>:	The request to send to the target, for example index.html
Expect word reply:	A case sensitive word or sentence to be expected in the reply. To find a suitable string, use the Show content link. Leave this field empty to let the probe ignore the contents of the reply.
Last reply:	The last reply Show content link points to the last HTML file that was generated by this service.
Port:	The port used by the target server, often 80 for HTTP requests
Support cookies:	If enabled, the HTTP GET request will remember cookies returned by the target and provide them in subsequent requests.

6.8.1.3 Ethernet — FSM — Syslog

Monitor

Setup

Syslog

Facility	Severity	Timestamp	Hostname	Agent	Message
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> domain name 'localdomain'
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> nameserver '172.16.217.2'
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> gateway 172.16.217.2
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> prefix 24 (255.255.255.0)
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> address 172.16.217.154
system	info	2016-01-29 15:52:55	localhost	NetworkManager[1985]	<info> (eth0): DHCPv4 state changed renew -> renew
system	info	2016-01-29 15:52:55	localhost	dhclient[5699]	bound to 172.16.217.154 -- renewal in 712 seconds.
system	info	2016-01-29 15:52:55	localhost	dhclient[5699]	DHCPACK from 172.16.217.254 (xid=0x6e8707a5)
system	info	2016-01-29 15:52:55	localhost	dhclient[5699]	DHCPREQUEST on eth0 to 172.16.217.254 port 67 (xid=0x6e8...
clock	info	2016-01-29 15:50:01	localhost	CROND[60342]	(root) CMD (/usr/lib64/sa/sa1 1 1)
system	info	2016-01-29 15:40:08	localhost	NetworkManager[1985]	<info> domain name 'localdomain'
system	info	2016-01-29 15:40:08	localhost	NetworkManager[1985]	<info> nameserver '172.16.217.2'
system	info	2016-01-29 15:40:08	localhost	NetworkManager[1985]	<info> gateway 172.16.217.2
system	info	2016-01-29 15:40:08	localhost	NetworkManager[1985]	<info> prefix 24 (255.255.255.0)

Newest

Much newer

Newer

Older

Much older

Oldest

Export...

Total messages: 1920

Position: 0%

Displayed: 100

The VB220-SW has a built-in syslog server which captures all incoming messages (UDP, port 514). Messages are displayed in a pageable grid with the following columns: Facility, Severity, Timestamp, Hostname, Agent and Message. Currently displayed page can be exported as an XML-document.

Since the syslog server typically stores about 100 pages of messages there is a group of buttons for a fast navigation:

Newest	Move to the first page
Much newer	Move 10 pages backwards
Newer	Move 1 page backwards
Older	Move 1 page forwards
Much older	Move 10 pages forwards
Oldest	Move to the last page

Syslog server has a limited capacity which is usually enough to store the latest 10,000 messages depending on the size of the syslog messages. When a new message arrives and no storage space remains the oldest messages are removed.

Note that the syslog server is very sensible to time settings, so it is strongly recommended to have a time synchronization enabled.

6.8.2 Ethernet — IGMP

FSM

IGMP

PCAP

i	No	Time	Source	Destination	Code	Message	Group
1	4833	Feb 01 09:22:32.872	10.0.31.145 (local)	239.255.0.152	0	IGMPV2 host membership report (0x16)	239.255.0.152
1	4834	Feb 01 09:23:24.646	10.0.30.1	224.0.0.1	100	IGMP host membership query (0x11)	
1	4835	Feb 01 09:23:25.844	10.0.31.145 (local)	239.255.0.151	0	IGMPV2 host membership report (0x16)	239.255.0.151
1	4836	Feb 01 09:23:29.576	10.0.31.145 (local)	239.255.0.152	0	IGMPV2 host membership report (0x16)	239.255.0.152
1	4837	Feb 01 09:23:31.192	10.0.31.145 (local)	239.255.0.150	0	IGMPV2 host membership report (0x16)	239.255.0.150
1	4838	Feb 01 09:24:24.689	10.0.30.1	224.0.0.1	100	IGMP host membership query (0x11)	
1	4839	Feb 01 09:24:27.808	10.0.31.145 (local)	239.255.0.152	0	IGMPV2 host membership report (0x16)	239.255.0.152
1	4840	Feb 01 09:24:28.016	10.0.31.145 (local)	239.255.0.151	0	IGMPV2 host membership report (0x16)	239.255.0.151
1	4841	Feb 01 09:24:32.360	10.0.31.145 (local)	239.255.0.150	0	IGMPV2 host membership report (0x16)	239.255.0.150
1	4842	Feb 01 09:25:24.752	10.0.30.1	224.0.0.1	100	IGMP host membership query (0x11)	
1	4843	Feb 01 09:25:27.400	10.0.31.145 (local)	239.255.0.152	0	IGMPV2 host membership report (0x16)	239.255.0.152
1	4844	Feb 01 09:25:30.536	10.0.31.145 (local)	239.255.0.150	0	IGMPV2 host membership report (0x16)	239.255.0.150
1	4845	Feb 01 09:25:31.592	10.0.31.145 (local)	239.255.0.151	0	IGMPV2 host membership report (0x16)	239.255.0.151
1	4846	Feb 01 09:26:24.807	10.0.30.1	224.0.0.1	100	IGMP host membership query (0x11)	
1	4847	Feb 01 09:26:29.608	10.0.31.145 (local)	239.255.0.152	0	IGMPV2 host membership report (0x16)	239.255.0.152
1	4848	Feb 01 09:26:30.120	10.0.31.145 (local)	239.255.0.150	0	IGMPV2 host membership report (0x16)	239.255.0.150
1	4849	Feb 01 09:26:31.304	10.0.31.145 (local)	239.255.0.151	0	IGMPV2 host membership report (0x16)	239.255.0.151

Live view

View list offline

Clear list

Export...

The IGMP view shows all IGMP (version 2 or 3) messages detected by the probe. This includes IGMP query messages sent by routers, IGMP reply messages sent by the probe itself and IGMP reply messages sent by other probes and devices on the same subnet.

The live IGMP page can be paused by clicking the **View list offline** button. The IGMP messages can be exported as XML by clicking the **Export...** button, and the list is cleared by clicking the **Clear list** button.

①: Click the blue information icon to open the IGMP record pop-up view

No:	The message number since the list was cleared
Time:	The probe time when the message occurred
Millisec:	The milliseconds timestamp
Source:	The source IP address
Destination:	The destination IP address
Code:	The timeout code
Message:	The interpreted IGMP message
Group:	The IGMP group address

6.8.3 Ethernet — PCAP

FSMIGMP**PCAP**

Filter settings: (packet captured if it matches any enabled filter)

Capture only headers (first 64 bytes) ☐
Capture non TCP/UDP traffic ☐
Capture TCP traffic ☒
Capture UDP traffic ☒
Capture if IP DST 0.0.0.0 and IP SRC 0.0.0.0 ☐
Capture if IP DST 0.0.0.0 and IP SRC 0.0.0.0 ☐
Capture if IP DST 0.0.0.0 and IP SRC 0.0.0.0 ☐
Capture if IP DST 0.0.0.0 and IP SRC 0.0.0.0 ☐
Capture if IP DST 0.0.0.0 and IP SRC 0.0.0.0 ☐

Select input eth0 - Data RJ45

Save Filter

Status:

Status In Progress
Size 78M
Packets 32750
Time (seconds) 4
Dropped packets 0
Disk free 834M
Capture [rec.pcap](#)

Start recording Stop recording

Sort recorded frames on packet time

The VB220-SW can make PCAP recordings on the data interface based on simple user configurable filters. If the DATA-LOG option is available, the recorded PCAP files can be moved to the internal hard drive using the **Data — Storage** view. The PCAP format supports microsecond timing accuracy.

Incoming traffic is recorded if it matches one or more of the enabled filters while outgoing traffic is always recorded. So for instance, to record all OTT traffic on the data interface it is sufficient to enable the “Capture all TCP traffic” filter (since OTT uses the HTTP protocol which is always TCP).

Filter settings

Capture only header (first 64 bytes):	If enabled, only 64 first bytes of Ethernet frame is captured. This allows higher bitrate traffic to be recorded and over longer time
Capture all non TCP/UDP traffic:	Check to record non-IPv4 traffic such as ARP, PIM or IPv6
Capture all TCP traffic:	Check to capture all IPv4 TCP traffic

Capture all UDP traffic:	Check to capture all IPv4 UDP traffic
IP DST and IP SRC filters:	Check to activate test. Will capture stream if IP destination address matches. If SRC is specified it has to match too
Select input:	Chooses the network interface to capture traffic on
<i>Status</i>	
Status:	Show the current recording status
Size:	Size of current recording
Packets:	Number of packets in the recording
Time (seconds):	Duration of the current recording
Dropped packets:	Number of dropped packets due, usually caused by running temporarily out of buffer due to too high traffic. To allow higher bitrate recordings Capture only headers may be enabled.
Disk free:	Remaining disk size
Capture:	Link to download the recorded capture. May be invalid if recording is still in progress.
Start recording:	Click to start a new recording. This will clear the current rec.pcap file.
Stop recording:	Click to stop the current recording.
Sort recorded frames on packet time:	At high bitrates, some Ethernet frames may be recorded out of order as a result of the multi-core architecture. Click to sort frames in recording according to time-stamp.

6.9 ETR 290 (Option)

The ETR 290 tab and all sub-views will only be present in the user interface provided that the probe is licensed with the ETR 290 option.

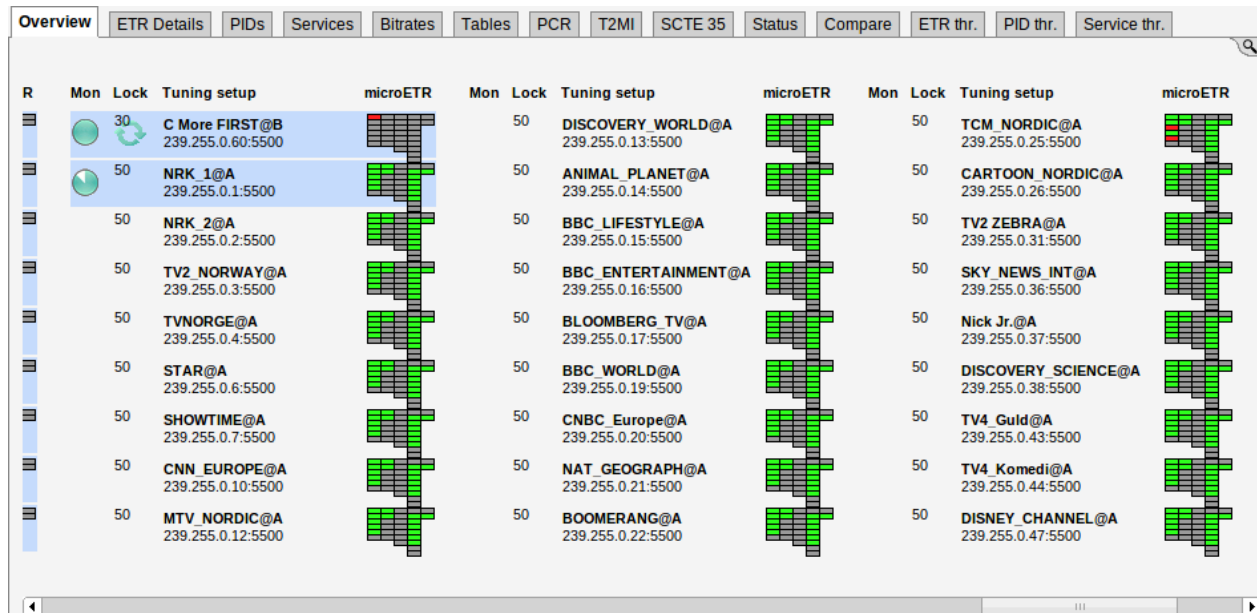
The ETR 290 views show information as reported by the ETSI TR 101 290 monitoring engines.

If ETR 290 analysis has been configured for multiple Ethernet streams to be monitored by a particular Ethernet ETR engine (refer to **Multicasts — Streams — Edit**), they will be analyzed in a round-robin fashion by the engine. A maximum of 260 Ethernet streams may be analyzed in total.

The number of ETR 290 analysis engines depends on the license. The SW currently support up to 200 engines. More engines make it possible to reduce the analysis round-trip time or allowing simultaneous full-time ETR analysis of many multicasts. The ETR 290 analysis engines operate in parallel.

It is possible to hide disabled inputs from being displayed in the various **ETR 290** sub-views. This setting is found in the **Setup — ETR** view.

6.9.1 ETR 290 — Overview



The **ETR 290 — Overview** view will show ETR 290 status for ETR 290 monitored streams. ETR 290 monitoring may be enabled for Ethernet streams in the **Multicasts — Streams — Edit** view.

The streams currently being analyzed are highlighted and a circular progress icon shows the monitoring progress.

The analysis time for each stream is set as part of the **ETR thresholds** parameters list in the **ETR 290 — ETR thr. — Edit** view.

The result of the different ETR 290 tests are shown as table entries in a condensed view called MicroETR, a scaled down version of the regular ETR display, one icon representing one stream. Green color indicates status OK whereas red color indicates an active alarm for that particular test. A white field shows that a check has not yet been performed, usually due to lack of measurement data, and grey indicates that a check is disabled. Tool-tip functionality allows the user to view the name of an individual check in the MicroETR display. Let your cursor hover over the field for a moment to view the tool-tip.

When clicking one of the MicroETR icons the detailed ETR 290 status for that stream is displayed in the **ETR 290 — ETR Details** view. By entering this view through the MicroETR, the view will remain static irrespective of the round-robin looping, thus making it easy to examine one stream in detail without interruptions. The round-robin looping and associated alarm handling will continue in the background. Click the magnifying glass icon to open a search field, making it possible to filter the list of monitored streams.

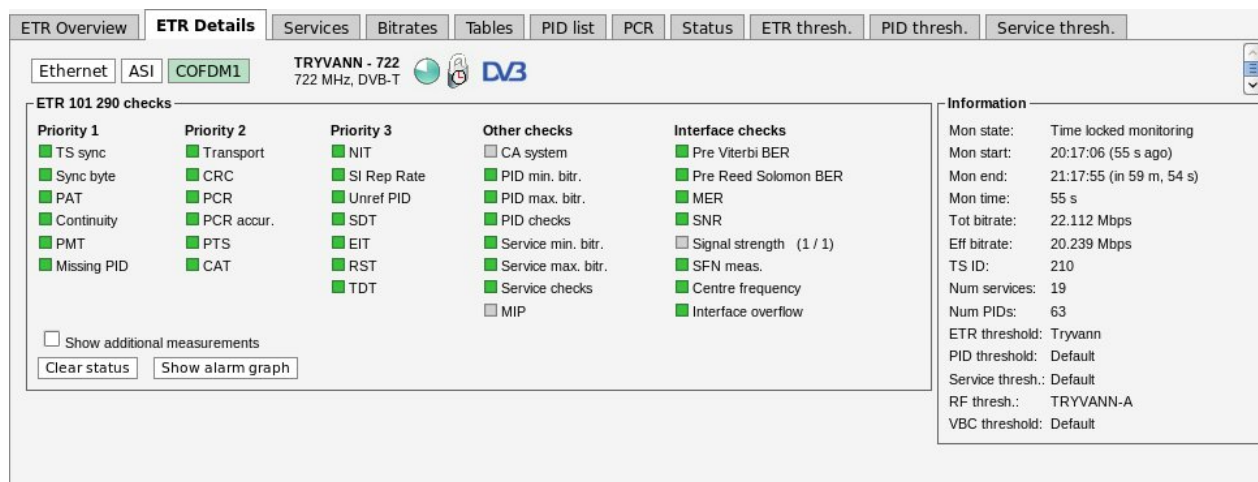
Note that it is possible to deactivate individual ETR 290 alarms by defining appropriate **ETR thresholds**.

To examine one particular Ethernet stream in more detail, lock the ETR 290 analysis to that stream by clicking the lock field at that stream. The round-robin operation of the ETR 290 engine will then

be stopped and a lock icon will appear as an indication that the monitoring is locked to that stream. If a time limit has been set for the time lock (**Setup — ETR view**), a clock icon will be superimposed on the lock icon. To re-activate the round-robin cycling the lock icon should be clicked. Note that locking the ETR 290 processing to one stream will affect alarm handling and all ETR 290 views. Active alarms for streams that are not currently being analyzed will freeze (remain active) until the processing lock is deselected and ETR 290 analysis eventually shows that the error state is cleared.

The user can select one input to be displayed exclusively by clicking the corresponding **Show only this input** button. This does not affect ETR 290 processing or alarming. Click **Show all inputs** to again display information about all inputs.

6.9.2 ETR 290 — ETR Details



The **ETR Details** view shows the ETR 290 status for the current stream of the user-selected input. The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon the round-robin tuning process is stopped (locked to the current frequency) or resumed. A DVB, ATSC or ISDB icon indicates the analysis mode. The analysis mode is defined as part of the ETR threshold template.

The information displayed here is the same as in the **ETR** tab of the **Streams details** pop-up from the **Streams** view.

The **ETR threshold**, **PID threshold** and **Service threshold** can be edited from this view by clicking the blue gear. This makes it possible to adjust the threshold settings while at the same time viewing the detailed measurement results. When the gear is clicked, three new options become available:

- **Drop-down list** — select another threshold from the list in **ETR thresholds**
- **Edit** — a pencil icon that opens the editor for the selected threshold
- **Duplicate** — a “+” icon that creates a copy of the threshold, which can be edited

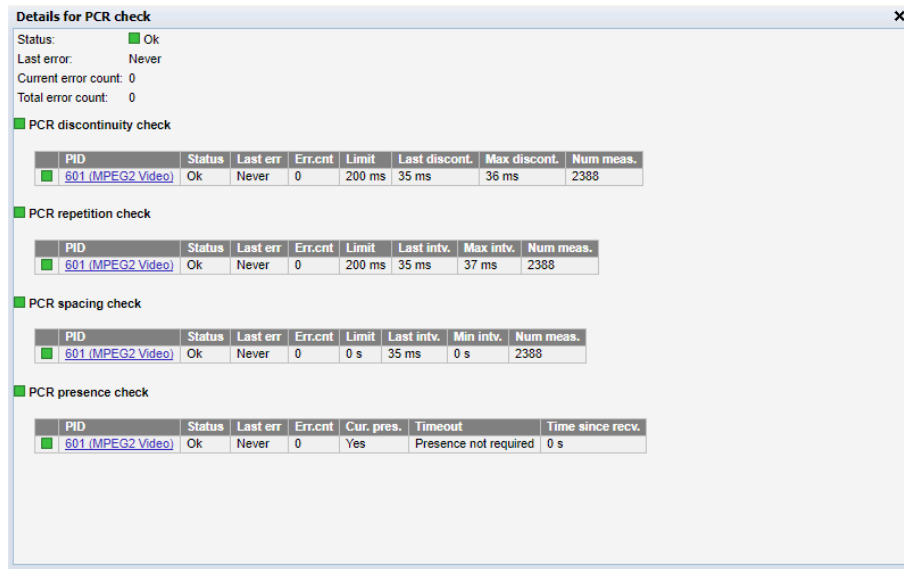
All thresholds can be edited, except for built-in defaults:

ETR thresholds: *ETSI TR 101 290, ATSC Default, Optimised, IP-SPTS, CMTS downlink, Analog carrier and Default*

PID and Service thresholds: *Default*

To modify a default threshold, use the + icon. The new duplicate is given a default name that appends a numeric suffix to the original name. The name can then be changed, as well as the threshold parameters.

When clicking one of the ETR 290 parameters, details about the current status can be viewed for that item.



Details for PCR check

Status: ■ Ok
 Last error: Never
 Current error count: 0
 Total error count: 0

■ PCR discontinuity check

PID	Status	Last err	Err.cnt	Limit	Last discont.	Max discont.	Num meas.
■ 601 (MPEG2 Video)	Ok	Never	0	200 ms	35 ms	36 ms	2388

■ PCR repetition check

PID	Status	Last err	Err.cnt	Limit	Last intv.	Max intv.	Num meas.
■ 601 (MPEG2 Video)	Ok	Never	0	200 ms	35 ms	37 ms	2388

■ PCR spacing check

PID	Status	Last err	Err.cnt	Limit	Last intv.	Min intv.	Num meas.
■ 601 (MPEG2 Video)	Ok	Never	0	0 s	35 ms	0 s	2388

■ PCR presence check

PID	Status	Last err	Err.cnt	Cur. pres.	Timeout	Time since recv.
■ 601 (MPEG2 Video)	Ok	Never	0	Yes	Presence not required	0 s

Enable the **Show additional measurements** checkbox to view additional measurements that are performed but which are ignored when determining the alarm status. These will appear with a ‘half-bulb’ icon indicating that the check is disabled whilst also showing the status of this element. As an example this can be used to view the BAT section repetition interval and section gap, or to view a list of PIDs with CC errors including the PIDs for which this check has been manually disabled.

Click a PID in a PID list to view PID details. Similarly you can click on a service to view service details.

If the **Clear status** button is clicked the error counts are reset and the ETR 290 analysis restarts.

The details of the individual ETR 290 measurements are described in a separate document called **Sencore VideoBRIDGE ETR 290 Details — Extended ETSI TR 101 290 Testing**.

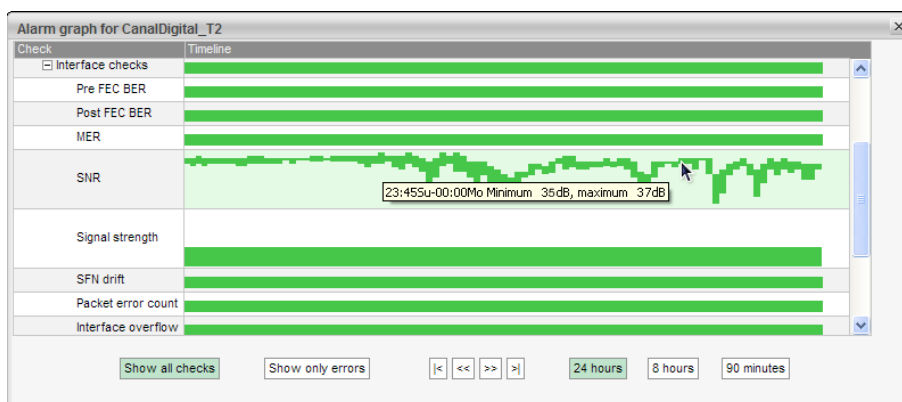
Clicking the **Show alarm graph** button opens the Alarm graph pop-up view.



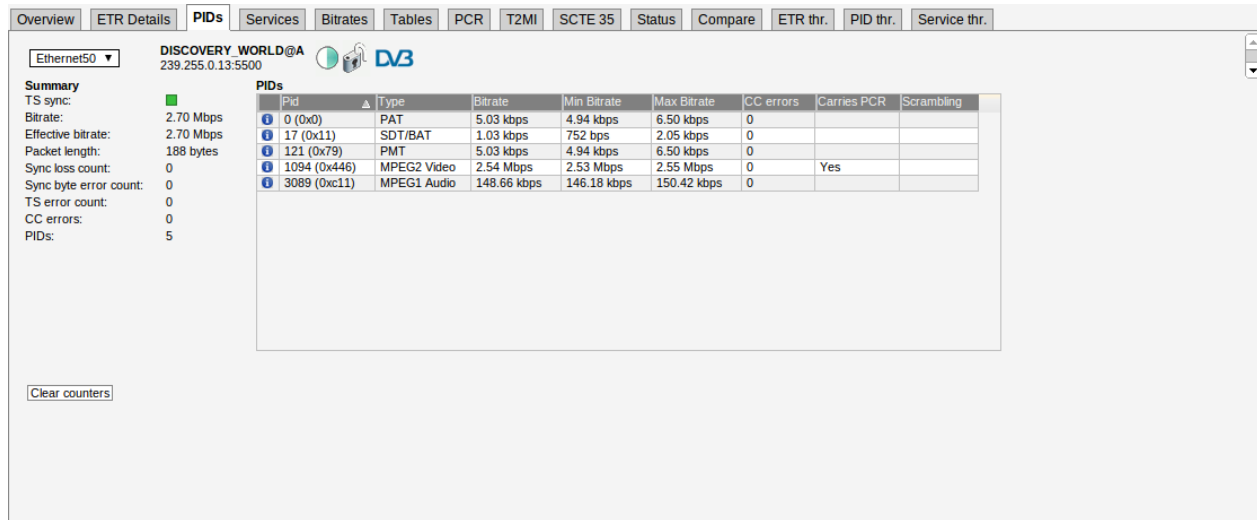
The alarm graph shows the ETR alarm status over time in the form of a status timeline. The timeline bar shows the stream status for a time span of 90 minutes, 8 hours or 24 hours as selected by clicking the time selection buttons below the timelines. The stream bar reveals any alarm that has been present during the selected time period. The bar color is either green for OK or colored in accordance with the alarm severity if an alarm has occurred. Refer to **section 6.2.2** for a description of the alarm color representation. Periods of time when the stream has not been ETR monitored due to round-robin operation are represented by grey. By using the arrow buttons it is possible to view alarm occurrences up to 24 hours back in time even if the highest graph time resolution is selected.

If alarms have occurred during the selected time period, the status timeline will not be all green. In this case it is possible to expand the timeline tree by clicking the plus sign at the timeline. Individual timelines for different ETR priorities and for different alarms may be viewed as the tree is expanded into several levels. Tool-tips reveals details about an error incident such as which PIDs have had CC errors.

By default the ‘Show only errors’ mode is selected, and only timelines that are not all green will be displayed.



6.9.3 ETR 290 — PIDs



Summary

TS sync:  2.70 Mbps
 Bitrate: 2.70 Mbps
 Effective bitrate: 188 bytes
 Packet length: 188 bytes
 Sync loss count: 0
 Sync byte error count: 0
 TS error count: 0
 CC errors: 0
 PIDs: 5

PIDs

Pid	Type	Bitrate	Min Bitrate	Max Bitrate	CC errors	Carries PCR	Scrambling
0 (0x0)	PAT	5.03 kbps	4.94 kbps	6.50 kbps	0		
17 (0x11)	SDT/BAT	1.03 kbps	752 bps	2.05 kbps	0		
121 (0x79)	PMT	5.03 kbps	4.94 kbps	6.50 kbps	0		
1094 (0x446)	MPEG2 Video	2.54 Mbps	2.53 Mbps	2.55 Mbps	0	Yes	
3089 (0xc11)	MPEG1 Audio	148.66 kbps	146.18 kbps	150.42 kbps	0		

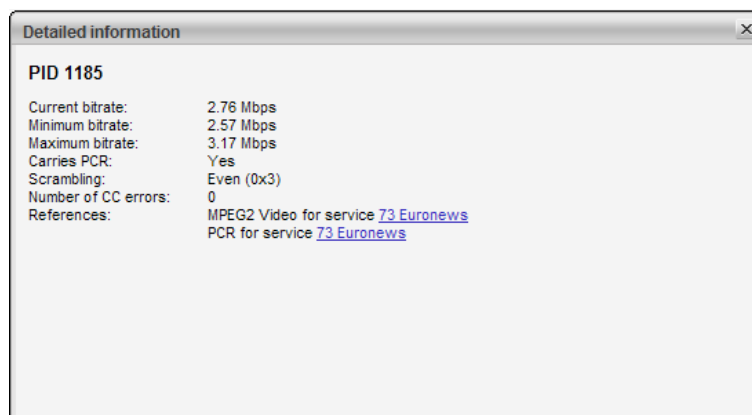
Clear counters

This view lists the PIDs of the currently active stream of the selected input. The PID list can be sorted by clicking a table column header.

The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon the round-robin cycling is stopped or resumed. A DVB, ATSC or ISDB icon indicates the analysis mode. The analysis mode is defined as part of the ETR thresholds.

By clicking the button **Clear counters** the minimum and maximum bitrates and the CC error counters will be reset. Note that this cannot be undone.

When clicking the blue information icon associated with a PID details concerning that PID will be displayed. All services referring to the PID are listed, and scrambling information is shown.



Detailed information

PID 1185

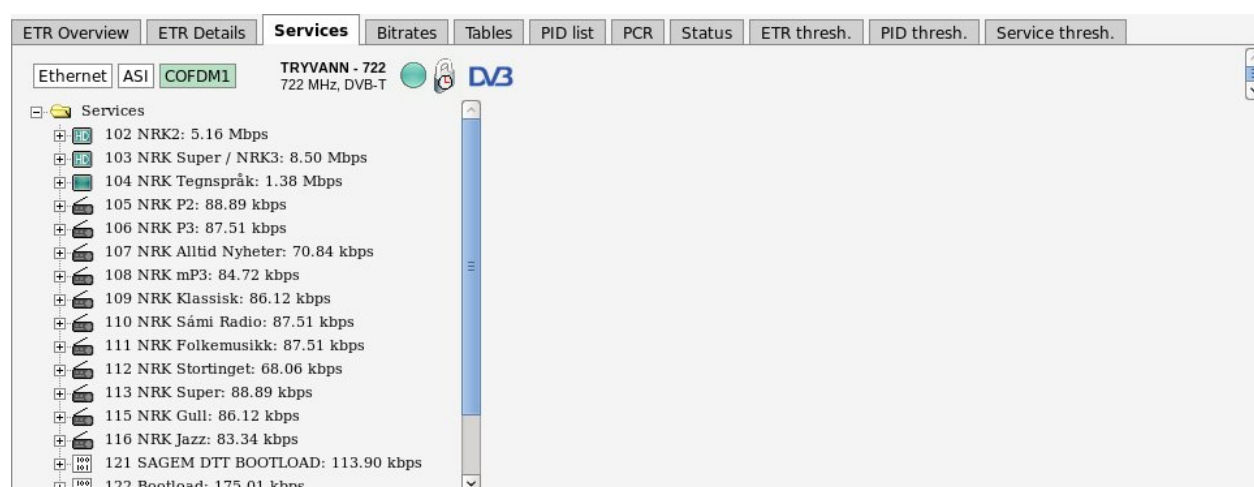
Current bitrate: 2.76 Mbps
 Minimum bitrate: 2.57 Mbps
 Maximum bitrate: 3.17 Mbps
 Carries PCR: Yes
 Scrambling: Even (0x3)
 Number of CC errors: 0
 References: MPEG2 Video for service [73 Euronews](#)
 PCR for service [73 Euronews](#)

The following PID details are displayed:

PID Details:

PID:	The PID for which the following parameters apply
Current bitrate:	The current bitrate measurement for this PID. The bitrate is averaged over 1 second.
Minimum bitrate:	The minimum bitrate measurement for this PID since the start of the monitoring period. (I.e. when the probe tuned to the frequency or when the monitoring of this frequency was restarted by the user clicking on Clear status in the ETR 290 — ETR Details view.)
Maximum bitrate:	The maximum bitrate measurement for this PID since the start of the monitoring period.
Carries PCR:	If the PID carries Program Clock Reference information, this field will be set to Yes. If PCR analysis is enabled in the ETR threshold template a link will be shown to bring up the PCR histogram data for this PID.
Scrambling:	If the PID is scrambled, this field will show if it is scrambled with Odd or Even control word.
Number of CC errors:	The number of CC errors for the specified PID. For the Ethernet interface the number of CC errors is measured from when the probe started to monitor the multicast or when the user clicked Clear counters in the Multicasts — Parameters view.
References:	All the references for this PID in the PSI/SI/PSIP tables. This will show the reference type and the service that refers the PID (if applicable). The service can be clicked to show the detailed service information.

6.9.4 ETR 290 — Services



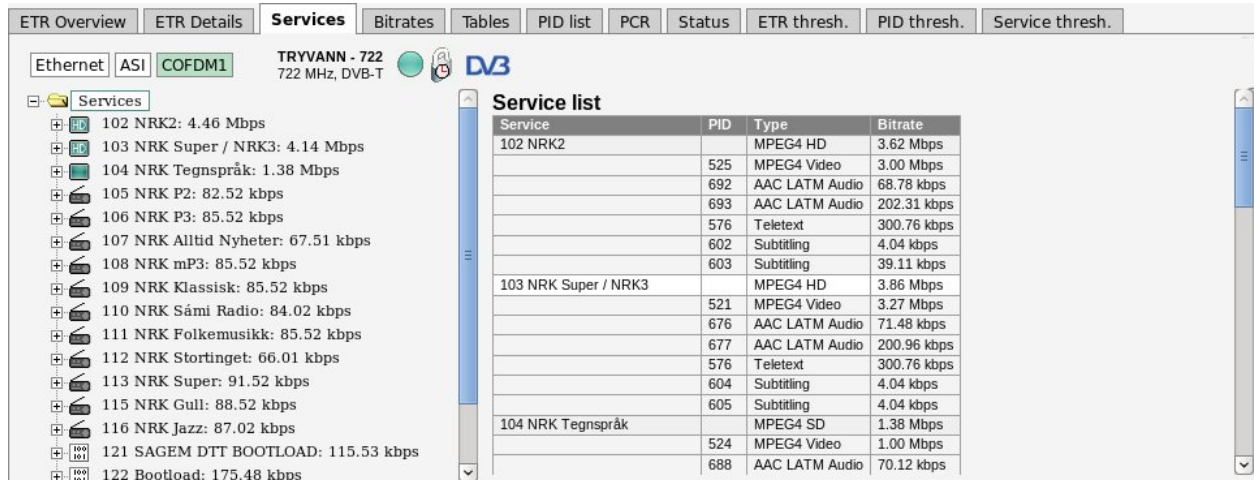
The **ETR290 — Services** view lists the services and service components of the current stream of the selected input.

The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon, the round-robin cycling is

stopped or resumed. A DVB, ATSC or ISDB icon indicates the analysis mode. The analysis mode is defined as part of the ETR thresholds.

When tree nodes are selected, detailed information will be displayed on the right hand side of the view.

If the service tree ‘Services’ top node is clicked, a summary list of stream services and PIDs is displayed. Each service’s service ID and each component’s PID value and bitrate are displayed together with individual PID and service bitrates.



Service	PID	Type	Bitrate
102 NRK2		MPEG4 HD	3.62 Mbps
	525	MPEG4 Video	3.00 Mbps
	692	AAC LATM Audio	68.78 kbps
	693	AAC LATM Audio	202.31 kbps
	576	Teletext	300.76 kbps
	602	Subtitling	4.04 kbps
	603	Subtitling	39.11 kbps
103 NRK Super / NRK3		MPEG4 HD	3.86 Mbps
	521	MPEG4 Video	3.27 Mbps
	676	AAC LATM Audio	71.48 kbps
	677	AAC LATM Audio	200.96 kbps
	576	Teletext	300.76 kbps
	604	Subtitling	4.04 kbps
	605	Subtitling	4.04 kbps
104 NRK Tegnspråk		MPEG4 SD	1.38 Mbps
	524	MPEG4 Video	1.00 Mbps
	688	AAC LATM Audio	70.12 kbps

Services top node

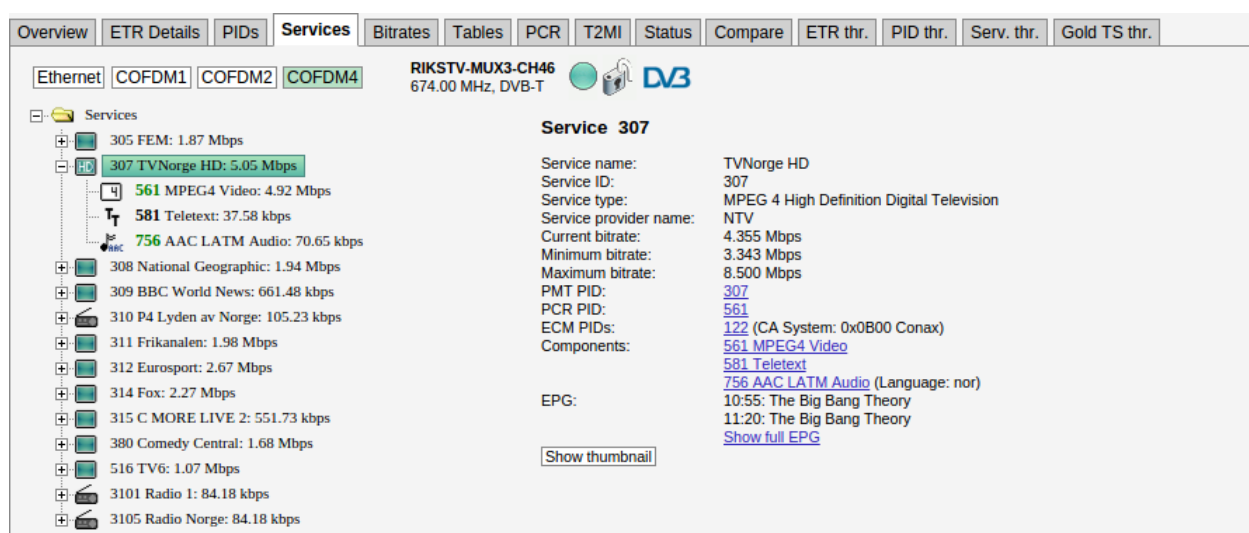
Service: Service name and service ID

PID: Service component PID value

Type: Service and component encoding format

Bitrate: Individual current bitrate of services and components

When clicking a service, details about the service and service components will be displayed.



If a PID is scrambled this is indicated in the service tree by the color green or blue (for even and odd scrambling respectively). A missing PID is indicated by the color red. Click on the PID to show more details.

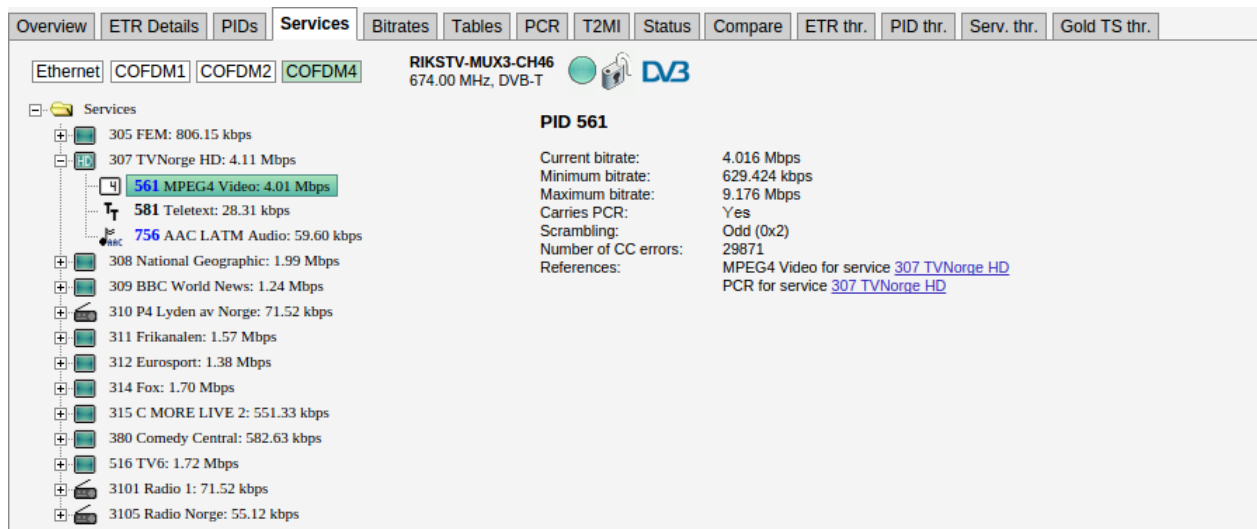
Click the Show thumbnail button to view a thumbnail of the selected service. Thumbnails can only be shown for services that are not scrambled. The pop-up window is identical to the one displayed in the **Thumbnails** view. For more details, see chapter 5.4.1.

Service node

Service name:	Name of the highlighted service, as signaled in SDT or VCT
Service ID:	Service ID number
Service type:	Service type as signaled in SDT
Service provider name:	The name of the service provider as signaled in SDT. Not applicable for ATSC streams.
Current bitrate:	The current bitrate measurement for this service. The bitrate is averaged over 1 second.
Minimum bitrate:	The minimum bitrate measurement for this service since the start of the monitoring period. (I.e. when the probe tuned to the frequency or when the monitoring of this frequency was restarted by the user clicking Clear status in the ETR 290 — ETR Details view.)
Maximum bitrate:	The maximum bitrate measurement for this service since the start of the monitoring period.
PMT PID:	The service's PMT PID
PCR PID:	The service's PCR PID
ECM PIDs:	The service's ECM PID(s) and name of CA system(s). This information will only be displayed if ECM PIDs are signaled in the PMT table, usually only done when one or more service components are scrambled.

Components:	A list of the component PIDs and reference types. For PIDs which have a language descriptor (typically audio PIDs) the language code is also shown.
EPG:	If DVB EIT is present in the stream, the EIT check is enabled in the ETR template used by the stream and EIT table IDs are configured in the Setup — ETR view, EIT present/following is displayed. For ATSC streams, EIT present/following is displayed if there are EITs present in the stream. If EIT schedule is present in the stream, a blue ‘Show full EPG’ link is displayed. By clicking the link it is possible to view the EIT schedule information.
Show thumbnail	Opens the Thumbnail view for this service. Thumbnails are only decoded automatically if the Extract thumbnails option has been enabled in the associated multicast setup. The same pop-up details are displayed as when opened from the Content — Thumbnails view. To display thumbnails for JPEG XS services, the JPEGXS-OPT license is required.

When clicking a service component, associated key parameters and references will be displayed.



The screenshot shows the 'Services' tab in the Sencore software. On the left, a list of services is displayed, including '561 MPEG4 Video: 4.01 Mbps'. On the right, the details for 'PID 561' are shown, including current and minimum/maximum bitrates, PCR status, scrambling, and references to other services.

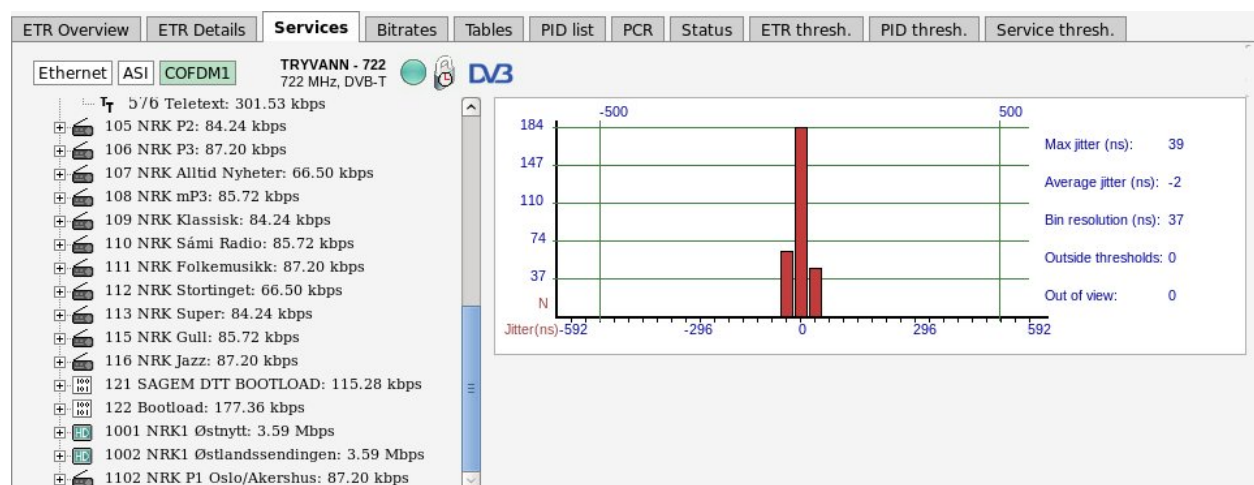
PID 561	
Current bitrate:	4.016 Mbps
Minimum bitrate:	629.424 kbps
Maximum bitrate:	9.176 Mbps
Carries PCR:	Yes
Scrambling:	Odd (0x2)
Number of CC errors:	29871
References:	MPEG4 Video for service 307 TVNorge HD PCR for service 307 TVNorge HD

For PIDs carrying PCR it is possible to view a PCR jitter histogram by clicking the blue ‘show histogram’ link. If one of the blue service links is clicked, service details are shown.

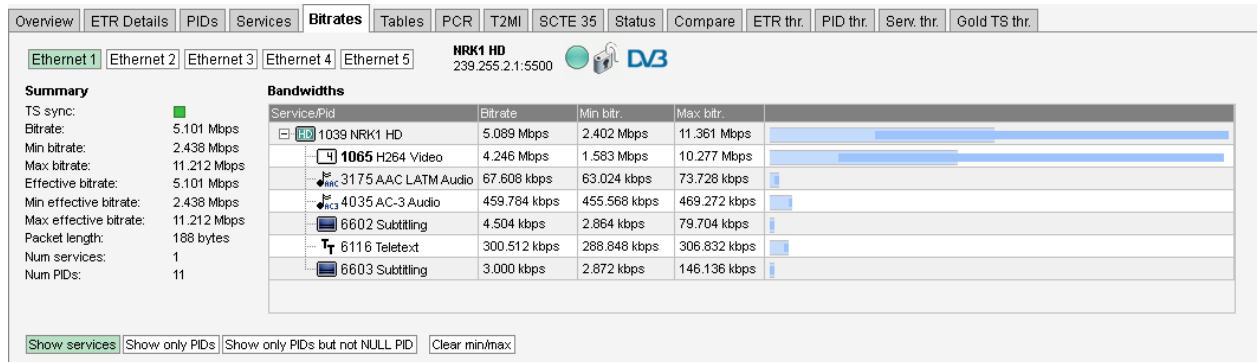
Service component node

Current bitrate:	The current bitrate measurement for this PID. The bitrate is averaged over 1 second.
-------------------------	--

Minimum bitrate:	The minimum bitrate measurement for this PID since the start of the monitoring period. (I.e. when the probe tuned to the frequency or when the monitoring of this frequency was restarted by the user clicking Clear status in the ETR 290 — ETR Details view.)
Maximum bitrate:	The maximum bitrate measurement for this PID since the start of the monitoring period.
Carries PCR:	An indication of whether the PID carries PCR or not. The value may be 'Yes' or 'No'. If PCR is carried by the PID, a blue 'show histogram' link is displayed. By clicking this link it is possible to view the PCR jitter histogram.
Scrambling:	An indication of whether the PID is scrambled or not. If the PID is not scrambled, the value will be 'No'. If the PID is scrambled, information about the current control word is displayed: 'Even 0x3' or 'Odd 0x2'.
Number of CC errors:	The number of CC errors detected during the monitoring period
References:	A list of PSI/SI references to the component PID. When one of the blue service links is clicked, detailed service information is displayed.



6.9.5 ETR 290 — Bitrates



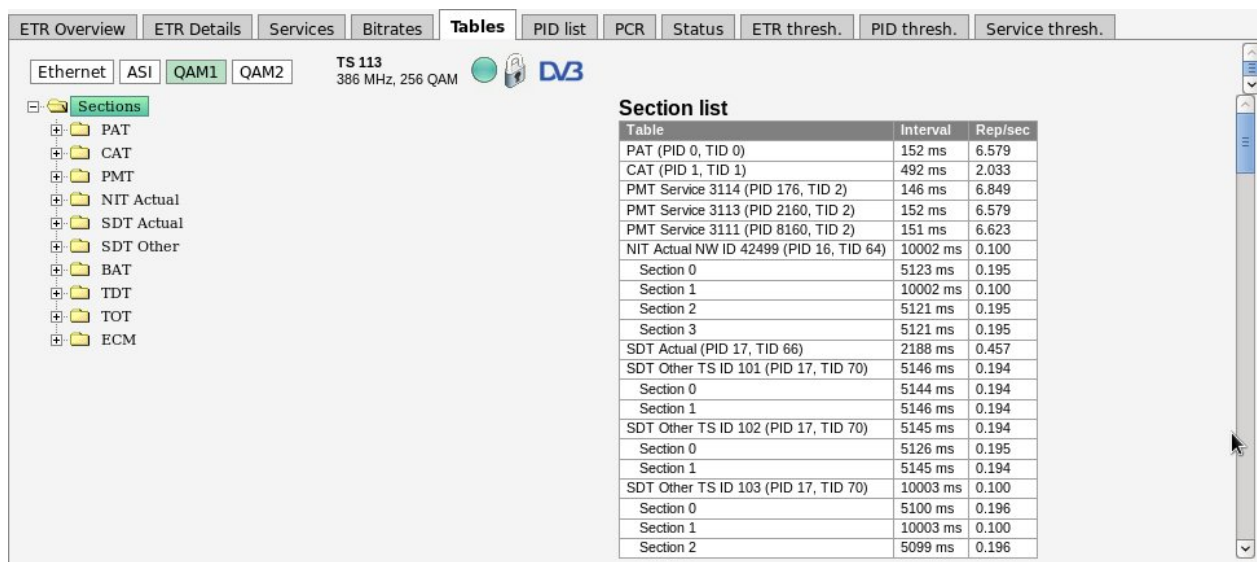
This view shows a graphical representation of service and PID bitrates. The current bitrate is shown as the length of the light blue bar whereas the dark blue bar represents bitrate variation, spanning from minimum to maximum measured bitrate.

The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon the round-robin tuning process is stopped (locked to the current frequency) or resumed. A DVB, ATSC or ISDB icon indicates the analysis mode. The analysis mode is defined as part of the ETR thresholds.

The user may select to view a list of services and component PIDs, to view PIDs only or to view PIDs without the null PID. This is selected by clicking the **Show Services**, **Show only PIDs** or **Show only PIDs but not NULL PID** button respectively.

Click **Clear min/max** to reset the minimum and maximum bitrate measurements.

6.9.6 ETR 290 — Tables

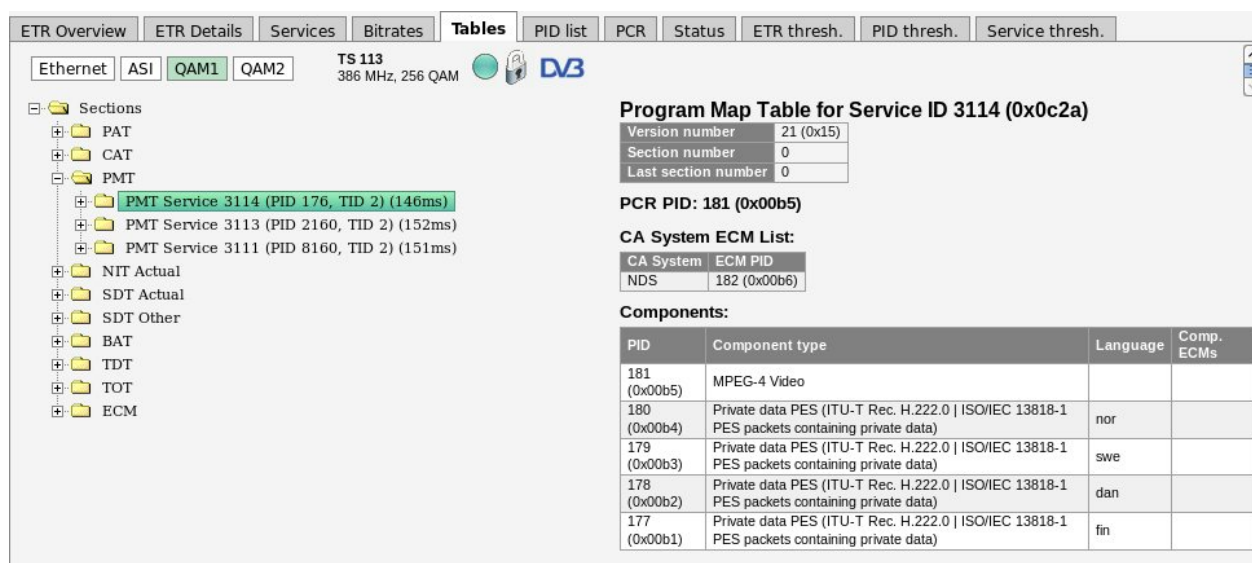


This view lists the PSI and SI or ATSC tables and table contents of the currently active stream of the selected input.

The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon the round-robin cycling is stopped or resumed. A DVB, ATSC or ISDB icon indicates the analysis mode. The analysis mode is defined as part of the ETR thresholds.

Clicking the ‘Sections’ node displays detected tables and associated repetition rates.

Clicking a table enables viewing the table contents in a readily readable format.



Program Map Table for Service ID 3114 (0x0c2a)

Version number	21 (0x15)
Section number	0
Last section number	0

PCR PID: 181 (0x00b5)

CA System ECM List:

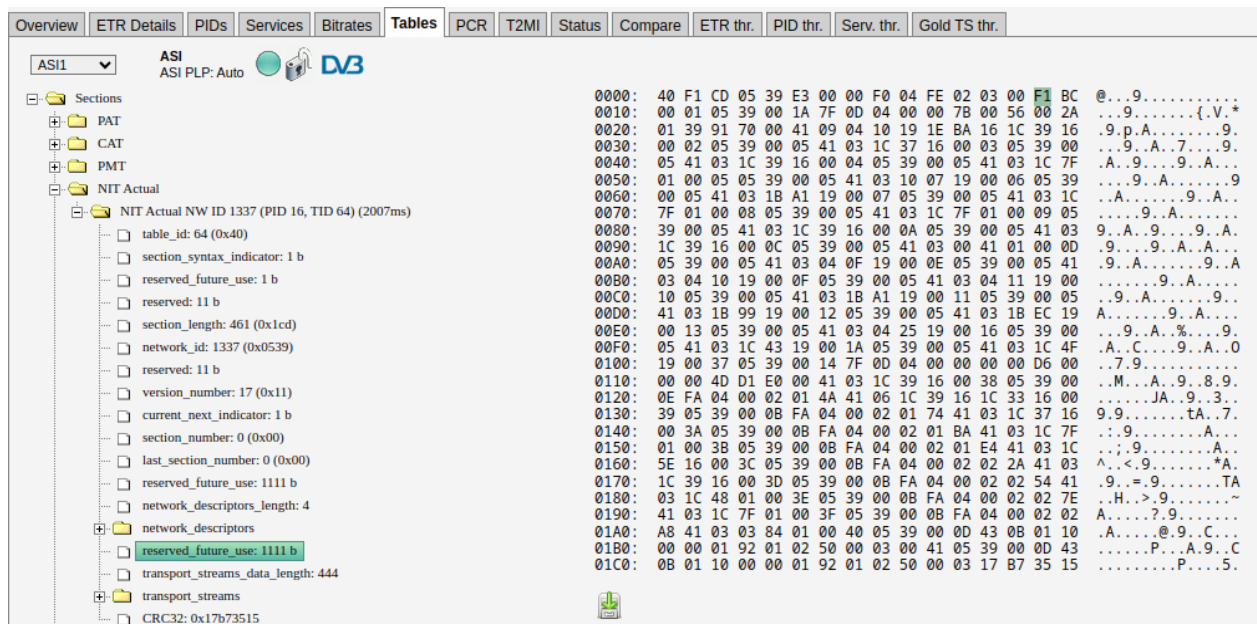
CA System	ECM PID
NDS	182 (0x00b6)

Components:

PID	Component type	Language	Comp. ECMs
181 (0x00b5)	MPEG-4 Video		
180 (0x00b4)	Private data PES (ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data)	nor	
179 (0x00b3)	Private data PES (ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data)	swe	
178 (0x00b2)	Private data PES (ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data)	dan	
177 (0x00b1)	Private data PES (ITU-T Rec. H.222.0 ISO/IEC 13818-1 PES packets containing private data)	fin	

By clicking the plus-icon at a table the table contents is displayed in detail.

Clicking one of the table entries will allow viewing the table contents as a hexadecimal dump for detailed inspection.



The selected table entry is highlighted in the table dump. Note that values shown in the table list may not correspond directly to the highlighted hex dump byte(s), because some of the table entries do not add up to whole bytes.

By hovering the cursor over the items in the tree a tool-tip is displayed showing the start position of the data in the hexadecimal dump and the length of data. Press the save icon to download and save the raw table data on your computer.

A description of each PSI/SI table is beyond the scope of this manual, please refer to the specifications for more information about PSI/SI.

If you get “Unknown descriptor” in the table parsing it could be that the stream contains additional descriptors that can be enabled. Make a note of the descriptor_tag and go to **Setup — ETR** to enable the parsing of the descriptor.

Overview	ETR Details	PIDs	Services	Bitrates	Tables	PCR	T2MI	Status	Compare	ETR thr.	PID thr.	Serv. thr.	Gold TS thr.
----------	-------------	------	----------	----------	--------	-----	------	--------	---------	----------	----------	------------	--------------

Ethernet	COFDM1	COFDM2	COFDM4
----------	--------	--------	--------

RIKSTV-MUX3-CH46
 674.00 MHz, DVB-T



EIT Present/Following

TS ID 231 original network ID 8770

Service	Current event	Next event	Full EPG
201 TV 2	13:00 (01:00:00) Tid for hjem Norsk livsstilsserie, (4:8/s10). Denne gangen tar "Tid for hjem" turen bort fra Bergen, til vakre Voss. Med seg har de en helt ny designer, norske Kirsten Visdal. (Event type: Leisure hobbies-general)	14:00 (01:00:00) Bolighjelpen UK Britisk livsstilsserie fra 2018, (8:8/s3). Det nygifte paret Nikki og Andy har bodd sammen noen år før de giftet seg. Nikki har begynt å hate den treroms terrasseboligen deres og vil flytte. (Event type: Leisure hobbies-general)	Show EIT schedule
204 TV 2 Nyhetskanalen	13:45 (00:15:00) Sportsnyhetene De siste nyhetene innen sport. (Event type: Sports-sports magazines)	14:00 (00:30:00) Nyhete Siste nytt fra TV2s nyhetsredaksjon. (Event type: News/Current affairs-news/weather report)	Show EIT schedule
210 TV 2 Sport 1	13:00 (02:00:00) Premier League: Cardiff - Bournemouth Britisk fotball. Fra Cardiff City Stadium og kampen mellom Cardiff og Bournemouth i 25. runde i Premier League. Kommentator: Espen Ween. (Event type: Sports-football/soccer)	15:00 (02:00:00) Tippekampen: Chelsea - Huddersfield Britisk fotball. Fra Stamford Bridge og kampen mellom Chelsea og Huddersfield i 25. runde i Premier League. Kommentator: Peder Mørtvedt. (Event type: Sports-football/soccer)	Show EIT schedule

For streams which have electronic program guide (EPG) information in the EIT table and the extraction of this information is enabled (in **ETR thresholds** and in **Setup — ETR**) the tree will show the text **EPG** (for ATSC streams EPG will be displayed regardless if EITs are present in the stream). Clicking on this will bring up the list of present/following events (the current program and the next program to be broadcast) for the current stream will be displayed. If the stream has EIT p/f other information (and this table is enabled in **Setup — ETR**) then the list will also contain EPG present/following for other streams (not available for ATSC). If the stream has EIT schedule information for the actual and/or other streams (and these tables are enabled in **Setup — ETR**) then the list will also contain the link **Show EIT schedule**. Clicking this will show the full schedule for the selected service. The amount of data shown depends on the signal. A common practice is to send EPG for 7 days ahead.

Overview

ETR Details

PIDs

Services

Bitrates

Tables

PCR

T2MI

Status

Compare

ETR thr.

PID thr.

Serv. thr.

Gold TS thr.

Ethernet

COFDM1

COFDM2

COFDM4

RIKSTV-MUX3-CH46

674.00 MHz, DVB-T

DVB

EIT Schedule for service 307 TVNorge HD in stream with TS ID 231 original network ID 8770

Go back to EIT Present/Following for all streams

2019.02.04

Start time	Duration	Event
00:10	01:45:00	Hot Pursuit Amerikansk actionkomedie fra 2015. Reese Witherspoon, Sofia Vergara. (Event type: Movie/Drama-adventure/western/war)
01:55	01:00:00	Første date Norsk realityserie fra 2018. (2:12/s2). På Første date-restauranten møtes single fra hele landet på blind date. (Event type: Show/Game show-general)
02:55	00:30:00	Hundepatruljen NZ Vet Clinic - Jonti. Newzealandsk dokumentarserie fra 2016. (13:13/s5). (Event type: Show/Game show-general)
03:25	00:25:00	Hundepatruljen NZ Episode 4. Newzealandsk dokumentarserie. (4:10/s7). Whanganui Delta-teamet Jason og Farris trekker en innbruddstyv fram fra skjulestedet sitt, og narkotikahunden Oscar varsler hundepasser Bill om problemer ved Mt Eden fengs. (Event type: Show/Game show-general)
03:50	00:30:00	Hundepatruljen NZ Episode 5. Newzealandsk dokumentarserie. (5:10/s7). Politihunden Hades gir ikke opp jakten på en innbruddstyv. Biosikkerhetslabradoren Ebony sniffer seg fram til noe som kravler på postbåndet. (Event type: Show/Game show-general)

To get detailed information about one event, click the binary symbol . This will open a popup window with parsing of the underlying EIT table. The information can be displayed either in detailed hex mode:

Table parsing

Show summary

Show hex

event

event_id: 10503 (0x2907)

start_time: 2019.02.04 14:02:19

duration: 00:29:06

running_status: running (0x4)

free_CA_mode: 0 (0 b) (0x0)

descriptors_loop_length: 233 (000011101001 b) (0x0c9)

descriptors

short event descriptor

descriptor_tag: 77 (0x4d)

descriptor_length: 181

ISO_639_language_code: nor

event_name_length: 29

event_name: Et år på tur med Lars Monsen

short_descr_length: 147

short_descr: Norsk opplevelsesserie fra 2007. Lars Monsen har vært på langtur og har tilbrakt et år

content descriptor

parental rating descriptor

Unknown descriptor

CRC32: 0x18f2650c

```

0000: 4F F1 04 03 EA ED 00 01 00 D2 22 42 01 4F 29 07 0....."B.0).
0010: E4 96 14 02 19 00 29 06 80 E9 4D B5 6E 6F 72 1D .....).M.nor.
0020: 05 45 74 20 E5 72 20 70 E5 20 74 75 72 20 6D 65 .Et .r p. tur me
0030: 64 20 4C 61 72 73 20 4D 6F 6E 73 65 6E 93 05 4E d Lars Monsen..N
0040: 6F 72 73 68 20 6F 70 70 6C 65 76 65 6C 73 65 73 orsk opplevelses
0050: 73 65 72 69 65 20 66 72 61 20 32 30 30 37 2E 20 serie fra 2007.
0060: 4C 61 72 73 20 4D 6F 6E 73 65 6E 20 68 61 72 20 Lars Monsen har
0070: 76 E6 72 74 20 70 E5 20 6C 61 6E 67 74 75 72 20 v.r.t p. langtur
0080: 6F 67 20 68 61 72 20 74 69 6C 62 72 61 68 74 20 og har tilbrakt
0090: 65 74 20 E5 72 20 6E 6F 72 64 20 66 6F 72 20 70 et .r nord for p
00A0: 6F 6C 61 72 73 69 72 6B 65 6C 65 6E 20 69 20 4E olarsirkelen i N
00B0: 6F 72 67 65 2C 20 53 76 65 72 69 67 65 20 6F 67 orge, Sverige og
00C0: 20 46 69 6E 6C 61 6E 64 2E 28 31 3A 38 29 28 52 Finland.(1:8)(R
00D0: 70 54 A7 A1 AA 55 A4 6E 6E 77 A1 76 76 A4 11 2E 1T 11 nor v. /

```


Or in summary mode:

Table parsing	
Show summary	Show hex
Event Information Table Present/Following Other	
Version number	22 (0x16)
Section number	0
Last section number	1
Service ID	1002 (0x03ea)
Transport Stream ID	210 (0x00d2)
Original Network ID	8770 (0x2242)
Event list:	
Event ID	10503 (0x2907)
Start time	2019.02.04 14:02:19
Duration	00:29:06
Content type	Leisure hobbies-tourism/travel
Event name	Language Value nor Et år på tur med Lars Monsen
Short description	Language Value nor Norsk opplevelsesserie fra 2007. Lars Monsen har vært på langtur og har tilbrakt et år nord for polarsirkelen i Norge, Sverige og Finland.(1:8)(R)

ETR 290 — Digital Radio Mondiale

Digital Radio Mondiale streams will show up in the tree with the label **Digital Radio Mondiale**, if they have been configured properly in the **ETR thresholds**.

182

IPTV 1

Digital Radio Mondiale

239.0.0.1:5503



Sections

PAT

PMT

NIT Actual

SDT Actual

Digital Radio Mondiale

Digital Radio Mondiale PID 3000

General	
Available streams:	239.103.150.1:5000
Protocol version:	00.00
Seconds OK:	24
Robustness mode:	B
Selected IP:	239.103.150.1
Selected port:	5000

FAC - Fast Access Channel	
Sync:	OK
Bandwidth occupancy:	10 kHz
Interleaver:	2s
Service configuration:	1 audio service
Service identifier:	0xe1c238
Language:	English
Program type:	News

SDC - Service Description Channel	
Sync:	OK
Service label:	BBC WS
SDC mode:	16-QAM CR 0.5
Audio coding:	xHE-AAC
Audio mode:	mono
Audio sampling rate:	38.4 kHz
Language code:	eng
Country code:	gb

MSC - Media Service Channel	
Sync:	OK
MSC mode:	16-QAM
Stream 0 bitrate:	10.7250 kbps
Stream 1 bitrate:	0.9200 kbps
Stream 2 bitrate:	0.0000 kbps
Stream 3 bitrate:	0.0000 kbps

General

Available streams: A list of IP addresses and ports available in this PID. If both the selected IP and port match one of the available streams, it will be highlighted in green.
Note: Only the available streams can be decoded and will contain information.

Protocol version: What protocol is being used in the stream.

Seconds ok: Seconds without error.

Robustness mode: The robustness mode used for this program. Labelled A to E.

Selected IP: The IP address selected in ETR thresholds. If it doesn't match any of the IP addresses in available streams, no data will be accessible.

Selected port: The port selected in ETR thresholds. If it does not match the port associated with the selected IP address in the available streams, no data will be accessible.

FAC — Fast Access Channel

Sync: *OK* if stream has sync. *No sync* otherwise.

Bandwidth occupancy: The bandwidth occupancy of this stream.

Interleaver: '2s', '400ms', '600ms'

Service configuration:	Configuration of the program.
Service identifier:	A hexadecimal value that uniquely identifies the program.
Language:	Specifies the language of the program.
Program type:	Specifies the genre of the program.

SDC — Service Description Channel

Sync:	<i>OK</i> if stream has sync. <i>No sync</i> otherwise.
Service label:	The primary identification of the program for the listener.
SDC mode:	The SDC mode used by the program.
Audio coding:	The audio coding in use by the program.
Audio mode:	The audio mode used. Either mono or stereo.
Audio sampling rate:	The audio bitrate in kHz.
Language code:	The language code of the language of the program.
Country code:	Country code for the country of origin.

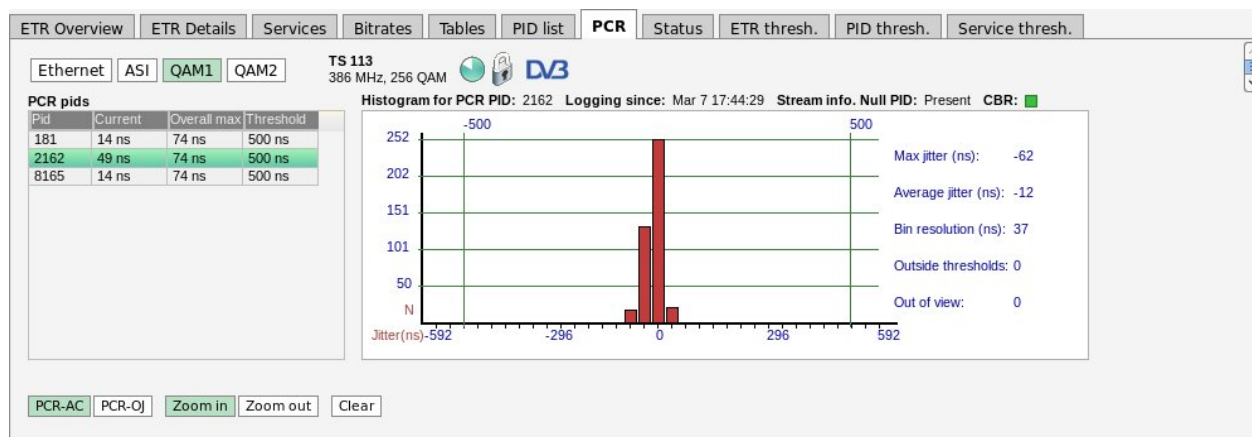
MSC — Media Service Channel

Sync:	<i>OK</i> if stream has sync. <i>No sync</i> otherwise.
MSC mode:	The MSC mode used by the program.
Stream 0 bitrate:	The bitrate of stream 0 in kilobits/s (kbps).
Stream 1 bitrate:	The bitrate of stream 1 in kilobits/s (kbps).
Stream 2 bitrate:	The bitrate of stream 2 in kilobits/s (kbps).
Stream 3 bitrate:	The bitrate of stream 3 in kilobits/s (kbps).

Developed according to the standards for DRM-MDI:

- ETSI TS 102 820, ‘Multiplex Distribution Interface (MDI)’
- ETSI ES 201 980, ‘System Specification’
- ETSI EN 301 192, ‘DVB specifications for Data Broadcasting’

6.9.7 ETR 290 — PCR



The PCR jitter histogram displays PCR jitter as measured by the probe. A list of detected PCR PIDs in the selected stream is shown together with their current and maximum PCR jitter values. A PCR PID is selected for histogram presentation by clicking the associated table entry. The histogram shows the number of received PCR values versus jitter. PCR jitter is by default measured as PCR-AC for all interfaces. By creating an ETR threshold template that enables PCR-OJ and assigning this template to a stream it is possible to select PCR-OJ measurement mode by clicking the **PCR_OJ** button. The PCR_OJ measurement is not relevant for Ethernet streams.

Please note PCR analysis will be disabled if none of the PCR-AC, PCR-OJ, PCR Accuracy or PCR Jitter checks are enabled in the **ETR thresholds**. So to use the **ETR 290 — PCR** functionality this needs to be enabled.

The name of the current stream is displayed in addition to the two round-robin indicator icons when relevant: the time cycle icon and the lock icon. By clicking the lock icon the round-robin cycling is stopped or resumed. The push-buttons **Zoom in** and **Zoom out** enables rescaling of the graph. This makes it possible to view PCR jitter values that are outside the range defined by the auto-scaling. Clicking the **Clear** button will clear historical data from the histogram.

Tool-tip functionality provides information about each histogram bar: the number of samples, the percentage of total number of samples and the jitter interval represented by the bar. For PCR measurements to be valid it is essential that the signal be stuffed with null packets (PID 8191) to obtain an absolutely constant bitrate. The stream info above the histogram shows if the analyzed stream contains null packets or not. A color indicator above the PCR jitter histogram indicates whether the signal is of constant bitrate or not, as perceived by the PCR filter in the processing engine. Green indicates OK, red indicates that the PCR jitter measurements are not valid due to the bitrate not being constant.

Note that PCR jitter measurements for Ethernet streams are very sensitive to packet loss, and packet loss results in a large jitter values – often for all PCR PIDs of an MPTS.

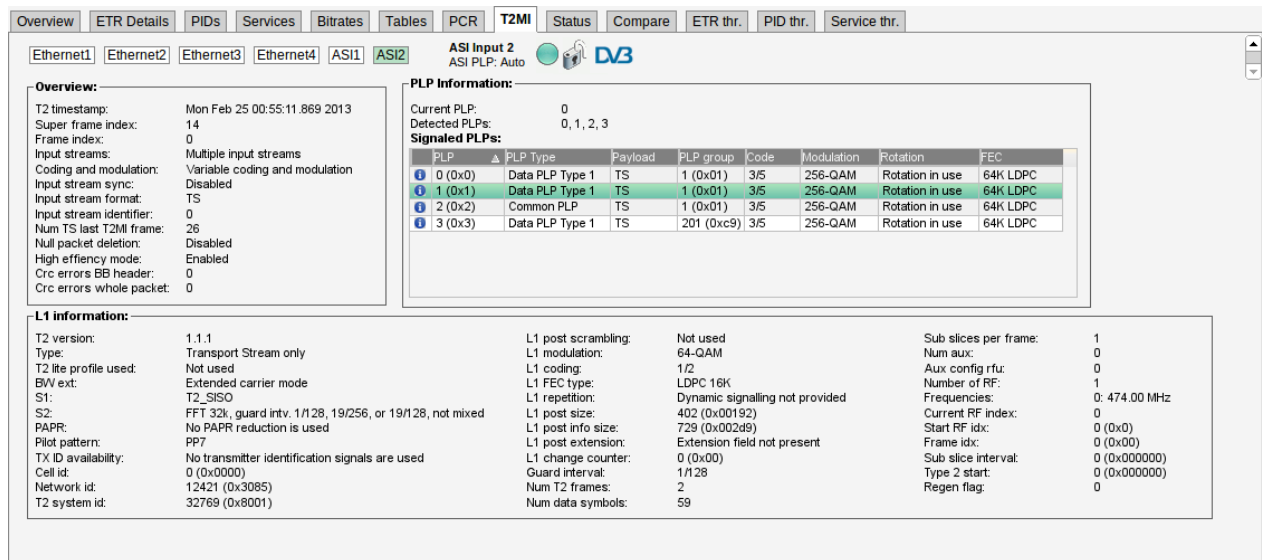
The PCR PID list displays the following parameters:

PID:	The PID for which the following parameters apply.
Current:	The last PCR jitter value measured.
Overall max:	The maximum PCR jitter value measured since transport stream sync was obtained. Note that this may not correspond to the maximum value for PCR jitter in the histogram, as the histogram displays values measured from the time when a PCR PID was selected.
Threshold:	The PCR jitter threshold currently valid for the stream, as defined in the associated ETR threshold template.

In addition to the histogram itself, the following parameters are displayed:

Max jitter (ns):	The maximum jitter value measured from the time the PID was selected.
Average jitter (ns):	The average jitter in nanoseconds.
Bin resolution (ns):	The width of the jitter interval spanned by each histogram bar.
Outside thresholds:	The number of PCR values that are outside the PCR jitter thresholds (defined by the user as part of the ETR threshold template).
Out of view:	The number of PCR values that are out of the currently displayed view.

6.9.8 ETR 290 — T2MI (requires T2MI-OPT)



Overview:

T2 timestamp: Mon Feb 25 00:55:11.869 2013
 Super frame index: 14
 Frame index: 0
 Input streams: Multiple input streams
 Coding and modulation: Variable coding and modulation
 Input stream sync: Disabled
 Input stream format: TS
 Input stream identifier: 0
 Num TS last T2MI frame: 26
 Null packet deletion: Disabled
 High efficiency mode: Enabled
 Crc errors BB header: 0
 Crc errors whole packet: 0

PLP Information:

Current PLP: 0
 Detected PLPs: 0, 1, 2, 3
 Signed PLPs:

PLP	PLP Type	Payload	PLP group	Code	Modulation	Rotation	FEC
0 (0x0)	Data PLP Type 1	TS	1 (0x01)	3/5	256-QAM	Rotation in use	64K LDPC
1 (0x1)	Data PLP Type 1	TS	1 (0x01)	3/5	256-QAM	Rotation in use	64K LDPC
2 (0x2)	Common PLP	TS	1 (0x01)	3/5	256-QAM	Rotation in use	64K LDPC
3 (0x3)	Data PLP Type 1	TS	201 (0xc9)	3/5	256-QAM	Rotation in use	64K LDPC

L1 information:

T2 version: 1.1.1	L1 post scrambling: Not used	Sub slices per frame: 1
Type: Transport Stream only	L1 modulation: 64-QAM	Num aux: 0
T2 lite profile used: Not used	L1 coding: 1/2	Aux config rfu: 0
BW ext: Extended carrier mode	L1 FEC type: LDPC 16K	Number of RF: 1
S1: T2_SISO	L1 repetition: Dynamic signalling not provided	Frequencies: 0: 474.00 MHz
S2: FFT 32k, guard intv. 1/128, 19/256, or 19/128, not mixed	L1 post size: 402 (0x00192)	Current RF index: 0
PAPR: No PAPR reduction is used	L1 post info size: 729 (0x002a9)	Start RF idx: 0 (0x0)
Pilot pattern: PP7	L1 post extension: Extension field not present	Frame idx: 0 (0x00)
TX ID availability: No transmitter identification signals are used	L1 change counter: 0 (0x00)	Sub slice interval: 0 (0x000000)
Cell id: 0 (0x0000)	Guard interval: 1/128	Type 2 start: 0 (0x000000)
Network id: 12421 (0x3085)	Num T2 frames: 2	Regen flag: 0
T2 system id: 32769 (0x8001)	Num data symbols: 59	

T2MI monitoring is a licensed option available for transport streams over Ethernet. T2MI is enabled on a per stream basis, most of the information is found in this GUI extracted from the L1 current packets in the T2MI streams. The full parsing of this information table is found in the ‘Tables’ section.

Please note that the T2MI stream needs to have either a relative or an absolute T2 Timestamp to be received properly. Signals without timing information can not be received.

Overview:

T2 timestamp:	The last received T2 timestamp. The probe supports both relative and absolute timestamps.
Super frame index:	The last received superframe index.
Frame index:	The index of the last received frame.
Input streams:	Indicates whether Single or Multiple Input Streams are used.
Coding and modulation:	Whether the stream uses Constant Coding and Modulation or Adaptive Coding and Modulation.
Input stream sync:	The Input Stream Synchronizer (ISSY) value.
Input stream format:	The format of the input stream. Will normally be 'TS'.
Input stream identifier:	The input stream identifier for the current stream.
Num TS pkt. last T2MI frame:	The number of transport stream packets that was in the last T2MI frame.
Null packet deletion:	Whether null packet deletion is in use or not.
High efficiency mode:	Whether high efficiency mode is active or not.
Crc Errors BB header:	The number of CRC errors on the BB header detected since the monitoring of the stream started.
Crc Errors whole packet:	The number of CRC errors calculated over the whole T2MI packet since the monitoring of the stream started.

L1 information:

T2 version:	The version of the T2 spec used. Up to version 1.3.1 is supported including T2 lite.
Type:	The type of data carried in the Transport stream.
T2 lite profile used:	Set to true if the T2 lite profile is used for sending power efficient broadcasts to portable clients.
BW ext:	The carrier mode (normal or extended).
S1:	T2-SISO, T2-MISO or Non-T2.
S2:	FFT mode and guard interval.
PAPR:	The PAPR reduction mode (if any).
Pilot pattern:	Pilot pattern PP1 to PP8.
TX ID availability:	Should always be set to 'No transmitter identification signals are used'.
Cell id:	The cell ID for the transmitter.
Network id:	The network id for this DVB-T2 network.

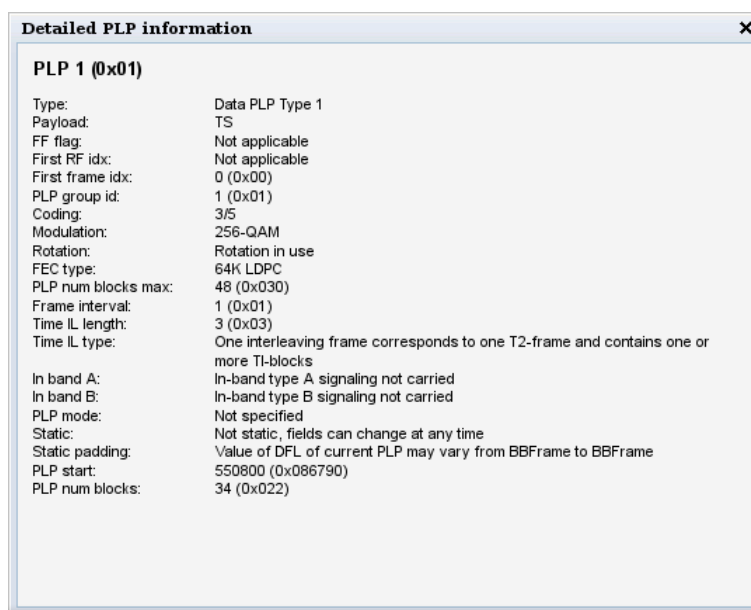
T2 system id:	The T2 system id.
L1 post scrambling:	Says whether post scrambling is used or not.
L1 modulation:	The L1 modulation type used. BPSK, QPSK, 16-QAM or 64-QAM.
L1 FEC type:	The L1 fec type in use. Only 'LDPC 16K' is currently supported in DVB-T2.
L1 repetition:	Shows if dynamic signaling is provided.
L1 post size:	The L1 post size.
L1 post info size:	The L1 post info size.
L1 post extension:	Shows if extension field is provided.
L1 change counter:	The value of the L1 change counter.
Guard interval:	The guard interval used for the transmission. 1/32, 1/16, 1/8 or 1/4.
Num T2 frames:	The number of T2 frames signaled.
Num data symbols:	The number of data symbols signaled.
Sub slices per frame:	How many sub slices are used per T2 frame.
Num aux:	The number of auxiliary channels transmitted.
Aux config rfu:	The aux config rfu number.
Number of RF:	The number of RF frequencies used to transmit the signal.
Frequencies:	The list of frequencies used to transmit the signal. Normally only one frequency will be used.
Current RF index:	The index of the frequency currently being used for the transmission.
Start RF idx:	The starting RF index.
Frame idx:	The frame index.
Sub slice interval:	The interval between sub slices.
Type 2 start:	The value of the type 2 start parameter.
Regen flag:	The value of the regen flag.

PLP (Physical Layer Pipes) information:

Current PLP:	The PLP currently being received. If a specific PLP was configured the interface settings T2MI extraction (Multicasts — Streams), this will be used. If auto mode is used the first PLP detected will be used.
Detected PLPs:	The detected PLP ids in the T2MI stream. In some error situations this may differ from the list of Signaled PLPs show below.
Signaled PLPs:	Lists the PLPs signaled in the stream.
PLP type:	The signaled type of the PLP. Data PLP Type 1 is the most common, some signals can have a common PLP as well as well as other PLP types.

Payload:	Payload type of this PLP. Will typically be the Transport Stream format
PLP Group:	The group signaled for this PLP. The PLPs in a group shares one common PLP and when analyzing a PLP both the data in the specified PLP and the common PLP in the same group (if present) are extracted. The PLP contains PIDs which are shared such as PAT, SDT, NIT, CAT and EMMs. In the example above , analyzing PLP 0 will also analyze PLP 2.
Code:	The FEC coding scheme used for this PLP.
Modulation:	Modulation for the PLP.
Rotation:	Specifies if IQ rotation is enabled.
FEC:	Specifies the FEC coding type for this PLP.

Clicking the blue information symbol in the PLP list will bring up more detailed information for that PLP.

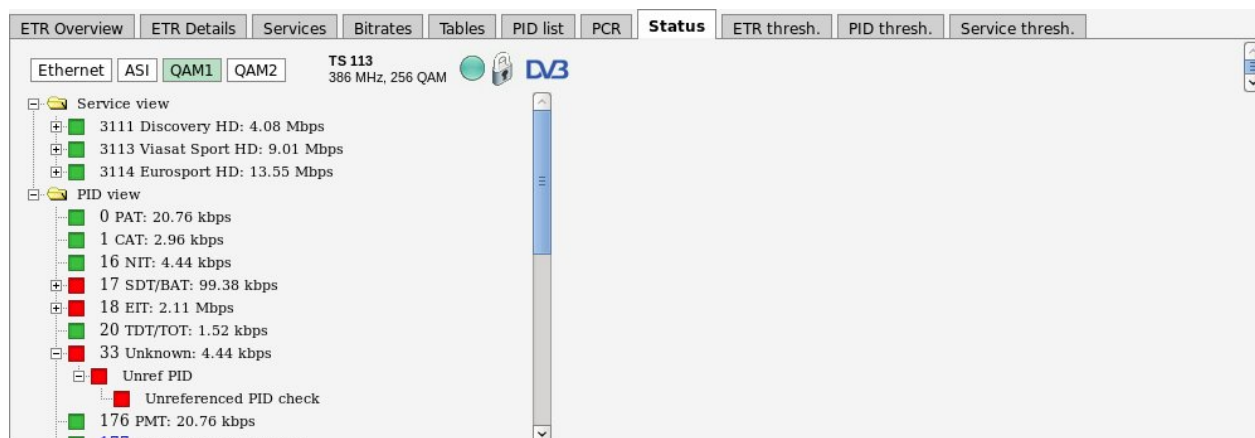


Detailed PLP information:

PLP:	The ID of the signaled PLP.
Type:	The signaled type of the PLP. Data PLP Type 1 is the most common, some signals can have a common PLP as well as well as other PLP types.
Payload:	Payload type of this PLP. Will typically be the Transport Stream format
FF flag:	The FF flag value.
First RF idx:	The first RF index used for transmitting this PLP.
First frame idx:	The first frame index used to transmit this PLP.

PLP group id:	The group signaled for this PLP. The PLPs in a group shares one common PLP and when analyzing a PLP both the data in the specified PLP and the common PLP in the same group (if present) are extracted. The PLP contains PID which are shared such as PAT, SDT, NIT, CAT and EMMs.
Coding:	The FEC coding scheme used for this PLP.
Modulation:	Modulation used for transmitting this PLP.
Rotation:	Specifies if IQ rotation is enabled for this PLP.
FEC type:	Specifies the FEC coding type for this PLP.
PLP num blocks max:	The maximum number of blocks which can be used by this PLP.
Frame interval:	The frame interval for this PLP.
Time IL length:	The length of the time interleaver.
Time IL type:	The time interleaving type in use.
In band A:	Says if in-band type A signaling is used for this PLP.
In band B:	Says if in-band type B signaling is used for this PLP.
PLP mode:	The PLP mode for this PLP.
Static:	Says whether the PLP bandwidth is static or not static.
Static padding:	Says whether the padding is static or can change between each BB frame.
PLP start:	The start value for the PLP in the stream.
PLP num blocks:	The number of blocks used for this PLP.

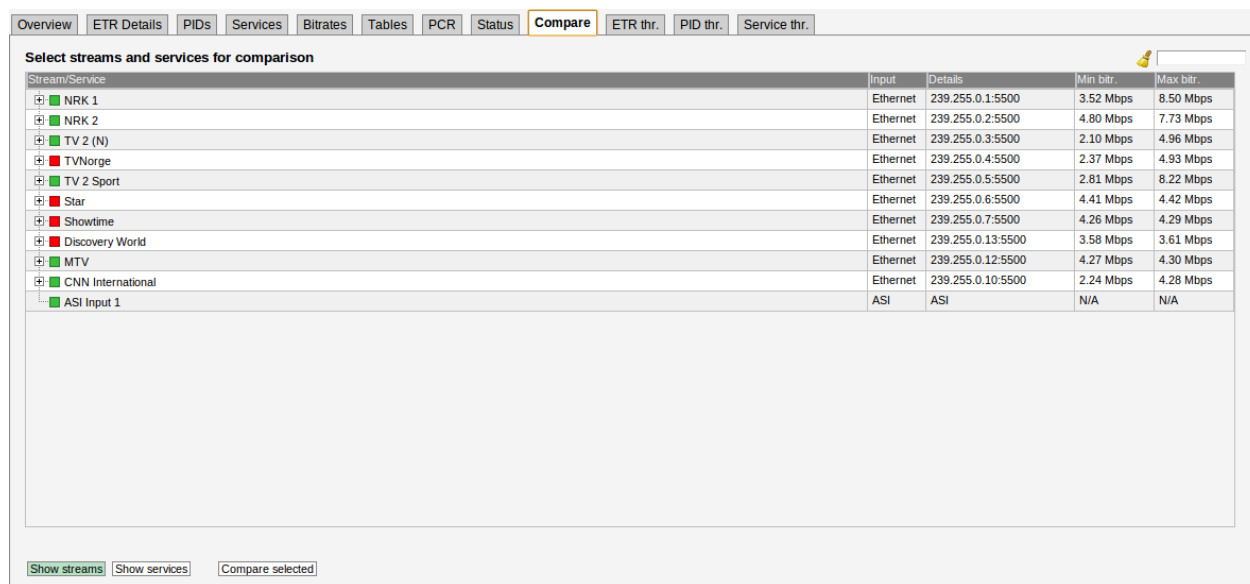
6.9.9 ETR 290 — Status



The **ETR 290 — Status** view shows a stream content overview linked to current alarms, making it easy to view what services and PIDs are currently affected by errors.

By clicking any of the ‘view’, service or PID nodes, more information will be displayed on the right hand side of the table. This information is described in **ETR 290 — Services**.

6.9.10 ETR 290 — Compare



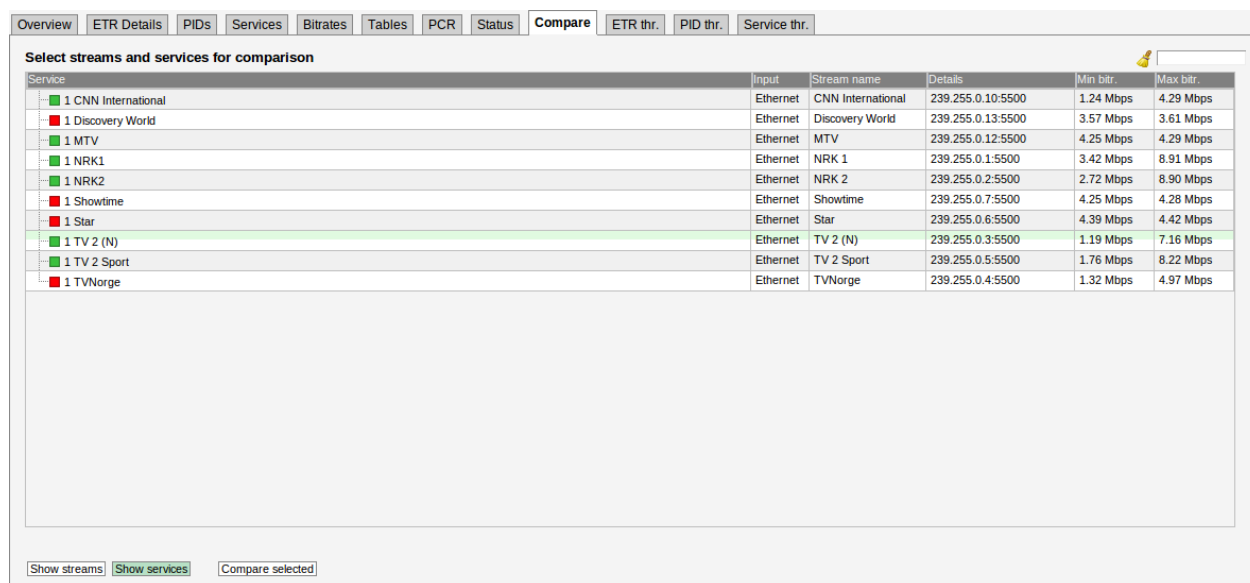
The screenshot shows the 'Compare' tab selected in the ETR 290 interface. The table displays the following data:

Stream/Service	Input	Details	Min bitr	Max bitr
NRK 1	Ethernet	239.255.0.1:5500	3.52 Mbps	8.50 Mbps
NRK 2	Ethernet	239.255.0.2:5500	4.80 Mbps	7.73 Mbps
TV 2 (N)	Ethernet	239.255.0.3:5500	2.10 Mbps	4.96 Mbps
TVNorge	Ethernet	239.255.0.4:5500	2.37 Mbps	4.93 Mbps
TV 2 Sport	Ethernet	239.255.0.5:5500	2.81 Mbps	8.22 Mbps
Star	Ethernet	239.255.0.6:5500	4.41 Mbps	4.42 Mbps
Showtime	Ethernet	239.255.0.7:5500	4.26 Mbps	4.29 Mbps
Discovery World	Ethernet	239.255.0.13:5500	3.58 Mbps	3.61 Mbps
MTV	Ethernet	239.255.0.12:5500	4.27 Mbps	4.30 Mbps
CNN International	Ethernet	239.255.0.10:5500	2.24 Mbps	4.28 Mbps
ASI Input 1	ASI	ASI	N/A	N/A

Buttons at the bottom: **Show streams**, **Show services**, **Compare selected**.

The **Compare** view is based on analysis performed by the ETSI TR 101 290 engine and only the streams monitored by ETR will be listed.

The **Compare** view allows comparison of services or transport streams across different probe interfaces. Clicking **Show streams** results in a list of selectable transport streams and services, and clicking **Show services** results in a list of selectable services. Note that the screen is not auto-refreshed, click the **Compare** tab to perform an active refresh.

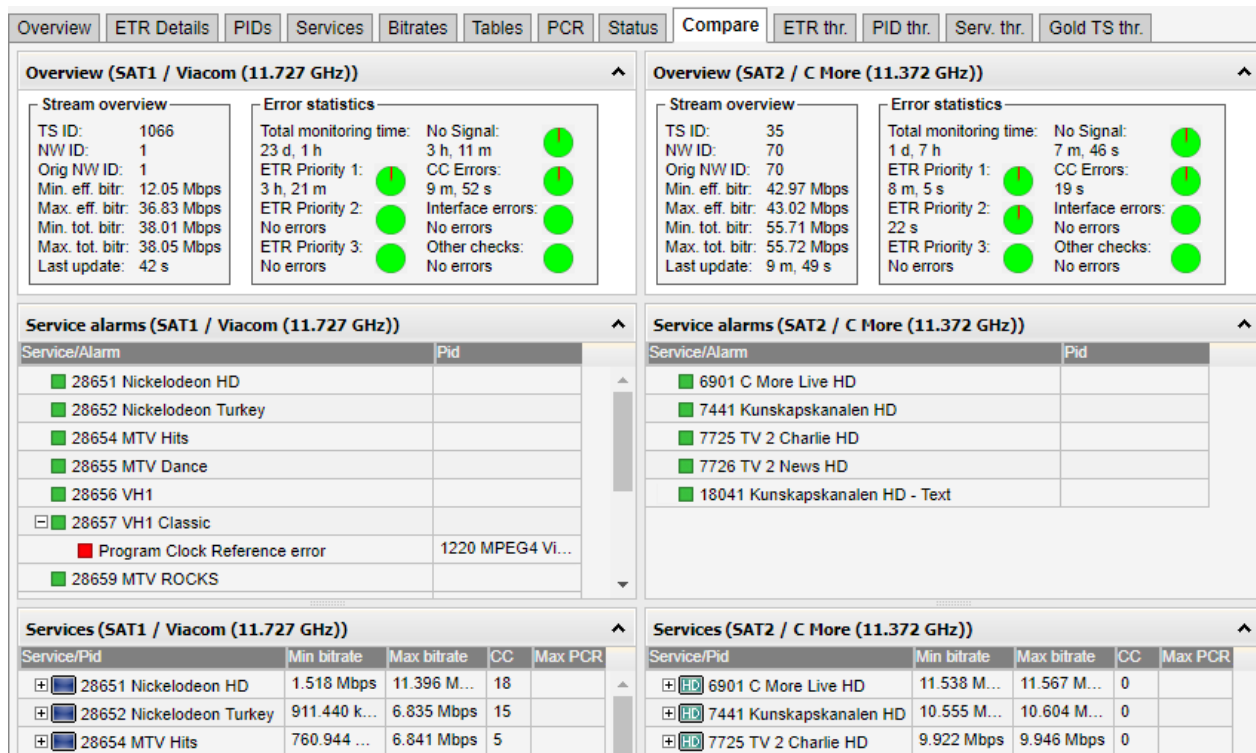


The screenshot shows the 'Compare' tab selected in the ETR 290 interface. The table displays the following data:

Service	Input	Stream name	Details	Min bitr	Max bitr
1 CNN International	Ethernet	CNN International	239.255.0.10:5500	1.24 Mbps	4.29 Mbps
1 Discovery World	Ethernet	Discovery World	239.255.0.13:5500	3.57 Mbps	3.61 Mbps
1 MTV	Ethernet	MTV	239.255.0.12:5500	4.25 Mbps	4.29 Mbps
1 NRK1	Ethernet	NRK 1	239.255.0.1:5500	3.42 Mbps	8.91 Mbps
1 NRK2	Ethernet	NRK 2	239.255.0.2:5500	2.72 Mbps	8.90 Mbps
1 Showtime	Ethernet	Showtime	239.255.0.7:5500	4.25 Mbps	4.28 Mbps
1 Star	Ethernet	Star	239.255.0.6:5500	4.39 Mbps	4.42 Mbps
1 TV 2 (N)	Ethernet	TV 2 (N)	239.255.0.3:5500	1.19 Mbps	7.16 Mbps
1 TV 2 Sport	Ethernet	TV 2 Sport	239.255.0.5:5500	1.76 Mbps	8.22 Mbps
1 TVNorge	Ethernet	TVNorge	239.255.0.4:5500	1.32 Mbps	4.97 Mbps

Buttons at the bottom: **Show streams**, **Show services**, **Compare selected**.

One or more services or transport streams are selected by clicking and later *Ctrl* + clicking items from the list. Clicking the **Compare selected** button will launch a condensed overview page that allows status parameters for services or streams to be viewed side by side. Key parameters are presented in one column for each service/stream, and it is easy to recognize differences in signal contents or alarm status. The number of streams that can be compared depends on screen size.



Overview (SAT1 / Viacom (11.727 GHz))

Stream overview

TS ID:	1066
NW ID:	1
Orig NW ID:	1
Min. eff. bitr:	12.05 Mbps
Max. eff. bitr:	36.83 Mbps
Min. tot. bitr:	38.01 Mbps
Max. tot. bitr:	38.05 Mbps
Last update:	42 s

Error statistics

Total monitoring time:	No Signal:	
23 d, 1 h	3 h, 11 m	
ETR Priority 1:	CC Errors:	
3 h, 21 m	9 m, 52 s	
ETR Priority 2:	Interface errors:	
No errors	No errors	
ETR Priority 3:	Other checks:	
No errors	No errors	

Service alarms (SAT1 / Viacom (11.727 GHz))

Service/Alarm	Pid
28651 Nickelodeon HD	
28652 Nickelodeon Turkey	
28654 MTV Hits	
28655 MTV Dance	
28656 VH1	
28657 VH1 Classic	
Program Clock Reference error	1220 MPEG4 Vi...
28659 MTV ROCKS	

Services (SAT1 / Viacom (11.727 GHz))

Service/Pid	Min bitrate	Max bitrate	CC	Max PCR
28651 Nickelodeon HD	1.518 Mbps	11.396 M...	18	
28652 Nickelodeon Turkey	911.440 k...	6.835 Mbps	15	
28654 MTV Hits	760.944 ...	6.841 Mbps	5	

Overview (SAT2 / C More (11.372 GHz))

Stream overview

TS ID:	35
NW ID:	70
Orig NW ID:	70
Min. eff. bitr:	42.97 Mbps
Max. eff. bitr:	43.02 Mbps
Min. tot. bitr:	55.71 Mbps
Max. tot. bitr:	55.72 Mbps
Last update:	9 m, 49 s

Error statistics

Total monitoring time:	No Signal:	
1 d, 7 h	7 m, 46 s	
ETR Priority 1:	CC Errors:	
8 m, 5 s	19 s	
ETR Priority 2:	Interface errors:	
22 s	No errors	
ETR Priority 3:	Other checks:	
No errors	No errors	

Service alarms (SAT2 / C More (11.372 GHz))

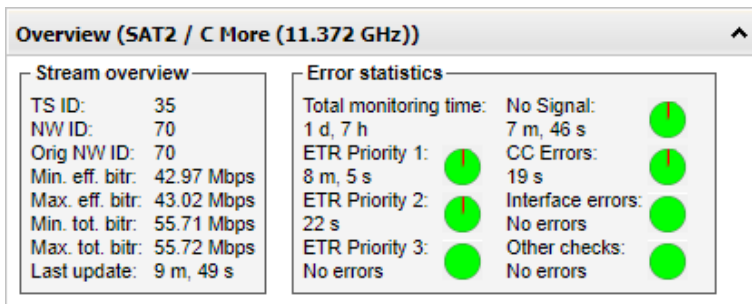
Service/Alarm	Pid
6901 C More Live HD	
7441 Kunskapskanalen HD	
7725 TV 2 Charlie HD	
7726 TV 2 News HD	
18041 Kunskapskanalen HD - Text	

Services (SAT2 / C More (11.372 GHz))

Service/Pid	Min bitrate	Max bitrate	CC	Max PCR
6901 C More Live HD	11.538 M...	11.567 M...	0	
7441 Kunskapskanalen HD	10.555 M...	10.604 M...	0	
7725 TV 2 Charlie HD	9.922 Mbps	9.946 Mbps	0	

The compare column consists of several sub-views:

Stream overview



Overview (SAT2 / C More (11.372 GHz))

Stream overview

TS ID:	35
NW ID:	70
Orig NW ID:	70
Min. eff. bitr:	42.97 Mbps
Max. eff. bitr:	43.02 Mbps
Min. tot. bitr:	55.71 Mbps
Max. tot. bitr:	55.72 Mbps
Last update:	9 m, 49 s

Error statistics

Total monitoring time:	No Signal:	
1 d, 7 h	7 m, 46 s	
ETR Priority 1:	CC Errors:	
8 m, 5 s	19 s	
ETR Priority 2:	Interface errors:	
22 s	No errors	
ETR Priority 3:	Other checks:	
No errors	No errors	

Stream overview shows a number of key parameters for the selected stream/service.

Stream overview

TS ID: The transport stream ID of the selected stream or the stream containing the selected service

NW ID:	The network ID of the selected stream or the stream containing the selected service
Orig NW ID:	The original network ID of the selected stream or the stream containing the selected service
Min. eff. bitr:	The minimum effective bitrate (null packets removed) measured for the selected stream or the stream containing the selected service
Max. eff. bitr:	The maximum effective bitrate (null packets removed) measured for the selected stream or the stream containing the selected service
Min. tot. bitr:	The minimum total bitrate (including null packets) measured for the selected stream or the stream containing the selected service
Max. tot. bitr:	The maximum total bitrate (including null packets) measured for the selected stream or the stream containing the selected service
Last update:	The time since the last update. The information will be updated when the round robin ETR engine stops monitoring a stream or once every minute for streams which are permanently monitored.

Error statistics

Total monitoring time:	The total time the stream has been monitored by the ETR engine
ETR Priority 1:	The time the stream has been affected by ETSI TR 101 290 Priority 1 errors
ETR Priority 2:	The time the stream has been affected by ETSI TR 101 290 Priority 2 errors
ETR Priority 3:	The time the stream has been affected by ETSI TR 101 290 Priority 3 errors
No signal:	The time the stream has been affected by 'No signal' alarm
CC errors:	The time the stream has been affected by 'CC error' alarm
Interface errors:	The time the stream has been affected by 'Interface error' alarm
Other checks:	The time the stream has been affected by miscellaneous 'Other' alarms

Pie charts indicate for how long the stream has been affected by errors compared to the total monitoring time, green color representing 'OK' and red color 'Error'.

Service alarm

Service alarms (SAT1 / Viacom (11.727 GHz))	
Service/Alarm	Pid
 28651 Nickelodeon HD	
 28652 Nickelodeon Turkey	
 28654 MTV Hits	
 28655 MTV Dance	
 28656 VH1	
 28657 VH1 Classic	
 Program Clock Reference error	1220 MPEG4 Vi...
 28659 MTV ROCKS	

If a transport stream is selected for comparison the **Service alarms** sub-view displays a list of services present in the stream. If there is one or more active alarms for a service this will be indicated by a red ‘bulb’ whereas a green ‘bulb’ indicates no active alarms. If a service is affected by one or more active alarms these alarms may be viewed by expanding the service tree. If relevant the PIDs affected by alarms are also displayed. Note that only alarms detected during the last monitoring period are displayed.

If a service is selected for comparison this sub-view simply shows the selected service and any active alarms affecting the service.

Services

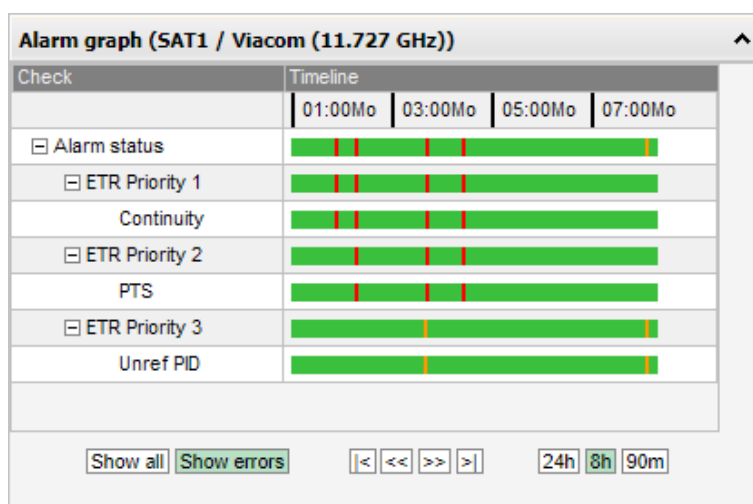
Services (SAT2 / C More (11.372 GHz))				
Service/Pid	Min bitrate	Max bitrate	CC	Max PCR
  6901 C More Live HD	11.538 M...	11.575 M...	0	
 404 PMT	7.440 kbps	7.576 kbps	0	
 4214 MPEG1 Audio	261.128 ...	263.856 ...	0	
 3325 MPEG1 Audio	261.128 ...	263.856 ...	0	
 7116 ECM	14.880 k...	16.608 k...	0	
 1278 MPEG4 Video	11.008 M...	11.040 M...	0	N/A
  7441 Kunskapskanalen HD	10.552 M...	10.599 M...	0	
  7725 TV 2 Charlie HD	9.922 Mbps	9.955 Mbps	0	

If a transport stream is selected for comparison the **Services** sub-view displays a list of services present in the stream. Clicking the plus icon at a service will expand the service tree, displaying the service’s individual components. The minimum and maximum effective bitrates of a service/-component are also shown, in addition to the number of continuity counter errors and the maximum measured PCR jitter (if relevant).

Colored PIDs indicate scrambling; blue and green representing odd and even scrambling respectively.

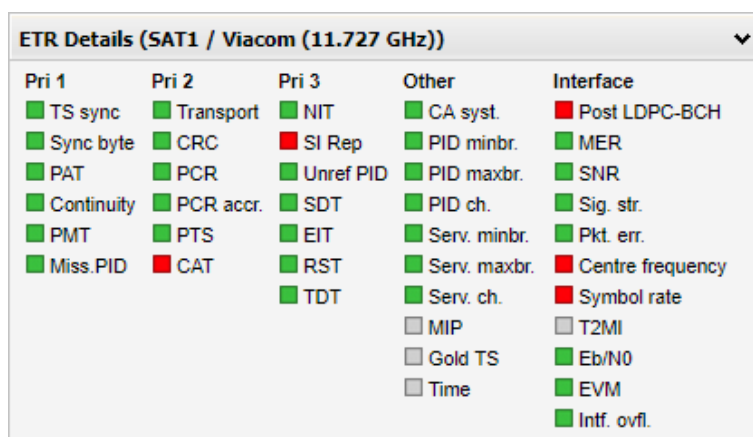
Note that all references to a PID will result in a PID entry, i.e. one PID may be displayed several times in the list.

Alarm graph



The Alarm graph sub-view shows similar alarm graphs as the **ETR 290 — ETR Details — Alarm graph popup** view. Please refer to the **ETR 290 — ETR Details** section of this User's Manual for a comprehensive description of this view.

ETR Details



The ETR details sub-view shows the same alarm overview as the **ETR 290 — ETR Details** view. Clicking a check will open a pop-up view displaying alarm details. Please refer to the **ETR 290 — ETR Details** section of this user's manual for a comprehensive description of this view.

Tables

Tables (IPTV / Eurosport 1 HD (N) (239.255.2.20:5500))				Tables (IPTV / DELUXE MUSIC (239.255.1.20:5500))			
PID	Table	CRC	Compare	PID	Table	CRC	Compare
0	PAT (PID 0, TID 0)	0xDDF22CE1	Reference	0	PAT (PID 0, TID 0)	0x5F020F81	Compare
1	CAT (PID 1, TID 1)	0xD5DCFB4C	Reference	1	CAT (PID 1, TID 1)	0xD5DCFB4C	Compare
482	PMT Service 7273 (PID 482, TI...	0xB720DAD6	Reference	99	PMT Service 65 (PID 99, TID 2)	0xC48A6F	No match
17	SDT Actual TS ID 39 Orig NW I...	0x31BECFE3	Reference	16	NIT Actual NW ID 65280 (PID 1...	0xA8CD098F	No match
20	TDT (PID 20, TID 112)	0x0	Reference	17	SDT Actual TS ID 15 Orig NW I...	0xB5B3EEAE	Compare
				20	TDT (PID 20, TID 112)	0x0	Compare
				20	TOT (PID 20, TID 115)	0x0	No match
				3333	AIT (PID 3333, TID 116)	0x63D1E66A	No match
				482	PMT Service 7273 (PID 482, TI...	N/A	Not found

The Tables sub-view provides a comparison of all PSI/SI tables present in the selected streams. The first transport stream selected will serve as a reference stream for the other(s). Each entry will display the PID, table name, and the CRC for the table. If a table exists in both the reference stream and the current stream and has a different CRC, it is marked in red and a 'Compare'-link will show for a more detailed view of the differences between the two. Likewise if the table are present in both streams, but has equal CRC, it will be displayed with normal text color and a 'Compare'-link will be shown. If either a table is only found in the reference stream or the current stream, it will be marked in pink with 'Not found' or grey with 'No match', respectively. Note that this feature only applies for comparing streams, not services within the same stream.

6.9.11 ETR 290 — ETR threshold

Overview
ETR Details
PIDs
Services
Bitrates
Tables
PCR
Status
Compare
ETR thr.
PID thr.
Serv. thr.
Gold TS thr.

ETR Thresholds

These thresholds are used to define detailed conditions for ETR 290 alarm triggering on a per-stream basis.

Name	Refs	Description	Tuning duration	Mode	Edit
ETSI TR 101 290	0	Settings according to TR 101 290. Some advanced features are disabled	70	DVB	Edit
Full ETR 290	131	Settings according to TR 101 290. Some advanced features are disabled	70	DVB	Edit
ATSC Default	0	ATSC template based on TR 101 290. Some advanced features are disabled	70	ATSC	Edit
Optimised	0	Optimised settings with additional checks enabled	70	DVB	Edit
IP-SPTS	0	Settings adapted to IP streaming of Single Program Transport Streams	20	DVB	Edit
CMTS downlink	0	Used to verify CMTS downlink traffic	20	DVB	Edit
Analog carrier	0	For monitoring analog frequencies	15	DVB	Edit
Default	4	Default template used for new streams. Only important alarms are raised.	70	DVB	Edit
PCR testing	3		70	DVB	Edit
ASI	1		70	DVB	Edit
DVB-T2	1		70	DVB	Edit
DVB-T1	1		70	DVB	Edit
SAT 1.2 GHz	1		70	DVB	Edit

ETR thresholds: 13

Add new threshold
Duplicate selected
Delete selected
Edit selected

The **ETR thresholds** make it possible to define detailed conditions for ETR 290 alarm triggering on a per-stream basis. There are seven predefined ETR threshold templates that are write-protected and cannot be edited by the operator:

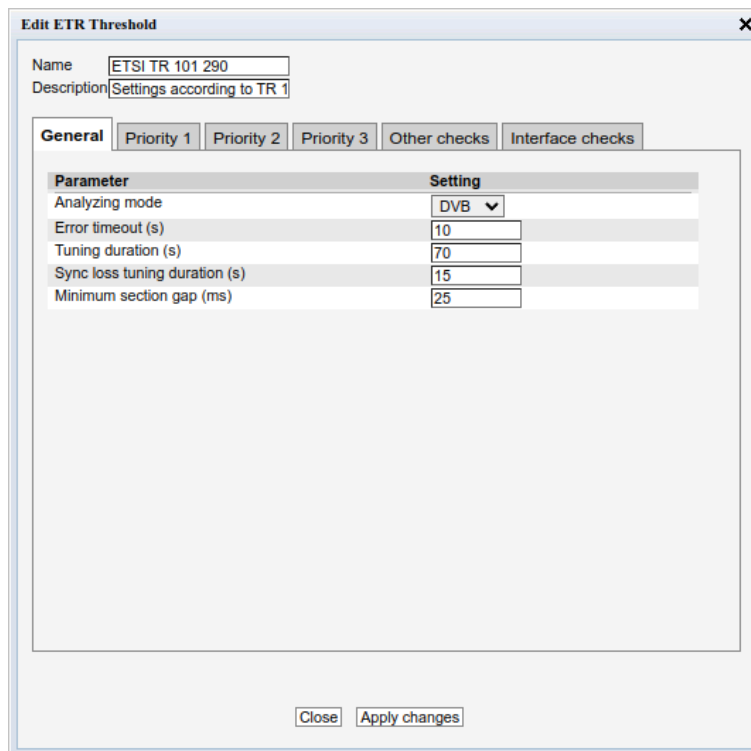
- Default
- ETSI TR 101 290
- ATSC Default
- Optimised
- IP-SPTS
- CMTS downlink
- Analog carrier

These predefined thresholds may be used when defining a monitoring configuration, but it is a good idea to create editable copies of these threshold templates and use these copies rather than the originals. Doing so will allow fine-tuning of parameters later on.

There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold** button. A pop-up window will appear allowing the user to define alarm conditions and set the round-robin cycling time. The default values of the different parameters settings are in accordance with the template **Default**. Another way of creating a user-defined threshold template is by highlighting one of the threshold templates already defined and then click the **Duplicate highlighted** button. The copy created this way may be edited during the fine-tuning phase of system configuration.

Deleting an ETR threshold template is done by highlighting the threshold template that should be removed and clicking **Delete highlighted**. Note that if the deleted threshold template is assigned to a stream currently being monitored, the new threshold for that stream will default to the predefined **Default** threshold template.

It is possible to perform multi-editing of existing threshold templates by selecting several threshold templates (using the regular *Ctrl + click* or *Shift + click* functionality) and clicking **Edit selected**. Parameters that differ between the threshold templates will be represented by an asterisk in the **Edit ETR threshold** view. Changes made will affect all selected threshold templates.



Parameter	Setting
Analyzing mode	DVB
Error timeout (s)	10
Tuning duration (s)	70
Sync loss tuning duration (s)	15
Minimum section gap (ms)	25

The ETR threshold dialog is divided into tabs for easier access to the relevant settings and has the following settings:

ETR Thresholds — Parameters:

Name: A text field with the name of the ETR threshold template

Description: Text field that should contain a meaningful description of the threshold

ETR Thresholds — General:

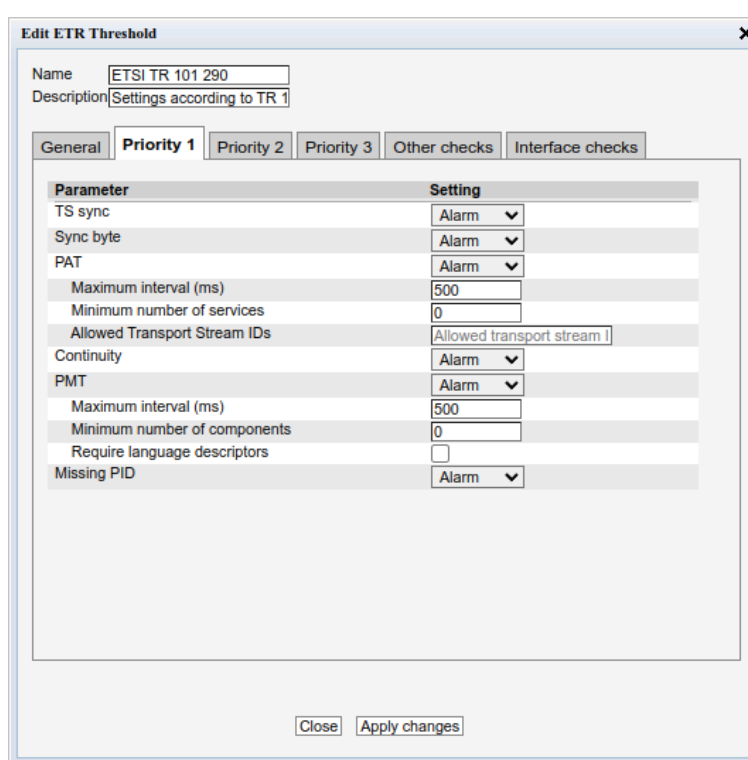
Analyzing mode: The mode of table analysis. DVB, ATSC or ISDB may be selected.

Error timeout (s): The number of seconds an alarm stays active before it is cleared, if no new alarms are generated. For all table related alarms the actual alarm timeout used is the sum of the Error timeout parameter and the maximum table repetition period. E.g. the TDT (Time Date Table) with table repetition set to 30 seconds will have an effective error timeout of 40 seconds. This avoids toggling of alarms for tables that are sent infrequently. Default value: 10 s

Tuning duration (s): The time (in seconds) the probe will stay tuned to a frequency/multicast during the round-robin loop. For setting the tuning duration, use the following expression: $\text{max_table_rep} * 2 + 10$
 Use the maximum table repetition, multiply it by 2 and then add 10 seconds.
 E.g. with TDT repetition set to 30 seconds, use $30 * 2 + 10 = 70$ seconds tuning duration.
 In order to speed up the tuning process tables should be transmitted more frequently. For instance if TDT, which is usually the least frequently transmitted table, is sent every 10 seconds, a tuning duration of 30 seconds may be used. For signals without TDT (common in SPTS) the TDT check can be disabled and the tuning duration may be reduced. If the tuning duration is set too low the checks for tables with long table repetition periods will still be in an unknown state as the probe does not have enough measurements to determine the state for these. Tuning duration should never be set to less than 10 seconds for Ethernet streams and 15 seconds for all other streams (the minimum for RF streams depends on the setup). Default value: 70 s

Sync loss tuning duration (s): The time (in seconds) the probe will stay tuned to a frequency/multicast with TS Sync loss during the round-robin tuning process. Usually there is no need to stay tuned to a frequency/multicast once the probe has established that there is no signal on the tuning setup. When monitoring a tuning setup with signal loss, the probe will use the lowest value of 'Tuning duration' and 'Sync loss tuning duration', e.g. if the former is set to 60 seconds and the latter to 1000 seconds, 60 seconds will be used. Default value: 15 s

Minimum section gap (ms): The minimum allowed gap between transmission of two consecutive sections with the same table ID. If the sections are transmitted too rapidly the STB may not be able to process the data in time and various problems can occur. However newer STBs can normally handle lower section gaps than the default value of 25ms. The section gap time is measured as the time between reception of the last TS packet of two consecutive (complete) sections. This section gap setting is used for PAT, PMT, CAT, NIT, RST, TDT, MGT, VCT, PIM/PNM, RRT, ATSC EIT, ETT and STT. There are separate gap settings for SDT and EIT. Default value: 25 ms



Parameter	Setting
TS sync	Alarm ▼
Sync byte	Alarm ▼
PAT	Alarm ▼
Maximum interval (ms)	500
Minimum number of services	0
Allowed Transport Stream IDs	Allowed transport stream I
Continuity	Alarm ▼
PMT	Alarm ▼
Maximum interval (ms)	500
Minimum number of components	0
Require language descriptors	☐
Missing PID	Alarm ▼

ETR Thresholds — Priority 1:

TS sync: Enable or disable alarming of no signal error (TS sync loss)

Sync byte: Enable or disable alarming of sync byte errors

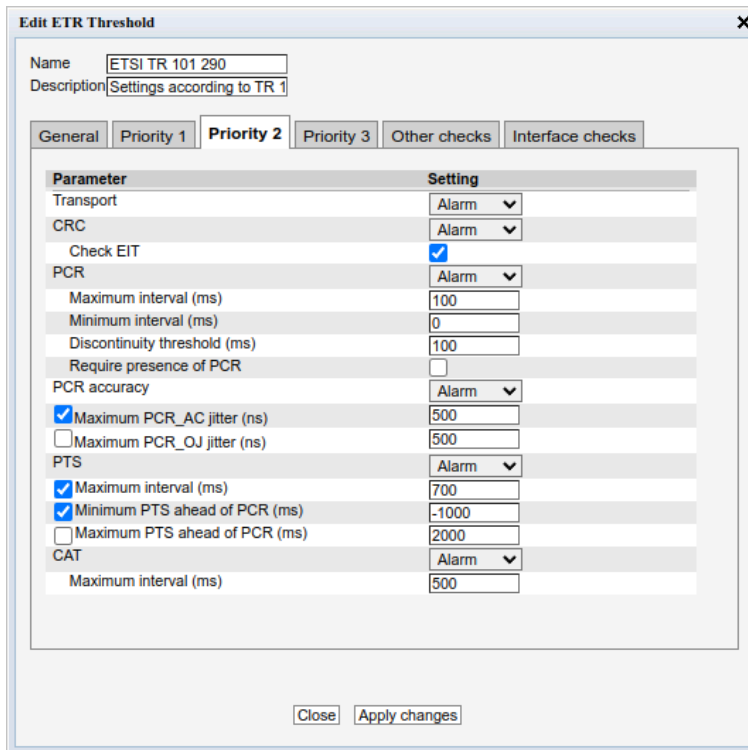
PAT: Enable or disable alarming of Program Association Table errors

PAT – Maximum interval (ms): The maximum allowed section repetition interval for the PAT table. Default according to ETSI TR 101 290: 500 ms

PAT – Minimum number of services: The minimum number of services that must be present in the PAT. Set to 0 to disable this check. Default: 0

PAT – Allowed Transport Stream IDs:	When this field is left blank all TS IDs are considered valid. If one or more TS IDs are specified (separated by commas or as a range) only these IDs are considered valid, and any other TS ID will trigger an alarm. Example of a valid field: ‘100-120, 300,320’
Continuity:	Enable or disable alarming of Continuity Counter errors
PMT:	Enable or disable alarming of Program Map Table errors
PMT – Maximum interval (ms):	The maximum allowed section repetition interval for the PMT tables. Default according to ETSI TR 101 290: 500 ms
PMT – Minimum number of components:	The minimum number of components that must be present in all services. Set to 0 to disable this check. Default: 0
PMT – Require language descriptors:	If enabled it requires a language descriptor to be present for all audio components signaled in the PMT. Default: Disabled
Missing PID:	Enable or disable alarming of missing PID errors

Note that errors affecting individual PIDs may be effectively masked by creating suitable PID threshold templates that are associated with these PIDs. This is particularly useful for PIDs affected by continuity counter errors, missing PID errors and unreferenced PID errors.



Edit ETR Threshold

Name: ETSI TR 101 290
Description: Settings according to TR 1

General | Priority 1 | **Priority 2** | Priority 3 | Other checks | Interface checks

Parameter	Setting
Transport	Alarm
CRC	Alarm
Check EIT	☒
PCR	Alarm
Maximum interval (ms)	100
Minimum interval (ms)	0
Discontinuity threshold (ms)	100
Require presence of PCR	☐
PCR accuracy	Alarm
☒ Maximum PCR_AC jitter (ns)	500
☐ Maximum PCR_OJ jitter (ns)	500
PTS	Alarm
☒ Maximum interval (ms)	700
☒ Minimum PTS ahead of PCR (ms)	-1000
☐ Maximum PTS ahead of PCR (ms)	2000
CAT	Alarm
Maximum interval (ms)	500

Close Apply changes

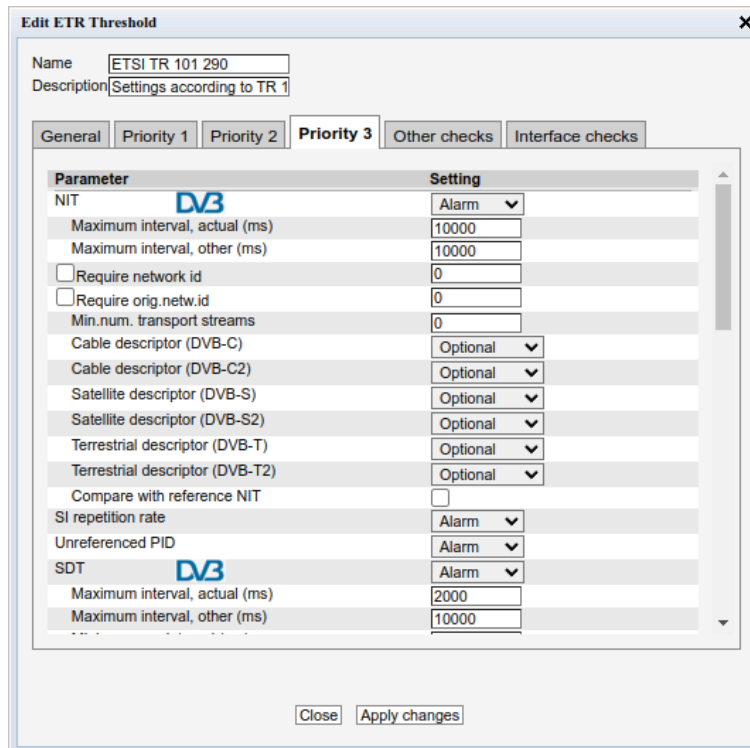
<i>ETR Thresholds — Priority 2:</i>	
Transport:	Enable or disable alarming of Transport error indicator errors
CRC:	Enable or disable alarming of checksum errors for tables
CRC – Check EIT:	When enabled alarming of CRC errors in the EIT tables will be performed. Default: Enabled
CRC – Check AIT:	When enabled alarming of CRC errors in the AIT tables will be performed. Default: Enabled
PCR:	Enable or disable alarming of Program Clock Reference errors
PCR – Maximum interval (ms):	The maximum interval between reception of PCR values. Default according to ETSI TR 101 290: 40 ms
PCR – Minimum interval (ms):	The minimum interval between reception of PCR values. Normally this setting should be 0. Default: 0 ms
PCR – Discontinuity threshold (ms):	The maximum change in the PCR value between two adjoining PCR values (where the discontinuity indicator flag has not been set). Default according to ETSI TR 101 290: 100 ms
PCR – Require presence of PCR:	When enabled an alarm will be raised if a PID signaled as PCR in the PMT does not carry PCR information
PCR Accuracy:	Enable or disable alarming of PCR Accuracy (PCR Jitter) errors for OCR_AJ and PCR_OJ. PCR_OJ is not relevant for Ethernet streams.
PCR Accuracy – Maximum PCR_AC jitter (ns):	The maximum allowed PCR jitter for PCR_AC measurements. Checking of this value will be performed if the checkbox is enabled. Default according to ETSI TR 101 290: 500 ns
PCR Accuracy – Maximum PCR_OJ jitter (ns):	The maximum allowed PCR jitter for PCR_OJ measurements. PCR_OJ measurement does not apply to IP streams. Checking of this value will be performed if the checkbox is enabled and the stream is received on an ASI or RF interface. Default according to ETSI TR 101 290: 500 ns
PTS:	Enable or disable alarming of Presentation Time Stamp errors
PTS – Maximum interval (ms):	The maximum allowed interval between the reception of two PTS values. Checking of this measurement will be performed for all PTS PIDs if the checkbox is enabled in the ETR Thresholds template. When the checkbox is disabled the measurement will only be checked for the PIDs that have this measurement enabled in the PID threshold template . Default threshold according to ETSI TR 101 290: 700 ms

PTS – Minimum PTS ahead of PCR (ms): The minimum allowed value for the measurement of the signaled PTS versus the current PCR clock. If the PTS value sent refers to a PCR clock time that have already passed the measurement will be negative. Checking of this measurement will be performed for all PTS PIDs if the checkbox is enabled in the ETR Thresholds template. When the checkbox is disabled the measurement will only be checked for the PIDs that have this measurement enabled in the **PID threshold template**. Default: -1000 ms

PTS – Maximum PTS ahead of PCR (ms): The maximum allowed value for the measurement of the signaled PTS versus the current PCR clock. Checking of this measurement will be performed for all PTS PIDs if the checkbox is enabled in the ETR Thresholds template. When the checkbox is disabled the measurement will only be checked for the PIDs that have this measurement enabled in the **PID threshold template**. Default: 2000 ms

CAT: Enable or disable alarming of Conditional Access Table errors

CAT – Maximum interval (ms): The maximum allowed section repetition interval for the CAT table. Default according to ETSI TR 101 290: 500 ms



Parameter	Setting
NIT DVB	Alarm
Maximum interval, actual (ms)	10000
Maximum interval, other (ms)	10000
☐ Require network id	0
☐ Require orig.netw.id	0
Min.num. transport streams	0
Cable descriptor (DVB-C)	Optional
Cable descriptor (DVB-C2)	Optional
Satellite descriptor (DVB-S)	Optional
Satellite descriptor (DVB-S2)	Optional
Terrestrial descriptor (DVB-T)	Optional
Terrestrial descriptor (DVB-T2)	Optional
Compare with reference NIT	☐
SI repetition rate	Alarm
Unreferenced PID	Alarm
SDT DVB	Alarm
Maximum interval, actual (ms)	2000
Maximum interval, other (ms)	10000

Close Apply changes

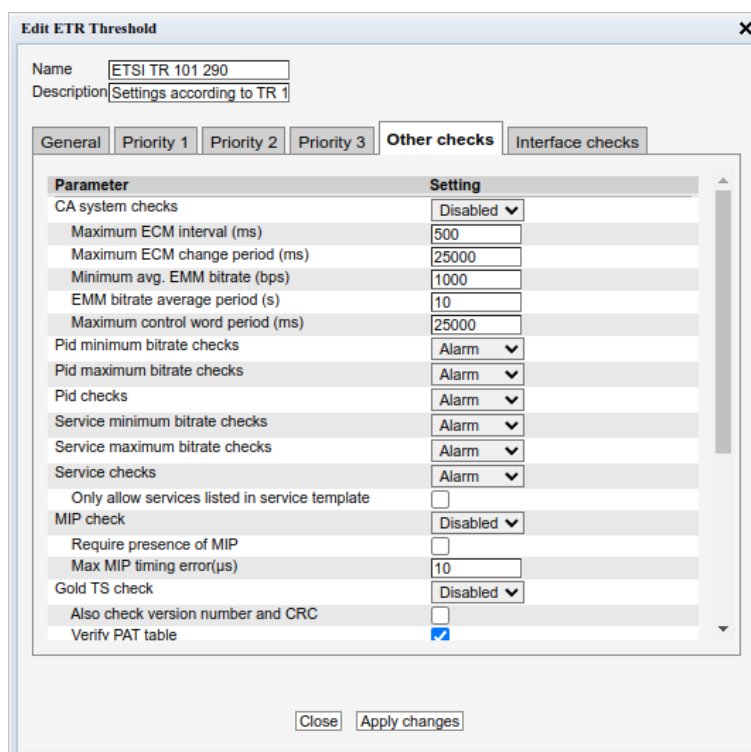
<i>ETR Thresholds — Priority 3:</i>	
NIT:	Enable or disable alarming of Network Information Table errors. Only relevant when DVB mode is selected.
NIT – Maximum interval actual (ms):	The maximum allowed section repetition interval for the NIT actual table. Default according to ETSI TR 101 290: 10 s
NIT – Maximum interval other (ms):	The maximum allowed section repetition interval for the NIT other table. Default according to ETSI TR 101 290: 10 s
NIT – Require network id:	If enabled the probe will require that the network ID found in the NIT matches the configured value. Default: Disabled
NIT – Require orig. netw. id:	If enabled the probe will require that the original network ID found in the NIT matches the configured value. Default: Disabled
NIT – Min. num. transport streams:	The minimum number of transport streams that must be present in the NIT. Set to 0 to disable this check. Default: 0
NIT – Cable descriptor (DVB-C):	If set to 'Required' an alarm will be generated if a DVB-C Cable descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-C Cable descriptor is present. Default: Optional
NIT – Cable descriptor (DVB-C2):	If set to 'Required' an alarm will be generated if a DVB-C2 Cable descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-C2 Cable descriptor is present. Default: Optional
NIT – Satellite descriptor (DVB-S):	If set to 'Required' an alarm will be generated if a DVB-S Satellite descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-S Satellite descriptor is present. Default: Optional
NIT – Satellite descriptor (DVB-S2):	If set to 'Required' an alarm will be generated if a DVB-S2 Satellite descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-S2 Satellite descriptor is present. Default: Optional

NIT – Terrestrial descriptor (DVB-T):	If set to 'Required' an alarm will be generated if a DVB-T Terrestrial descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-T Terrestrial descriptor is present. Default: Optional
NIT – Terrestrial descriptor (DVB-T2):	If set to 'Required' an alarm will be generated if a DVB-T2 Terrestrial descriptor is not present in the NIT for the monitored frequency. Similarly if set to 'Not allowed', an alarm will be generated if the DVB-T2 Terrestrial descriptor is present. Default: Optional
NIT – Compare with reference NIT:	If enabled the NIT will be compared with the NIT on the reference frequency, and an alarm will be generated if a mismatch is found. The first frequency in the tuning list will be used as the reference frequency. Both the CRC values of the different sections and the number of sections must be identical. Default: Disabled
SI Repetition Rate:	Enable or disable alarming of SI Repetition Rate errors.
Unreferenced PID:	Enable or disable alarming of Unreferenced PID errors. To mask Unreferenced PID alarms for a PID create a PID threshold template where this error is masked.
SDT:	Enable or disable alarming of Service Description Table errors. Only relevant when DVB mode is selected.
SDT – Maximum interval actual (ms):	The maximum allowed section repetition interval for the SDT actual table. Default according to ETSI TR 101 290: 2 000 ms
SDT – Maximum interval other (ms):	The maximum allowed section repetition interval for the SDT other table. Default according to ETSI TR 101 290: 10 000 ms
SDT – Minimum gap interval (ms):	The minimum allowed section gap interval for the SDT table. Default according to ETSI TR 101 290: 25 ms
SDT – Verify SDT against PAT:	If enabled an alarm will be generated if a service found in the PAT is not listed in the SDT. Default: Disabled
SDT – Require service name:	If enabled an alarm will be generated if a service found in the PAT does not have a service name or if the service name is empty. Default: Disabled
SDT – Require BAT Presence:	If enabled an alarm will be generated if BAT is not present in the stream. Default: Disabled
EIT:	Enable or disable alarming of Event Information Table errors. Only relevant when DVB mode is selected.

EIT – Maximum interval actual (ms):	The maximum allowed section repetition interval for the EIT actual table. Default according to ETSI TR 101 290: 2 000 ms
EIT – Minimum gap interval (ms):	The minimum allowed section gap interval for the EIT tables. Default according to ETSI TR 101 290: 25 ms
EIT – Required Table IDs:	If one or more table IDs are specified an alarm will be generated if these table IDs are not present in the stream on the EIT PID. Entries should be separated by commas, or a range may be specified. Example: '78,79,80-85' Default: Disabled
EIT – Verify that present event is transmitted	If enabled, an alarm will be raised if one or more services don't have a present event transmitted in the EIT (i.e. no EPG for the current program)
EIT – Check valid time for present event	If enabled, an alarm will be raised if time signaled for the present event (the current program) is not correct. The maximum offset from the current time can be configured.
EIT – Maximum timing error for present event(s)	The maximum timing error to allow for the present event. If the current time is not inside the program start/stop times by this margin then an alarm will be raised.
EIT – Verify that following event is transmitted	If enabled, an alarm will be raised if one or more services don't have a following event transmitted in the EIT (i.e. no EPG for the next program)
RST:	Enable or disable alarming of Running Status Table errors. Only relevant when DVB mode is selected.
RST – Maximum interval (ms):	The maximum allowed section repetition interval for the RST table. Default according to ETSI TR 101 290: 20 s
TDT:	Enable or disable alarming of Time Date Table errors. Only relevant when DVB mode is selected.
TDT – Maximum interval (ms):	The maximum allowed section repetition interval for the TDT and TOT tables. Default according to ETSI TR 101 290: 30 000 ms
TDT – Require TOT presence:	Check this checkbox if TOT presence is required. Default: disabled
MGT:	Enable or disable alarming of Master Guide Table errors. Only relevant when ATSC mode is selected.

MGT – Maximum interval (ms):	The maximum allowed section repetition interval for the MGT table. Default: 150ms
VCT:	Enable or disable alarming of Virtual Channel Table errors. Only relevant when ATSC mode is selected.
VCT – Require TVCT:	Require presence of the Terrestrial Virtual Channel Table.
VCT – Require CVCT:	Require presence of the Cable Virtual Channel Table.
VCT – Maximum interval (ms):	The maximum allowed section repetition interval for the VCT table. Default: 400ms
PIM/PNM:	Enable or disable alarming of Program Information Message and Program Name Message tables. Only relevant when ATSC mode is selected.
PIM/PNM – Require PIM:	Require presence of the Program Information Message table.
PIM/PNM – Maximum interval PIM (ms):	The maximum allowed section repetition interval for the PIM table. Default: 500ms
PIM/PNM – Require PNM:	Require presence of the Program Name Message table.
PIM/PNM – Maximum interval PNM (ms):	The maximum allowed section repetition interval for the PNM table. Default: 1000ms
RRT:	Enable or disable alarming of Rating Region Table errors. Only relevant when ATSC mode is selected.
RRT – Maximum interval (ms):	The maximum allowed section repetition interval for the RRT table. Default: 30000ms
STT:	Enable or disable alarming of System Time Table errors. Only relevant when ATSC mode is selected.
STT – Maximum interval (ms):	The maximum allowed section repetition interval for the STT table. Default: 1000ms
ATSC EIT:	Enable or disable alarming of ATSC Event Information Table errors. Only relevant when ATSC mode is selected.
ATSC EIT – Maximum interval EIT-0 (ms):	The maximum allowed section repetition interval for the ATSC EIT-0 table. Default: 500ms

ATSC EIT – Maximum interval EIT–1 to EIT–3 (ms):	The maximum allowed section repetition interval for the ATSC EIT–1 to EIT–3 tables. Default: 5000ms
ATSC EIT – Maximum interval EIT–4 to EIT–127 (ms):	The maximum allowed section repetition interval for the ATSC EIT–4 to EIT–127 tables. Default: 30000ms
ETT:	Enable or disable alarming of Extended Text Table errors. Only relevant when ATSC mode is selected.
ETT – Maximum interval ETT–0 (ms):	The maximum allowed section repetition interval for the ATSC ETT–0 table. Default: 2000ms
ETT – Maximum interval ETT–1 to ETT–3 (ms):	The maximum allowed section repetition interval for the ATSC ETT–1 to ETT–3 tables. Default: 5000ms
ETT – Maximum interval ETT–4 to ETT–127 (ms):	The maximum allowed section repetition interval for the ATSC ETT–4 to ETT–127 tables. Default: 30000ms



Edit ETR Threshold

Name: ETSI TR 101 290
Description: Settings according to TR 1

General | Priority 1 | Priority 2 | Priority 3 | **Other checks** | Interface checks

Parameter	Setting
CA system checks	Disabled
Maximum ECM interval (ms)	500
Maximum ECM change period (ms)	25000
Minimum avg. EMM bitrate (bps)	1000
EMM bitrate average period (s)	10
Maximum control word period (ms)	25000
Pid minimum bitrate checks	Alarm
Pid maximum bitrate checks	Alarm
Pid checks	Alarm
Service minimum bitrate checks	Alarm
Service maximum bitrate checks	Alarm
Service checks	Alarm
Only allow services listed in service template	☐
MIP check	Disabled
Require presence of MIP	☐
Max MIP timing error(μs)	10
Gold TS check	Disabled
Also check version number and CRC	☐
Verifv PAT table	☒

Close Apply changes

<i>ETR Thresholds — Other checks:</i>	
CA system checks:	Enable or disable alarming of Conditional Access System errors.
CA system checks – Maximum ECM interval (ms):	The maximum allowed ECM repetition interval. Default: 500 ms
CA system checks – Maximum ECM change period (ms):	The maximum time allowed between ECM changes. Default: 25000ms
CA system checks – Minimum avg. EMM bitrate (bps):	The minimum allowed average EMM bitrate. Default: 1000 bps
CA system checks – EMM bitrate average period (s):	The averaging period used to calculate EMM bitrate. Note that the average period must be at least 20s less than the round-robin tuning period, e.g. with a round-robin tuning period of 70s the maximum EMM bitrate average period is 50s. Default: 10s
CA system checks – Maximum control word period (ms):	The maximum allowed control word period (the maximum time that can go by without a change in the scrambling control bits for scrambled PIDs). Default: 25 000 ms
PID minimum bitrate checks:	Enable or disable alarming of PID minimum bitrate. The bitrates are set in the PID threshold template .
PID maximum bitrate checks:	Enable or disable alarming of PID maximum bitrate. The bitrates are set in the PID threshold template .
PID checks:	Enable or disable alarming of PID presence errors, scrambling/clear requirements and PID type checks. The checks are set in the PID threshold template .
Service minimum bitrate checks:	Enable or disable alarming of service minimum bitrate errors. Requirements are specified in the service threshold template associated with the stream.
Service maximum bitrate checks:	Enable or disable alarming of service maximum bitrate errors. Requirements are specified in the service threshold template associated with the stream.
Service checks:	Enable or disable alarming of service presence, scrambling/clear required, service type, service name and service ID errors. Requirements are specified in the service threshold template associated with the stream.

Service checks – Only allow services listed in service template:	Check this box to enable service ID checks against the service ID list specified in the service threshold template associated with the stream.
MIP check:	Enable or disable alarming of errors related to the Megaframe Insertion Packet.
MIP checks – Require presence of MIP:	Check this box to enable an alarm if the MIP table is missing for the stream.
MIP checks – Max MIP timing error(μs):	The maximum MIP timing error before raising an alarm. The unit is μ s. Default: 10 μ s
Gold TS check:	Enable or disable alarming for tables failing Gold TS reference checking.
Gold TS check – Also check version number and CRC:	When enabled an alarm will be raised for any change, including a change in the table version number and CRC.
Gold TS check – Verify PAT table:	Do verification of the PAT table against the stored reference PAT table.
Gold TS check – Verify PMT tables:	Do verification of the PMT tables against the stored reference PMT tables.
Gold TS check – Verify CAT table:	Do verification of the CAT table against the stored reference CAT table.
Gold TS check – Verify SDT actual table:	Do verification of the SDT actual table against the stored reference SDT actual table.
Gold TS check – Verify SDT other tables:	Do verification of the SDT other tables against the stored reference SDT other tables.
Gold TS check – Verify BAT table:	Do verification of the BAT table against the stored reference BAT table.
Gold TS check – Verify NIT actual table:	Do verification of the NIT actual table against the stored reference NIT actual table.
Gold TS check – Verify NIT other tables:	Do verification of the NIT other tables against the stored reference NIT other tables.

Time information check:	Enable or disable alarming if there are errors in the time information sent in the streams. Probe should use NTP time sync to use this functionality.
Time information check – Check TDT:	Check the time in the TDT table and alarm if it is wrong.
Time information check – Check TOT:	Check the time in the TOT table and alarm if it is wrong.
Time information check – Check LTC:	Check the time in the Logical Time Code table and alarm if it is wrong.
Time information check – Max time offset:	The maximum number of seconds the time information provided in the stream can deviate from the probe time before an alarm is raised.
Time information check – Max repetition time:	The maximum time without any time information before an alarm is raised.

6.9.12 ETR 290 — PID thresholds

Overview
ETR Details
PIDs
Services
Bitrates
Tables
PCR
Status
Compare
ETR thr.
PID thr.
Serv. thr.
Gold TS thr.

PID Thresholds
These thresholds are used to override the ETR thresholds on a per-PID basis

Name	Refs	Description	Edit
Default	139	No special rules for any PIDs.	Edit
Bitrate + pcr odd	0		Edit
Bitrate + pcr even	0		Edit
Err	0		Edit
Mask CC err EIT	2		Edit
Thor	1		Edit

PID thresholds: 6

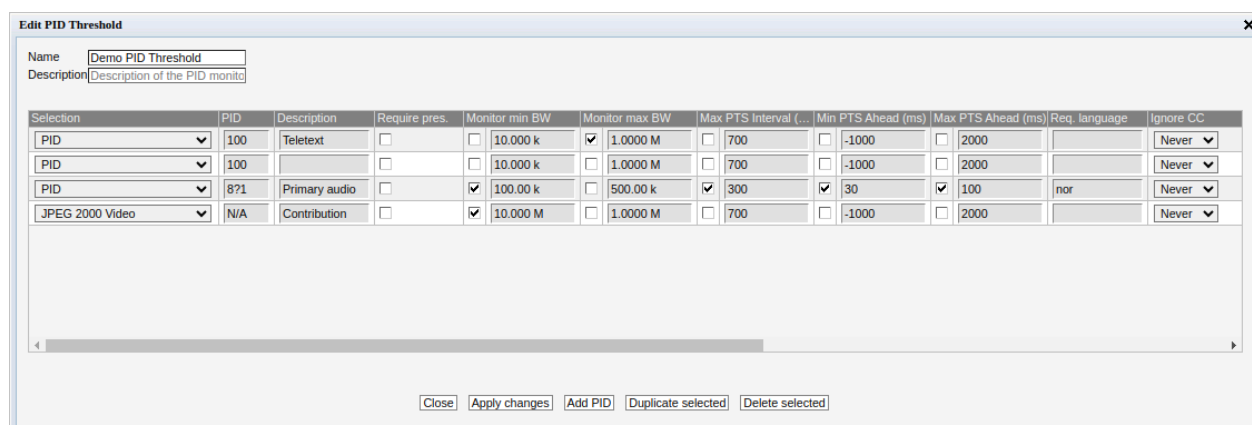
Add new threshold group
Duplicate selected
Delete selected

The **PID thresholds** make it possible to define detailed conditions for alarm triggering on a PID or PID type basis. There is one predefined PID threshold template that cannot be edited by the operator: 'Default'. The 'Default' PID threshold template contains no PID definitions and will therefore not alter alarming for any service.

By associating scheduling templates to checks it is possible to disable alarming at pre-selected time intervals. Scheduling templates are defined in the **Setup — Scheduling** view and will be available from a selection drop-down menu for some of the checks.

In the 'PID Thresholds' table, the 'Refs' column shows how many streams are associated with each threshold template.

There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold** template button. A pop-up window will appear allowing the user to define alarm conditions. Another way of creating a user-defined threshold template is by highlighting one of the templates already defined and then click the **Duplicate highlighted** button.



Selection	PID	Description	Require pres.	Monitor min BW	Monitor max BW	Max PTS Interval (...)	Min PTS Ahead (ms)	Max PTS Ahead (ms)	Req. language	Ignore CC
PID	100	Teletext	☐	☐ 10.000 k	☒ 1.0000 M	☐ 700	☐ -1000	☐ 2000		Never
PID	100		☐	☐ 10.000 k	☐ 1.0000 M	☐ 700	☐ -1000	☐ 2000		Never
PID	871	Primary audio	☐	☒ 100.00 k	☐ 500.00 k	☒ 300	☒ 30	☒ 100	nor	Never
JPEG 2000 Video	N/A	Contribution	☐	☒ 10.000 M	☐ 1.0000 M	☐ 700	☐ -1000	☐ 2000		Never

Deleting a PID threshold template is done by highlighting the threshold template that should be removed and clicking **Delete highlighted**. Note that if the deleted threshold template was assigned to a stream being monitored, the new threshold for that stream will default to the predefined **Default** threshold template.

The PID threshold template has the following settings:

Edit PID Threshold:

Name: The name of the PID threshold template

Description: Text field that should contain a meaningful description of the threshold template

PID Threshold Parameters:

Selection: The user selects if the requirements should apply for a specific PID or for all PIDs of a specified type. Note that the PID type detection depends on correct PSI/SI/PSIP signaling.

PID: The PID for which the specified requirements apply. If a PID type is selected in the 'Selection' column, this field will update to read N/A when the **Apply changes** button is clicked. A question mark can be used as a wild card to represent one digit. Example: The PID value 8?1 will match 3 digit PID numbers such as 801, 811 and 891. It will not match PID 81 or 8001.

Description: A text field describing the PID or PID type requirement.

Require pres.: If this field is checked an alarm will be raised provided that the specified PID is not present in the transport stream. Note that this check is only available for specified PIDs and not for PID types.

Monitor min BW:	An alarm is raised if the PID bandwidth goes below the specified minimum bandwidth (bandwidth in kbit/s or Mbit/s) and monitoring is enabled.
Monitor max BW:	An alarm is raised if the maximum PID bandwidth specified is exceeded (bandwidth in kbit/s or Mbit/s) and monitoring is enabled.
Max PTS interval (ms):	If the checkbox is enabled, the PTS interval measurement will be enabled for this PID and use the configured threshold. This will override the setting in the ETR thresholds template. An alarm is raised if the PTS repetition interval exceeds the configured limit.
Min PTS ahead (ms):	If the checkbox is enabled, the measurement of minimum PTS ahead will be enabled for this PID and use the configured threshold. This will override the setting in the ETR thresholds template. An alarm is raised if the PTS ahead measurement is lower than the the configured limit. The PTS ahead measurement measures the PTS value relative to the current PCR clock.
Max PTS ahead (ms):	If the checkbox is enabled, the measurement of maximum PTS ahead will be enabled for this PID and use the configured threshold. This will override the setting in the ETR thresholds template. An alarm is raised if the PTS ahead measurement is higher than the the configured limit. The PTS ahead measurement measures the PTS value relative to the current PCR clock.
Req. language:	If the PID need to have a certain language code signaled in the language descriptor it can be set here. An alarm will be raised if a wrong language is signaled or if the language is not signaled.
Ignore CC:	Select a scheduling template different from 'Never' for the probe to ignore CC errors for the specified PID or PID type.
Ignore missing:	Select a scheduling template different from 'Never' for the probe to ignore that the specified PID or PID type is signaled in PSI but missing in the stream.
Ignore PCR:	Select a scheduling template different from 'Never' for the probe to ignore any PCR errors for this PID or PID type.
Ignore unref.:	Select a scheduling template different from 'Never' for the probe to ignore that the specified PID is present in the stream but unreferenced in PSI.
Ignore all:	Select a scheduling template different from 'Never' for the probe to ignore all errors for a specified PID or PID type.

Scrambling: An alarm will be raised provided that the specified PID is scrambled when ‘require clr’ has been selected. Similarly an alarm will be raised if the specified PID is clear when ‘require scr’ has been selected. The default setting is to ignore whether the PID or PID type is scrambled or not.

6.9.13 ETR 290 — Service thresh.

Overview

ETR Details

PIDs

Services

Bitrates

Tables

PCR

Status

Compare

ETR thr.

PID thr.

Serv. thr.

Gold TS thr.

Service Thresholds

These thresholds are used to override the ETR thresholds on a per-service basis

Name	Refs	Description	Edit
Default	142	No special rules for any services.	Edit
Err	0		Edit
Testing	0		Edit
TS 4095	0		Edit
TS 4096	0		Edit

Added NewPreset1

Add new threshold group

Duplicate selected

Delete selected

The **Service thresholds** make it possible to define detailed conditions for alarm triggering on a per-service basis. There is one predefined service threshold template that cannot be edited by the operator: **Default**. The Default service threshold template contains no service definitions and will therefore not alter alarming for any service.

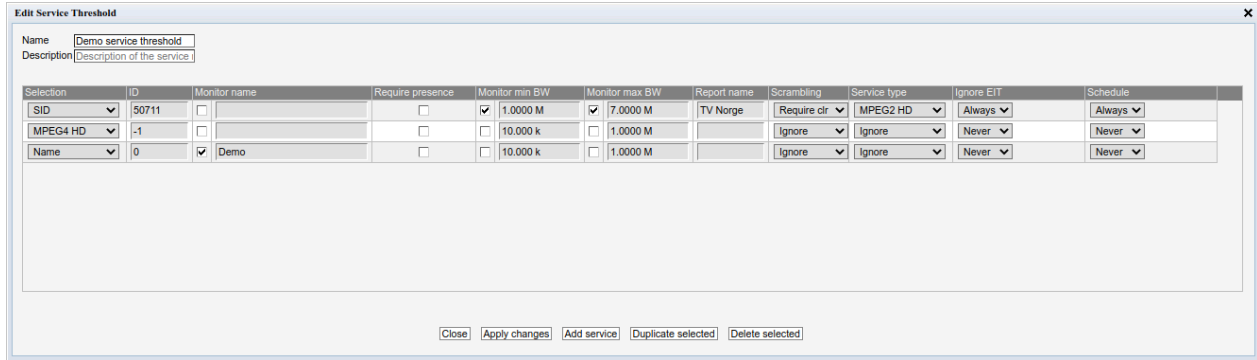
By associating scheduling templates to service threshold templates it is possible to disable alarming at pre-selected time intervals. Scheduling templates are defined in the **Setup — Scheduling** view and will be available from the schedule drop-down menu.

In the ‘Service Thresholds’ table, the ‘Refs’ column shows how many streams are associated with each threshold template. Thresholds are associated with each stream in the **Multicasts — Streams — Edit** view.

There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold group** button. A pop-up window will appear allowing the user to assign a name and value to the new threshold and define the alarm conditions. Another way of creating a user-defined threshold template is by highlighting one of the templates already defined and then click the **Duplicate selected** button.

Deleting a service threshold template is done by highlighting the template that should be removed and clicking **Delete selected**. Note that if the deleted threshold template was assigned to a stream being monitored, the new threshold template for that stream will default to the **Default** template.

The settings **Service minimum bitrate checks**, **Service minimum bitrate checks** and **Service checks** in the ETR threshold template controls whether or not to report alarms based on the service threshold template parameters.



Edit Service Threshold

Name: A text string that identifies the service threshold group

Description: Text field that should contain a meaningful description of the threshold

Service Threshold Parameters

Selection: The user selects if the requirements should apply for a specific service ID (as specified in the **ID** column), for all services of a specified type or for a service with a specified service name (as specified in the **Monitor name** column). Note that the service type detection depends on correct PSI/SI/PSIP signaling.

ID: The service ID for which the associated thresholds should apply. For an SPTS the service ID will generally be 1; adding several list entries with different service IDs allows different thresholds to apply for different services within an MPTS.
This value only applies if 'SID' is selected in the **Selection** column.

Monitor name: A text string may be specified that should match the service name of the associated service ID, as analyzed from the received SDT. Note that the check is case sensitive. An alarm will be raised if there is not a perfect match.

Require presence: If this field is checked an alarm will be raised provided that the specified service is not present in the stream. This check only requires that the service is present in the PAT, the other ETR checks will give alarms if there are other problems with the service, such as missing PMT or missing components. Note that this check is only available for specified services and not for service types.

Monitor min BW: If enabled an alarm is raised provided that the minimum service bandwidth goes below the specified bandwidth (in kbit/s or Mbit/s).

Monitor max BW:	If enabled an alarm is raised provided that the maximum service bandwidth specified (in kbit/s or Mbit/s) is exceeded.
Report name:	It is possible to define the service name that should be used for alarm traps and for alarm reporting to the VideoBRIDGE Controller. This can be convenient to be able to track a service that changes name (as signaled in PSI/SI) in the signal chain, when services within an MPTS are unnamed (no service names in the SDT) or when services should be recognized by the VideoBRIDGE Controller under a different name than indicated in the SDT. Note that this functionality will only work for services specified by service ID or by name (specified in the Selection column).
Scrambling:	If a value different from 'Ignore' is selected an alarm will be raised if the service scrambling status differs from the requirement. A service is considered scrambled if one of its components is scrambled.
Service type:	If a value different from 'Ignore' is selected it should match the service type detected by analyzing the received SDT. An alarm will be raised if the service types differ.
Ignore EIT:	Ignore missing EIT errors for this service. This is used for services which does not have EIT data. By ignoring EIT alarms on these services, false EIT alarms are avoided.
Schedule:	The Schedule drop-down menu allows the user to associate a scheduling scheme to a service, in effect masking alarms during selected intervals. Scheduling templates are defined in the Setup — Scheduling view. The predefined scheduling templates 'Never' and 'Always' will always be selectable, and these will result in service alarms never and always being masked, respectively. Note that if a PID is shared between several services and alarm masking is defined for one of the services, no alarms will be raised due to errors affecting this service.

Note that it is possible to create a service threshold template that allows probe alarming if a new service appears in a stream. This is done by creating a threshold template listing the service IDs that are allowed to be present in a stream, and associating it to the stream. A complementary ETR threshold template should be created, that has the 'Only allow services listed in service template' check enabled. This ETR threshold template should also be associated with the stream.

6.9.14 ETR 290 — Gold TS thresholds

Overview

ETR Details

PIDs

Services

Bitrates

Tables

PCR

T2MI

SCTE 35

Status

Compare

ETR thr.

PID thr.

Serv. thr.

Gold TS thr.

Gold TS reference thresholds

Name	Refs	Description	Edit
QAM2, LTT QAM	1	TS 102, NW ID 42499 (Updated Mar 7 10:20:08)	Edit
Ethernet, NC_239.255.0.10	1	TS 27 (Added Mar 7 10:20:29)	Edit

Gold TS reference presets:0

Add/update threshold

Delete selected threshold

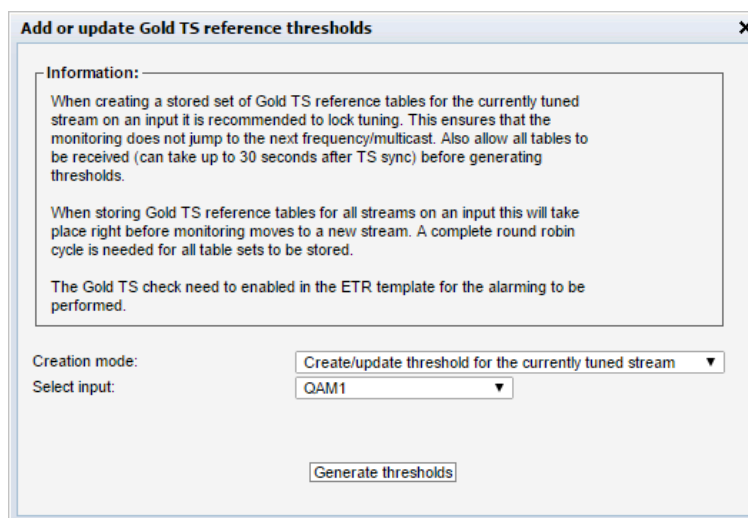
The Gold TS reference feature is used to compare the tables in the transport stream with a set of stored reference tables. This allows the operator to be notified of any changes in the PSI/SI tables such as:

- A service disappearing
- A new service being added
- Language descriptors suddenly changing
- Changes in service names
- Changes in frequencies used to transmit the signals
- And lots of misconfigurations in multiplexers

To use the Gold TS reference functionality, first store away tables for a stream or a set of streams. Go to **ETR 290 — Gold TS thr.**

Here you can see the reference thresholds currently stored on the probe and they can be renamed or edited.

To add new reference thresholds or update the existing thresholds click on the button named **Add/update threshold**. The following dialog is then shown:



There are two different ways of creating a Gold TS reference template:

- Creating a template for the currently tuned stream on a specific input
- Creating a template for all streams on a specific input (or all inputs)

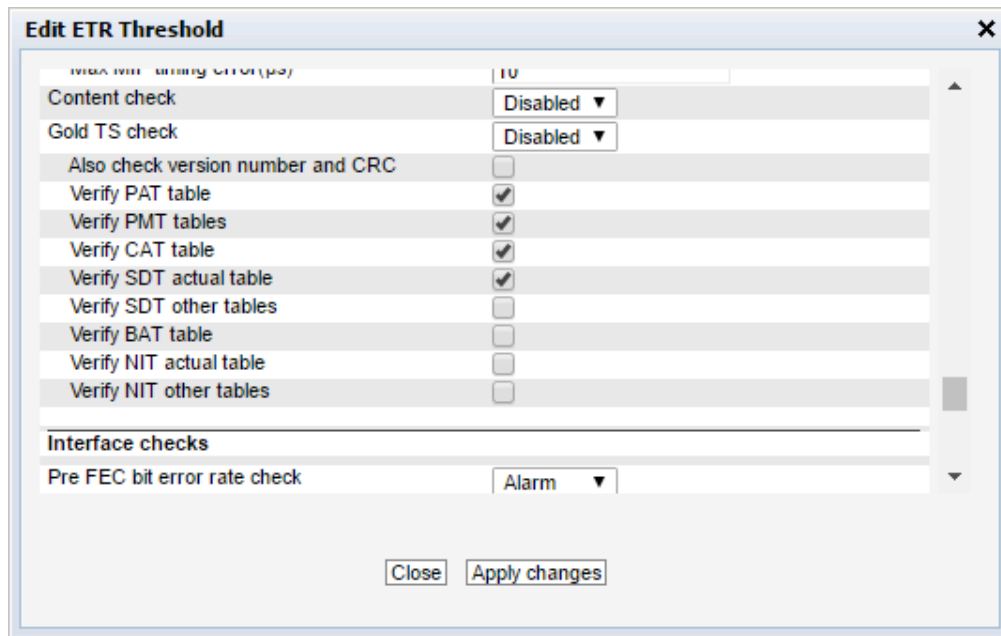
When creating a template for a specific stream the table set is saved immediately. It is therefore recommended that the ETR tuning is locked to this stream to avoid the round-robin operation from tuning to a new frequency just before the table set is stored. It can take 30 seconds after tuning to receive all tables.

When creating templates for all streams on an input this is done as a part of the round robin cycle at the end of the tuning period. It can then take a while for all thresholds to be generated (or updated) depending on the number of streams on that input.

When the reference template have been created it is automatically associated with the stream for which it was generated.

The operation of the Gold TS reference thresholds are controlled by the ETR threshold template associated with the stream. No settings are changed here when creating the reference templates so this needs to be done manually by going to **ETR 290 — ETR thr.**

If needed a new template can be created and associated with the stream(s). Or the existing template(s) can be changed.



The reference check needs to be set to alarm if the Gold TS reference checking are to be performed.

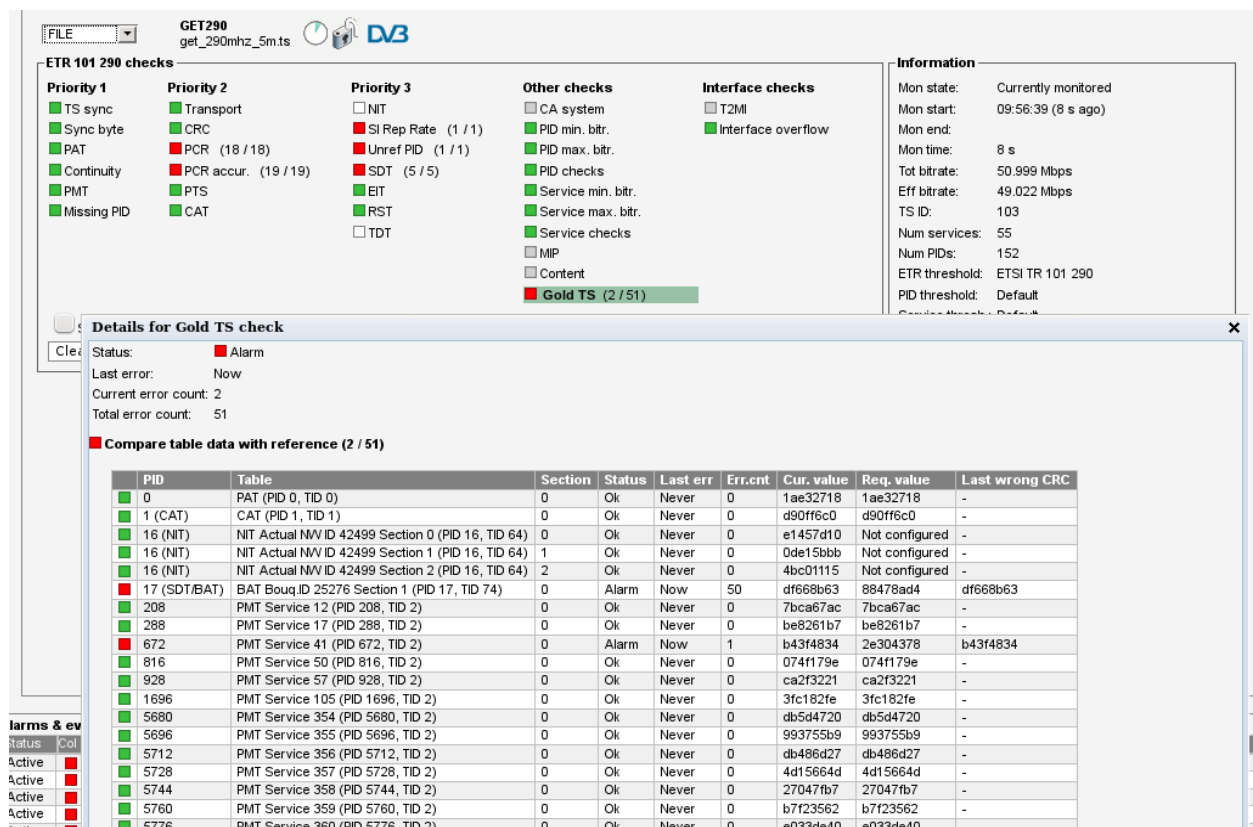
The settings are as follows:

Also check version number and CRC	By default the version number and the original CRC of the tables are not checked. In many systems the version number can be updated even if no other changes are performed (for instance if a multiplexer is rebooted). So for most cases this should be left disabled.
Verify PAT table	When enabled the Program Association Table will be checked. This allows the operator to catch addition and removal of services as well as changes to the PMT PIDs used for the different services.
Verify PMT table	When enabled the Program Map Table will be checked. This allows the operator to catch lots of changes to the different services: • Addition or removal of the various components such as audio and video PIDs. • Changes in language descriptors • Changed PCR PIDs • Changed or removed ECM PID • Lots of changes in the descriptors can be detected

Verify CAT table	When enabled the Conditional Access Table will be checked. This allows the operator to catch errors related to the signaling for the CA Systems such as EMM PID disappearing or the CA System ID being changed
Verify SDT actual table	When enabled the SDT table for the current stream will be checked. This allows the operator to catch changes is service and operator names, service types and the various descriptors, both DVB defined and private descriptors
Verify SDT other tables	When enabled the SDT tables for the other streams will be checked. Checking is not enabled as default. This allows the operator to catch changes is service and operator names, service types and the various descriptors, both DVB defined and private descriptors
Verify BAT table	When enabled the Bouquet Association Table will be checked. The BAT table is not checked as default.
Verify NIT actual table	When enabled the Bouquet Association Table will be checked. The BAT table is not checked as default When enabled the Network Information Table for the current network will be checked. This allows the operator to catch changes such as: • Changes in frequency • Changes in modulation parameters • Network name • Changes in service lists per transport stream • Changes in private as well as MPEG/DVB defined descriptors
Verify NIT actual tables	When enabled the Network Information Tables for the other networks will be checked. This is disabled as default. This allows the operator to catch changes such as: • Changes in frequency • Changes in modulation parameters • Network name • Changes in service lists per transport stream • Changes in private as well as MPEG/DVB defined descriptors

The Gold TS reference checking is performed by the ETR engines and can be performed in round

robin. To view the status go to the ETR Details page for the stream and click the Reference check:



The screenshot displays the Sencore software interface for monitoring ETR 101 290 checks. The main window shows a list of checks categorized by priority (Priority 1, Priority 2, Priority 3) and other checks. A details window titled "Details for Gold TS check" is open, showing a table of monitored tables and sections.

ETR 101 290 checks

- Priority 1**
 - TS sync
 - Sync byte
 - PAT
 - Continuity
 - PMT
 - Missing PID
- Priority 2**
 - Transport
 - CRC
 - PCR (18 / 18)
 - PCR accur. (19 / 19)
 - PTS
 - CAT
- Priority 3**
 - NIT
 - SI Rep Rate (1 / 1)
 - Unref PID (1 / 1)
 - SDT (5 / 5)
 - EIT
 - RST
 - TDT
- Other checks**
 - CA system
 - PID min. bitr.
 - PID max. bitr.
 - PID checks
 - Service min. bitr.
 - Service max. bitr.
 - Service checks
 - MIP
 - Content
 - Gold TS (2 / 51)**
- Interface checks**
 - T2MI
 - Interface overflow

Information

- Mon state: Currently monitored
- Mon start: 09:56:39 (8 s ago)
- Mon end:
- Mon time: 8 s
- Tot bitrate: 50.999 Mbps
- Eff bitrate: 49.022 Mbps
- TS ID: 103
- Num services: 55
- Num PIDs: 152
- ETR threshold: ETSI TR 101 290
- PID threshold: Default

Details for Gold TS check

Status: ■ Alarm

Last error: Now

Current error count: 2

Total error count: 51

■ Compare table data with reference (2 / 51)

PID	Table	Section	Status	Last err	Err.cnt	Cur. value	Req. value	Last wrong CRC
0	PAT (PID 0, TID 0)	0	Ok	Never	0	1ae32718	1ae32718	-
1 (CAT)	CAT (PID 1, TID 1)	0	Ok	Never	0	d90ff6c0	d90ff6c0	-
16 (NIT)	NIT Actual NRV ID 42499 Section 0 (PID 16, TID 64)	0	Ok	Never	0	e1457d10	Not configured	-
16 (NIT)	NIT Actual NRV ID 42499 Section 1 (PID 16, TID 64)	1	Ok	Never	0	0de15bbb	Not configured	-
16 (NIT)	NIT Actual NRV ID 42499 Section 2 (PID 16, TID 64)	2	Ok	Never	0	4bc01115	Not configured	-
17 (SDT/BAT)	BAT Bouq.ID 25276 Section 1 (PID 17, TID 74)	0	Alarm	Now	50	df668b63	88478ad4	df668b63
208	PMT Service 12 (PID 208, TID 2)	0	Ok	Never	0	7bca67ac	7bca67ac	-
288	PMT Service 17 (PID 288, TID 2)	0	Ok	Never	0	be8261b7	be8261b7	-
672	PMT Service 41 (PID 672, TID 2)	0	Alarm	Now	1	b43f4834	2e304378	b43f4834
816	PMT Service 50 (PID 816, TID 2)	0	Ok	Never	0	074f179e	074f179e	-
928	PMT Service 57 (PID 928, TID 2)	0	Ok	Never	0	ca2f3221	ca2f3221	-
1696	PMT Service 105 (PID 1696, TID 2)	0	Ok	Never	0	3fc182fe	3fc182fe	-
5680	PMT Service 354 (PID 5680, TID 2)	0	Ok	Never	0	db5d4720	db5d4720	-
5696	PMT Service 355 (PID 5696, TID 2)	0	Ok	Never	0	993755b9	993755b9	-
5712	PMT Service 356 (PID 5712, TID 2)	0	Ok	Never	0	db486d27	db486d27	-
5728	PMT Service 357 (PID 5728, TID 2)	0	Ok	Never	0	4d15664d	4d15664d	-
5744	PMT Service 358 (PID 5744, TID 2)	0	Ok	Never	0	27047fb7	27047fb7	-
5760	PMT Service 359 (PID 5760, TID 2)	0	Ok	Never	0	b7f23562	b7f23562	-
5776	PMT Service 360 (PID 5776, TID 2)	0	Ok	Never	0	e033de40	e033de40	-

alarms & ev

Status: ■ Active

All the different tables and sections monitored are listed here. If there have been any changes to the tables the check will turn red and alarms be sent.

When the ETR engine is tuned to a stream it is possible to compare the tables for this stream with the stored reference tables by clicking on the entry in the list. This opens up a new window where the table data can be compared, both as a tree-breakdown and as a hexadecimal dump:

Show summary
Show hex

Current table:

- table_id: 2 (0x02)
- section_syntax_indicator: 1 b
- reserved_future_use: 0 b
- reserved: 11 b
- section_length: 150 (0x096)
- program_number: 41 (0x0029)
- reserved: 0x3
- version_number: 6 (0x06)
- current_next_indicator: 1 b
- section_number: 0
- last_section_number: 0
- reserved: 111 b
- PCR PID: 673 (0x02a1)
- reserved: 1111 b
- program_info_length: 6
- program_info
 - components
 - component
 - component
 - component
 - component
 - component
 - component
 - stream_type: MPEG-2 Audio
 - reserved: 111 b
 - elementary_PID: 675 (0x02a3)
 - reserved: 1111 b
 - ES_info_length: 6
 - ES descriptors
 - language descriptor
 - descriptor_tag: 10 (0x0a)
 - descriptor_length: 4
 - languages
 - language
 - ISO 639 language code: nor
 - audio_type: Undefined

Stored reference table:

- table_id: 2 (0x02)
- section_syntax_indicator: 1 b
- reserved_future_use: 0 b
- reserved: 11 b
- section_length: 150 (0x096)
- program_number: 41 (0x0029)
- reserved: 0x3
- version_number: 6 (0x06)
- current_next_indicator: 1 b
- section_number: 0
- last_section_number: 0
- reserved: 111 b
- PCR PID: 609 (0x0261)
- reserved: 1111 b
- program_info_length: 6
- program_info
 - components
 - component
 - component
 - component
 - component
 - component
 - component
 - stream_type: MPEG-2 Audio
 - reserved: 111 b
 - elementary_PID: 675 (0x02a3)
 - reserved: 1111 b
 - ES_info_length: 6
 - ES descriptors
 - language descriptor
 - descriptor_tag: 10 (0x0a)
 - descriptor_length: 4
 - languages
 - language
 - ISO 639 language code: swe
 - audio_type: Undefined

```

0000: 02 80 96 00 29 CD 00 00 E2 A1 F0 06 09 04 09 26 .....&
0010: E2 A8 02 E2 A1 F0 00 06 E2 A7 F0 2F 56 2D 65 6E ...../V-en
0020: 67 09 00 73 77 65 09 01 73 77 65 11 99 6E 6F 72 g..swe..swe..nor
0030: 0A 01 6E 6F 72 12 99 64 61 6E 00 01 64 61 6E 15 ..nor..dan..dan.
0040: 99 66 69 6E 0E 01 66 69 6E 16 99 04 E2 A5 F0 06 ..fin..fin.....
0050: 0A 04 73 77 65 00 04 E2 A4 F0 06 0A 04 64 61 6E ..swe.....dan
0060: 00 04 E2 A3 F0 06 0A 04 73 77 65 00 04 E2 A2 F0 .....nor.....
0070: 06 0A 04 66 69 6E 00 06 E2 A6 F0 19 0A 14 65 6E ...fin.....en
0080: 67 00 66 69 6E 00 73 77 65 00 6E 6F 72 00 64 61 g..fin.swe.nor.da
0090: 6E 00 6A 01 00 B4 3F 48 34 n..j...PH4
    
```

```

0000: 02 80 96 00 29 CD 00 00 E2 61 F0 06 09 04 09 26 .....a.....&
0010: E2 A8 02 E2 A1 F0 00 06 E2 A7 F0 2F 56 2D 65 6E ...../V-en
0020: 67 09 00 73 77 65 09 01 73 77 65 11 99 6E 6F 72 g..swe..swe..nor
0030: 0A 01 6E 6F 72 12 99 64 61 6E 00 01 64 61 6E 15 ..nor..dan..dan.
0040: 99 66 69 6E 0E 01 66 69 6E 16 99 04 E2 A5 F0 06 ..fin..fin.....
0050: 0A 04 73 77 65 00 04 E2 A4 F0 06 0A 04 64 61 6E ..swe.....dan
0060: 00 04 E2 A3 F0 06 0A 04 73 77 65 00 04 E2 A2 F0 .....swe.....
0070: 06 0A 04 66 69 6E 00 06 E2 A6 F0 19 0A 14 65 6E ...fin.....en
0080: 67 00 66 69 6E 00 73 77 65 00 6E 6F 72 00 64 61 g..fin.swe.nor.da
0090: 6E 00 6A 01 00 2E 30 43 78 n..j...OCx
    
```

If the tables are inspected and the change found to be OK the operator can then go back to **ETR 290 — Gold TS thr.** and update the stored table set to the new version.

6.9.15 ETR 290 — Alarm filtering thresholds

Overview
ETR Details
PIDs
Services
Bitrates
Tables
PCR
T2MI
Status
Compare
ETR thr.
PID thr.
Serv. thr.
Gold TS thr.
Alarm filter thr.

Alarm filtering thresholds

The alarm filter threshold setting defines when the alarm should be activated. It sets the accumulated number of seconds that has to occur with faults within the alarm window period before raising an alarm.

Name	Refs	Error second limit	Error window	Description	Edit
Default	17	1	1	Alarm immediately.	Edit
Alarm after five seconds	0	5	10	Alarm after five error seconds summed over an alarm window of ten seconds.	Edit

Alarm filter thresholds: 2

Add new alarm filter
Duplicate selected
Delete selected
Edit selected

The **Alarm filtering thresholds** make it possible to delay alarms after a user-defined amount of error seconds has occurred during a user-defined window, on a per stream basis. Each template can be associated with an alarm check in the **ETR Thresholds**. In the **Alarm filtering thresholds** table, the 'Refs' shows how many **ETR Thresholds** are associated with each of them.

Alarm filtering thresholds are currently only for **Continuity errors**.

There are two predefined thresholds: **Default** and **Alarm after five seconds**. With the **Default** filter the alarming will be as if no filter is applied: The alarm is raised immediately when an error occurs. With the **Alarm after five seconds** the alarm will be raised after 5 seconds with errors has occurred during a 10 second window.

To configure alarm filtering, either use **Alarm after five seconds** or create a new template. Then apply this template to the **ETR Threshold**. To create a new alarm filtering template, either click **Add new** or **Duplicate**. To edit, use the **Edit** link in the table or the **Edit selected** button. With the **Edit selected** button, one or multiple templates can be edited.

A pop-up window will appear allowing the user to assign a name and description to the threshold and configure the alarm filter parameters.

Edit alarm filter threshold

Name
Filter

Description
Description of the alarm

Parameter	Setting	Description
Error seconds	1	Minimum number of error seconds before alarming
Alarm window (s)	1	The window during which error seconds are summed

The thresholds are used to specify how many error seconds are required during the alarm window defined here before raising the corresponding alarm. The alarm will clear again after a default of 10 seconds without any faults (can be adjusted in the ETR Threshold->General).

Close
Apply changes

Edit Alarm Filter Threshold

Name: A text string that identifies the alarm filter threshold. This name appears in the **ETR Threshold** Alarm filtering drop down for the check.

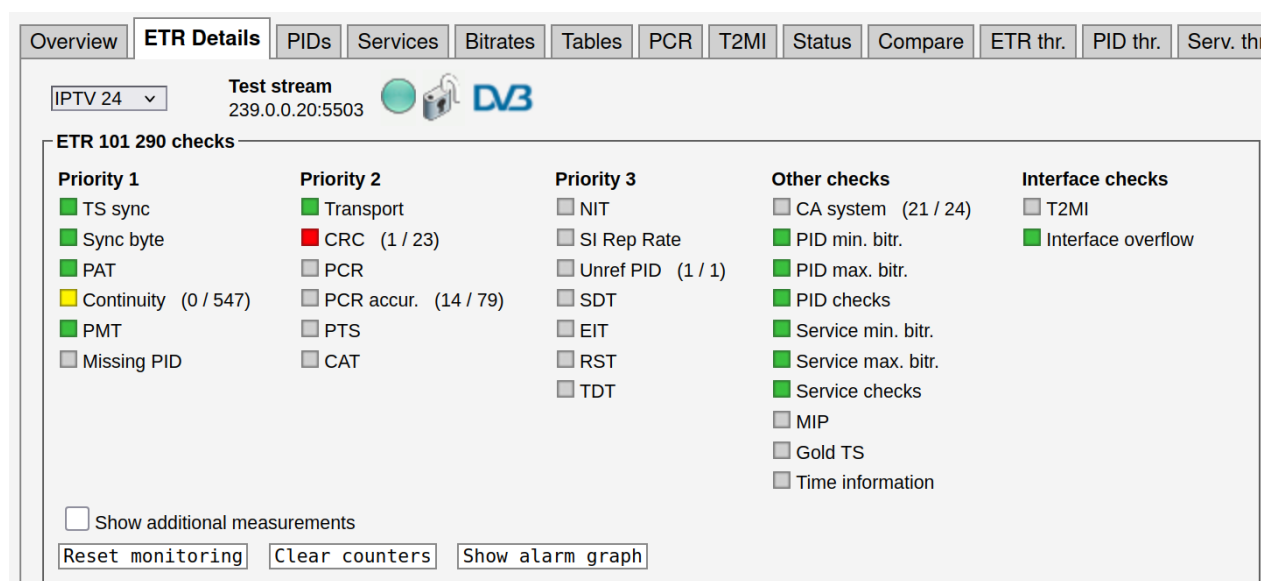
Description: Text field that should contain a meaningful description of the threshold

Alarm Filter Threshold parameters

Error seconds: The minimum number of error seconds that needs to occur before an alarm is raised. Error seconds up to 3600 (1 hour) is supported.

Alarm window (s): The window, in seconds, during which error seconds are summed. The window needs to be equal to or larger than the number of error seconds. The window is dynamic, which means that the amount of error seconds is always summed over the past x seconds, where x is the size of the window (unless the time since the first error is less than x). A window up to 3600 seconds (1 hour) is supported.

With alarm filtering applied a yellow bulb will appear in the **ETR Details** view and the **ETR Overview** view when there are not enough errors to raise an alarm.



Only after the error seconds limit is reached will the bulb be red and an alarm raised. All errors, whether they are over the error second limit or not, will be registered in the probes 'Last fault' that can be seen in the **ETR Details** view to the right and the Details popup for the check at the top.

The alarm clears after the amount of time specified in *Error timeout* in the associated **ETR Threshold** (default 10 seconds).

6.10 Content

6.10.1 Content — Thumbnails

This view replicates the **Thumbnails** view. Please see chapter 5.4 on page 50 for details.

6.10.2 Content — Captions (requires CONTENT-OPT)

Thumbnails	Captions	EBP/IDR	Timeline	SCTE 35	Content thresh.	Service thresh.	Setup
Caption monitoring 							
	Thumb	Name	Parent MC stream	#SCTE 20	#CEA 608	#CEA 708	Errors
		METV	ABC inp 1 stream 1	0	1	1	0
		KSFY CW	ABC inp 1 stream 1	0	2	2	90
		KSFY-DT	ABC inp 1 stream 1	0	3	5	45

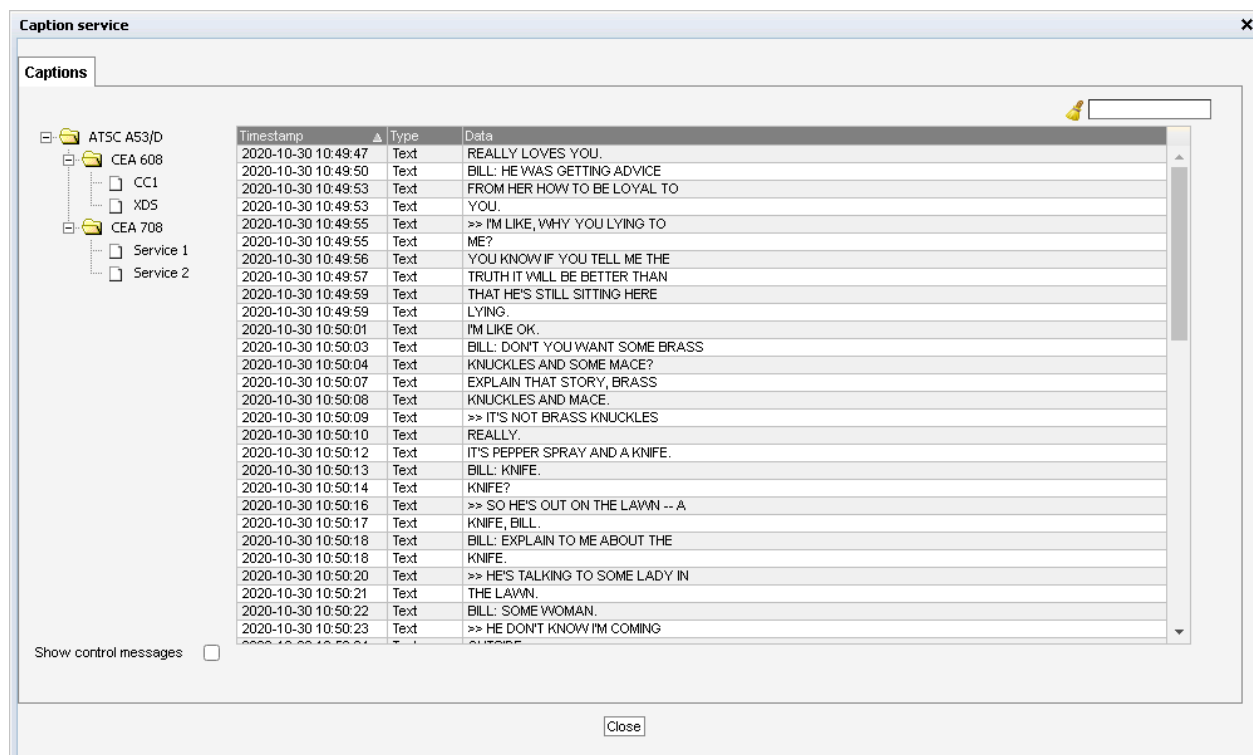
The **Content — Captions** view provides an overview of the closed caption status of each service. The services that the Software Probe extracts captions from are presented in a list of services.

Please note that this view only displays data related to closed captions carried inside the video stream. DVB Subtitling is carried on specialized PIDs and displayed elsewhere.

Thumb:	Thumbnail
Name:	Service name
Parent MC stream:	Name of the multicast stream this service is extracted from.
#SCTE 20:	Number of SCTE 20 caption services detected in this service.
#CEA 608:	Number of non-SCTE 20, CEA 608 caption services detected in this service.
#CEA 708:	Number of CEA 708 caption services detected in this service.
Errors:	Number of caption related errors on this service since joined.

Caption service

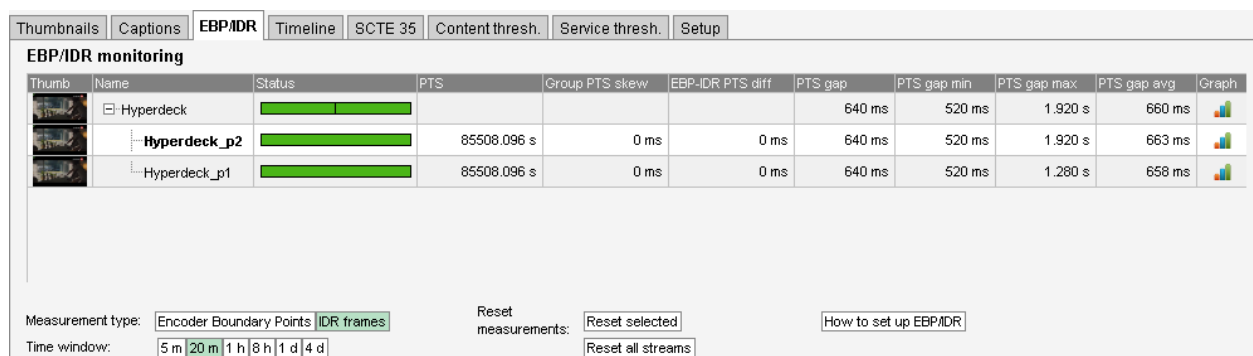
Press the blue information button on a service to open the caption service window. This window gives you access to view all closed caption services, and see the alarms for this service.



The **Caption service** — **Captions** view in this pop-up consists of a closed caption service format selector, and the list to display the select captions.

By default, only the closed caption text is shown in the list. If you would like to see all control messages as well, check the **Show control messages** checkbox at the bottom left.

6.10.3 Content — EBP/IDR (requires CONTENT-OPT)



The Encoder Boundary Point (EBP) monitoring is designed to monitor Adaptive Transport Streams (ATS) carrying boundary signaling. The VB220-SW presents Presentation Time Stamp (PTS) measurements and calculations for IDR frames³, and EBPs following the OpenCable EBP specification⁴.

³Instantaneous Decoder Refresh (IDR) frames are currently detected in H.264 and H.265 streams

⁴Encoder Boundary Point Specification, Version I01, OC-SP-EBP-I01-130118 <https://www.cablelabs.com/specifications/encoder-boundary-point-specification?v=I01>

Buttons in the GUI control which data is presented in the table. Streams that belong to the same ATS group can be grouped together, and a reference stream can be selected. The VB220-SW will give information about each stream and compare streams within the groups.

The table in the GUI uses a tree structure. Each group will have an entry in the table followed by the streams in the group. Streams without a group will be put under *Not grouped*. The different measurements and calculations, along with all elements of the **Content — EBP/IDR** view, are described in the following tables. A setup guide is located at the end of this section. A short guide is also available directly in the GUI by clicking the **How to set up EBP** button.

Thumb:	The thumbnails will not always be generated at the same time for all streams in a group. This means that the thumbnails displayed in the user interface might differ even though the streams are synchronized.
Name:	The name of the stream or group. A group row will have a + or - sign to the left of the name. This can be used to expand and collapse the group. If a name is highlighted in the table it means that it is the reference for Group PTS skew calculations for the group members.
Status:	The EBP status of the stream or group. The colors reflect the status of the EBP or IDR frame alarms. A group's status will have one field per member and show the status of all stream members. These are not in order. The colors show the following • Green: No active alarms • Red: One or more alarms are active • Grey: The stream has <i>No signal</i>
PTS:	The latest PTS read, for the boundaries (EBP or IDR frame) depending on the <i>Measurement type</i> selected.
Group PTS skew	The skew between the stream's and the group reference's boundary PTSs. This value is calculated based on the points that are expected to be synchronized. If a stream has fallen out of sync with the group, the value is updated continuously. The value is calculated by subtracting the reference's PTS from the stream's PTS. A positive value means the PTS of the stream is larger (later in time) than that of the reference. A negative value means smaller (before in time). Typically the streams will share the same PTSs, and the skew is expected to be 0.
EBP-IDR PTS diff	The difference between the PTS of the packet containing the EBP, and the PTS of the IDR frame. As the header indicates, the IDR frame PTS is subtracted from the EBP PTS. A positive value means the PTS of the stream is larger (later in time) than that of the reference. A negative value means smaller (before in time). An ATS is expected to carry an EBP in the IDR frame. In this case they have the same PTS with no difference between the EBP and IDR frame.
PTS gap	The gap between the EBP or IDR frame PTSs of the respective stream.

PTS gap min	The minimum value measured within the selected <i>Time window</i> .
PTS gap max	The max value measured within the selected <i>Time window</i> .
PTS gap avg	The average calculated from the gaps within the selected <i>Time window</i> .
Graph	Column used to open the graph pop-up.

The table below describes the buttons found at the bottom of the page.

Measurement type:	Selects which measurements are displayed in the table. The currently selected measurement type's button is highlighted. Options: Encoder Boundary Points or IDR frames
Time window:	Selects the time window of the gap statistics. The currently selected time window's button is highlighted. Time units: m = minute, h = hour, d = day. Options: 5m, 20m, 1h, 8h, 1d or 4d
Reset measurements:	These buttons are used to reset the EBP data of the streams. Reset selected: reset the EBP data of streams (table rows) currently selected in the table. Reset all streams: resets the EBP data of all streams.
How to set up EBP	Opens a pop-up with a short description of how to set up the EBP monitoring.

Setup guide

By default, the EBP and IDR frame PTS monitoring is not enabled. The setup consists of two main steps: create content thresholds, and configure the streams. The monitoring is controlled by the content thresholds. A stream must be assigned a content thresholds template with EBP and/or IDR frame monitoring enabled to appear in the **Content — EBP/IDR** view.

Create content thresholds:

1. Go to the **Content — Content thresh.** view.
2. Create new, or edit existing, thresholds.
 - The EBP related settings are in the EBP/IDR tab.
 - Hover over the field in the Threshold column with your cursor for a tool-tip.
3. Enable EBP and/or IDR frame PTS monitoring.
4. Set the thresholds according to your specifications.

Add streams:

1. Go to the **Multicasts — Streams** view.

2. Add the streams you want to monitor.
3. When editing set the following: (remember that multi-edit is possible)
 - **Group name** under the **General**.
 - **Group reference** under **Content** for the skew reference.
 - **Content thresholds** under **Content** selects the content thresholds.
4. All streams with the same **Group name** are considered a group.
5. A reference is selected automatically if no group member has **Group reference** checked.

6.10.4 Content — Timeline (requires CONTENT-OPT)



The **Timeline** view requires the Content Extraction and Alarming option, and that a disk is mounted for the Timeline storage. If these conditions are met, the Timeline option is enabled.

If no disk is available, but the system has more than 32 Gbyte RAM installed, temporary storage is made available for the Timeline. This temporary storage will reset when the system is rebooted. If no storage is available, this view will display a message saying so.

Depending on how the file systems are mounted, the Timeline may also compete for space with data stored for use with the multi-stream recording feature.

Select **Timeline** from the **Content** tab, and the timeline should load in the main content area.

Choosing what to inspect

To change which stream and service you are looking at, select the desired service from the drop down at the top left. Note that tracks that are already added will stay put to enable comparing services. If you do not want to have the old tracks there, click the small × in the top right of each track. You can filter which streams you see by typing part of the stream or service name into the filter box. The drop down should now only be populated by the matching streams or services. To clear the filter, just click on the × in the right hand part of the filter box.

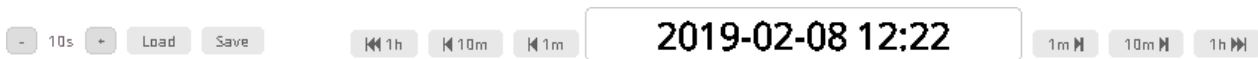


In the bottom left you can select the different types of data available for the selected service.

To remove a track, press the × located at the top right of the track you want to remove.

Some tracks can be resized by clicking on the vertical arrows located under the close button for the track.

Navigating in time



To navigate in time you have two options. Back and forth in time, and zoom in / out.

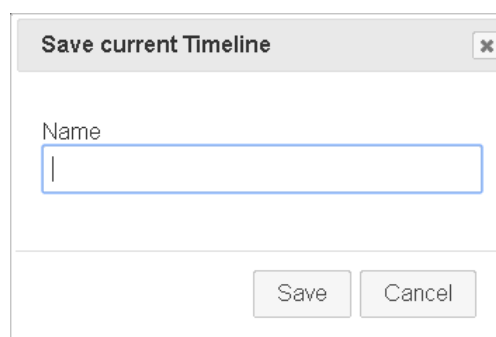
To go back and forth in time you can select the desired time from the time and date picker located at the center top. The time and date picker is most useful for large jumps in time, like if you want to look at data from days/weeks/months back in time. Just select the correct date and time, and the timeline should automatically jump to that point in time.

The buttons to the left and right of the time-picker let you move in small increments in both directions, and are most suited for smaller adjustments in time.

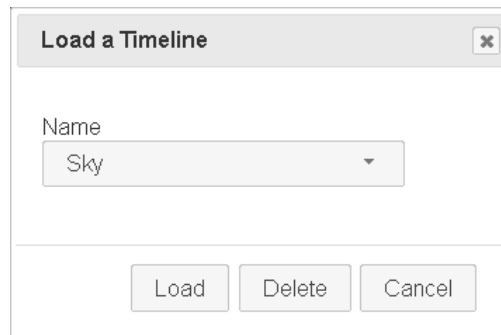
The last way to navigate in time is to drag the timeline in the direction you would want to move it. The timeline should smoothly glide with the dragging motion, and new data should pop up seamlessly.

To zoom in and out, use the + and – buttons located to the right of the filter box. Between the buttons the current zoom level is shown. The zoom level describes how much time is shown in one box.

Persistent layout



When you are happy with the widget layout, you may save the layout by pressing the **Save** button on the top of the screen and giving the layout an unique name. If you later want to update this layout, just save with the same name, and the new layout will override the old.



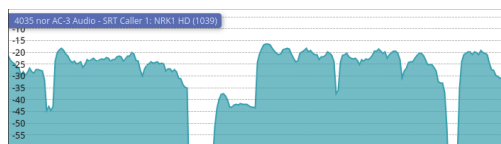
To load a previously saved layout, press the **Load** button on the top of the screen, find the layout you want in the list, and press the **Load** button. You can also delete layouts you no longer need from this view. Select the layout from the list, press the **Delete** button and confirm the deletion.

Audio silence in the timeline

Audio loudness analysis on the probe is designed to monitor and analyze the loudness of audio streams continuously, however, in certain situations the probe may become overloaded resulting in an inability to keep up with the volume of incoming audio data configured for analysis. In such situations you may notice missing audio analysis segments in the timeline. You can see an example of such a missing audio segment below:



The graphical representation of silent audio in the timeline is subtly different: notice that the thicker, darker line travels down the Y-axis towards an audio level of negative infinity (instead of abruptly disappearing from the segment). You can also see that upon audio returning from silence to once again being audible, the thick blue line travels up from negative infinity towards its new levels.



6.10.5 Content — SCTE 35 (requires SCTE35-OPT)

Thumbnail	Captions	EBP	Timeline	SCTE 35	Content thresh.	Service thresh.	Setup
Services carrying SCTE 35 and SCTE 104 messages							
SID	Service name	Stream name	Interface	Events	Time since last event	Time since last place...	
65	DELUXE MUSIC	DELUXE MUSIC	IPTV	826	30s	160s	

SCTE 35/104 - Event information													
Event list SCTE 35/104													
Time	SID	Service name	PID	Type	Splice command	Cmd id	Event ID	Pre-roll	Cd	Imm	Switch mode	Seg. type	Type id
Apr 11 07:47:05	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772551	7.18			Program In Point		NA
Apr 11 07:44:55	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772551	6.24			Program Out Point		131.40
Apr 11 07:28:54	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772539	7.10			Program In Point		NA
Apr 11 07:28:29	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772539	7.02			Program Out Point		20.20
Apr 11 07:28:26	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772527	7.11			Program In Point		NA
Apr 11 07:27:16	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772527	5.55			Program Out Point		71.20
Apr 11 07:11:46	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772515	6.99			Program In Point		NA
Apr 11 07:09:53	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772515	5.59			Program Out Point		113.80
Apr 11 06:52:10	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772503	6.98			Program In Point		NA
Apr 11 06:50:08	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772503	6.04			Program Out Point		121.60
Apr 11 06:32:12	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772491	6.96			Program In Point		NA
Apr 11 06:29:32	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772491	6.80			Program Out Point		162.00
Apr 11 06:12:03	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772479	7.00			Program In Point		NA
Apr 11 06:10:11	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772479	5.88			Program Out Point		113.20
Apr 10 22:42:50	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772467	7.18			Program In Point		NA
Apr 10 22:40:35	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772467	6.79			Program Out Point		136.60
Apr 10 22:27:18	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772455	6.80			Program In Point		NA
Apr 10 22:27:10	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772455	5.89			Program Out Point		10.20
Apr 10 22:26:04	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772443	7.15			Program In Point		NA
Apr 10 22:24:36	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772443	6.38			Program Out Point		83.20
Apr 10 22:10:50	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772431	7.01			Program In Point		NA
Apr 10 22:08:10	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772431	6.99			Program Out Point		162.60
Apr 10 21:46:28	65	DELUXE MUSIC	60	35	Splice insert	0x5	1073772410	6.78			Program In Point		NA

SCTE 35 is a specification which allows equipment to splice in local content at specific times, SCTE 35 is basically just the signaling mechanism the equipment uses to know when to switch from the master transmission to insert local content. It can be used to allow insertion of local advertising at certain points in time or to allow the local operator to insert their own programs such as local news transmission.

SCTE 104 specifies carriage of these events in uncompressed streams.

The SCTE 35 option enables monitoring of SCTE 35 and SCTE 104 events of all streams and OTT channels monitored by the probe.

Service list parameters

SID:	The ID of the service for which SCTE 35 or SCTE 104 data has been received.
Service name:	The name of the service for which SCTE 35 or SCTE 104 data has been received.
Stream name:	Name specified by the user when adding a multicast or tuning.
Interface:	The input source of the transport stream.
Events:	The number of SCTE 35 or SCTE 104 events seen for the service.
Time since last event:	The time since the last SCTE 35 event specified in seconds, minutes, hours or days.
Time since last placement:	The time since the last SCTE 35 placement opportunity in seconds, minutes, hours or days.

To monitor SCTE 35 and SCTE 104 information, enable the **Monitor SCTE 35** checkbox in

Content — Content thresh. and configure the transport stream or OTT channel to use that content threshold. If it contains SCTE 35 or SCTE 104 information, the stream will be added to the list in the SCTE 35 view. By pressing the blue information button a new pop-up will show up, the pop-up will give specific information about events in the specified transport stream or OTT channel.

<i>Event information list parameters:</i>	
<i>Parameter</i>	<i>Description</i>
Time:	When the event occurred.
SID:	The ID of the service for which the event applies.
Service name:	The name of the service for which the event applies.
PID:	The PID carrying the SCTE 35 or SCTE 104 information. A service can have multiple SCTE 35 or SCTE 104 PIDs signaled in the PMT table(s).
Type:	Indicates whether the received event was SCTE 35 or SCTE 104.
Splice command:	The type of the splice command.
Cmd id:	The hex value of the command.
Event ID:	ID of the specific event.
Pre-roll:	Number of seconds before a splice the event was received.
Cxl:	Canceled indicator, if set it indicates that this splice message cancels a previously sent splice message.
Imm:	Immediate mode, if set it indicates that this message should take effect immediately.
Switch mode:	Specifies whether it is a splice in (switch to local content/ads) or splice out event (switch back to the audio/video in the stream). For messages with the splice command type 'Time signal' the Switch mode parameter will be empty and the Segment type parameter will contain the details.
Seg. type:	The segmentation type found in the segmentation descriptor (if found).
Type id:	The hex value of the segmentation type parameter.
Duration:	The time when a splice occurred to its end.
Tier:	Specifies which tier group are to use this splice message. Multiple splice messages can be sent addressed to different tier groups to allow switching at different times.

Use the drop-down at the top of the event list dialog to switch between displaying all events (default) or to display only SCTE 35 or only SCTE 104 events.

When pressing the information button for a specific event a new window will pop-up with detailed information about the event. The pop-up will show a log of the SCTE 35 or SCTE 104 events signaled for the specified transport stream or OTT channel. Splice NULL messages are not logged.

6.10.6 Content — Content thresh.

Thumbnails

Captions

EBP

Timeline

Content thresh.

Service thresh.

Setup

Content threshold presets

These thresholds are used to control what to include in the Timeline, generate content alarms and to determine when an error-second has occurred

Name	Refs	Freeze-frame	Freeze timeout	Alignment	Loudness	Silence thresh.	Silence timeout	EBP	IDR	GoE	VMAF	Capti...	Edit
Default	24	Disabled	10 min	Disabled		0 dB	10 s						Edit
All Checks Stored	402	Trigger seldom	10 min	Disabled	✓	-60 dB	10 s			✓		✓	Edit
OTT	0	Trigger seldom	10 min	Trigger seldom		0 dB	10 s						Edit
OTT GoE	0	Trigger seldom	10 min	Trigger seldom		0 dB	10 s			✓	✓		Edit

Thresholds: 4

Add new threshold

Duplicate selected

Delete selected

Edit selected

The **Content — Content thresh.** view makes it possible to define threshold values that operate at stream level. Thresholds are associated with each stream in the **Multicasts — Streams — Edit** and **OTT — Channels** views. There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold** button. A pop-up window will appear allowing the user to define alarm conditions. Another way of creating a user-defined threshold template is by highlighting one of the threshold templates already defined and then click the **Duplicate highlighted** button.

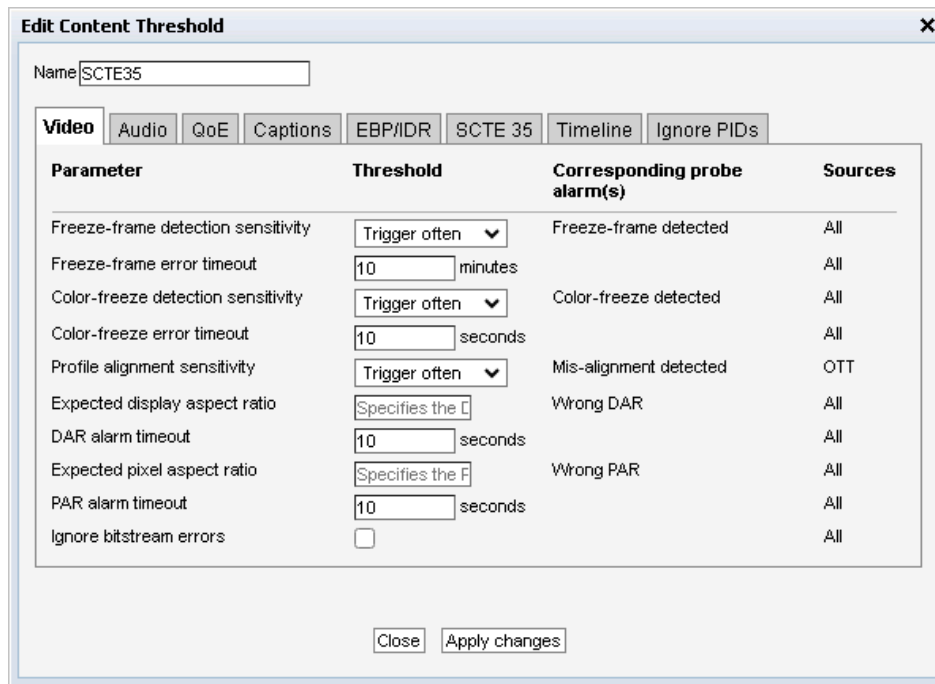
VB220-SW GigaE Software Probe User's Manual version 7.0

entries are selected by using the regular *Ctrl + click* or *Shift + click* functionality. Click the **Edit** button to edit one or more selected threshold templates. Note that the predefined ‘Default’ threshold template cannot be deleted or changed.

In the threshold presets list the ‘Refs’ column displays how many streams are associated with each stream threshold template.

The available thresholds depend on the currently active license. Applying content analysis on many concurrent streams can introduce a performance penalty, please refer to appendix B.5 for more details.

The **Sources** column indicates which of the different threshold settings are supported where.

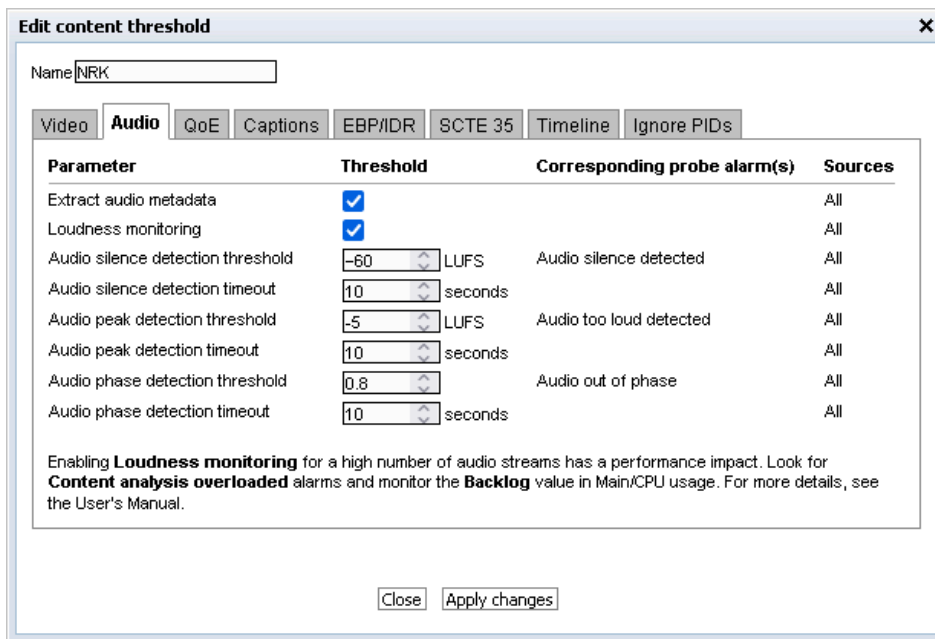


Parameter	Threshold	Corresponding probe alarm(s)	Sources
Freeze-frame detection sensitivity	Trigger often ▼	Freeze-frame detected	All
Freeze-frame error timeout	10 minutes		All
Color-freeze detection sensitivity	Trigger often ▼	Color-freeze detected	All
Color-freeze error timeout	10 seconds		All
Profile alignment sensitivity	Trigger often ▼	Mis-alignment detected	OTT
Expected display aspect ratio	Specifies the	Wrong DAR	All
DAR alarm timeout	10 seconds		All
Expected pixel aspect ratio	Specifies the	Wrong PAR	All
PAR alarm timeout	10 seconds		All
Ignore bitstream errors	☐		All

Video

Freeze-frame detection sensitivity:	Picture matching in video streams is not an exact science, as noise can be introduced in many of the stages the stream goes through. This setting makes it possible to define the amount of noise to be allowed when performing freeze-frame detection. When set to Disabled, the freeze-frame detection is disabled. When set to Trigger seldom, only a small amount of noise is allowed when deciding whether the picture has changed or not. This means that the pictures have to be close to identical before the freeze-frame alarm is raised. Normal is the recommended setting and should be used in most cases. Trigger often allows a high amount of noise. This means that it allows pictures to be quite different while still classifying them as identical, which may result in too many freeze-frame alarms.
Freeze-frame error timeout:	The time (in minutes) a freeze-frame error should persist before the probe will raise an alarm
Color-freeze detection sensitivity:	This setting makes is possible to define the amount of noise to be allowed when performing color-freeze detection. When set to Disabled, the color-freeze detection is disabled. When set to Trigger seldom, only a small amount of noise is allowed when comparing to the list of solid colors. Normal is the recommended setting, whereas Trigger often allows a high amount of noise, which may result in too many color-freeze alarms.
Color-freeze error timeout:	The time (in seconds) a color-freeze error should persist before the probe will raise an alarm.
Profile alignment sensitivity:	<i>OTT channels only:</i> Picture matching in video streams is not an exact science, as noise can be introduced in many of the stages the stream goes through. This setting makes it possible to define how much noise is allowed when performing profile alignment detection. When set to Disabled, profile alignment detection is disabled. When set to Trigger seldom, a large amount of noise is allowed when comparing the frames across profiles for out-of-alignment conditions. Normal is the recommended setting, whereas Trigger often allows only a small amount of noise, which may result in too many out-of-alignment alarms.

Expected display aspect ratio:	If this field is non-empty, an alarm will be raised if the display aspect ratio for the stream differs from the one entered here. The aspect ratio is entered on the form <i>n:m</i> (e.g <i>16:9</i> or <i>4:3</i>).
DAR alarm timeout:	The minimum number of seconds during which an alarm remains active when the Expected display aspect ratio is not correct.
Expected pixel aspect ratio:	If this field is non-empty, an alarm will be raised if the pixel aspect ratio for the stream differs from the one entered here. The aspect ratio is entered on the form <i>n:m</i> (e.g <i>1:1</i> or <i>2:1</i>).
PAR alarm timeout:	The minimum number of seconds during which an alarm remains active when the Expected pixel aspect ratio is not correct.
Ignore bitstream errors:	In some cases, the video codec reports errors in the bitstream while still being able to generate thumbnails or partial thumbnails. If the stream shows a “Bitstream Errors” icon, you can try to ignore this by enabling this setting.



Edit content threshold

Name:

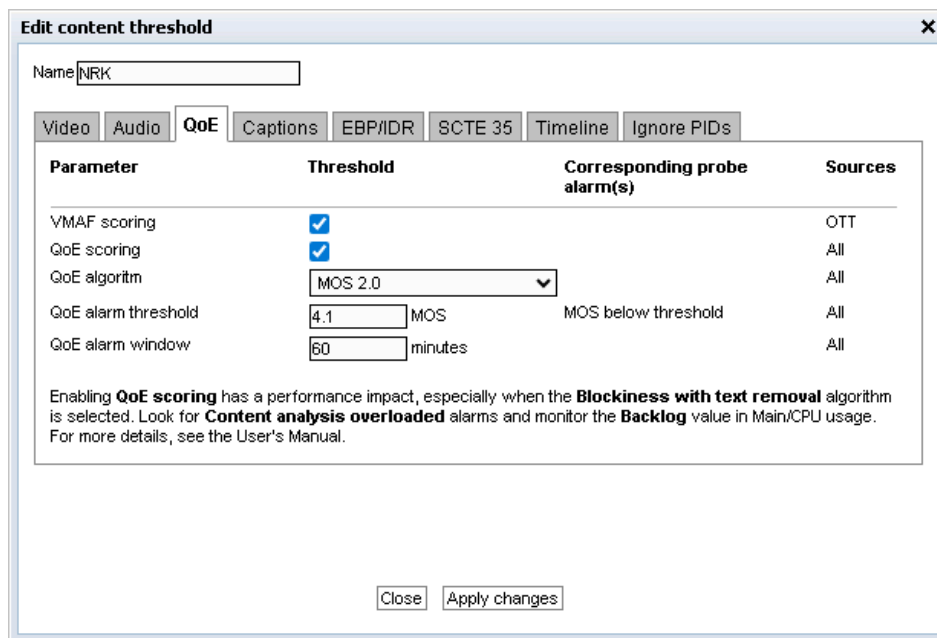
Video **Audio** QoE Captions EBP/IDR SCTE 35 Timeline Ignore PIDs

Parameter	Threshold	Corresponding probe alarm(s)	Sources
Extract audio metadata	☒		All
Loudness monitoring	☒		All
Audio silence detection threshold	-60 LUFS	Audio silence detected	All
Audio silence detection timeout	10 seconds		All
Audio peak detection threshold	-5 LUFS	Audio too loud detected	All
Audio peak detection timeout	10 seconds		All
Audio phase detection threshold	0.8	Audio out of phase	All
Audio phase detection timeout	10 seconds		All

Enabling **Loudness monitoring** for a high number of audio streams has a performance impact. Look for **Content analysis overloaded** alarms and monitor the **Backlog** value in Main/CPU usage. For more details, see the User's Manual.

Audio

Extract audio metadata:	By default, the Software Probe does not consider audio PIDs or profiles. With this setting enabled, it will also visit audio PIDs and profiles, extracting metadata such as sample rate and number of audio channels. Please note that if audio PIDs or profiles are explicitly set to being ignored by other threshold settings, that setting is considered first, and will override this one.
Loudness monitoring:	Enables real-time loudness extraction for the stream. The loudness data can be retrieved through the Eii. If this setting is enabled, the Extract audio metadata setting will also be enabled.
Audio silence detection threshold:	The value in LUFS/LKFS when to trigger the audio silence alarm. Setting this to a value of 0 disables audio silence detection.
Audio silence detection timeout:	The number of seconds that audio has to be below the silence detection threshold before the audio silence alarm is triggered.
Audio peak detection threshold:	The value in LUFS/LKFS when to trigger the audio too loud alarm. Setting this to a value of 0 disables audio peak detection.
Audio peak detection timeout:	The number of seconds that audio has to be above the peak detection threshold before the audio too loud alarm is triggered.
Audio phase detection threshold:	For two channel audio (stereo or dual mono), this defines the threshold for when to report out of phase audio. A value of -1 indicates audio that is completely out of phase, whereas a value of 1 indicates audio that is completely in phase. Setting this to a value of -1 disables audio phase detection.
Audio phase detection timeout:	The number of seconds that audio has to be above the phase detection threshold before the audio out of phase alarm is triggered.



QoE

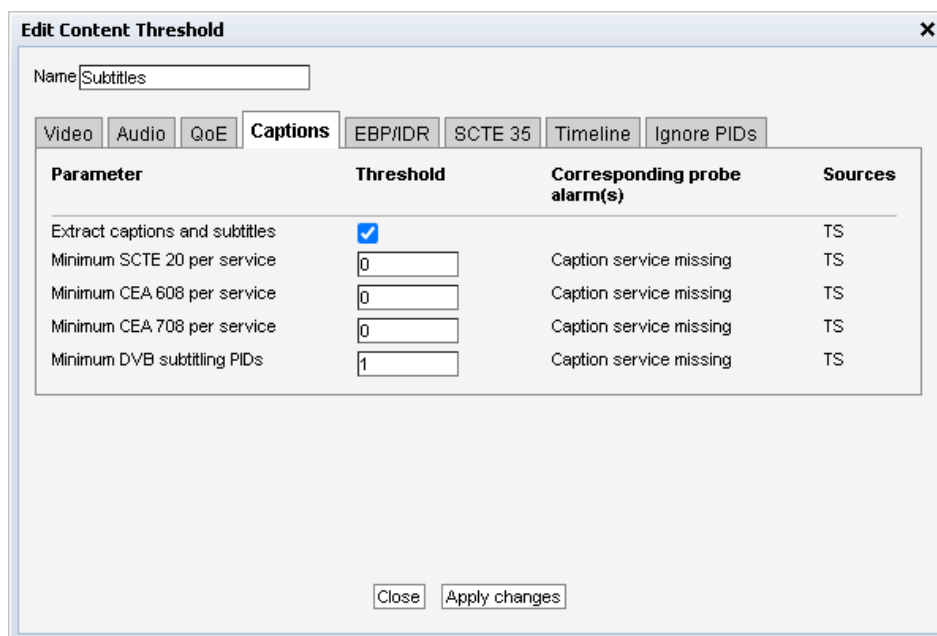
VMAF scoring: *OTT channels only:* When enabled, the VB220-SW will compare the different profiles and create a VMAF score relative to the profile with the highest bitrate.

QoE scoring: Enables picture analysis and MOS scoring.

QoE algorithm: Select the algorithm to be used when calculating the MOS. The following algorithms are available:
MOS 2.0, which is the currently recommended algorithm, **Classic**, which is the original algorithm first introduced in software release 5.4.0, and **Blockiness with text removal**, which is a specialized algorithm that only looks at the amount of sharp edges in the image, after first removing detected text.
Please see appendix B.5 for further details.

QoE alarm threshold: Set the threshold for average MOS. If QoE scoring is enabled and this value is set to a value above 1.0, an alarm will be triggered if the MOS average drops below this value. Set to 1.0 to disable the alarm.

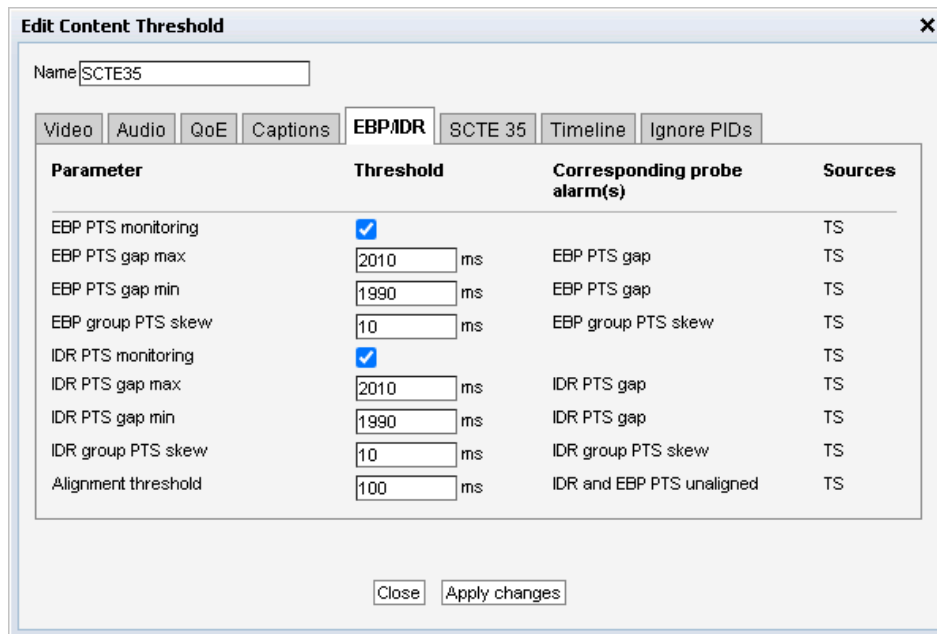
QoE alarm window: The time (in minutes) over which to calculate the MOS average for alarming purposes. MOS is calculated at most once per minute per service.
If the service has been monitored for a shorter time than the length of the alarm window, the MOS average computed so far will be used for alarming purposes.



Parameter	Threshold	Corresponding probe alarm(s)	Sources
Extract captions and subtitles	☒		TS
Minimum SCTE 20 per service	0	Caption service missing	TS
Minimum CEA 608 per service	0	Caption service missing	TS
Minimum CEA 708 per service	0	Caption service missing	TS
Minimum DVB subtitling PIDs	1	Caption service missing	TS

Captions

Extract captions and subtitles:	Enable extraction of closed captions from the video stream and of DVB subtitles.
Minimum SCTE 20 per service:	The minimum number of SCTE 20 caption services that has to be present in the video stream before an alarm is triggered.
Minimum CEA 608 per service:	The minimum number of non-SCTE 20 CEA 608 caption services that has to be present in the video stream before an alarm is triggered.
Minimum CEA 708 per service:	The minimum number of CEA 708 caption services that has to be present in the video stream before an alarm is triggered.
Minimum DVB subtitling PIDs:	The minimum number of DVB subtitling PIDs that has to be present in the service before an alarm is triggered.



Parameter	Threshold	Corresponding probe alarm(s)	Sources
EBP PTS monitoring	☒		TS
EBP PTS gap max	2010 ms	EBP PTS gap	TS
EBP PTS gap min	1990 ms	EBP PTS gap	TS
EBP group PTS skew	10 ms	EBP group PTS skew	TS
IDR PTS monitoring	☒		TS
IDR PTS gap max	2010 ms	IDR PTS gap	TS
IDR PTS gap min	1990 ms	IDR PTS gap	TS
IDR group PTS skew	10 ms	IDR group PTS skew	TS
Alignment threshold	100 ms	IDR and EBP PTS unaligned	TS

EBP/IDR

EBP PTS monitoring: When *EBP PTS monitoring* is enabled, the probe will look for EBPs, and the respective PTS, in the stream. The table in the **Content — EBP** view will present the stream's EBP related information. This setting only applies to the table's *Encoder Boundary Points Measurement type*. The stream is only visible in the table when *EBP PTS monitoring* is enabled.

EBP PTS gap max: The upper EBP PTS gap threshold. Gaps longer than this threshold will raise an alarm. Set this and gap min to -1 to disable the alarm.

EBP PTS gap min: The lower EBP PTS gap threshold. Gaps shorter than this threshold will raise an alarm. Set this and gap max to -1 to disable the alarm.

EBP group PTS skew: The absolute value of the group PTS skew allowed before an alarm is raised. The skew is calculated based on the group reference stream. set to -1 to disable alarm

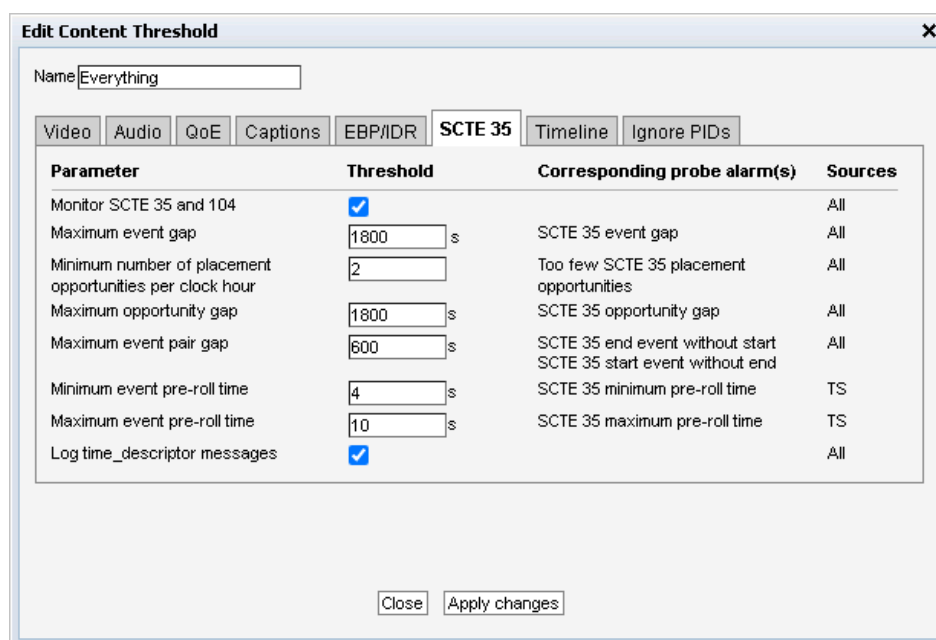
IDR PTS monitoring: When *IDR PTS monitoring* is enabled, the probe will look for IDR frames, and the respective PTS, in the stream. The table in the **Content — EBP** view will present the stream's IDR frame related information. This setting only applies to the table's *IDR frame Measurement type*. The stream is only visible in the table when *IDR PTS monitoring* is enabled.

IDR PTS gap max: The upper IDR frame PTS gap threshold. Gaps longer than this threshold will raise an alarm. Set this and gap max to -1 to disable alarm.

IDR PTS gap min: The lower IDR frame PTS gap threshold. Gaps shorter than this threshold will raise an alarm. Set this and gap max to -1 to disable alarm.

IDR group PTS skew: The absolute value of the group PTS skew allowed before an alarm is raised. The jitter is calculated based on the group reference stream. set to -1 to disable alarm.

Alignment threshold: The maximum PTS difference allowed between an EBP and the associated IDR frame. Set to -1 to disable alarm.



Edit Content Threshold

Name:

Video Audio QoE Captions EBP/IDR **SCTE 35** Timeline Ignore PIDs

Parameter	Threshold	Corresponding probe alarm(s)	Sources
Monitor SCTE 35 and 104	☒		All
Maximum event gap	1800 s	SCTE 35 event gap	All
Minimum number of placement opportunities per clock hour	2	Too few SCTE 35 placement opportunities	All
Maximum opportunity gap	1800 s	SCTE 35 opportunity gap	All
Maximum event pair gap	600 s	SCTE 35 end event without start SCTE 35 start event without end	All
Minimum event pre-roll time	4 s	SCTE 35 minimum pre-roll time	TS
Maximum event pre-roll time	10 s	SCTE 35 maximum pre-roll time	TS
Log time_descriptor messages	☒		All

SCTE 35

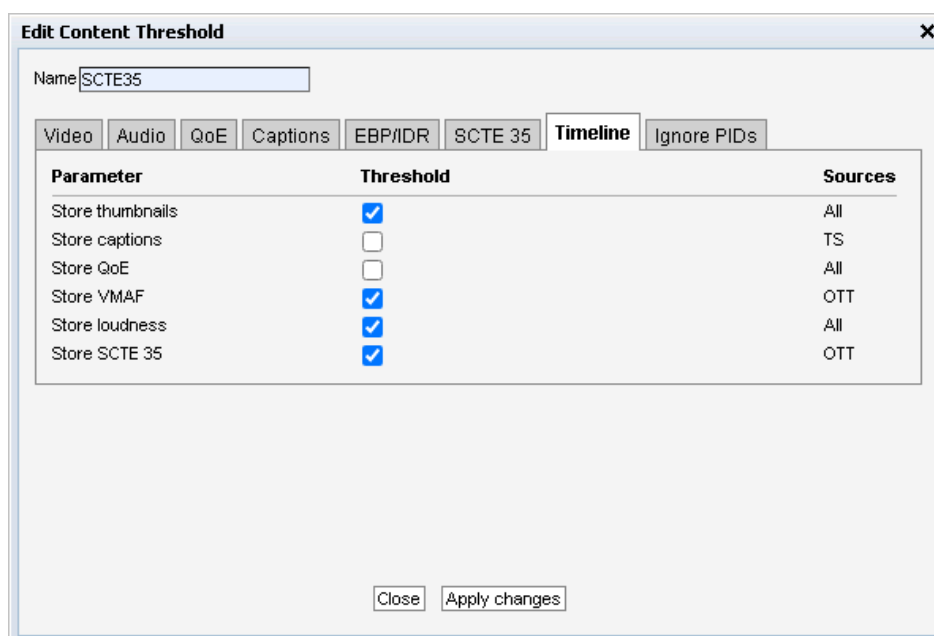
Monitor SCTE 35: If enabled, SCTE 35 and SCTE 104 events are captured and displayed in the **Content – SCTE 35** view

Maximum SCTE 35 event gap: Specifies the maximum number of seconds allowed between two SCTE 35 or SCTE 104 events before an alarm is raised. Set to –1 to disable the alarm.

Minimum number of placement opportunities per clock hour: Specifies the minimum number of placement opportunities that must be signaled for a full clock hour. An alarm will be raised at the top of the hour if the previous hour had fewer than this number of opportunities. Set to –1 to disable the alarm.

Maximum SCTE 35 opportunity gap: Specifies the maximum number of seconds allowed between two SCTE 35 or SCTE 104 placement opportunities before an alarm is raised. Set to –1 to disable the alarm.

Maximum event pair gap:	Specifies the maximum number of seconds allowed between the a SCTE 35 or SCTE 104 start and end segmentation descriptor messages in Time signal events. An alarm will be raised for five seconds when this is detected. Additionally, an alarm will be raised if an end segmentation message was received without the corresponding start message. Set to –1 to disable these alarms.
Minimum event pre-roll time:	Specifies the minimum number of seconds allowed between when the SCTE 35 event is received and when the splice is supposed to happen. An alarm will be raised for five seconds when this is detected. Set to –1 to disable these alarms.
Maximum event pre-roll time:	Specifies the maximum number of seconds allowed between when the SCTE 35 event is received and when the splice is supposed to happen. An alarm will be raised for five seconds when this is detected. Set to –1 to disable these alarms.
Log time_descriptor messages	Determines whether the SCTE 35 or SCTE 104 messages containing nothing else than a time_descriptor should be included in the message log. In some systems there are a lot of these messages (they can be used as keep alive messages to ensure that there always is some traffic on the SCTE 35 or SCTE 104 PID). If the message log is filled up with the time_descriptor messages, disable logging of these messages



Parameter	Threshold	Sources
Store thumbnails	☒	All
Store captions	☐	TS
Store QoE	☐	All
Store VMAF	☒	OTT
Store loudness	☒	All
Store SCTE 35	☒	OTT

Timeline

-
- Store thumbnails:** If enabled, thumbnails are stored for display in the **Content — Timeline** view.
Note that the **Extract thumbnails** checkbox in the tuning setup must be checked for this to take effect.
-
- Store captions:** If enabled, closed captions are stored for display in the **Content — Timeline** view.
Note that the **Extract thumbnails** checkbox in the tuning setup must be checked for this to take effect.
-
- Store QoE:** If enabled, QoE scores are stored for display in the **Content — Timeline** view.
Note that the **QoE scoring** checkbox must be checked for this to take effect.
-
- Store VMAF:** If enabled, VMAF scores are stored for display in the **Content — Timeline** view.
Note that the **VMAF scoring** checkbox must be checked for this to take effect.
-
- Store loudness:** If enabled, loudness data are stored for display in the **Content — Timeline** view.
Note that the **Loudness monitoring** checkbox must be checked for this to take effect.
-
- Store SCTE 35:** If enabled, SCTE 35 events are stored for display in the **Content — Timeline** view.
Note that the **Monitor SCTE 35 and 104** checkbox must be checked for this to take effect.
-

Edit content threshold

Name

Video
Audio
QoE
Captions
EBP/IDR
SCTE 35
Timeline
Ignore PIDs

Parameter	Value	Sources
Ignore PIDs	100,101,102	TS
Suppress alarms from PIDs	3175,4035	TS

PIDs listed in **Ignore PIDs** will not be decoded, analyzed, or get any content check errors. This can be used to lower the performance impact of the content analysis. PIDs listed in **Suppress alarms from PIDs** will be monitored, but will never be subject to alarms. For more details, see the User's Manual.

Close

Apply changes

Ignore PIDs

Ignore PIDs: *Not applicable to OTT channels:* A comma separated list of PIDs for which the probe should not decode, analyze or report any content check errors. No thumbnails, loudness or captions will be decoded on these PIDs.

Suppress alarms from PIDs:	<i>Not applicable to OTT channels:</i> A comma separated list of PIDs for which the probe should not report any content check errors. Thumbnails, loudness and captions will be decoded on these PIDs.
-----------------------------------	--

Some SCTE 35 alarms apply to the entire service (*SCTE 35 event gap*, *Too few SCTE 35 placement opportunities*, *SCTE 35 placement gap*), and are not affected by this setting.

Some caption alarms apply to the entire stream (*Bad caption quality*) or the entire service (*Caption service missing*), and are not affected by this setting.

The 'Ignore PIDs' and 'Suppress alarms from PIDs' settings are only applied from the stream content thresholds, they are ignored when used in the Content Service thresholds.

6.10.7 Content — Service thresh.

Thumbnails

Captions

EBP

Timeline

Content thresh.

Service thresh.

Setup

Content service thresholds

These thresholds are used to override the Content thresholds on a service basis

Name	Refs	Description	Edit
Default	11	No special rules for any services.	Edit
Service 1039	1	Override service 1039	Edit
MPTS	0	Service-specific rules	Edit

Service thresholds: 3

Add new threshold group

Duplicate selected

Delete selected

Thresholds are used to determine when to actually raise an alarm upon detection of an error. The **Content — Service thresh.** view makes it possible to define detailed conditions for alarm triggering on a per-service basis. This is particularly useful to specify individual alarm handling rules for services in a multi-program transport stream (MPTS). Note that if there is a stream and service threshold mismatch, the service threshold will apply. This may be the case if QoE or scheduling requirements are set differently in the stream threshold template and service threshold template associated with a stream. There is one predefined service threshold template that cannot be edited by the operator: **Default**. The Default service threshold template contains no service definitions and will therefore not alter alarming for any service.

By associating scheduling templates to service threshold templates it is possible to disable alarming at pre-selected time intervals. Scheduling templates are defined in the **Setup — Scheduling** view and will be available from the schedule drop-down menu.

In the ‘Service Thresholds’ table, the ‘Refs’ column shows how many streams are associated with each threshold template. Thresholds are associated with each stream in the **Multicasts — Streams — Edit** view.

There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold group** button. A pop-up window will appear allowing the user to assign a name and value to the new threshold and define the alarm conditions. Another way of creating a user-defined threshold template is by highlighting one of the templates already defined and then click the **Duplicate selected** button.

Deleting a service threshold template is done by highlighting the template that should be removed and clicking **Delete selected**. Note that if the deleted threshold template was assigned to a stream being monitored, the new threshold template for that stream will default to the **Default** template.

Name:	A text string that identifies the service threshold group
Description:	Text field that should contain a meaningful description of the threshold

ID:	The service ID for which the associated thresholds should apply. For an SPTS the service ID will generally be 1; adding several list entries with different service IDs allows different thresholds to apply for different services within an MPTS.
Content thresholds:	This settings defines the content threshold settings that should be applied to this stream. The entire content threshold setting, with the exception for the ‘Ignore PIDs’ and ‘Suppress alarms from PIDs’ settings, will be applied to the service. Please refer to chapter 6.10.6 for the specific meaning of the settings. Set this to <i>Same as stream</i> to apply the default content thresholds for this service.
Schedule:	The Schedule drop-down menu allows the user to associate a scheduling scheme to a service, in effect masking alarms during selected intervals. Scheduling templates are defined in the Setup — Scheduling view. The predefined scheduling templates ‘Never’ and ‘Always’ will always be selectable, and these will result in service alarms never and always being masked, respectively. When <i>Same as stream</i> is selected, the requirement defined in the stream threshold will apply. Note that alarm masking only affects alarm lists and SNMP traps; other alarm indications in the GUI will remain visible.

6.10.8 Content — Setup (requires CONTENT-OPT)

Thumbnails

Captions

EBP/IDR

Timeline

SCTE 35

Content thresh.

Service thresh.

Setup

Timeline storage

Storage capacity warning threshold

5

%

Minimum storage capacity required

50G

Target thumb intervals

20 seconds

Current free storage

17% (174G)

Estimated total disk days

92.1

All data types are stored in the Timeline storage if the amount of disk free is above the warning threshold. Critical data types are stored as long as the disk is above the minimum level.

Timeline durations

Data type	Duration	Critical	Disk usage
Thumbnails	2 Months	☐	97.1%
Closed Captions	2 Months	☒	0.0%
QoE	3 Days	☐	0.0%
Audio Loudness	2 Months	☐	2.9%
VMAF	3 Days	☐	0.0%
Recording Links	2 Months	☐	0.0%
SCTE 35	2 Months	☐	0.0%

The Disk usage column shows the contribution of each data type for the last 10 minutes.

Shown streams

OTT: 0093 Wowza NRK1 DASH

OTT: 0094 Wowza NRK1 SS

OTT: 0095 ABR Disney HLS

OTT: 0096 ABR Disney CMAF

OTT: 0097 ABR Disney DASH

OTT: 0098 ABR Disney SS

OTT: 0099 ABR Disney HDS

OTT: 0100 ABR Deluxe Music HLS

TS: Al Jazeera English HD

TS: Animal Planet HD

TS: BBC BRIT HD

TS: BBC Earth HD

⇒

⇐

Hidden streams

TS: arte HD

Show all streams

Show joined streams

Hide unjoined streams

Hide all streams

Apply changes

The **Content — Setup** view is used to configure storage and display parameters for the Timeline. The individual streams that should be archived and made available in the **Content — Timeline** view are configured using the **Content — Content thresh.** view.

The Timeline view requires a dedicated file system being available for storage. If no disk has been mounted and the system has enough RAM available, a RAM disk filesystem will be created for the Timeline. In this case, Timeline data will be lost when the probe is rebooted, either explicitly, or as a result of a power failure. A message stating that no disk has been mounted for Timeline storage is displayed in this case.

By default, all streams available in the Timeline database are available in the selection drop-down. If services have undergone many renames, the **Shown/hidden streams** view can be used to select which streams should be available.

Use **Show joined streams** to move all streams that are currently joined to the **Shown streams** list. Use **Hide unjoined streams** to move all streams that are currently not joined to the **Hidden streams** list.

Timeline storage

Storage capacity warning threshold: This defines the amount of free space that should be available on the file system holding the Timeline database before a warning is issued. Archiving of data types not marked as critical is suspended when the free space goes below this threshold. When you get an alarm saying the disk is getting full, you can change the configuration to keep it for a shorter duration, or add more disk to the server. If the multi-stream recording feature is used and data is stored on the same file system as is used for the Timeline, it is recommended that this value is configured to be lower than the value in the **Record — Setup** view if Timeline data is to take precedence of recordings.

Minimum storage capacity required: This value is the amount of free space that should be available on the file system holding the Timeline database for any data to be stored in the database. This value is set to five percent or fifty gigabytes, whichever is lowest.

Target thumb intervals: Allows the interval between updated thumbnails in the timeline to be selected, between 1 and 60 seconds. This is the targeted refresh and will never be faster than the frequency at which full-frame pictures are present in the stream (IPTV) or the segment duration (OTT).

Current free storage: This shows the currently available free space on the file system holding the Timeline database.

Estimated total disk days: Number of days of data the disk can hold, according to current settings. This number is based on the disk usage figures in the Timeline durations frame. Depending on how the file systems are mounted, the Timeline may also compete for space with data stored for use with the multi-stream recording feature, in which case the number presented here might not be accurate.

Timeline durations

Duration:	For each supported data type, this selects for how long data is retained in the Timeline database.
Critical:	If a data type is set as critical, it is still stored in the Timeline database if the amount of free space drops below the warning threshold, as long as it is above the minimum storage capacity required value.
Disk usage:	The actual disk usage for each of the available data types over the last 10 minutes. The value is used to calculate the <i>Estimated total disk days</i> . When changing a setting affecting disk usage, these figures should begin to settle within 10 minutes.

6.11 Record

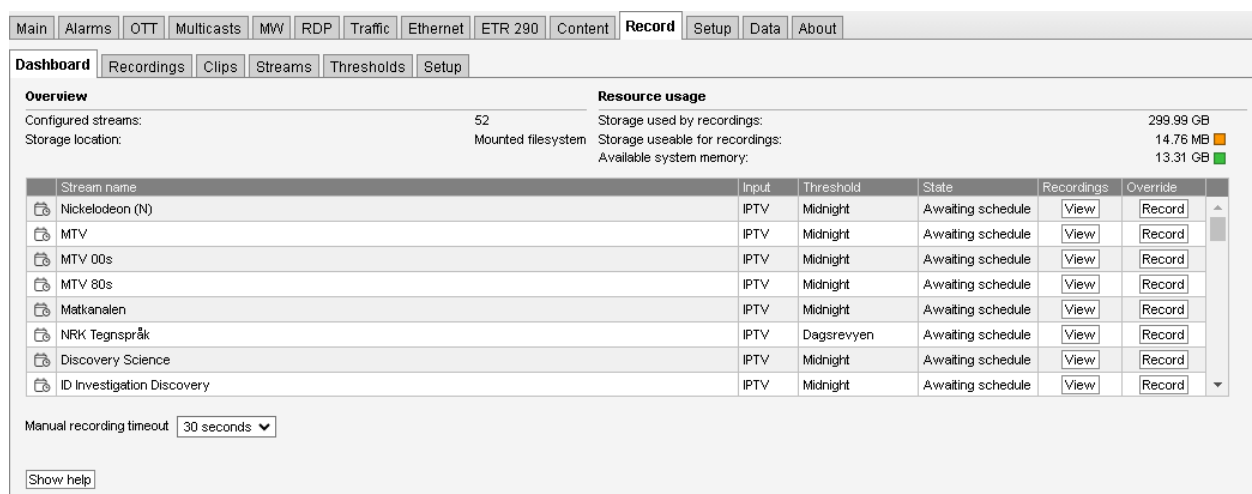
The multi-stream recording feature enables recording streams to file, either directly, on a schedule, or triggered by alarms or events. Streams may be recorded from IPTV interfaces.

By default, the Software Probe can record up to two streams simultaneously. With license upgrades, up to 200 streams can be recorded in parallel at an aggregate bandwidth of 10 Gbit/s.

The multi-stream recording feature is designed and tested to keep up to 100000 recordings stored on a probe at a given time. Exceeding this may cause undefined behavior.

The probe can be instructed to record a stream through the graphical user interface, or the external integration interface. In the graphical user interface there are five sub-views related to the multi-stream recording feature.

6.11.1 Record — Dashboard



The screenshot shows the 'Record' dashboard with the following components:

- Navigation Bar:** Main, Alarms, OTT, Multicasts, MW, RDP, Traffic, Ethernet, ETR 290, Content, **Record**, Setup, Data, About.
- Sub-views:** Dashboard, Recordings, Clips, Streams, Thresholds, Setup.
- Overview Section:**
 - Configured streams: 52
 - Storage location: Mounted filesystem
 - Storage used by recordings: 299.99 GB
 - Storage useable for recordings: 14.76 MB
 - Available system memory: 13.31 GB
- Streams Table:**

Stream name	Input	Threshold	State	Recordings	Override
Nickelodeon (N)	IPTV	Midnight	Awaiting schedule	View	Record
MTV	IPTV	Midnight	Awaiting schedule	View	Record
MTV 00s	IPTV	Midnight	Awaiting schedule	View	Record
MTV 80s	IPTV	Midnight	Awaiting schedule	View	Record
Matkanalen	IPTV	Midnight	Awaiting schedule	View	Record
NRK Tegnspråk	IPTV	Dagsrevyen	Awaiting schedule	View	Record
Discovery Science	IPTV	Midnight	Awaiting schedule	View	Record
ID Investigation Discovery	IPTV	Midnight	Awaiting schedule	View	Record
- Manual recording timeout:** 30 seconds
- Show help** button.

The **Record — Dashboard** view contains an overview of recording activity on the probe and a list of streams that are currently configured to be recorded, or where recording was started manually.

The overview consists of key attributes outlining the state of the probe when it comes to recording.

Overview

Configured streams:	This attribute sums up how many streams that are configured to be recorded, using a Threshold. The streams may be configured to start recording according to a schedule and / or triggered by an event or alarm.
Storage location:	This attribute describes where recordings are stored. Recordings may be stored in: • Root filesystem: The recordings are stored in the same location as the system files. If the disk space occupied by the recordings grow beyond the set safety margins for unknown reasons then it could affect the probe upgrade process. • RAM disk filesystem: Recordings are stored in a filesystem located in volatile memory. The data will be lost when the probe is rebooted, either explicitly, or as a result of a power failure. • Mounted filesystem: Recordings are stored in a filesystem mounted to the record directory (or its parent directory). The recorded files will not be conflicting with system files, but may still compete for space with data stored for use with the Timeline feature etc.
Storage used by recordings:	The current amount of disk space used by recordings.
Storage usable for recording:	The amount of space that can be used for further recordings, taking into account the current settings for maximum disk usage for recordings, and the actual free space on the partition recordings are stored on.
Available system memory:	The available of free memory.

Bulbs are shown colored based on the amount of available disk space and memory to be used for recording in the system. The disk space bulb is green if there are lots of usable space, orange if there is still usable space, but it is low, and red if there are no more space for further recordings. The memory bulb is green if there is enough memory available for the configured recordings, and red if there is not. System alarms are raised if there is not enough memory or disk available.

A list of currently configured streams are also present in this view. The following columns are present in the list:

Dashboard recording list columns

Icon:	An icon representing the way the stream is configured is present.  Ready, waiting for trigger  Ready, waiting for schedule  Active recording
Stream name:	The name of the stream that is recorded. This name is configured in the stream source (e.g. multicast view).
Input:	Input type of the stream. Currently only IPTV is supported.
Threshold:	The recording threshold assigned to this stream.
State:	Displays the status of the stream: • Awaiting schedule: The stream is configured for scheduled recording, and is waiting for the scheduled starting time. • Awaiting trigger: The stream is configured for triggered recording, and is waiting for the triggered action to occur. • Awaiting both: The stream is waiting for both of the above. • Recording: The stream is currently recording.
Recordings:	This button takes the user to the recordings view with the stream name entered as a filter. Thus earlier recordings for the stream will be listed.
Override:	Allows the user to override the current state by using the button: • Record: Immediately start a manual recording for the stream. The length of this manual recording is determined by the Manual recording timeout option below the list. • Stop: The stream is currently being recorded. Click the stop button to end the recording immediately. • Grayed out record: The stream currently has no signal and cannot be recorded at this time.

6.11.2 Record — Recordings

Dashboard Recordings Clips Streams Thresholds Setup											
Past recordings											
Stream name	Input	Timestamp	Reason	Notes	Edit	File size	Protect	Duration	CC errs	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 13:30:00	SCTE35 event: Whole Splice		Edit	13.00 MB	☐	28s		Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 13:09:22	SCTE35 event: Whole Splice		Edit	109.89 MB	☐	223s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 12:55:14	SCTE35 event: Whole Splice		Edit	12.03 MB	☐	21s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 12:51:02	SCTE35 event: Whole Splice		Edit	104.61 MB	☐	223s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 12:31:11	SCTE35 event: Whole Splice		Edit	106.90 MB	☐	223s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 12:11:41	SCTE35 event: Whole Splice		Edit	101.83 MB	☐	215s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 11:51:31	SCTE35 event: Whole Splice		Edit	89.43 MB	☐	214s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 11:30:59	SCTE35 event: Whole Splice		Edit	106.59 MB	☐	222s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 11:07:54	SCTE35 event: Whole Splice		Edit	109.33 MB	☐	218s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 10:54:13	SCTE35 event: Whole Splice		Edit	20.05 MB	☐	41s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 10:50:13	SCTE35 event: Whole Splice		Edit	111.62 MB	☐	214s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 10:29:05	SCTE35 event: Whole Splice		Edit	90.43 MB	☐	178s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 10:08:41	SCTE35 event: Whole Splice		Edit	114.81 MB	☐	201s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 09:57:31	SCTE35 event: Whole Splice		Edit	17.12 MB	☐	26s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 09:53:21	SCTE35 event: Whole Splice		Edit	116.83 MB	☐	224s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 09:32:30	SCTE35 event: Whole Splice		Edit	105.83 MB	☐	219s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 09:11:27	SCTE35 event: Whole Splice		Edit	109.59 MB	☐	214s	0	Download	Metadata
DELUXE MUSIC@em1	IPTV	2025 Jan 17 08:56:58	SCTE35 event: Whole Splice		Edit	15.56 MB	☐	26s	0	Download	Metadata

Displaying 500 of 1848 recordings

Remove selected recording(s) Remove all recordings [◀](#) [◀◀](#) [▶▶](#) [▶](#)

The **Recordings** view presents past and currently active recordings to the user in a list.

Each recording is represented by a separate row in the list with the following properties:

<i>Recordings list columns</i>	
Stream name:	Name of the input stream that was recorded.
Input:	Input source of the stream recorded. Currently only IPTV streams are supported.
Timestamp:	The timestamp of the start of the recording. If the recording was result of a trigger the timestamp refers to the instant the trigger was triggered. The recording will likely contain data from before this instant that was stored in the pre record buffer.
Reason:	The reason this recording was performed. - Manual recording: This recording was started manually from the user interface or Eii. - Scheduled recording: This recording was started at scheduled time. - Triggered recording: The recording was initiated as a response to a trigger event happening. The name of the event is inserted in the reason field. - Multiple: This recording was started because of one of the reasons above. Additionally, while the recording was in progress one or more of the events above occurred which caused the recording to be extended.
Notes:	First line of the operator supplied notes. Clicking on this column opens a popup where the complete notes can be viewed and edited.
Edit:	Clicking this will open a popup where the complete notes can be viewed and edited.
File size:	The size of the recorded transport stream file on disk.

Protect:	If this check box is checked the recording will not be automatically deleted when running out of disk space. Also deleting a recording from the user interface while the recording is protected may be impossible.
Duration:	The duration (in seconds) of the recording, from the time it is started (triggered, manually started or scheduled), to it is stopped. This duration does not contain the duration of the recording that originates from the pre-trigger buffer.
CC errs:	The number of CC errors for the specified recording. This number is calculated when the recording is finished, and the column is blank while the recording is active.
Download:	Link to the file containing the recorded stream data. To download partial recordings, use the Record — Clips view.
Metadata:	Link to a file containing metadata for the recording in JSON-format.

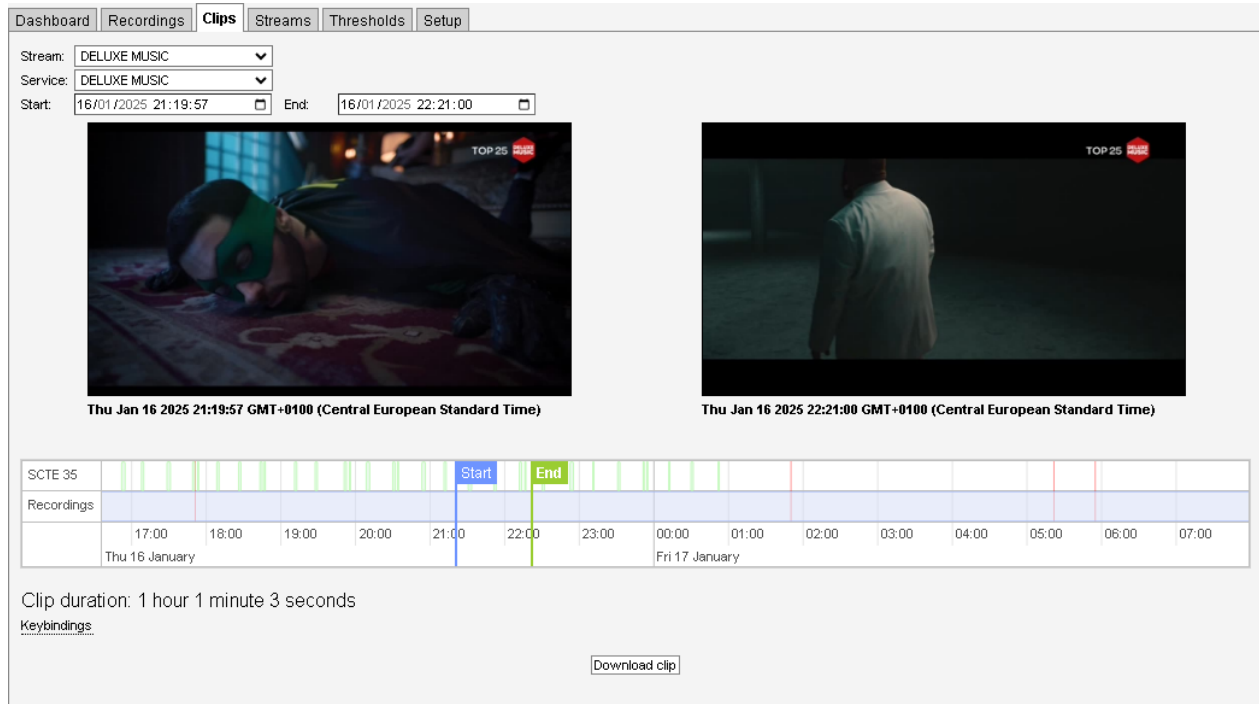
Selecting recordings in this list and clicking on the **Remove selected file(s)** button will delete the recordings from the probe's disk. The list of recordings supports bulk selection in an identical way to the **Record — Configuration** view, which may ease in deleting multiple recordings. Depending on whether or not deleting protected recordings is enabled in the **Record — Setup** view, protected recordings may or may not be deleted when included in the selection. Pressing the **Remove all recordings** button will either remove all unprotected recordings, or if configured as described above, all recordings. This deletion can take some time, and the disk space will be made available again after a couple of minutes.

For performance reasons the length of the past recordings list that is accessible to the web browser at a given time is limited to 500 recordings. The **Displaying x of y recordings** text at the bottom of the past **Record — Recordings** view shows how many recordings are visible, and available respectively. It is possible to use the filter fields in the top right corner of the view to filter by stream name and timestamp. When a date and time is entered in the time picker the recordings that happens before that time will be retrieved from the server. Any sorting done in the list will only take the data that is currently displayed into account. This means that if the user sorts by timestamp it will not see the oldest recording if it is not retrieved from the probe.

By default the list of past recordings are sorted by timestamp, showing the most recent recordings at the top. It is possible to click at the list headers to sort by other properties.

◀Newest	Show the newest recordings
◀◀Newer	Change timestamp to show newer recordings
▶▶Older	Change timestamp to show older recordings
▶Oldest	Show the oldest recordings

6.11.3 Record — Clips



The **Clips** view makes it possible to download selected parts of the recordings shown in the **Record — Recordings** view. This is especially useful when using the continuous recording feature, as the **Clips** view allows downloading clips that span several files.

To change which stream and service you are looking at, select the desired stream and service from the drop down at the top left. To navigate in time you have three options. You can use the date/time selectors at the top of the window, move the **Start** and **End** markers manually in the bottom timeline, or double click the **Recordings** line to move the active marker there. The active marker is colored green. To change which marker is active, press the Space bar.

You can zoom in and out of the timeline using the scroll wheel and drag the timeline left and right to find the location you need to access. It is also possible to navigate the timeline using the keyboard, hover the **Keybindings** label with your cursor to see all available keyboard shortcuts.

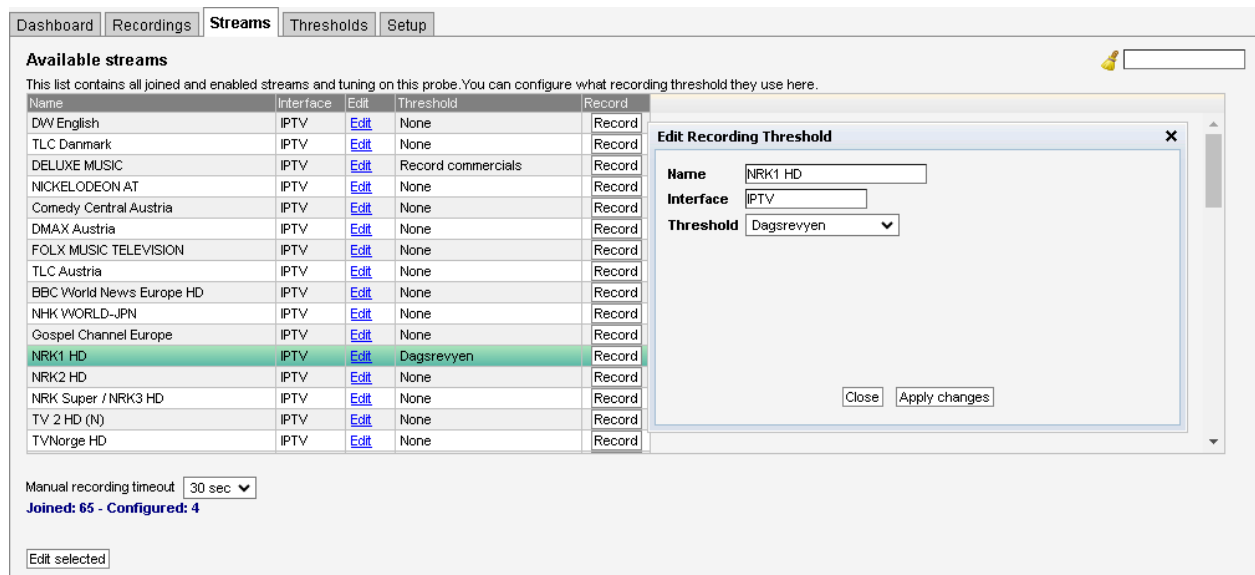
When selecting a time, the Clips feature will find the first key frame after this time. The frame shown on the left is the **Start** frame and will be the start of the export. The frame shown on the right is the **End** frame and is the first frame *not to be included* in the exported clip.

The **Clip duration** is automatically adjusted to display the selected time period. Be aware that selecting a long period of time can produce very large clip downloads.

If available, SCTE 35 events are displayed in the SCTE 35 event graph. If zoomed in, the event type is displayed, with more information available by hovering the event with your cursor. Click the SCTE 35 event to snap the **Start** and **End** markers to download the selected event only.

CC error events are shown as red lines in the timeline; if a clip containing CC errors is selected, the total number of CC errors will be displayed adjacent to the Clip duration.

6.11.4 Record — Streams



Available streams

This list contains all joined and enabled streams and tuning on this probe. You can configure what recording threshold they use here.

Name	Interface	Edit	Threshold	Record
DWV English	IPTV	Edit	None	Record
TLC Danmark	IPTV	Edit	None	Record
DELUXE MUSIC	IPTV	Edit	Record commercials	Record
NICKELODEON AT	IPTV	Edit	None	Record
Comedy Central Austria	IPTV	Edit	None	Record
DMAX Austria	IPTV	Edit	None	Record
FOLX MUSIC TELEVISION	IPTV	Edit	None	Record
TLC Austria	IPTV	Edit	None	Record
BBC World News Europe HD	IPTV	Edit	None	Record
NHK WORLD-JPN	IPTV	Edit	None	Record
Gospel Channel Europe	IPTV	Edit	None	Record
NRK1 HD	IPTV	Edit	Dagsrevyen	Record
NRK2 HD	IPTV	Edit	None	Record
NRK Super / NRK3 HD	IPTV	Edit	None	Record
TV 2 HD (N)	IPTV	Edit	None	Record
TVNorge HD	IPTV	Edit	None	Record

Manual recording timeout: 30 sec ▼

Joined: 65 - Configured: 4

[Edit selected](#)

Edit Recording Threshold

Name: NRK1 HD

Interface: IPTV

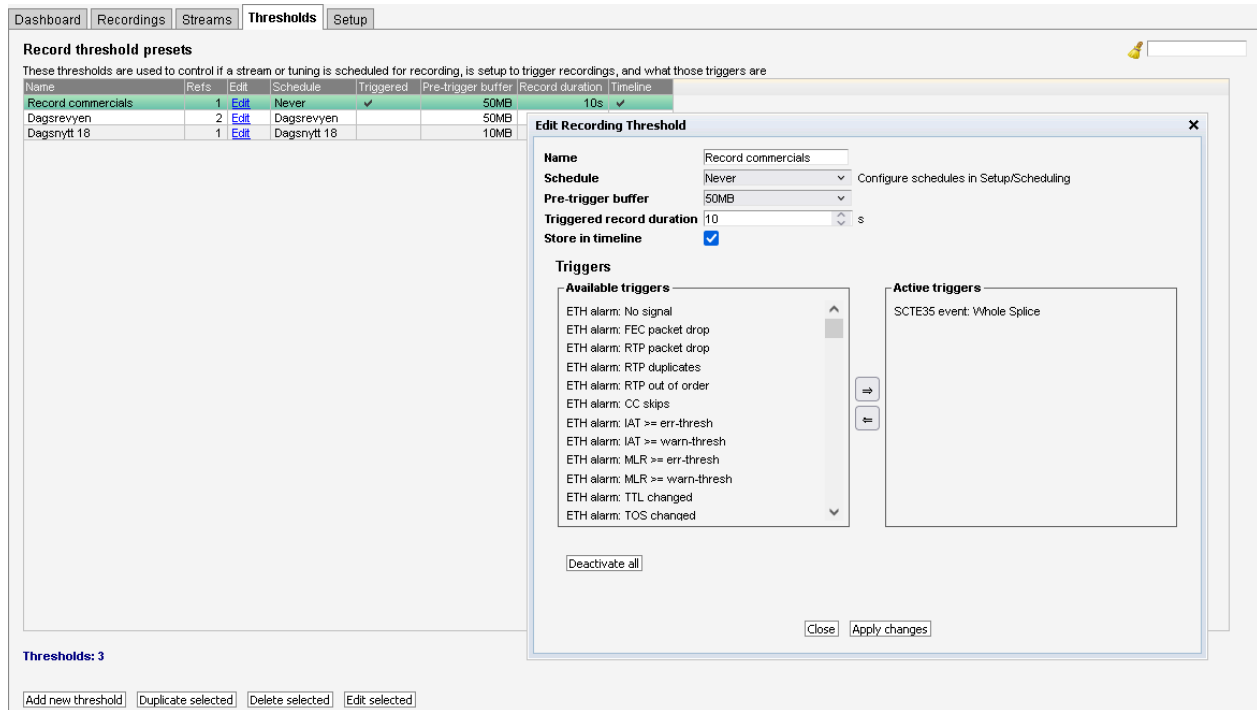
Threshold: Dagsrevyen ▼

[Close](#) [Apply changes](#)

The **Record — Streams** view allows the user to assign thresholds to streams. To assign a threshold, click the **Edit** link for a stream, or select one or more streams and click on the **Edit selected** button.

The list of streams in the **Record — Streams** view also presents the user with a **Record**-button which can be used to initiate a manual recording of the stream regardless of whether a threshold is assigned to it or not. The length of this manual recording is determined by the **Manual recording timeout** option below the list.

6.11.5 Record — Thresholds



Record threshold presets

These thresholds are used to control if a stream or tuning is scheduled for recording, is setup to trigger recordings, and what those triggers are

Name	Refs	Edit	Schedule	Triggered	Pre-trigger buffer	Record duration	Timeline
Record commercials	1	Edit	Never	✓	50MB	10s	✓
Dagsrevyen	2	Edit	Dagsrevyen		50MB		
Dagsnytt 18	1	Edit	Dagsnytt 18		10MB		

Edit Recording Threshold

Name: Record commercials

Schedule: Never Configure schedules in Setup/Scheduling

Pre-trigger buffer: 50MB

Triggered record duration: 10 s

Store in timeline: ☒

Triggers

Available triggers

- ETH alarm: No signal
- ETH alarm: FEC packet drop
- ETH alarm: RTP packet drop
- ETH alarm: RTP duplicates
- ETH alarm: RTP out of order
- ETH alarm: CC skips
- ETH alarm: IAT >= err-thresh
- ETH alarm: IAT >= warn-thresh
- ETH alarm: MLR >= err-thresh
- ETH alarm: MLR >= warn-thresh
- ETH alarm: TTL changed
- ETH alarm: TOS changed

Active triggers

- SCTE35 event: Whole Splice

Deactivate all

Close Apply changes

Thresholds: 3

Add new threshold Duplicate selected Delete selected Edit selected

The multi-stream recording feature is configured by assigning thresholds to streams. Thresholds can be created, edited and removed in the **Record — Thresholds** view. The thresholds can then be assigned to streams in the **Record — Streams** view.

Thresholds are sets of settings that, once applied to a stream, instructs the probe on how and when to record that stream. The **Record — Thresholds** view displays a list of currently existing thresholds. Adding, deleting and editing existing thresholds can be performed from by clicking the appropriate buttons.

There are two different ways of creating user-defined thresholds. To create a new threshold template from scratch the operator should click the **Add new threshold** button. A pop-up window will appear allowing the user to define recording conditions. Another way of creating a user-defined threshold template is by highlighting one of the threshold templates already defined and then click the **Duplicate selected** button.

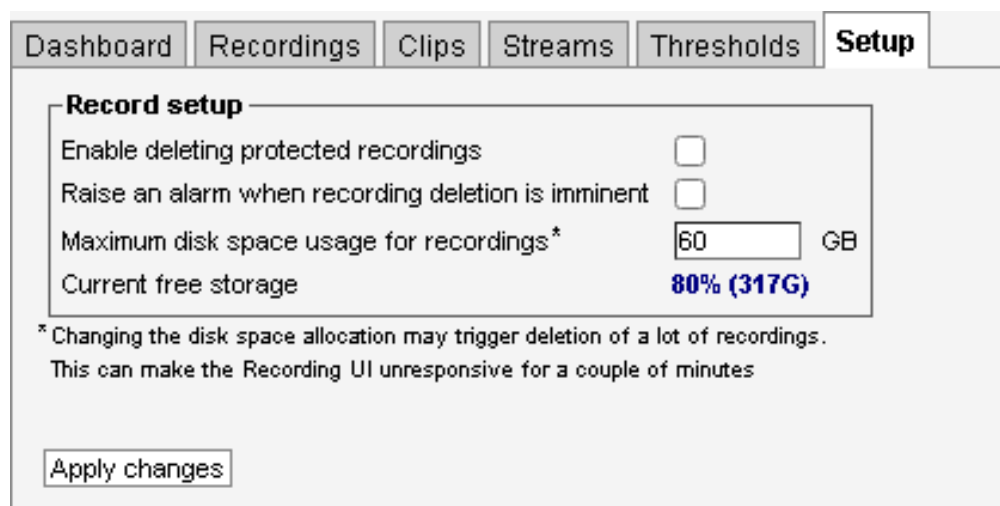
Deleting a threshold template is done by highlighting the threshold template that should be removed and clicking **Delete selected**. It is possible to delete or edit several entries simultaneously. Several entries are selected by using the regular *Ctrl + click* or *Shift + click* functionality. Click the **Edit** button to edit one or more selected threshold templates.

In the threshold presets list the 'Refs' column displays how many streams are associated with each stream threshold template.

Name:	The name that identifies this threshold
Schedule:	If set to a value other than Never, the streams this threshold is assigned to will be recorded according to the given schedule. By using the special schedule Always, a stream can be configured for continuous recording. Such a stream will be recorded in chunks of one clock hour each, which can be managed using the Record — Clips view. Schedules can be created or modified in the Setup — Scheduling view. These schedules are shared with the alarm functionality.

Pre-trigger buffer:	The size of the pre-trigger buffer (in Megabytes). Each stream assigned to this threshold will buffer the selected amount of data, which will become the start of the recording when the trigger occurs. A sensible amount should be selected with regards to the streams bitrate to ensure the triggering event is located inside the buffer. This setting is ignored for scheduled recordings.
Triggered record duration:	The duration (in seconds) to record for after a trigger has occurred. This setting is ignored for scheduled recordings.
Store in timeline:	If enabled, a link to the recordings are stored for display in the Content — Timeline view. Note that this link will only be valid as long as the recording is stored, and the Timeline will stop displaying it after it has been deleted from disk.
Triggers:	If the recording should be triggered by an alarm or stream event, the operator must add the appropriate trigger(s) to the Active triggers list. This is done by selecting the triggers from the list of Available triggers, followed by pressing the button with the arrow pointing to the right. To remove triggers from the threshold, the reverse applies, in that one should select the trigger from the Active triggers list and followed by pressing the arrow pointing to the left. All triggers can also be removed by pressing the Deactivate all button. When triggering on an alarm, that alarm must be activated for the corresponding stream in its thresholds configuration. Similarly, when triggering on an SCTE 35 event, SCTE 35 extraction must be configured in the associated content thresholds.

6.11.6 Record — Setup



The **Record — Setup** view presents recording related settings.

<i>Record setup</i>	
Enable deleting protected recordings:	If this checkbox is unchecked protected recordings cannot be deleted while they are protected from the user interface. This is especially useful for bulk editing, where selecting and deleting all recordings in a view may be desirable, but still without deleting protected recordings.
Raise an alarm when recording deletion is imminent:	If this checkbox is checked, an alarm will be raised when the usable disk space for recordings is nearing 0, meaning that deletion of the oldest recordings is imminent.
Maximum disk space usage for recordings:	This setting lets the user specify how many gigabytes of disk can be used for recordings. The record feature will start removing (non protected) recordings when this much disk space is used by recordings, or if the disk gets full because of other files being stored on the same partition. When the useable disk space drops below 1% of this setting, the probe will raise a warning to indicate that non protected recordings will soon start to be deleted. If the usable disk space drops to zero, no new recordings will be allowed to start.
Current free storage:	This shows the currently available free space on the file system holding the recordings.

6.11.7 Automatic deletion of recordings

In order to avoid running out of disk space the probe will delete the oldest unprotected recordings when the usable disk space for recordings drops to zero, this can be caused either by the free space on the partition having become low, or if the size of the recordings stored has reached the threshold. The threshold for deleting recordings is configurable from the **Record — Setup** view.

If for some reason the amount of usable disk space gets too low recording will eventually stop before the recordings filesystem is filled completely.

6.12 Redundancy (requires IP-SWITCH-OPT)

The IP redundancy switching feature enables the VB220-SW to function as a control unit for an external redundancy switching device. The VB220-SW integrates easily by specifying a few parameters. Then the VB220-SW can be configured to send switching commands based on the alarm settings. The actual distribution and switching will be done by the external device. IP redundancy switching is currently supported on the DMG 4000.

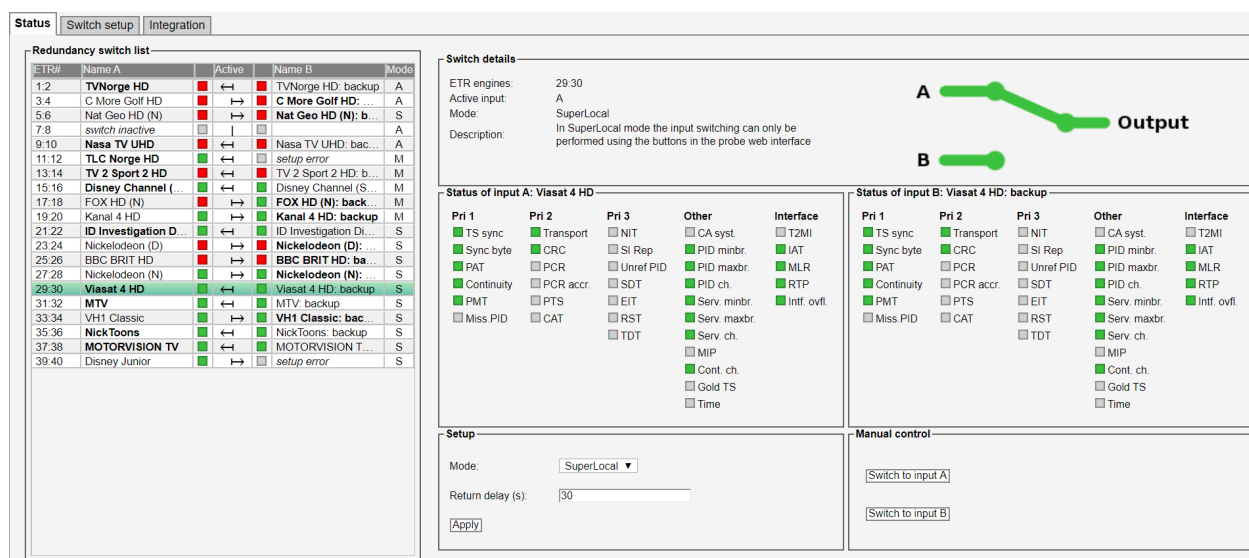
Each redundancy switch is coupled with two specific ETR engines. The pairs are 1 and 2, 3 and 4 etc. The number of ETR engines depends on the ETR290-OPT of the VB220-SW. More information about the ETR290-OPT is found in section 6.9. The number of switches available will adjust automatically to the number of ETR engines.

The multicasts must be assigned to the ETR engines using the **Multicasts — Streams** view. A step by step description of how to do this can be found in section 6.12.5.

A single multicast must be monitored per engine for the switching to work as intended. Round-robin monitoring (multiple multicasts monitored sequentially on the same ETR engine) is NOT supported for redundancy switching.

The redundancy switch status and settings are available using the Eii. Setup changes through the Eii is also possible. See section 6.14.5 for more information about the Eii.

6.12.1 Redundancy — Status



Status | Switch setup | Integration

Redundancy switch list

ETR#	Name A	Active	Name B	Mode
1:2	TVNorge HD	←	TVNorge HD: backup	A
3:4	C More Golf HD	→	C More Golf HD: backup	A
5:6	Nat Geo HD (N)	→	Nat Geo HD (N): backup	S
7:8	switch inactive			A
9:10	Nasa TV UHD	←	Nasa TV UHD: backup	A
11:12	TLC Norge HD	←	setup error	M
13:14	TV 2 Sport 2 HD	←	TV 2 Sport 2 HD: backup	M
15:16	Disney Channel (S)	←	Disney Channel (S): backup	M
17:18	FOX HD (N)	→	FOX HD (N): backup	M
19:20	Kanal 4 HD	→	Kanal 4 HD: backup	M
21:22	ID Investigation D...	←	ID Investigation D...	S
23:24	Nickelodeon (D)	→	Nickelodeon (D): backup	S
25:26	BBC BRIT HD	→	BBC BRIT HD: backup	S
27:28	Nickelodeon (N)	→	Nickelodeon (N): backup	S
29:30	Viasat 4 HD	←	Viasat 4 HD: backup	S
31:32	MTV	←	MTV: backup	S
33:34	VH1 Classic	→	VH1 Classic: backup	S
35:36	NickToons	←	NickToons: backup	S
37:38	MOTORVISION TV	←	MOTORVISION T...	S
39:40	Disney Junior	→	setup error	S

Switch details

ETR engines: 29:30
Active input: A
Mode: SuperLocal
Description: In SuperLocal mode the input switching can only be performed using the buttons in the probe web interface

Status of input A: Viasat 4 HD

Pri 1	Pri 2	Pri 3	Other	Interface
☒ TS sync	☒ Transport	☐ NIT	☐ CA syst.	☐ T2MI
☒ Sync byte	☒ CRC	☐ SI Rep	☐ PID minbr.	☐ IAT
☒ PAT	☐ PCR	☐ Unref PID	☐ PID maxbr.	☐ MLR
☐ Continuity	☐ PCR accr.	☐ SDT	☐ PID ch.	☐ RTP
☐ PMT	☐ PTS	☐ EIT	☐ Serv. minbr.	☐ Intf. ovfl.
☐ Miss PID	☐ CAT	☐ RST	☐ Serv. maxbr.	
		☐ TDT	☐ Serv. ch.	
			☐ MIP	
			☐ Cont. ch.	
			☐ Gold TS	
			☐ Time	

Status of input B: Viasat 4 HD: backup

Pri 1	Pri 2	Pri 3	Other	Interface
☒ TS sync	☒ Transport	☐ NIT	☐ CA syst.	☐ T2MI
☒ Sync byte	☒ CRC	☐ SI Rep	☐ PID minbr.	☐ IAT
☒ PAT	☐ PCR	☐ Unref PID	☐ PID maxbr.	☐ MLR
☐ Continuity	☐ PCR accr.	☐ SDT	☐ PID ch.	☐ RTP
☐ PMT	☐ PTS	☐ EIT	☐ Serv. minbr.	☐ Intf. ovfl.
☐ Miss PID	☐ CAT	☐ RST	☐ Serv. maxbr.	
		☐ TDT	☐ Serv. ch.	
			☐ MIP	
			☐ Cont. ch.	
			☐ Gold TS	
			☐ Time	

Setup

Mode: SuperLocal
Return delay (s): 30
[Apply]

Manual control

[Switch to input A]
[Switch to input B]

The **Status** view displays the status of the redundancy switches. The Redundancy switch list on the left side gives an overview of all the switches.

Redundancy switch list

ETR#:	The ETR engines coupled with the switch. <input A>:<input B>
Name A:	Displays the name of the stream on input A (odd numbered ETR engine). To the right of the name is a bulb showing the ETR290 alarm status. The field also provides the following information: • Bold text indicates that the stream is the currently selected as the output. • Displaying “<i>switch inactive</i>” together with an empty Name B field means that one or both of the ETR engines are not in use. • “<i>setup error</i>” is displayed if there is a setup error. Opening the respective switch information will give more details.
Active:	The arrow indicates which input is currently selected as the output.
Name B:	Displays the name of the stream on input B (even numbered ETR engine). To the left of the name is a bulb showing the ETR290 alarm status. The field also provides the following information: • Bold text indicates that the stream is the currently selected as the output. • An empty field together with Name A displaying “<i>switch inactive</i>” means that one or both of the ETR engines are not in use. • “<i>setup error</i>” is displayed if there is a setup error. Opening the respective switch information will give more details.
Mode:	The operation mode, described in section 6.12.4, set for the switch A = Auto, M = Manual, S = SuperLocal

To the right of the Redundancy switch list, more detailed information about a switch is displayed. This is information about the redundancy switch currently selected in the switch list. A switch can be selected by clicking the respective list entry. The following information is displayed:

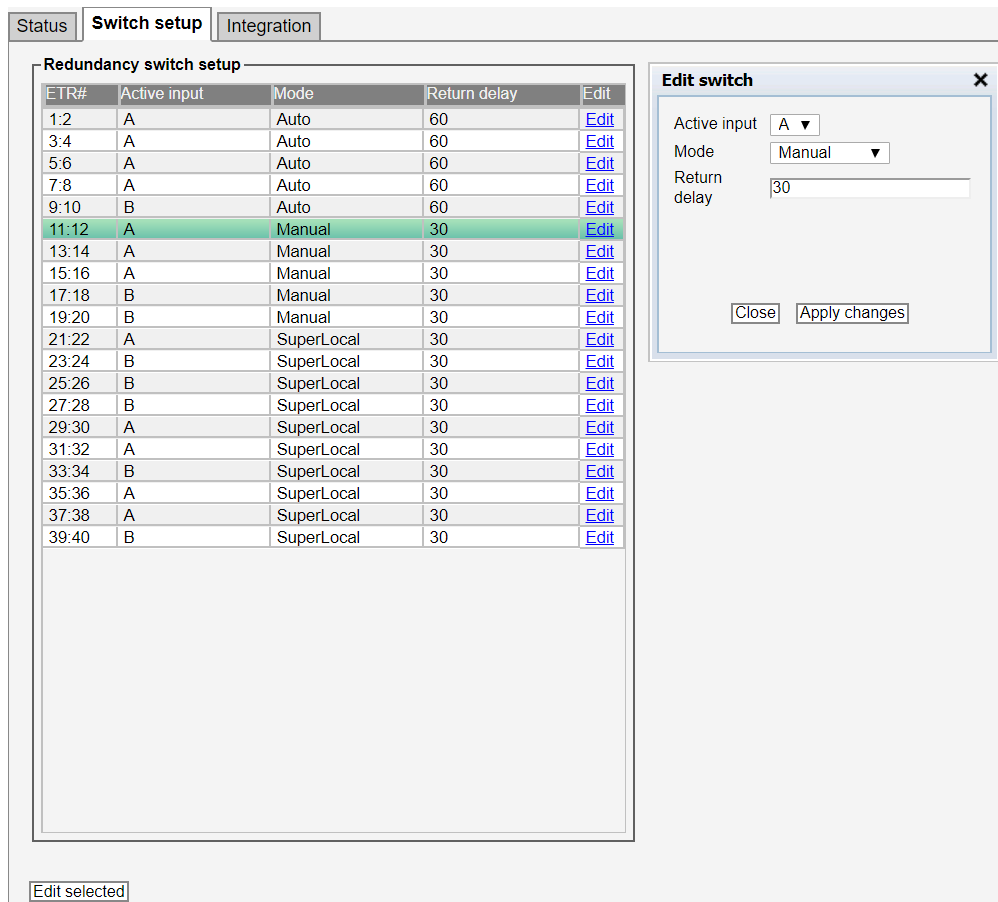
Switch information frames

Switch details:	ETR engines: The ETR engines coupled with the switch. <input A>:<input B> Active input: The input selected to be output from the switch. Mode: The operation mode, described in section 6.12.4, set for the switch Description: A description of the switch’s current operation. After a switch, the return delay countdown will be shown here. The switch details frame includes a figure with a visual representation of the switch’s status.
Status of input A:	The header text is followed by the name of the stream. The frame shows the full ETR290 alarm status of the stream on input A of the selected switch. The content of this frame is described in section 6.9.2.
Status of input B:	This shows the same information as Status for input A , but for input B.

Setup: Allows for quick access to the currently selected switch's setup. The setup parameters are described in section 6.12.2.

Manual control: Buttons in this frame are used to select which input should be the output from the switch. These are only available in modes Manual and SuperLocal.

6.12.2 Redundancy — Switch setup



The screenshot shows the 'Switch setup' tab in the software interface. It contains a table titled 'Redundancy switch setup' with columns: ETR#, Active input, Mode, Return delay, and Edit. The table lists 20 entries. The entry for ETR# 11:12 is highlighted in green, showing it is in 'Manual' mode with a 'Return delay' of 30. To the right of the table is an 'Edit switch' dialog box. This dialog has fields for 'Active input' (set to 'A'), 'Mode' (set to 'Manual'), and 'Return delay' (set to '30'). At the bottom of the dialog are 'Close' and 'Apply changes' buttons. Below the table, there is an 'Edit selected' button.

ETR#	Active input	Mode	Return delay	Edit
1:2	A	Auto	60	Edit
3:4	A	Auto	60	Edit
5:6	A	Auto	60	Edit
7:8	A	Auto	60	Edit
9:10	B	Auto	60	Edit
11:12	A	Manual	30	Edit
13:14	A	Manual	30	Edit
15:16	A	Manual	30	Edit
17:18	B	Manual	30	Edit
19:20	B	Manual	30	Edit
21:22	A	SuperLocal	30	Edit
23:24	B	SuperLocal	30	Edit
25:26	B	SuperLocal	30	Edit
27:28	B	SuperLocal	30	Edit
29:30	A	SuperLocal	30	Edit
31:32	A	SuperLocal	30	Edit
33:34	B	SuperLocal	30	Edit
35:36	A	SuperLocal	30	Edit
37:38	A	SuperLocal	30	Edit
39:40	B	SuperLocal	30	Edit

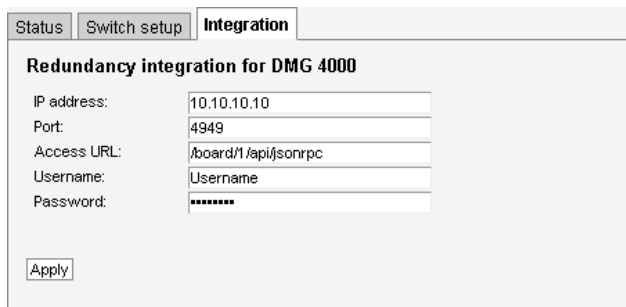
The **Switch setup** view shows the current setup of all the switches. Using this view is the most effective way to edit the setups of the redundancy switches. Multi-edit functionality makes it possible to edit several setups simultaneously. Highlight the setup list entries that should be edited and click the **Edit selected** button. The link in the Edit column can be used to edit the setup on that specific row.

Any setting can be set from the setup page regardless of current mode etc. The probe does not have a way to read the status from the external device. The **Setup** view can be used to manually sync the VB220-SW probe's switch settings to the settings of the external device.

Switch setup list

ETR#:	The ETR engines coupled with the switch. <input A>:<input B>
Active input:	The input selected to be the output from the switch.
Mode:	The operation mode, described in section 6.12.4, set for the switch.
Return delay:	The return delay specifies a time period following an automatic switch where a new switch cannot be triggered. This only applies if the Mode is set to Auto.
Edit:	Click this column to edit the switch's setup parameters.

6.12.3 Redundancy — Integration



The **Integration** view is used to set the parameters needed to integrate with the external switching device. IP redundancy switching is currently supported on the DMG 4000. The following parameters are supported:

Integration parameters

IP address:	IP address used to reach the external switching device.
Port:	Port used to connect to the external device.
Access URL:	Path to control API.
Username:	Username used to authenticate against the external device.
Password:	Password used to authenticate against the external device.

6.12.4 Redundancy switch operation modes

The redundancy switches have three different modes of operation: Auto, Manual and SuperLocal. The mode can be set for each switch independently. The modes are described below:

Modes

Auto:	Switching between the inputs is done automatically based on the user-defined alarm setup. A switch is triggered when the active stream has an active alarm while the inactive stream is alarm free. The return delay specifies a period of time following an automatic switch where a new automatic switch cannot be triggered.
Manual:	An action from the user is required to switch. The switching can be performed using the Manual control buttons in Redundancy — Status , editing the setup in Redundancy — Switch setup or through the Eii.
SuperLocal:	The redundancy switches can only be controlled through the web GUI. Control through Eii is disabled. Use this mode to disable externally triggered switches.

6.12.5 Setup guide

Coupling multicasts to a redundancy switch

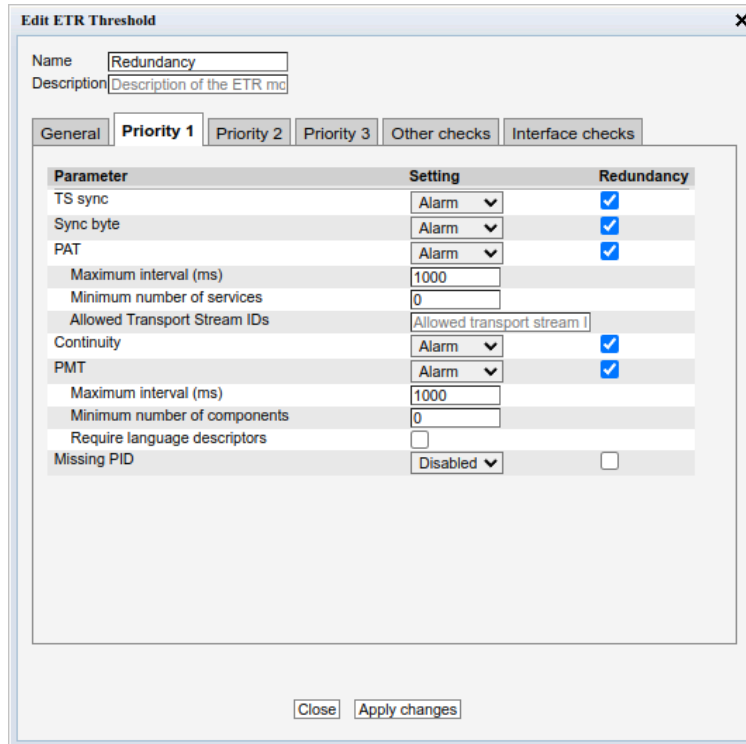
As mentioned at the start of the Redundancy section, each switch is coupled with a specific pair of ETR engines. The number of the ETR engines coupled with a switch are two consecutive numbers starting with the odd number (i.e. 1 and 2, 3 and 4, ...).

The multicasts are assigned to ETR engines using the **Multicasts — Streams** view. Figures and a full description of this view can be found in section 6.4.8.

1. Go to the **Multicasts — Streams** view.
2. Open the edit popup of the multicast you want to couple with a redundancy switch.
3. Join the multicast:
Under **General**, check **Join stream**.
4. Enable ETR monitoring:
Under **ETR**, check **Enable ETR**.
5. Assign the multicast to the ETR engine of the switch you want it to be coupled with:
Under **ETR**, set **Selected ETR engine** to the number of the ETR engine. Only a single multicast can be assigned to ETR engines used for redundancy switching.
6. If the switch will use the Auto mode, set the ETR thresholds:
Under **ETR**, select the ETR thresholds using the **ETR thresholds** drop-down. How to set up the ETR thresholds for redundancy switching is described in the next section (ETR thresholds for automatic switching).
7. The multicasts will be listed in the **Redundancy — Status** view's Redundancy switch list. If the name of the multicast is not in the list, make sure that the options mentioned in points 3–5 are set correctly. Redundancy switch list error texts are described in chapter 6.12.1.

ETR thresholds for automatic switching

Switches that operate in Auto mode will switch automatically based on the ETR alarm state of the input streams. The ETR thresholds are used to configure which alarms that will be reported, and the limits (i.e. thresholds) for when they will be triggered. A detailed description of the ETR thresholds is given in section 6.9.11. When the IP-SWITCH-OPT is installed, the ETR thresholds will also have a redundancy checkbox for each alarm. The ETR thresholds edit popup with redundancy can be seen below.



Parameter	Setting	Redundancy
TS sync	Alarm	☒
Sync byte	Alarm	☒
PAT	Alarm	☒
Maximum interval (ms)	1000	
Minimum number of services	0	
Allowed Transport Stream IDs	Allowed transport stream I	
Continuity	Alarm	☒
PMT	Alarm	☒
Maximum interval (ms)	1000	
Minimum number of components	0	
Require language descriptors	☐	
Missing PID	Disabled	☐

An automatic switch can be triggered by an alarm when the alarm is enabled and has the Redundancy checkbox checked in the ETR threshold. If an alarm should be reported, but not trigger a switch, it should then be enabled with the drop-down menu and not have the Redundancy checkbox checked.

Setting up ETR thresholds:

1. Go to the **ETR 290 — ETR thr.** view.
2. Create a new threshold or open an existing one for editing.
This will open the pop-up seen above.
3. Enable the alarms that should be reported for the stream:
Select **Alarm** in the **Setting** column of the alarms.
4. Allow automatic switching on alarms:
Check the checkbox in the **Redundancy** column of the alarms.

5. To assign the ETR thresholds to multicasts, follow the steps describing how to couple multicasts to redundancy switches in the previous section.

6.13 Setup

6.13.1 Setup — Params

Main	Alarms	OTT	Multicasts	MW	RDP	Traffic	Ethernet	ETR 290	Content	Record	Setup	Data	About
Params	Pages	Colors	Login	ETR	VBC thresh.	Scheduling	Routing	Security					

Various
Probe name:
Organization:
Probe contact:
Probe location:
Enable thumbnails: ☒
EBU mode: ☒
Date format:

Network settings
Enable SAP discovery: ☒
Enable IGMPv3 support: ☒
Import source address:
Gap between joins (milliseconds):

SNMP
Community string:
Trap destination 1:
Trap destination 2:
Trap destination 3:
Year in trap time: ☐

Time synchronization
Time zone:

Alarms
Freeze log when full: ☐
Treat Ethernet events as alarms: ☐

The **Setup — Params** view is used to configure basic parameters for the Software Probe. This page is displayed by default when accessing the web interface, until the configuration has been saved by clicking the **Apply changes** button.

Various

Probe name:	Each probe can be assigned a user-defined name. It is part of the probe's MIB. The name is shown in the Main — Summary view, which is the probe default page, as well as in the browser's title line. The name is also used for identifying the system when activating the license on-line, see G Appendix: On-line License Activation for more details.
Organization:	The name of the organization (usually the company name) that is running the probe. This name is only used for identifying the system when activating the license on-line.
Probe contact:	The probe contact is part of the probe's MIB, and this parameter is relevant for SNMP use only. It is used to identify the contact person responsible for this probe.
Probe location:	The probe location is part of the probe's MIB. It is used to identify the physical location of the probe. The probe location is also shown in the Main — Summary view and in the browser's title line. This name is also used for identifying the system when activating the license on-line.

Enable thumbnails:	Enable or disable thumbnail generation globally. When enabled, thumbnails are only decoded automatically if the Extract thumbnails option has been enabled in the associated OTT or multicast setup. If freeze-frame or color-freeze alarming has been enabled in the Content threshold template, the video frames are investigated regardless of this setting. For high bitrates (above 700 Mbit/sec) the probe may feel more responsive if thumbnail picture generation is switched off. This does not affect the accuracy of the measurements.
EBU mode:	Selects the unit to use for loudness monitoring. In EBU mode, LUFS is used, otherwise LKFS is used.
Date format:	The date format used in the user interface can be changed here. Dates exported through machine-readable interfaces are not affected by this setting.

Alarms

Freeze log when full:	When enabled the alarm list will freeze when full (an event will show that it is full). When the list is full new alarms are ignored until Clear alarms is pressed. This can sometimes be useful if a unit is placed unattended.
Treat Ethernet events as alarms:	When enabled each event is treated as an alarm that is active for ten seconds. This may be useful when reporting to external systems that do not support events but only active or cleared alarms. This setting affects the local alarm list and SNMP traps.

Network settings

Enable SAP discovery:	When enabled, the Software Probe makes streams announced using the Session Announcement Protocol available through the Multicasts — SAP view.
Enable IGMPv3 support:	Required for probe to support the IGMP v3 protocol. Should always be enabled in networks that support IGMP v3.
Import source address:	When enabled, the detected source address is added to the configuration when importing streams from Traffic — Detect or Traffic — Multicast scan . This instructs the probe to request the stream as a source specific multicast.
Gap between joins (milliseconds):	When monitoring a lot of multicasts, sending join requests for all of them at the same time may overload the network infrastructure. This setting specifies the minimum time, in milliseconds, between join requests.

Time zone

Time zone: By setting the time zone the Software Probe time can be offset from the reference NTP time. Please note that this changes the global time zone on the system running the Software Probe.

SNMP

Community string: The probe SNMP community string can be changed.

Trap destination 1–3: SNMP traps will be sent to the specified destinations. Set all three destinations to 0.0.0.0 to disable SNMP trap transmission. This will also disable storing of traps accessible through SNMP queries.

Year in trap time: If enabled, dates in SNMP traps include the year number.

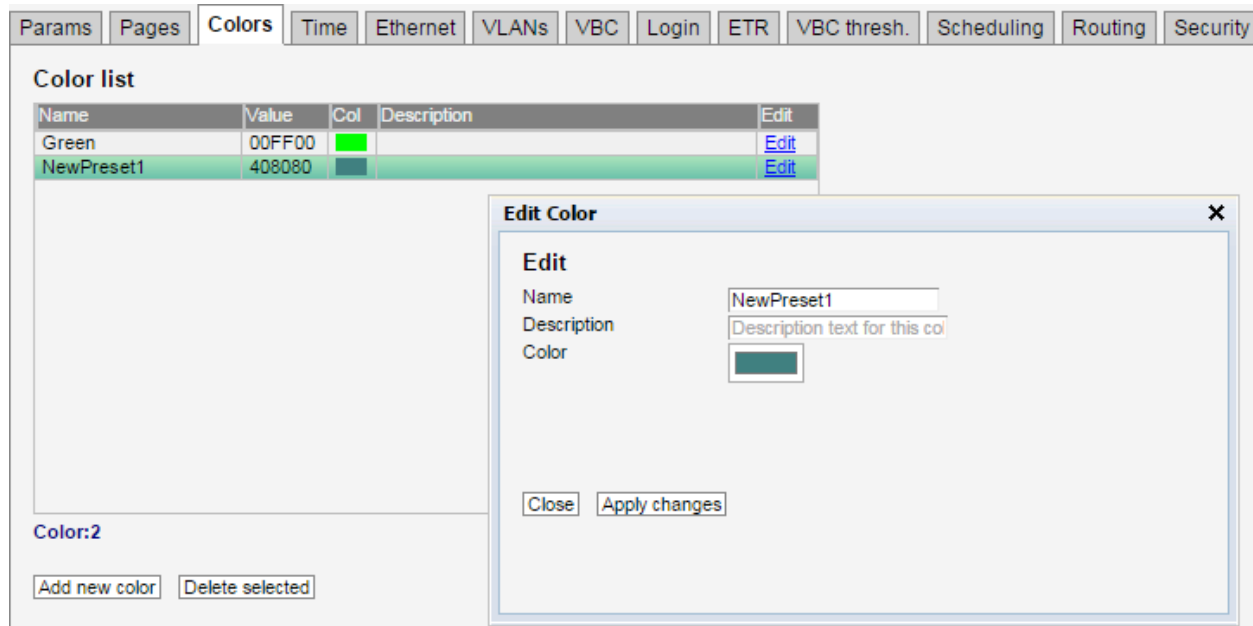
6.13.2 Setup — Pages

Params	Pages	Colors	Time	Ethernet	VLANs	VBC	Login	ETR	VBC thresh.	Scheduling	Routing	Security
Page names												
Page 1	P1	Page 6	Info	Page 11	Edit name to be associe	Page 16	Edit name to be associe					
Page 2	P2	Page 7	Edit name to be associe	Page 12	Edit name to be associe	Page 17	Edit name to be associe					
Page 3	Edit name to be associe	Page 8	Edit name to be associe	Page 13	Edit name to be associe	Page 18	Edit name to be associe					
Page 4	Edit name to be associe	Page 9	Edit name to be associe	Page 14	Edit name to be associe	Page 19	Edit name to be associe					
Page 5	Edit name to be associe	Page 10	Edit name to be associe	Page 15	Edit name to be associe	Page 20	Edit name to be associe					
Apply changes												

The **Setup — Pages** view allows names to be associated with different pages. Individual multicasts can be assigned to different pages in the **Multicasts — Streams** view, to facilitate easier navigation in the different **Multicasts** views.

The page names for OTT channels are configured using the **OTT — Settings** view.

6.13.3 Setup — Colors



Name	Value	Col	Description	Edit
Green	00FF00			Edit
NewPreset1	408080			Edit

Color:2

[Add new color](#) [Delete selected](#)

Edit Color

Edit

Name:

Description:

Color: 

[Close](#) [Apply changes](#)

The **Setup — Colors** view allows the user to define colors that should be recognized if a color-freeze condition should occur. A mono-colored freeze frame condition may in some cases indicate what equipment is failing, resulting in the color-freeze.

A freeze color is defined by clicking the **Add new color** button and assigning an RGB value to a name. A maximum of four colors may be defined. An existing color may be modified by clicking the associated **Edit** link.

Edit color

Name: The color name. This name will be part of a color alarm description and the associated SNMP trap.

Description: A description of the color or an error indication.

Color: The RGB color on the format #XX(Red)XX(Green)XX(Blue) where XX represents a hexadecimal figure spanning 0-255 in decimal notation. If supported by the browser, clicking the color should pop up a color selection dialog.

6.13.4 Setup — Login

Params
Pages
Colors
Login
ETR
VBC thresh.
Scheduling
Routing
Security

User login

Current user

You are currently logged out

Your login message here

Login

Name

Password

By default, there is no access control and all users have access to all features. If access control is disabled, you need to log in using this view before accessing any of the settings in **Setup — Security**.

See chapter 5.6 on page 75 for more details.

6.13.5 Setup — ETR

Params
Pages
Colors
Time
Ethernet
VLANs
Login
ETR
VBC thresh.
Scheduling
Routing
Security

Parsing rules for private descriptors

Tag	Descriptor	Edit
129 (0x81)	Disabled	Edit
131 (0x83)	logical channel descriptor v1	Edit
134 (0x86)	Disabled	Edit
135 (0x87)	logical channel descriptor v2	Edit
138 (0x8a)	Disabled	Edit
151 (0x97)	Disabled	Edit
161 (0xa1)	Disabled	Edit
162 (0xa2)	Disabled	Edit
163 (0xa3)	Disabled	Edit
173 (0xad)	Disabled	Edit
196 (0xc4)	Disabled	Edit

ETR 290 tuning control

☐ Allow unauthorized users to lock tuning for minutes

☐ Limit authorized users to lock tuning for only minutes

ETR details

Show service name: ☒

Inactive inputs

Hide inactive inputs: ☒

EIT table IDs

EIT Table IDs:

Add log event on tuning reset

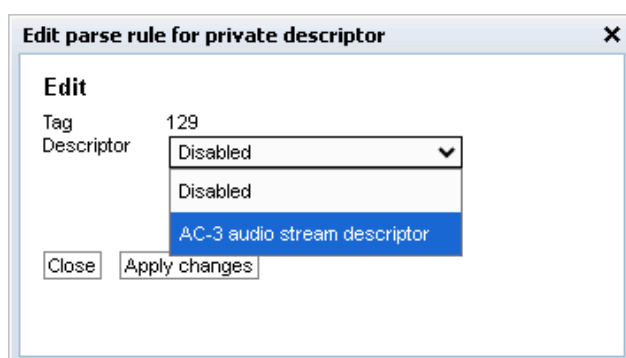
Enable logging: ☒

The **Setup — ETR** view allows the user to select miscellaneous ETR handling modes.

Parsing rules for private descriptors

Probe recognition of a number of selected private descriptors may be defined by the user:

129 (0x81):	'Disabled' or 'AC-3 audio stream descriptor'
131 (0x83):	'Disabled', 'Extended video descriptor' or 'logical channel descriptor v1'
134 (0x86):	'Disabled' or 'caption service descriptor'
135 (0x87):	'Disabled', 'logical channel descriptor v2' or 'content advisory descriptor'
138 (0x8a):	'Disabled' or 'cue identifier descriptor'
151 (0x97):	'Disabled' or 'SCTE_adaptation_field_data_descriptor'
161 (0xa1):	'Disabled', 'service location descriptor' or 'etv_bif_platform_descriptor'
162 (0xa2):	'Disabled' or 'etv_integrated_signaling_descriptor'
163 (0xa3):	'Disabled' or 'Component name descriptor'
173 (0xad):	'Disabled' or 'ATSC private information descriptor'
196 (0xc4):	'Disabled' or 'Anc data descriptor'
201 (0xc9):	'Disabled' or 'download_content_descriptor'
206 (0xce):	'Disabled' or 'extended_broadcaster_descriptor'
215 (0xd7):	'Disabled' or 'SI_parameter_descriptor'
231 (0xe7):	'Disabled' or 'private cable delivery system descriptor'
233 (0xe9):	'Disabled' or 'EBP descriptor'
239 (0xef):	'Disabled' or 'evertz_descriptor'



The default value for private descriptors is 'Disabled'. To change this value, select a new descriptor interpretation from the drop-down menu and click the **Apply changes** button.

ETR 290 tuning control

By default authorized users will be allowed to lock the ETR 290 analysis to one stream for an infinite length of time and unauthorized users will not be allowed to lock the analysis. The **Setup — ETR** view makes it possible to time limit the locking for authorized users and unauthorized users can be granted permission to lock to a stream for a selectable time period.



If the locking mechanism works in a time limited mode a clock icon (see image on the left) is superimposed on the regular lock icon in the different **ETR 290** sub-views. When the specified lock time is out the round-robin cycling will resume. When ETR tuning control parameters have been changed, click the **Apply** button for changes to take effect.

ETR details

The user selects if service names should be displayed in the **ETR 290 — ETR Details** view. Note that a large screen size is required for proper service name displaying.

EIT table IDs

The user defines which DVB EIT table IDs should be analyzed by the probe. By default only table ID 78 (EIT p/f actual) is analyzed.

It is possible to extend EIT analysis to include EIT schedule, however this is not recommended except for ad-hoc troubleshooting, as analysis of EIT schedule can be extremely demanding on probe processing resources. If full-time monitoring of all EIT information is required, dedicated probes should be used for this task.

Table IDs are specified as a comma separated list, or alternatively an ID range can be defined, e.g. 78, 80–95.

<i>EIT table IDs:</i>	
78	P/F for Actual TS
79	P/F for Other TS
80–95	Schedule for Actual TS
96–111	Schedule for Other TS

Inactive inputs

It is possible to hide disabled inputs from the **ETR 290** views. This is convenient when one ore more inputs are never used, and therefore have been disabled. Check the **Hide inactive inputs** checkbox to hide disabled inputs.

Add log event on tuning reset

When the **Enable logging** checkbox is enabled, the probe will log events that cause monitoring of a ETR monitored stream to be reset, or when ETR measurements are cleared:

- Tuning reset from the GUI
- Min/max measurements for a stream reset from the GUI

- Min/max measurements for a specific measurement for a stream reset from the GUI
- Tuning reset from the Eii interface
- Min/max measurements for a stream reset from the Eii interface
- Min/max measurements for a specific measurement for a stream reset from the Eii interface
- Monitoring of a stream was restarted due to a configuration change (templates changed etc.)
- Monitoring of the stream was started due to round robin tuning between frequencies or multicasts

The events logged are shown in the **Alarms — Event log** view.

6.13.6 Setup — VBC thresh.

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VBC threshold presets

Search...

These error second thresholds are used by VBC to generate VBC alarms

Name	Refs	Sig	RTP	MLR	JAT	Pri1	Pri2	Pri3	Otr	Tra	HTTP	XML	Vid	Aud	SCTE35	EBPIDR	CapA	CapQ	Edit
Default	182	5	5	20	20	250	250	250	250	60	60	60	60	60	60	60	60	60	Edit
HD exception	0	5	5	70	40	500	500	500	500	60	60	60	60	60	60	60	60	60	Edit
Sensitive	21	5	5	20	20	250	250	250	250	60	60	60	30	30	30	30	30	30	Edit
ONLY-NO-SIGNAL	600	1	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	Edit

Thresholds: 4

Add new threshold
Duplicate selected
Delete selected
Edit selected

The VBC error second thresholds are used by the VideoBRIDGE Controller to issue VBC specific alarms. The VBC will raise an alarm when the number of error seconds exceeds the error seconds threshold. The VBC thresholds are only relevant when a VideoBRIDGE Controller is part of the monitoring system.

The reason for using error second thresholds is to avoid alarms that toggle on and off, which for a large monitoring system might otherwise lead to an unintelligible user interface. The VBC thresholds will allow masking of minor error incidences thus resulting in a control system GUI that presents persistent alarms only.

The VBC error second thresholds are specified as the number of seconds affected by an error situation. These thresholds refer to a monitoring window of one hour, meaning that if the number of error seconds summed over any one-hour period exceeds the associated error second threshold an alarm will be raised by the VBC.

If a monitoring window different from one hour is selected by the VBC user, the threshold values will be automatically recalculated to proportional values.

In the ‘VBC threshold presets’ table the ‘Refs’ column shows how many streams are associated with each VBC threshold template.

By clicking the **Add new threshold** button the user will enter a VBC thresholds edit view enabling definition of a new threshold template. It is possible to copy or delete an existing threshold template by clicking the **Duplicate selected** or **Delete selected** button respectively. To edit a highlighted threshold template, the **Edit selected** button should be clicked.

Multi-edit functionality allows editing several VBC thresholds simultaneously. Highlight the list entries that should be edited and click the **Edit selected** button.

Edit VBC threshold
✕

Name

Parameter	Threshold	Corresponding VBC alarm
<i>Ethernet:</i>		
No signal	5	No signal
RTP drops	5	RTP drops
MLR error	20	MLR error
IAT error	20	IAT error
Max bitrate error	20	Bitrate overflow
Min bitrate error	20	Bitrate underflow
<i>ETR:</i>		
ETR pri one errors	250	ETR pri one error
ETR pri two errors	250	ETR pri two error
ETR pri three errors	250	ETR pri three error
ETR pri other errors	250	ETR pri other error
ETR interface errors	250	ETR interface error
<i>OTT:</i>		
OTT transport error	60	OTT transport errors
OTT HTTP error	60	OTT HTTP errors
OTT XML error	60	OTT XML errors
<i>QoE & captions:</i>		
QoE video	60	QoE video
QoE audio	60	QoE audio
Captions availability	60	Captions availability
Captions quality	60	Captions quality

The thresholds are used by VBC and specify how many error-seconds are required during an alarm window of 60 minutes to raise the corresponding alarm.

VBC will automatically adjust these error second numbers according to the alarm window specified on the VBC. There is one error-window per alarm.

So 30 error-seconds specified here will be scaled to 10 seconds for error windows of 20 minutes etc.

<i>VBC thresholds</i>	
Name:	The name of the VBC threshold template
No signal:	Number of seconds with 'No signal'
RTP error:	Number of seconds with RTP packet drops. This measurement will be zero unless the stream is encapsulated in RTP headers
MLR error:	Number of seconds with packet drops in the TS layer (seconds when media loss rate is non-zero). This is equal to the number of error seconds with CC errors.
IAT error:	Number of seconds when the inter-packet arrival time exceeds the threshold
Max bitrate error:	Number of seconds the bitrate can exceed the error-threshold before a VBC alarm is generated
Min bitrate error:	Number of seconds the bitrate can fall below the error-threshold before a VBC alarm is generated
ETR Pri 1 errors:	Number of seconds with ETSI TR 101 290 Priority 1 alarms before a VBC alarm is generated
ETR Pri 2 errors:	Number of seconds with ETSI TR 101 290 Priority 2 alarms before a VBC alarm is generated
ETR Pri 3 errors:	Number of seconds with ETSI TR 101 290 Priority 3 alarms before a VBC alarm is generated
ETR other errors:	Number of seconds with ETR 'other' alarms before a VBC alarm is generated
ETR interface errors:	ETR error seconds are not relevant for the VB220-SW Software Probe
OTT transport errors:	Number of seconds with OTT transport related alarms
OTT HTTP errors:	Number of seconds with OTT HTTP related alarms
OTT XML errors:	Number of seconds with OTT XML related alarms
QoE video:	Number of seconds with QoE video-related alarms, such as freeze-frame and MOS below average
QoE audio:	Number of seconds with QoE audio-related alarms, such as audio silence or out of phase
SCTE 35:	Number of seconds with SCTE 35-related alarms, such as event gap or number of placement opportunities
EBP / IDR:	Number of seconds with EBP/IDR-related alarms, such as EBP PTS gap outside of threshold or EBP and IDR PTS unaligned
Captions availability:	Number of seconds with captions availability alarms
Captions quality:	Number of seconds with captions quality alarms

6.13.7 Setup — Scheduling

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Schedule list


These schedules can be used to define when alarms are to be ignored, or when streams should be recorded

Name	Refs	All days	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Edit
Never	18									Edit
Always	0	0000-2400								Edit
Maintenance	0				0500-0600					Edit

Schedules: 3

Add new schedule
Duplicate selected
Delete selected
Edit selected

The **Setup — Scheduling** view enables definition of schedules. These schedules can be used to mask alarms during selected time intervals, e.g. due to maintenance. To mask ETR 290 alarms, schedules can be assigned to a PID threshold or service threshold. To mask content alarms, schedules can be assigned to a multicast or OTT channel, or to a specific service using a content service threshold.

Schedules can also be used in recording templates, where they define the times during which the selected service should be recorded.

In the Schedule list table the ‘Refs’ column shows how many references exist for each scheduling template. References to scheduling templates may be found in the places mentioned above.

The search field in the upper right corner of the view allows the user to type a text string and the schedule list is updated to display only scheduling templates matching the specified text.

The predefined scheduling templates **Never** and **Always** result in alarms being masked never or always, respectively. When used for recording, the **Never** template disables all time-based recording. The **Always** template cannot be assigned to recording thresholds. A new scheduling template is created by clicking the **Add new schedule** button. It is also possible to copy an existing scheduling template by highlighting a schedule template and clicking the **Duplicate selected** button. The alarm masking intervals are defined for individual week days or for all week days. Intervals are specified on the form hhmm–hhmm, for instance the interval 1200–1400 means that the schedule starts at noon and finish at 2 pm. Several alarm masking intervals may be specified for each day using comma separation. To edit an existing scheduling template, highlight it and click the **Edit selected** button. To delete a template, highlight it and click the **Delete selected** button.

When a scheduling template has been modified, click the **Apply changes** button. Defined scheduling templates become available as selections in the **Record — Thresholds — Edit**, **Multicasts — Streams — Edit — Content**, **OTT — Channels — Edit**, **ETR 290 — PID thresh. — Edit**, **ETR 290 — Service thresh. — Edit** and **Content — Service thresh. — Edit** views.

Edit schedule

X

Name

Midnight Wed

Schedule

All days

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Sunday

Timing

Common schedule for all days

Schedule for Mondays

2330-2400

0000-0030

Schedule for Thursday

Schedule for Friday

Schedule for Saturday

Schedule for Sunday

Schedules are used to define when alarms are to be filtered (i.e. ignored) and to define when streams are to be recorded.

Times are specified as hhmm-hhmm in 24-hour format and can be comma separated. Example: "0000-0258,2350-2400" (from midnight to two minutes before three o'clock, and ten minutes before midnight to midnight).

Close

Apply changes

6.13.8 Setup — Routing

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Routing setup

Default

eth1 - Management

IP monitoring (default)

eth0 - SFP+ B

OTT monitoring (default)

eth0 - SFP+ B

NTP date

Default interface

SNMP

Default interface

VBC auto-detect

Default interface

For each of the listed services traffic will be forced on the selected interface.

The probe must be rebooted for any changes to take effect.

Apply changes

Auto-detect

Enable VBC auto-detect of this device

☒

VBC server (DNS-name or IP-address):

vbc.example.com

Resolved IP-address of the VBC server:

10.0.30.39

The **Setup — Routing** view allows configuring the default interface for out-going probe traffic, the default monitoring interface and VBC detection. System networking configuration is configured using the system network configuration, please refer to **D Appendix: Network configuration** for details.

Note: When monitoring both multicast (UDP) and OTT (TCP) traffic, we recommend using different network interfaces. Mixing the two traffic types on the same network can have unwanted impact on the monitored signals.

The VideoBRIDGE Controller can automatically detect the Software Probe and add it to the VBC equipment list, provided that the auto-detect functionality is enabled and the VBC server address is known to the VB220-SW. Note that the network must be transparent to traffic between the VBC server and Software Probes for auto-detection to work.

When changes have been made in the **Setup — Routing** view, click the **Apply** button for changes to take effect.

Routing setup

Default	This setting determines the default interface.
IP monitoring	Defines the interface to use for the multicasts specified in the Multicasts — Streams view. The available interfaces depend on the probe license.
OTT	Interface to use for OTT channels specified in the OTT — Channels view.
SNMP	Interface to use for SNMP traps.
VBC auto-detect	Interface to use for VBC auto-detect, as specified in the Auto-detect column.

Note that routing for Full Service Monitoring (FSM) is selected in the **Ethernet — FSM — Setup — Edit** view.

Auto-detect

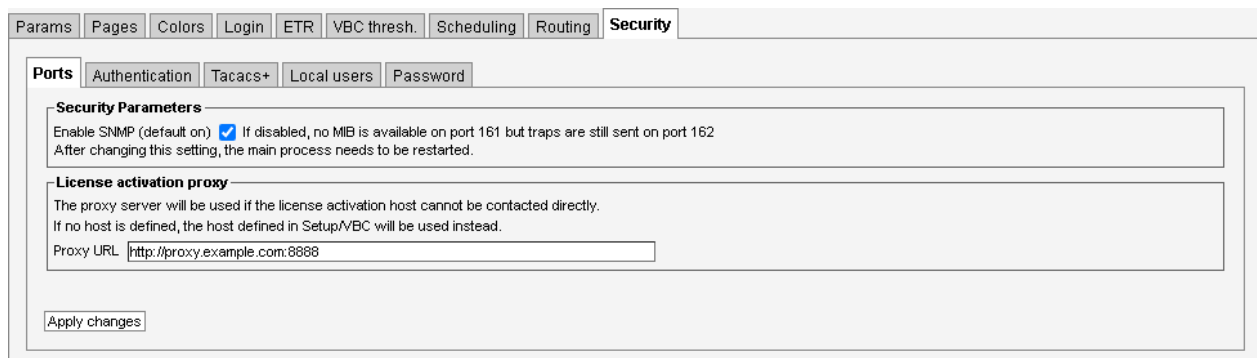
Enable VBC auto-detect of this device	Check this box to enable auto-detect
VBC server	Enter the host name name or IP address of the VBC
Resolved IP address	The IP address associated with the DNS name will be displayed here. If host name lookup fails, it is necessary to type the VBC server's IP address instead. Host name lookup is only performed if auto-detect is enabled.

6.13.9 Setup — Security

The **Setup — Security** view is a restricted section where only the administrator should have access, making it possible to disable selected communication protocols to increase safety against unauthorized access to the Software Probe.

To access this view, you must be logged in as the **admin** user, please refer to chapter 5.6 for details. You also need to access the VB220-SW user interface directly, it is not available when logged in through the VBC.

6.13.9.1 Setup — Security — Ports



Params Pages Colors Login ETR VBC thresh. Scheduling Routing **Security**

Ports Authentication Tacacs+ Local users Password

Security Parameters

Enable SNMP (default on) ☒ If disabled, no MIB is available on port 161 but traps are still sent on port 162. After changing this setting, the main process needs to be restarted.

License activation proxy

The proxy server will be used if the license activation host cannot be contacted directly. If no host is defined, the host defined in Setup/VBC will be used instead.

Proxy URL

The **Setup — Security — Ports** view makes it possible to enable and disable a number of protocol ports used by the VB220-SW. To disable a protocol, deselect it by removing the associated check-mark and click the **Apply changes** button. Available security parameters are:

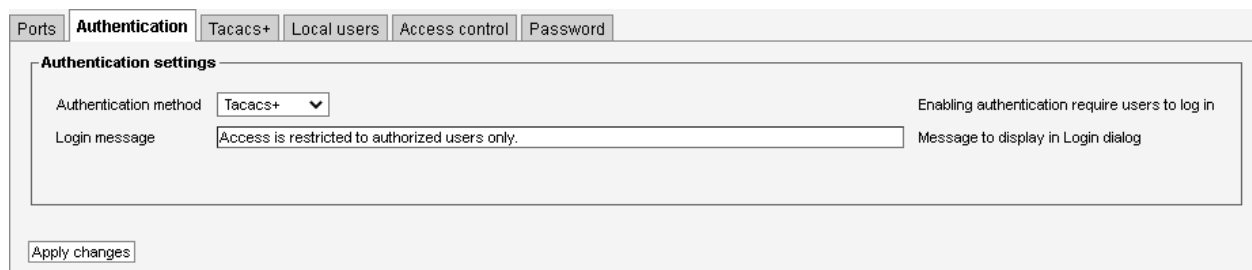
Security parameters

Enable SNMP If SNMP is disabled, no MIB is available on port 161. However SNMP traps are sent as usual on port 162.
Defaults to **on**.

License activation proxy

Proxy URL When using on-line activation, the Software Probe needs to be able to connect to the license activation server. If the Software Probe is not connected directly to the Internet, you can add the URL to a proxy server that it can use here. If not configured, the Software Probe will try to use the proxy installed on the VBC host, as configured in the **Setup — Routing** view; see G Appendix: On-line License Activation for more details

6.13.9.2 Setup — Security — Authentication



The **Setup — Security — Authentication** view makes it possible to restrict access to the VB220-SW user interface by requiring the user to log in first.

Authentication method

Disabled VB220-SW authentication is disabled, and no login is required when accessing the VB220-SW from a web browser. The Software Probe is seamlessly accessible from the VideoBRIDGE Controller.
This is the default setting.

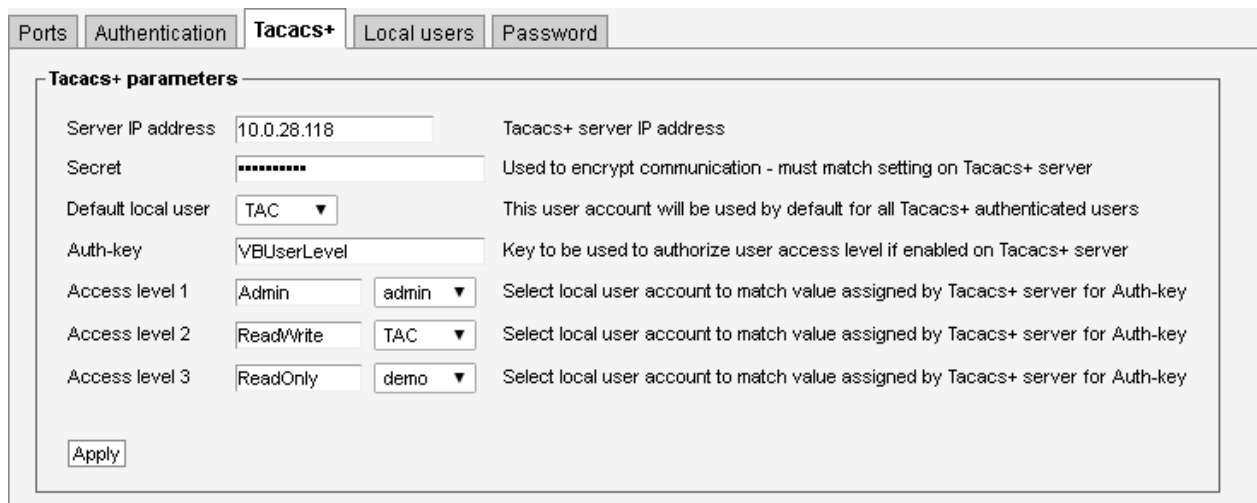
Tacacs+ VB220-SW authentication is enabled.
When accessing the VB220-SW with a web browser, users need to authenticate themselves with a username and password. These need to match the pre-defined **admin** user, a user available on the Tacacs+ server configured through the **Setup — Security — Tacacs+** view, or any of the users configured in the **Setup — Security — Local users** view.

Local users VB220-SW authentication is enabled.
 When accessing the VB220-SW with a web browser, users need to authenticate themselves with a username and password. These need to match either the pre-defined **admin** user, or any of the users configured in the **Setup — Security — Local users** view.

If authentication has been enabled when accessing the VB220-SW through the VideoBRIDGE Controller, the local VB220-SW user will be “admin”, but with restrictions imposed by the user account. If the password has been changed from the default, the same password needs to be configured in the **Edit device** popup in the **VBC Equipment** view.

The message entered in the **Login message** text field will be displayed to the user in the **Login** view before logging in.

6.13.9.3 Setup — Security — Tacacs+



The screenshot shows the 'Tacacs+' configuration window. It contains the following fields and descriptions:

- Server IP address:** 10.0.28.118. Description: Tacacs+ server IP address.
- Secret:** [Masked]. Description: Used to encrypt communication - must match setting on Tacacs+ server.
- Default local user:** TAC. Description: This user account will be used by default for all Tacacs+ authenticated users.
- Auth-key:** VBUserLevel. Description: Key to be used to authorize user access level if enabled on Tacacs+ server.
- Access level 1:** Admin (dropdown: admin). Description: Select local user account to match value assigned by Tacacs+ server for Auth-key.
- Access level 2:** ReadWrite (dropdown: TAC). Description: Select local user account to match value assigned by Tacacs+ server for Auth-key.
- Access level 3:** ReadOnly (dropdown: demo). Description: Select local user account to match value assigned by Tacacs+ server for Auth-key.

An 'Apply' button is located at the bottom left of the configuration area.

This view is used to configure a Tacacs+ server for user authentication. For this to be used, Tacacs+ authentication must be selected in the **Setup — Security — Authentication** view.

To use Tacacs+ authentication, the IP address of the Tacacs+ server must be specified, along with the secret key used to encrypt the communication between the Tacacs+ server and the VB220-SW server. The same key must also be specified as part of the Tacacs+ server configuration.

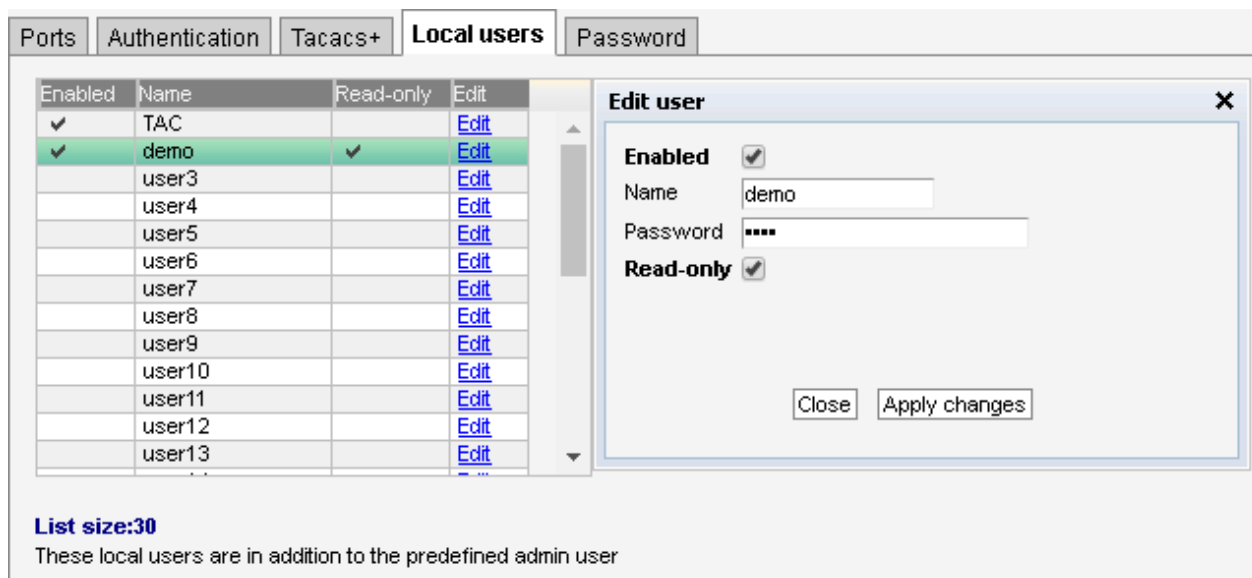
We recommend using HTTPS when using authentication, as this combines authentication with encryption. Using authentication with HTTP is not considered very secure since it is possible to sniff the un-encrypted communication and possibly reverse engineer the scrambling of login details.

Tacacs+ parameters

Server IP address IP address of the Tacacs+ server used for authentication.

Secret	Configures a fixed string used to encrypt the communication with the server.
Default local user	Defines the local user ID that should be used on successful Tacacs+ authentication.
Auth-key	Defines which key in the Tacacs+ authentication response to use to determine the user access level. The value of this key is compared to the Access level below.
Access level 1–3	Up to three different Tacacs+ access levels can be configured to map to different local user accounts, allowing different authenticated users to have different access levels. The value configured here is matched with the value of the Auth-key configured above.

6.13.9.4 Setup — Security — Local users



Enabled	Name	Read-only	Edit
✓	TAC		Edit
✓	demo	✓	Edit
	user3		Edit
	user4		Edit
	user5		Edit
	user6		Edit
	user7		Edit
	user8		Edit
	user9		Edit
	user10		Edit
	user11		Edit
	user12		Edit
	user13		Edit

Edit user

Enabled ☒

Name

Password

Read-only ☒

List size:30
These local users are in addition to the predefined admin user

This view is used to configure local users that are allowed to access the VB220-SW user interface. For these to be used, Local users authentication must be selected in the **Setup — Security — Authentication** view. The VB220-SW supports up to 30 local users.

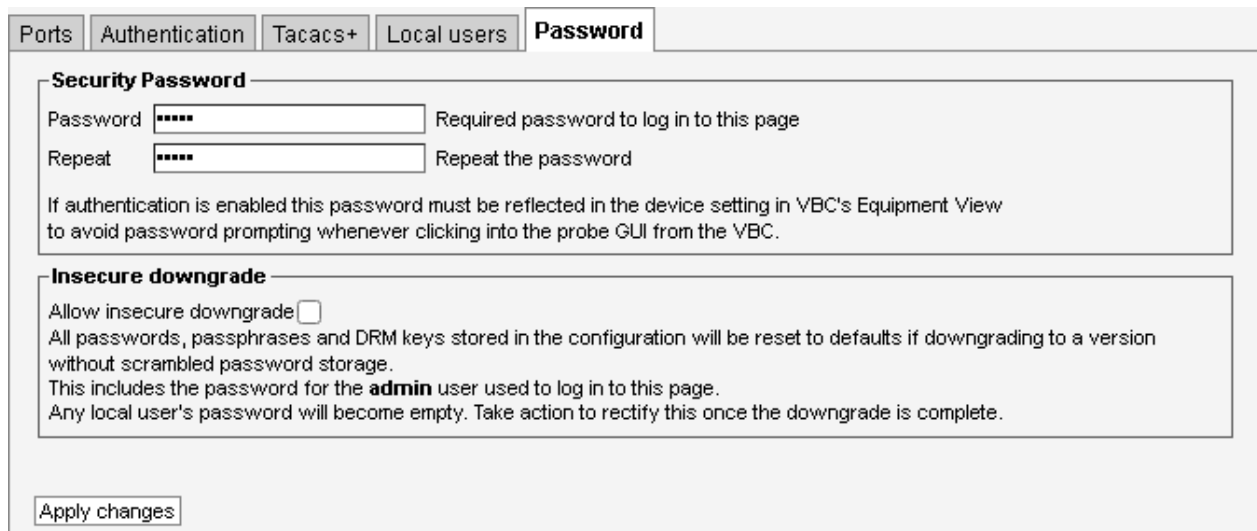
In addition to the users defined here, the predefined “admin” user can also log in. The password for the “admin” user is configured in the **Setup — Security — Password** view. Note that the login requirements towards the **Security** tab is independent of the general authentication and always requires the login of the admin user.

It is not possible to see which user is actually logged in to the VB220-SW, as this information is not kept or used by the probe.

Edit user

Enabled	If this is checked, the user is allowed to log in.
Name	User-name of the account used to log in.
Password	Password of the account used to log in.
Read-only	If this is checked, the user only has read-only access to the user interface. When read-only access is activated a READ-ONLY access message is displayed under the alarm list. To change any parameters, the user needs to log out and then log in as another user.

6.13.9.5 Setup — Security — Password



The **Setup — Security — Password** view is used to change the password used to access all of the **Setup — Security** section. The password is changed by entering a new password and clicking the **Apply changes** button. If authentication has been enabled in the **Setup — Security — Authentication** view, the password defined here can be used with the special username “admin”.

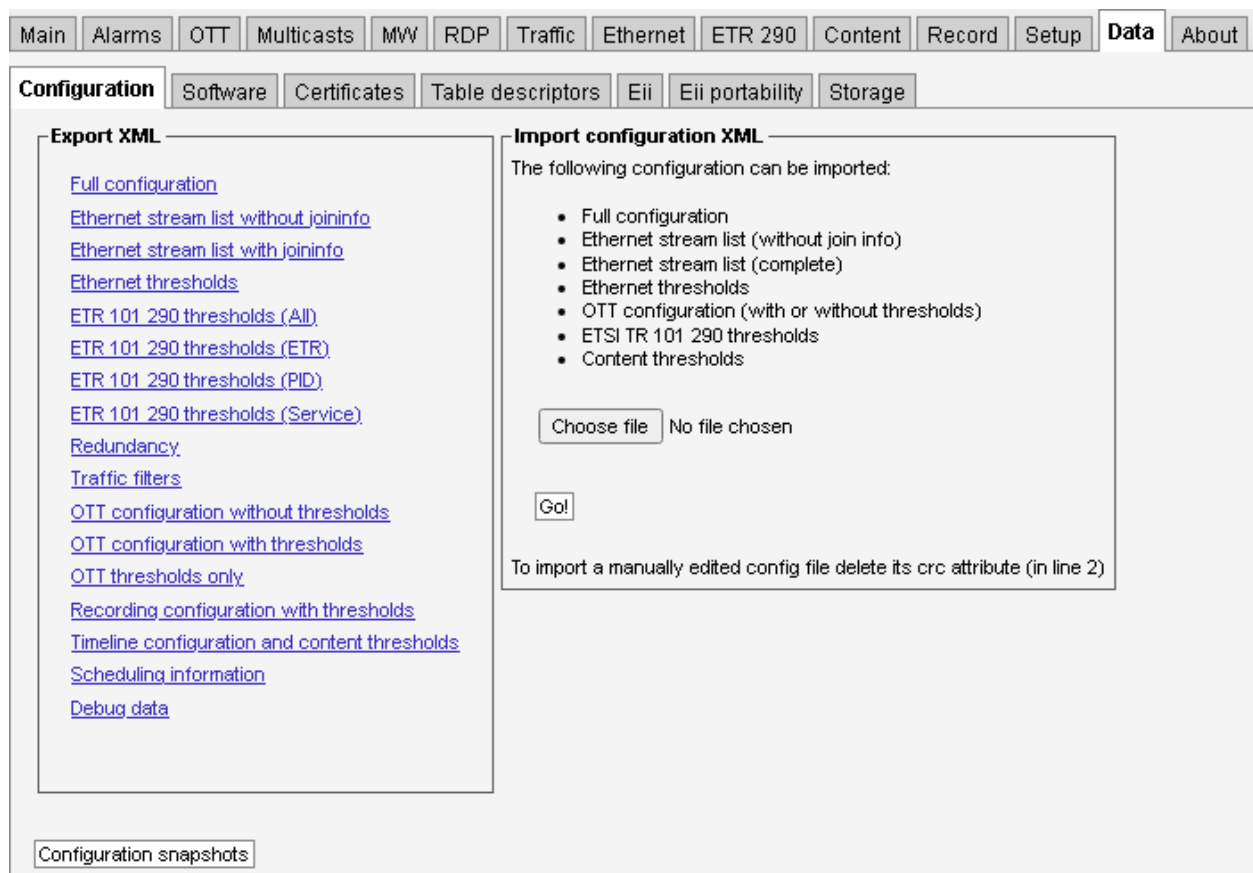
The password defined here controls access to the VB220-SW user interface. The administrative interface uses the system accounts, please refer to chapter 3.4 for details.

The method for storing passwords in the configuration file changed in version 6.5, making it incompatible with previous versions. The **Allow insecure downgrade** checkbox allows downgrades to a version that is unable to read the passwords from the configuration. Please note that the **admin** user password will be reset to the default, and that you will lose all passwords defined for local users, DRM passphrases and keys configured for OTT channels and SRT passphrases and stream IDs configured for multicasts.

It is possible to downgrade without losing passwords. Versions 6.3.0–12 and 6.4.0–5 and later can read the new password storage, converting to the old format. If you need to downgrade further, make sure the configuration is re-saved in the old format before proceeding, by making an inconsequential change to the configuration before applying another downgrade. You could, for instance, change the **Probe name** in the **Setup — Params** view and press **Apply changes** to save the configuration to disk.

6.14 Data

6.14.1 Data — Configuration



The screenshot shows the 'Data' tab in the Sencore software interface. The 'Configuration' sub-tab is active, displaying two main sections: 'Export XML' and 'Import configuration XML'.

Export XML: This section contains a list of links for exporting different parts of the configuration:

- [Full configuration](#)
- [Ethernet stream list without joininfo](#)
- [Ethernet stream list with joininfo](#)
- [Ethernet thresholds](#)
- [ETR 101 290 thresholds \(All\)](#)
- [ETR 101 290 thresholds \(ETR\)](#)
- [ETR 101 290 thresholds \(PID\)](#)
- [ETR 101 290 thresholds \(Service\)](#)
- [Redundancy](#)
- [Traffic filters](#)
- [OTT configuration without thresholds](#)
- [OTT configuration with thresholds](#)
- [OTT thresholds only](#)
- [Recording configuration with thresholds](#)
- [Timeline configuration and content thresholds](#)
- [Scheduling information](#)
- [Debug data](#)

Import configuration XML: This section provides information on importing configuration files:

- The following configuration can be imported:
 - Full configuration
 - Ethernet stream list (without join info)
 - Ethernet stream list (complete)
 - Ethernet thresholds
 - OTT configuration (with or without thresholds)
 - ETSI TR 101 290 thresholds
 - Content thresholds
- A 'Choose file' button is present, with the text 'No file chosen' next to it.
- A 'Go!' button is located below the file selection area.
- A note states: 'To import a manually edited config file delete its crc attribute (in line 2)'.

At the bottom of the page, there is a button labeled 'Configuration snapshots'.

Full and partial configuration of the Software Probe can be exported as XML documents. This is achieved by clicking one of the links inside the **Export XML** frame. A new browser window pops up containing the selected XML document. The browser will allow the contents of the page to be saved to file.

Restoring the Software Probe configuration, multicast stream list or OTT channel list is just as simple. Just click the **Browse** button and select the file that contains the XML document. Then click the **Go!** button and the information in the XML document will be applied. The configuration, stream list and thresholds exports can all be imported.

Configuration files generated by a probe can be imported by the VB220-SW. Multicast stream lists, OTT channel lists and scheduling information can also be exported to and imported from the VB7880 Advanced Content Extractor.

You can also import and export license and software maintenance keys in XML format from this page.

To import documents that have been manually edited the CRC attribute at the very top of the document must be deleted (i.e. delete `crc="..."` from the file). This will bypass the checksum verification mechanism.

Please refer to the document **Eii External Integration Interface** for detailed information about XML import and export.

Note that the probe name and location are not part of the XML document. Hence exporting the full configuration of one Software Probe and restoring it on another will make the two Software Probes identical except for the network settings.

Clicking the Debug data export option will generate a document containing debug information that may be useful if Software Probe misbehavior is reported. This file should be sent along with a description of the misbehavior.

6.14.1.1 Configuration snapshots

Configuration

Software

Certificates

Table descriptors

Eii

Eii portability

Storage

List of configuration snapshots

Used configuration slots: 1/10

Name	Size	Timestamp	# mcast	# ott	Description
2025-01-17T11:02:54.xml	95.11 kB	2025-01-17 11:02:54	5/5	4/4	6.5 configuration

Restore selected

Delete selected

Provide a description of the snapshot:

Add new configuration snapshot

Configuration

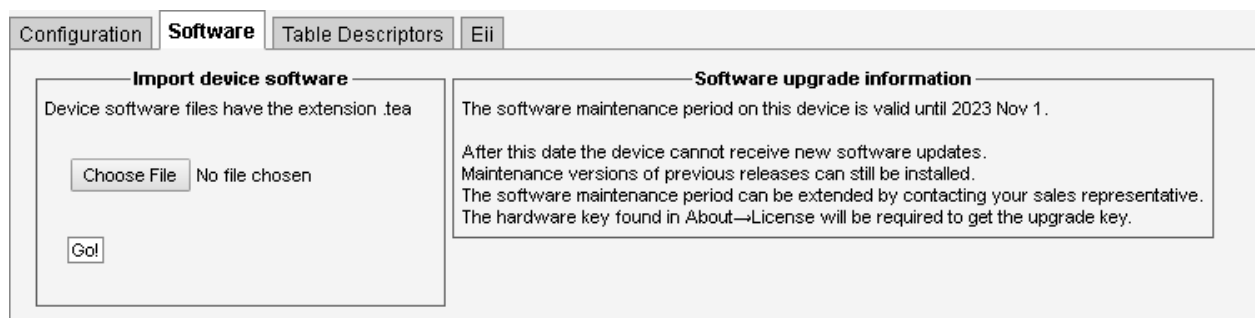
Configuration snapshots allow you to save up to 10 named probe configurations directly on the probe. Each snapshot represents a **Full configuration** XML document and can be used to restore the probe to a previous state, similar to uploading a configuration XML.

Access the **Configuration snapshot** view by clicking the **Configuration snapshots** button below the XML export options in the **Data — Configuration** view. From here you can restore any existing

snapshot by selecting it and clicking the **Restore selected** button, and create new snapshots by providing a name and clicking the **Add new configuration snapshot** button. If all snapshot slots are used, you can delete an existing snapshot by selecting it and clicking the **Delete selected** button.

Click the **Configuration** button to return to the **Data — Configuration** view.

6.14.2 Data — Software



The screenshot shows the 'Software' tab selected. On the left, the 'Import device software' panel contains the text 'Device software files have the extension .tea', a 'Choose File' button, the text 'No file chosen', and a 'Go!' button. On the right, the 'Software upgrade information' panel contains the following text: 'The software maintenance period on this device is valid until 2023 Nov 1. After this date the device cannot receive new software updates. Maintenance versions of previous releases can still be installed. The software maintenance period can be extended by contacting your sales representative. The hardware key found in About→License will be required to get the upgrade key.'

The software section allows the Software Probe to be upgraded to a newer software version. Select the **.tea** file from the local PC and click **Go!** to copy the software to the VB220-SW. When the upload is complete, clicking the **Update software** button will begin the upgrade procedure.

A more detailed description on the software update procedure can be found in I Appendix: Software Upload



The screenshot shows the 'Software' tab with a large message box stating 'Software image uploaded successfully' and '14505925 bytes saved to disk'. Below the message is a 'Save flash' button.

Software update in progress

Writing ...

Updating:  30%

-- Do not power off --

The system will automatically restart on completion

Status updated: 2/1/2017, 8:07:58 AM

Upgrading to a new major release requires a valid software maintenance license, please refer to H Appendix: Software Maintenance for more details. If the current software maintenance license does not cover the uploaded software version, the upgrade will be aborted and the current version is kept.

6.14.3 Data — Certificates (requires OTT-OPT)

Configuration
Software
Certificates
Table descriptors
Eii
Eii portability
Storage

Certificate storage

Import PKCS #12 certificate

Import certificates from PKCS #12 archives (file extensions .p12 or .pfx)

Passphrase
Enter passphrase used for the PKCS #12 archive

Name
Name to store the imported ce

Type
☒ Client certificate
☐ CA certificate

Choose file
No file chosen

Go!

Name	Subject	Refs	Type	Uploaded	Valid from	Valid until	Size
old-ca.pem	Bridge Technologies co as	0	CA	1956 Aug 15 20:27:40	2024 Oct 17 13:43:13	2034 Oct 15 13:43:13	2.279 kB
selfsigned-ca.pem	Bridge Technologies co as	2	CA	1956 Aug 15 20:22:10	2024 Oct 17 15:20:06	2034 Oct 15 15:20:06	2.279 kB
selfsigned-cli-1.pem	Bridge Technologies co as	0	Client	1956 Aug 15 20:22:58	2024 Oct 17 13:52:22	2025 Oct 17 13:52:22	5.599 kB
selfsigned-cli.pem	Bridge Technologies co as	2	Client	1956 Aug 15 20:22:36	2024 Oct 17 15:27:58	2034 Oct 15 15:27:58	5.602 kB

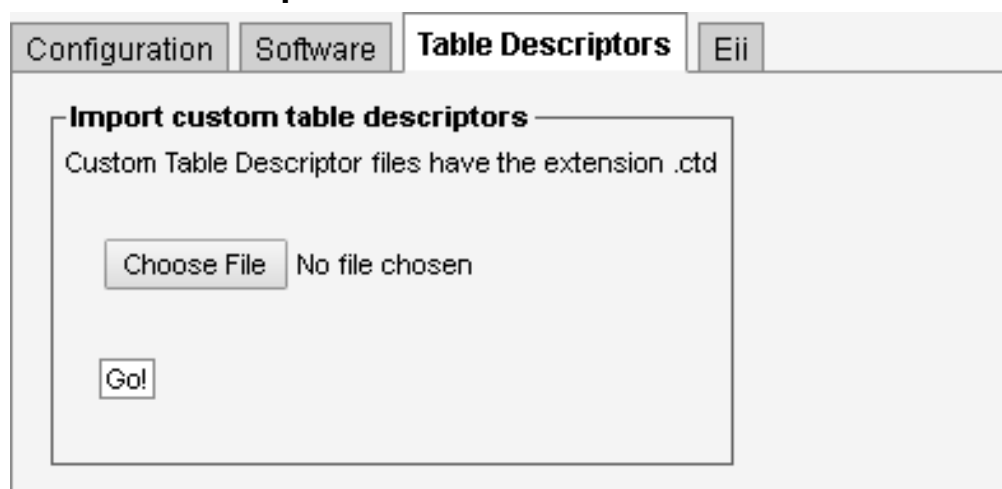
Delete selected

This view makes it possible to upload client certificates for mTLS authentication and CA certificates for TLS host verification.

Use **Import PKCS #12 certificate** to upload a certificate. Certificates must be available as a PKCS #12 archive (these files usually have a **p12** or **pfx** file extension). Enter the passphrase used for the PKCS #12 archive, enter a name under which to store the certificate, and select whether the certificate is a client certificate or a CA certificate. Click the **Browse** button to select the file that contains the certificate and then click the **Go!** button and the certificate will be imported.

All imported certificates are displayed in the certificate list in the bottom half of the screen. To remove certificates from the certificate store, select the certificate or certificates to remove and click the **Delete selected** button.

6.14.4 Data — Table Descriptors



Configuration Software **Table Descriptors** Eii

Import custom table descriptors

Custom Table Descriptor files have the extension .ctd

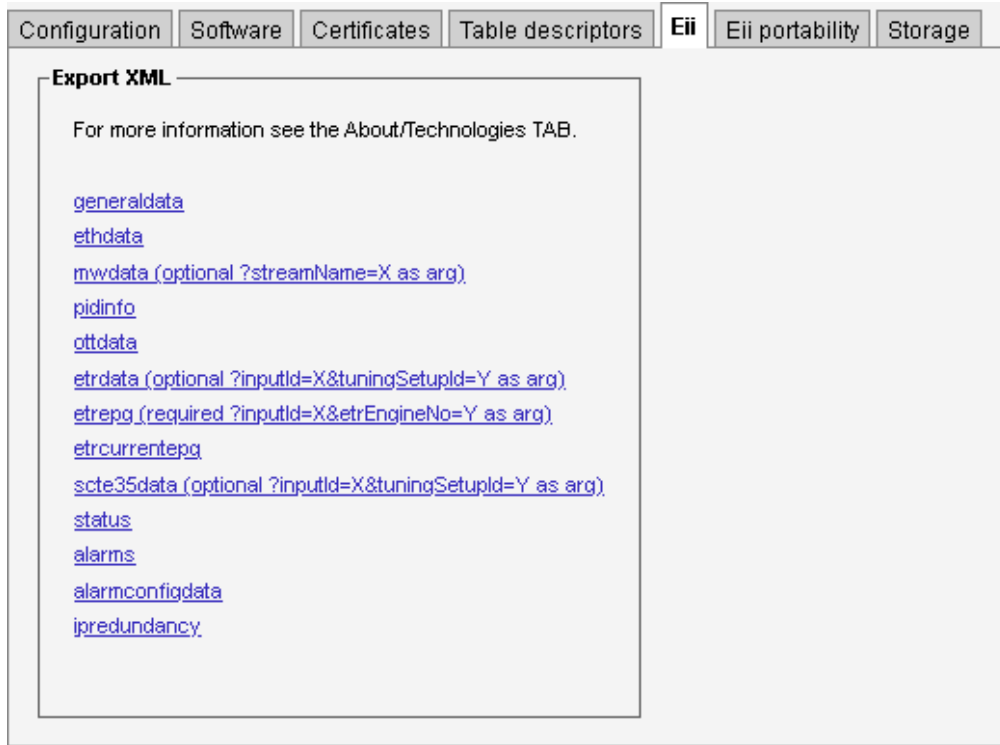
Choose File No file chosen

Go!

It is possible to upload parser files to the probe adding support for private descriptors. Private descriptors should be enabled (in the **Setup — ETR** view).

Contact Sencore for more information about private descriptors.

6.14.5 Data — Eii



Export XML

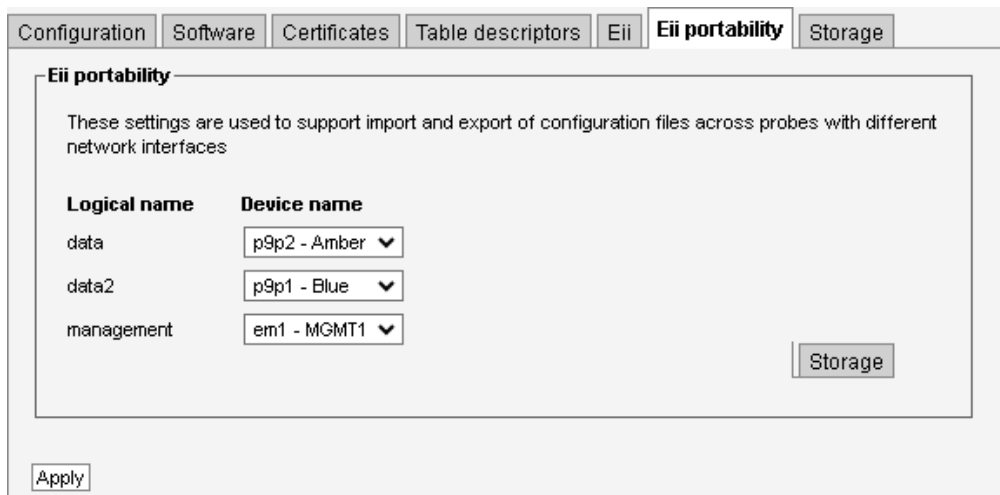
For more information see the About/Technologies TAB.

- [generaldata](#)
- [ethdata](#)
- [mwdata \(optional ?streamName=X as arg\)](#)
- [pidinfo](#)
- [ottdata](#)
- [etrdata \(optional ?inputId=X&tuningSetupId=Y as arg\)](#)
- [etrepg \(required ?inputId=X&etrEngineNo=Y as arg\)](#)
- [etrcurrentepg](#)
- [scte35data \(optional ?inputId=X&tuningSetupId=Y as arg\)](#)
- [status](#)
- [alarms](#)
- [alarmconfigdata](#)
- [ipredundancy](#)

The **External integration interface (Eii)** allows inclusion of Sencore VideoBRIDGE equipment into 3rd party NMS systems. In order to facilitate integration the **Data — Eii** view allows export of XML files containing the data typically being requested by an NMS system via the regular Eii interface.

Please refer to the document **Eii External Integration Interface** for detailed information about Eii.

6.14.6 Data — Eii Portability



Eii portability

These settings are used to support import and export of configuration files across probes with different network interfaces

Logical name	Device name
data	p9p2 - Amber ▼
data2	p9p1 - Blue ▼
management	em1 - MGMT1 ▼

[Storage](#)

[Apply](#)

This view makes it possible to map the logical network interface names **data**, **data2** and **management** to the physical network interfaces available on the VB220-SW. These mappings are used when importing and exporting configuration files between probes of different types and when using the **setrdp** Eii interface.

6.14.7 Data — Storage (requires DATA-LOG-OPT)

Configuration
Software
Table Descriptors
Eii
Storage

Persistent File Storage

PCAP

No files currently ready for transfer

Name	Timestamp	Size	Rename
RDP2_2020-02-04::10:55:35.ts	2020-02-04 10:55:35	92.842 MB	Rename
RDP1_2020-02-04::10:54:55.ts	2020-02-04 10:54:55	43.483 MB	Rename
PCAP_2020-02-04::10:37:34....	2020-02-04 10:37:41	148.127 MB	Rename
RDP1_2020-02-04::10:37:12.ts	2020-02-04 10:37:12	45.024 MB	Rename

Used: 3.846 GB / 0.759%
Free: 502.6 GB / 99.24%
Total: 506.4 GB

Delete selected
Delete all files

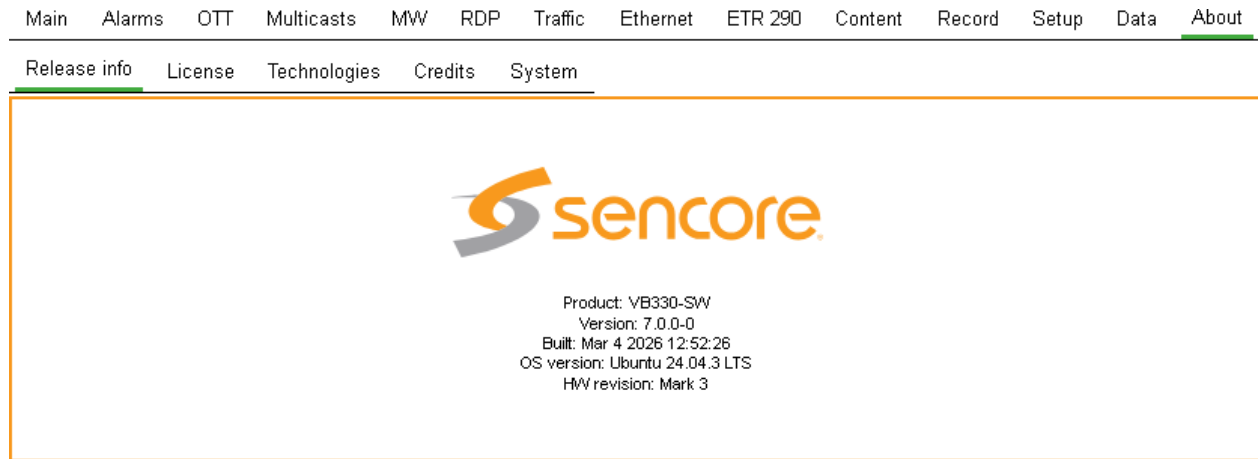
The DATA-LOG option allows the internal hard drive to be used for storing recordings. RDP recordings made from the **RDP — Control** view are automatically stored and can be retrieved from here.

PCAP recordings made from the **Ethernet — PCAP** view can also be stored for later retrieval. When a PCAP recording is available, clicking the **Transfer files** button copies it to the persistent storage area.

The probe will generate system information messages when the storage has less than 10 % free memory. When the storage is full, a system error is generated. These are configured in the **Alarms — Alarm setup** view.

6.15 About

6.15.1 About — Release info



This view shows the product name, software version, the software build date and the version of the underlying operating system for the Software Probe.

6.15.2 About — License

Release info **License** Technologies Credits System

Available options

Available	Installed	Option code	Option name	Details
✓	✓	IP-OPT	IP Monitoring and Analysis (2000 streams)	i
✓	✓	ETR290-OPT	ETSI TR 101 290 for Ethernet (1000/1000 parallel engines)	i
✓	✓	CONTENT-OPT	Content Extraction and Alarming	i
✓		RECORD-OPT	Multi-Stream Recording (2/200 streams)	i
✓	✓	JPEGXS-OPT	JPEG XS decoding (up to 4096 horizontal pixels)	i
✓	✓	OTT-OPT	OTT Active Testing (1000/1000 channels)	i
✓	✓	T2MI-OPT	DVB-T2MI Encapsulation Synchronization Monitoring	i
✓	✓	SCTE35-OPT	SCTE35 Signaling Analysis and Logging	i
✓		IP-SWITCH-OPT	Redundancy switching for IP based on ETR alarms	i
✓		VB330-25Gx2-OPT	Maximum Ethernet Bandwidth (20 Gbit/s)	i
✓	✓	DATA-LOG-OPT	Persistent Storage	i

Current license details

Probe status: Permanent
 System ID:
 Current license: Verified
 Production date: 2020 Dec 9
 Software maintenance period: **Ended 2026 Jan 1**

License key

Product license key:

 The license has been activated on-line and will be verified periodically.
Note: Changing the feature license key will restart the main process!

Manage license activation

The current license does not require on-line activation.

 If you release the license, you will need to enter the license key again to re-activate it.

Manage server

Access the administrative interface; use system account credentials to log in:
[Manage server](#)
 If you deactivate the software, you will need to use the administrative interface to re-enable it.
☒ Activate probe

The **License** view displays the currently active license. The license includes the available Software Probe options and software maintenance details. By clicking the blue information icon associated with each option it is possible to view option details.

The license key is activated towards a license server. Depending on the license properties, the activation might need to be updated periodically. The key is transferable between systems running the same software, as long as the license is not permanently assigned to a system. The system identifier is used to identify the system. The **Current license** field will display information on when the license key was last activated and possibly when it needs to be activated again. Click the **Renew** button to immediately renew the license with the license server.

Click the **Release** button to remove the current license, making it available to another host. Please make sure you have the license key available before you do this, as you must enter it again on the system you wish to transfer the license to. If you have lost the license key, contact your dealer to retrieve it. Make sure you include all details from this page in your request.

Please refer to G Appendix: On-line License Activation for more information on how to use on-line activated licenses. This appendix also describes how to renew the license when the Software Probe cannot connect to the Internet.

Please refer to H Appendix: Software Maintenance for more details on software maintenance licenses.

A basic probe may be upgraded to include the ETR 290 option. This can be done on-site by the user when the option has been purchased.

Click the **Manage server** link to access the Cockpit administrative interface, see chapter 3.4 for more information.

To disable the Software Probe, uncheck the **Activate software** checkbox and click the **Change** button. You cannot do this if it has been set as the default software through the administrative interface (which is done by default the first time you activate the software), you will need to remove it as the default before disabling Software Probe. See chapter 3.10 for more details.

Current license details

Probe status: This shows information about the current status of the license.
Activated indicates a license has been activated successfully, and **Permanent** indicates a non-transferable on-line activated license.
Demo license indicates a time-limited license, and also indicates the time remaining.
Not activated means that the system does not have a valid license; if the status says **Not activated yet**, the system has a valid license but the system time is set incorrectly to a time before the activation. If the status says **activation period has expired**, the system has a valid license, but the activation period has expired, either because the system has not been able to renew the license or because the system time is set to be into the future.
Not covered by software maintenance license is displayed if the installed version is not covered by the maintenance license. The software upgrade procedure usually blocks the installation of such versions.
Please refer to G Appendix: On-line License Activation for more information on how to use on-line activated licenses.

System ID: The unique ID used to identify the system. This is a property of the system hardware, and will remain even if reinstalling the system. This ID is used to tie the license to the system.
In the unlikely event that the hardware is missing this information, a number will be generated and the word “overridden” will be shown after the number.

Current license:	Verified indicates that the current license was read properly; when using a license that is not permanent, the time the license was last verified against the license activation server is also displayed. Off-line indicates that the current license has not been verified against the license activation server. The message will also include information about when the license activation must be renewed to avoid losing access to the license. Checked indicates that the system does not have an activated license, and includes the time when the status was last checked with the license activation server. Unknown is displayed if the activation status could not be determined, this is often because the system time is configured incorrectly.
Production date:	Displays the date when the system was produced.
Software maintenance period:	Displays the end date of software maintenance for the currently attached license. Please refer to H Appendix: Software Maintenance for more details on software maintenance licenses.

6.15.3 About — Technologies

Release info
License
Technologies
Credits



As part of the VBC, the Timeline functionality enables operators to go back and explore, understand, verify and document in complete detail what happened at any given time, or look for patterns over longer periods of time to identify and eliminate problems.



Gold TS Protection makes monitoring for digital services much quicker to set up, and fault-tracking much faster, more accurate and secure. Gold TS Protection includes all the checks specified in the ETR290 standard, but goes much further to include testing for critical conditions missed by ETR290.



External Integration Interface (Eii) is a well defined interface allowing easy integration of Bridgetech probes into a 3rd party network management system (NMS). Measurement data and alarms from the probes can be accessed by the NMS through SNMP traps and/or XML files, enabling development of a customised graphical user interface that could comprise equipment from several manufacturers. The Eii interface is described in a document that is open and available.



Full Service Monitoring (FSM) allows easy validation of any server reachable by the probe via Ethernet. The servers may be probed by either sending an ICMP echo request packet (also known as ping) or performing an HTTP get request. The FSM feature thus allows the operator to verify that vital system components like remote VoD, CA and middleware servers are active, ensuring correct overall system performance. In the event of a server not being reachable, the operator will be notified by an alarm so that the problem may be corrected.

The **Technologies** view lists some of the technologies available in the Sencore VideoBRIDGE product family.

6.15.4 About — Credits

Release info	License	Technologies	Credits	System
Contains software licensed under the GNU General Public License version 2. Please contact your dealer to receive copies of the source code for these parts.				
Contains software licensed under the GNU Lesser General Public License version 2.1.				
Contains software licensed under the Mozilla Public License version 2.0.				
Contains software licensed under the Apache License version 2.0. Contributors: Zhi Li (zli@netflix.com), Todd Goodall (beyondmetis@gmail.com), Zhengxiong Zhang (zhang.zhixiong@gmail.com), Joe Lin (joe.yuchieh.lin@gmail.com), Eddy Wu (chihao.eddy.wu@gmail.com)				
Contains software from the cURL project licensed under the cURL license .				
Contains software from the FFmpeg project licensed under the GNU Lesser General Public License version 2.1.				
This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). OpenSSL is licensed under both the OpenSSL license and original SSLeay license				
Contains software based on the json.hpp library . json.hpp is copyright © 2013-2019 Niels Lohmann.				
Contains the jQuery library from the JS Foundation , licensed under the MIT license . Copyright JS Foundation and other contributors.				
Contains software from the bitStream project, licensed under the MIT license . Copyright © 2010-2011 VideoLAN.				
Contains software from the brunsli project, licensed under the MIT license . Copyright © 2019 Google LLC.				
Contains libebur128, licensed under the MIT license . Copyright © 2011 Jan Kokemüller.				
Contains software from the libpqxx project, licensed under the BSD license . Copyright © 2001-2017 Jeroen T. Vermeulen.				
Contains software from the libpcap project licensed under the BSD license .				

This view shows information about the software included with the Software Probe.

6.15.5 About — System

Release info	License	Technologies	Credits	System																																																																																																																																				
Probe services <table><tr><th>Service</th><th>Status</th><th>Started</th><th>Usr</th><th>Sys</th><th>Memory</th></tr><tr><td>probe.ewe</td><td>Running</td><td>2024-03-23 22:17:42</td><td>3%</td><td>0%</td><td>336M</td></tr><tr><td>probe.sap</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>2M</td></tr><tr><td>probe.flashserver</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>2M</td></tr><tr><td>probe.tsoffload</td><td>Running</td><td>2024-03-23 22:17:43</td><td></td><td></td><td></td></tr><tr><td>probe.linkout</td><td>Running</td><td>2024-03-23 22:17:43</td><td></td><td></td><td></td></tr><tr><td>probe.esyslog</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>1M</td></tr><tr><td>probe.etr</td><td>Running</td><td>2024-03-23 22:17:43</td><td>2%</td><td>0%</td><td>1003M</td></tr><tr><td>probe.relay</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>79M</td></tr><tr><td>probe.database</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>7M</td></tr><tr><td>probe.record</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>35M</td></tr><tr><td>probe.storage</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>49M</td></tr><tr><td>probe.dbana</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>6M</td></tr><tr><td>probe.ana</td><td>Running</td><td>2024-03-23 22:17:44</td><td>0%</td><td>0%</td><td>282M</td></tr><tr><td>probe.psi</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>9M</td></tr><tr><td>probe.vidana</td><td>Running</td><td>2024-03-23 22:17:43</td><td>351%</td><td>15%</td><td>1904M</td></tr><tr><td>probe.capture</td><td>Running</td><td>2024-03-23 22:17:42</td><td>0%</td><td>0%</td><td>5M</td></tr><tr><td>probe.ott</td><td>Running</td><td>2024-03-23 22:17:44</td><td>7%</td><td>12%</td><td>486M</td></tr><tr><td>probe.microbitr</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>5M</td></tr><tr><td>probe.srtrx</td><td>Running</td><td>2024-03-23 22:17:43</td><td>0%</td><td>0%</td><td>7M</td></tr><tr><td>httpd</td><td>Running</td><td>2024-03-25 03:43:04</td><td>0%</td><td>0%</td><td>6M</td></tr><tr><td>lldpd</td><td>Running</td><td>2024-03-23 22:17:44</td><td>0%</td><td>0%</td><td>4M</td></tr></table> Disk status RAID status No supported RAID found Installation directory: 96% free (454G) RAM Disk: 99% free (7G) Timeline: 17% free (173G) RDP and PCAP data: 100% free (8G) Recordings: 17% free (173G) Server response time Static request 39ms Redo Jittery values may be caused by browser overhead, network latency or heavy load Links Debug... System status (XML)...					Service	Status	Started	Usr	Sys	Memory	probe.ewe	Running	2024-03-23 22:17:42	3%	0%	336M	probe.sap	Running	2024-03-23 22:17:43	0%	0%	2M	probe.flashserver	Running	2024-03-23 22:17:42	0%	0%	2M	probe.tsoffload	Running	2024-03-23 22:17:43				probe.linkout	Running	2024-03-23 22:17:43				probe.esyslog	Running	2024-03-23 22:17:42	0%	0%	1M	probe.etr	Running	2024-03-23 22:17:43	2%	0%	1003M	probe.relay	Running	2024-03-23 22:17:43	0%	0%	79M	probe.database	Running	2024-03-23 22:17:42	0%	0%	7M	probe.record	Running	2024-03-23 22:17:43	0%	0%	35M	probe.storage	Running	2024-03-23 22:17:42	0%	0%	49M	probe.dbana	Running	2024-03-23 22:17:43	0%	0%	6M	probe.ana	Running	2024-03-23 22:17:44	0%	0%	282M	probe.psi	Running	2024-03-23 22:17:42	0%	0%	9M	probe.vidana	Running	2024-03-23 22:17:43	351%	15%	1904M	probe.capture	Running	2024-03-23 22:17:42	0%	0%	5M	probe.ott	Running	2024-03-23 22:17:44	7%	12%	486M	probe.microbitr	Running	2024-03-23 22:17:43	0%	0%	5M	probe.srtrx	Running	2024-03-23 22:17:43	0%	0%	7M	httpd	Running	2024-03-25 03:43:04	0%	0%	6M	lldpd	Running	2024-03-23 22:17:44	0%	0%	4M
Service	Status	Started	Usr	Sys	Memory																																																																																																																																			
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probe.sap	Running	2024-03-23 22:17:43	0%	0%	2M																																																																																																																																			
probe.flashserver	Running	2024-03-23 22:17:42	0%	0%	2M																																																																																																																																			
probe.tsoffload	Running	2024-03-23 22:17:43																																																																																																																																						
probe.linkout	Running	2024-03-23 22:17:43																																																																																																																																						
probe.esyslog	Running	2024-03-23 22:17:42	0%	0%	1M																																																																																																																																			
probe.etr	Running	2024-03-23 22:17:43	2%	0%	1003M																																																																																																																																			
probe.relay	Running	2024-03-23 22:17:43	0%	0%	79M																																																																																																																																			
probe.database	Running	2024-03-23 22:17:42	0%	0%	7M																																																																																																																																			
probe.record	Running	2024-03-23 22:17:43	0%	0%	35M																																																																																																																																			
probe.storage	Running	2024-03-23 22:17:42	0%	0%	49M																																																																																																																																			
probe.dbana	Running	2024-03-23 22:17:43	0%	0%	6M																																																																																																																																			
probe.ana	Running	2024-03-23 22:17:44	0%	0%	282M																																																																																																																																			
probe.psi	Running	2024-03-23 22:17:42	0%	0%	9M																																																																																																																																			
probe.vidana	Running	2024-03-23 22:17:43	351%	15%	1904M																																																																																																																																			
probe.capture	Running	2024-03-23 22:17:42	0%	0%	5M																																																																																																																																			
probe.ott	Running	2024-03-23 22:17:44	7%	12%	486M																																																																																																																																			
probe.microbitr	Running	2024-03-23 22:17:43	0%	0%	5M																																																																																																																																			
probe.srtrx	Running	2024-03-23 22:17:43	0%	0%	7M																																																																																																																																			
httpd	Running	2024-03-25 03:43:04	0%	0%	6M																																																																																																																																			
lldpd	Running	2024-03-23 22:17:44	0%	0%	4M																																																																																																																																			

The **System** view displays a snapshot of the current status of the system, to ensure correct Software Probe operation.

The **Probe services** overview displays the VB220-SW services that are required. All the VB220-SW services listed should have status *Running* or *Disabled* if the corresponding feature is not licensed or available. The current CPU and memory usage is also displayed.

Disk status displays free disk space to give the user some overview of disk resources available. It will additionally display the status of the RAID system, if supported. If no RAID system is installed, the message “No supported RAID found” will be displayed in red. The same message will be displayed if a RAID system is installed but not detected, as the installed software is unable to differentiate between the two cases.

Server response time is determined upon entering the **System** view. When the **Redo** button is clicked, a new request is sent to the web server.

Clicking the **Debug...** link allows the user to generate a document containing debug information that may be useful if VB220-SW misbehavior is reported. This file should be sent along with a description of the misbehavior.

Clicking the **System status (XML)...** link generates an XML document with a short description of the system status.

A Appendix: VB220-SW Versus VBC Alarms

The VB220-SW Software Probe alarms are independent of the VideoBRIDGE Controller alarms. The Software Probe has been designed to yield instantaneous alarms based on the current measurements. This typically results in lots of short-lived alarms that would be “too much” for the VBC to report, as the VBC may control a large number of Software Probes. The VBC therefore generates alarms based on error-second statistics gathered from Software Probes during a selectable time period (default 60 minutes – sliding window).

Some the VBC alarms map to only one probe alarm type. Other the VBC alarms map to several probe or VB7880 Advanced Content Extractor alarms. As an example, the VBC alarm ETR pri one error does alarming for the following probe alarms:

- TS sync
- Sync byte
- PAT
- Continuity
- PMT
- Missing PID

The VBC GUI has functionality for searching for all Software Probe alarms that have corresponding VBC alarms. This makes it easier to find the cause of an VBC alarm.

Ethernet measurement data are sent from the VB220-SW Software Probe together with Ethernet error-second threshold values (as set in the VB220-SW Software Probe **Setup — VBC thresh.** view). The VBC monitors the error seconds for each parameter and will raise an alarm provided that the error-seconds figure exceeds the threshold value, as monitored during the windowing period.

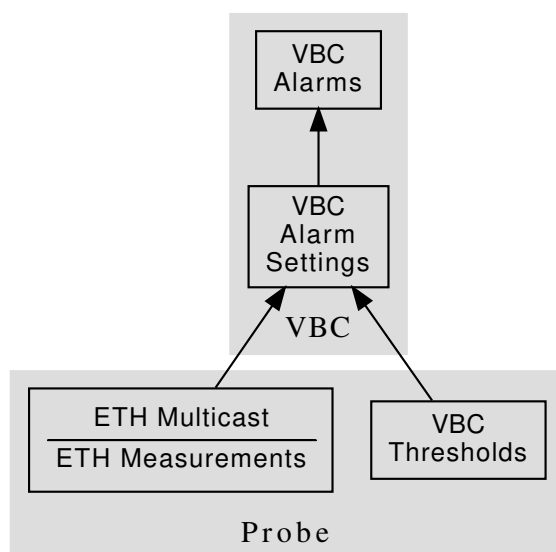


Figure A.1: VBC alarming based on Software Probe measurements

B Appendix: Monitoring Practices

This Appendix summarizes a few useful monitoring practices.

B.1 RTP Monitoring

When running video inside an RTP wrapper it is possible to exactly deduce the number of dropped IP frames due to network issues. This is possible as a result of the 16-bit sequence counter inside the RTP header. When the protocol mapping is nTS/RTP the RTP parameters **RTPdrop**, **RTPdup**, **RTPooo** and **RTPlag** will be updated and the corresponding alarms **Packet drops:N**, **Duplicate packets:N** and **Out of order packets(lag:N)** are fired (if not switched off).

Note that the probe will perform out-of-order corrections before RTP packet loss analysis is performed.

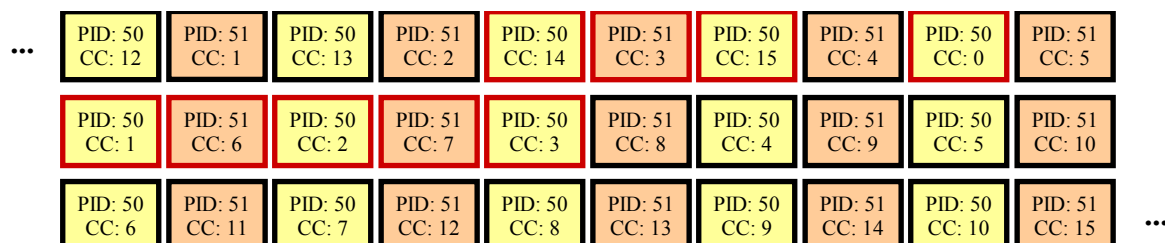
Example of RTP sequences and their effects on monitoring:

Sequence	Effect
..., 10, 11, 12, 13, 14, 17, 18, 19, ... 2 dropped packets (15-16)	Monitoring page: RTPdrop:+2 Alarms & events: RTP Packet drop: 2
..., 10, 12, 13, 16, 17, 18, 19, ... 1 and 2 dropped packets (11, 14-15)	Monitoring page: RTPdrop:+3 Alarms & events: RTP Packet drop: 3
..., 10, 11, 15, 12, 14, 16, 18, 19, ... 2 dropped packets (13, 17) 1 out of order packets of order 3 (15 → 12)	Monitoring page: RTPdrop:+2 Monitoring page: RTPooo:+1 Monitoring page: RTPlag: 3 (at least) Alarms & events: RTP Packet drops: 2 Alarms & events: RTP out of order packets (lag:3)

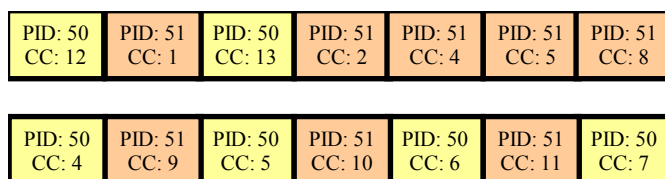
B.2 Default Multicast Monitoring

When the protocol mapping is nTS/UDP, meaning there is no RTP information in the multicast stream, there is no easy way to isolate and register network-induced errors. Assumptions can be done by performing continuity counter analysis for the content of each received UDP-frame on the fly. The probe will note CC-errors (**CCerr**) and generate corresponding alarms (**CC skips:N**).

Imagine the following MPEG-2 Transport Stream being generated by an encoder. The TS contains two PIDs (50 and 51) and the Continuity Counter (CC) values are continuous for each PID since there are no packets missing.



When the Transport Stream reaches our imaginary head-end some packets (those with red frame) have been lost (maybe due to a bad satellite connection). Our IP-Streamer packs 7 and 7 MPEG-2 TS packets into each UDP-frame (mapping is 7TS/UDP) and the resulting frames may look like:



...

The probe's response to this multicast is summarized in the following table:

Sequence	Effect
UDP packet #1 (7 MPEG2 TS packets): PID 50: 12, 13, 14, 15 PID 51: 1, 2, 4, 5, 8 PID 51 has 2 CC discontinuities of 2 (2 → 4) and 3 (5 → 8)	Monitoring page: CCerr:+2
UDP packet #2 (7 MPEG2 TS packets): PID 50: 4, 5, 6, 7 PID 51: 9, 10, 11 PID 50 has 1 CC discontinuity of 6 (13 → 4)	Monitoring page: CCerr:+1
If no more CC-errors for at least 1 second	Alarms & events: CC skips:9 discontinuities:3 Depending on the thresholds you may also get: MLR >= warning-threshold (9 >= 1)

There were 9 TS packets missing (with red frame) and the alarm reflects this.

B.3 Strategy for MediaWindow Analysis

This section provides further insight into MediaWindow analysis and suggests how the Ethernet threshold settings can be configured to maximize the usefulness of the MediaWindow graphs and alarms.

The MLR value is always calculated using the continuity counter inside the transport stream packets. Since the continuity counter is expected to increase by one for each packet of the same PID it is possible to detect missing TS packets by noting gaps in the continuity counters. Knowing that there are usually 7 transport stream packets inside one UDP packet you expect a continuity counter error of 7 if one UDP packet goes missing. This corresponds to an MLR value of 7. The range of the continuity counter is 4 bits meaning that if you are unlucky and lose exactly 16 packets for the same PID you will not be able to detect the packet loss at all. Losing 16 or more packets of the same PID is very rare and will only happen in networks with plenty of obvious problems.

Not all PIDs carry continuity counters. The null packets (PID 8191) and PIDs carrying PCR (program clock reference) do not carry continuity counters. This is the reason why losing one UDP packet does not necessarily result in an MLR of 7 but maybe 6 or even 5 (assuming the mapping is 7TS/UDP).

Systems typically do not mix the mappings among their streams so there is seldom a need to remember the mapping for streams in order to interpret the exact impact of MLR values.

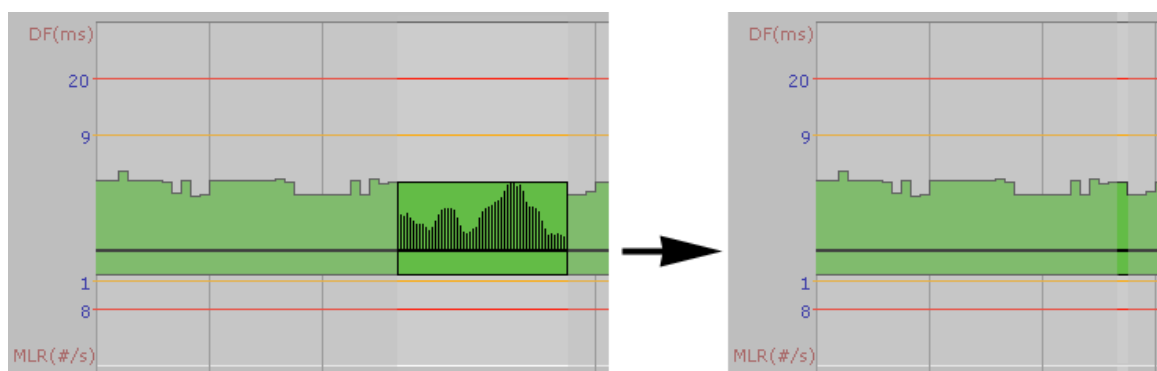
The range of the MediaWindow graphs can be configured by the user. Even when the graph is updated in “real-time” each bar in the graph will represent a large number of elementary measurements. For a 5Mbit/s stream there will be approximately 500 elementary measurements per second, assuming a mapping of 7 TS packets into each UDP-frame (i.e. there are approximately 500 UDP packets per second). An elementary measurement is generated for each interval between two neighboring UDP frames.

Within each update-interval only the extreme IAT and MLR values are displayed in the graph. For IAT the peak inter-arrival time over the measurement period represents the IAT for that period. For MLR the highest loss ratio within any second represents the MLR for that period.

When the range of the graph is set to larger intervals, even more elementary measurements are merged for each bar-interval.

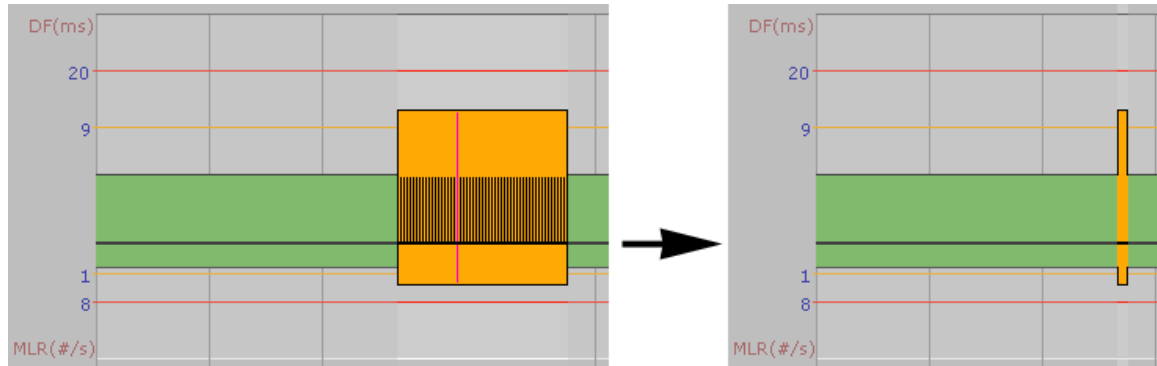
The rest of this discussion assumes the MediaWindow graph range is set to “running” since that lowers the probability that more packet losses occurred inside the same bar-interval.

The following figure shows how a large number of elementary measurements are represented by one bar in the graph.

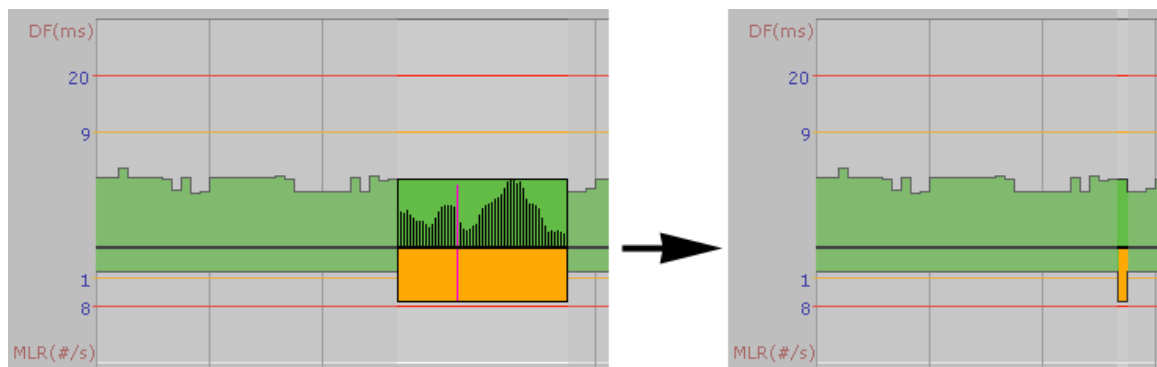


B.3.1 IAT Before and After Router

Packet-loss that occurs before or inside a router will usually not be visible since the queuing mechanism at the outgoing interface of the router will send out packets in an orderly fashion. If however the packet-loss did occur after the router (due to line noise for example) thus affect the timing between two neighboring packets – effectively doubling it – the packet loss will always affect the IAT component for CBR streams. For VBR streams, that are jittery by default, the extra time gap may have no effect since there may already be other larger gaps within the MediaWindow interval.



If a UDP packet goes missing after it has left the router it will visually affect both the IAT and MLR for CBR streams. The pink line represents one elementary measurement.

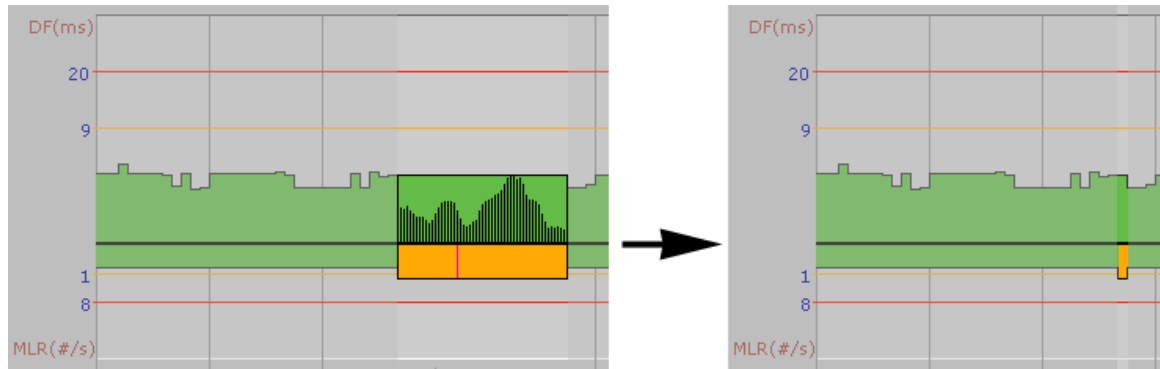


For VBR streams a similar packet-loss will not necessarily affect the IAT graph even if the time between two neighboring packets doubles. The pink line represents the IAT and MLR value measured for the missing packet.

B.3.2 Identifying UDP Packet Loss

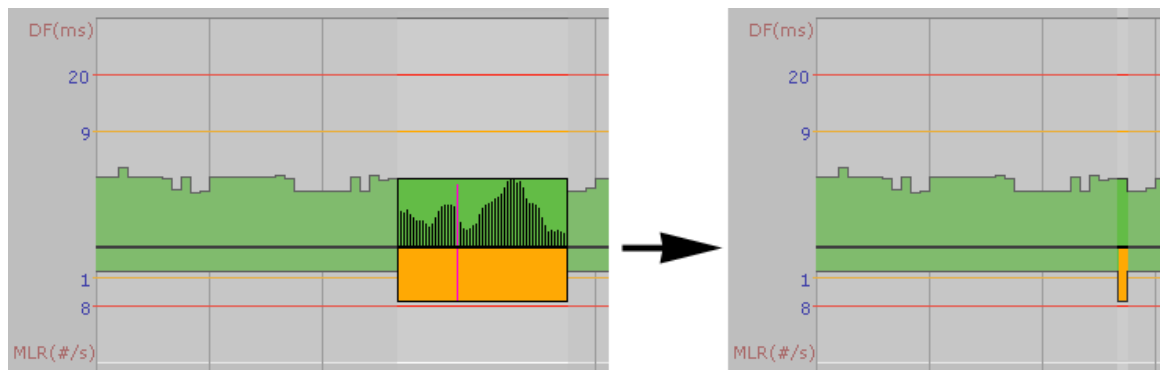
This discussion does not apply to streams with TS/RTP mapping since in that case identifying UDP packet loss is straight forward.

There is no fail-safe way to distinguish packet loss caused by dropping UDP packets from packet loss caused by dropping packets inside the TS layer. IP based networks will generally not introduce new errors in the TS layer. As soon as the TS layer is wrapped inside UDP packets all further processing operates on the UDP packets.



The pink line indicates a packet loss of 1-4 with no jitter component.

As a rule of thumb, the co-existence of small MLR readings (1-4) and no IAT readings can be assumed to have been caused by packet loss in the original TS data.



The pink line indicates a packet loss of 6 or 7 and a doubling of the jitter component.

A UDP packet-drop will usually show up in the MLR value as a multiple of the mapping value; for a mapping value of 7 TS packets into each UDP packet, the MLR component will be equal to 7, 14, 21 etc.

Slightly lower values such as 6, 13, and 20 can be expected if a missing UDP packet did contain one TS packet without continuity counter (i.e. a PCR packet with no payload).

As we have seen, there is no sure way to distinguish between UDP packet-loss and loss in the underlying TS packets. One way to deal with the situation is to have a probe doing zero readings close to the signal source before the network can introduce UDP packet loss.

B.4 Multicast Thresholds

It is useful to configure individual threshold settings for IAT for each stream unless they are fixed at the same bit-rate. Streams that are being monitored by several probes should have equal Ethernet thresholds configured on each probe to make it easy to compare measurements for a stream across several probes.

As a rule of thumb the IAT warning threshold could be set to 50% above the max IAT value observed over a considerable period of time, the last 24h or so. The IAT error threshold could be set a little below the maximum jitter the system can tolerate – usually limited by the STB jitter tolerance. STB manufacturers should be able to provide information about how much jitter they can handle. Setting the Ethernet warning-threshold too high results in a graph where almost all plots are close to the x-axis and it becomes less useful to visually compare MediaWindow graphs.

For streams with TS/UDP mapping the default MLR threshold is set so that errors are reported if the number of CC errors exceeds the number of TS packets in one UDP frame (assumed to be 7).

B.5 Content Thresholds

When enabling the various content analysis options in the **Content — Content thresh.**, a processing overhead is introduced. Some of the options introduce a relatively small performance overhead, whereas some may introduce a greater overhead. The overhead is also relative to the data that is being analyzed, performing picture analysis is heavier on a 4K UHD video stream than on an SD stream.

While picture analysis does not require every video frame to be decoded, enabling real-time audio analysis does require the entire audio stream to be decoded. MOS scoring is quite CPU intensive, and should only be enabled for the services where such scoring is required. Between the available QoE algorithms, the **Blockiness with text removal** algorithm is the heaviest of the three and depending on the amount of CPU available, it might not be possible to deploy MOS for as many services when using this algorithm compared to the other two.

The **Main — CPU usage** view contains a **Backlog** column that indicate the length of the content analysis queue for each of CPU core. As long as the backlog value is stable, the system should have enough resources to handle the configured load. If the value keeps increasing, try disabling content analysis for a few streams, or filter away PIDs that do not need to be analyzed in the content threshold.

The VB220-SW will raise a *Content analysis overloaded* system alarm if it detects that it is unable to keep up with the configured load. If the backlog numbers indicate that only a few CPU cores are overloaded, you can try redistributing the streams using the **Main — CPU usage — Advanced** view, or try to reduce the load, as described above.

If the load on the content analysis process becomes extremely high, it might start to drop incoming data that it is unable to process. If this happens, the VB220-SW will raise a *Data queue overflow (btvidana) – Thumbnailing and freeze-frame analysis paused, SCTE35 data may be lost* system alarm.

B.6 Dedicated interface for OTT

As a rule of thumb, you should never have OTT traffic on the same network as multicasts. This means that you should either use one Software Probe for multicast and one for OTT, or you should use different and dedicated interfaces for each.

The interface used for OTT traffic is controlled using the **Setup — Routing** view.

B.7 Monitoring HTTP Live Streaming (HLS)

In HLS, each profile is identified by its own playlist, whose URL is listed in the master playlist, which in turn is downloaded from the **Manifest URL** as configured in the channel configuration in the **OTT — Channels** view.

By default, the OTT profiles are identified by their URL. Some streaming systems generate profile URLs based on a session ID, and in some cases these session IDs are re-generated every time the master manifest is downloaded. In these cases, the OTT engine will see all profiles as new every round and is unable to retain any profile history. If this happens once, the event *All playlist URLs changed* is flagged, and if it happens repeatedly, the alarm *HLS playlist URLs unstable* will be raised on the channel.

In both cases, the recommendation is to enable the setting **Monitor HLS profile manifests only**. This will keep the downloaded master manifest in memory until the session times out (as indicated by the playlist URLs becoming unavailable), and will also change the way profiles are identified to instead use their position in the master manifest.

To avoid unwanted alarms about the session timing out, and gaps in the monitoring or Timeline, set the **Reset connection after** timeout value in the **OTT — Settings** view to a value shorter than the session timeout.

B.8 Monitoring RTMP and SHOUTcast

For RTMP and SHOUTcast, data is transmitted in real-time. To allow time for analysis, the Software Probe downloads data in chunks of ten seconds and then stops, which means that it cannot continuously monitor streams of these types. Since network access blocks the OTT engine, channels of these types should be assigned their own engine or at least not be mixed with channels of other types.

B.9 OTT descrambling with Verimatrix

If you are using a Verimatrix VCAS 3.7 server to encrypt your OTT stream, you can get the Software Probe to descramble the segments. It will use the same API to descramble the segments, as the encoder or segmenter uses to encrypt the segments. To achieve this, the Software Probe needs to be able to reach the VCAS server's private encoder interface.

Since the Software Probe only uses a single interface for OTT, your network needs to be configured so that the Software Probe can reach both the VCAS server and your origin server on the same interface.

B.10 OTT Bandwidth requirements

The recommended available bandwidth for full coverage OTT monitoring is equal to the sum of the profile bitrates monitored plus an estimated overhead of 20 % for manifests and IP, TCP and HTTP headers.

Note: The OTT engines will be using all available bandwidth on the interface in spikes while downloading the segments, this is the main reason why it is not a good idea to mix multicasts on the same interface, as it can cause packet drops which multicasts cannot handle.

C Appendix: OTT Profile Health

C.1 OTT Profile Health Bar

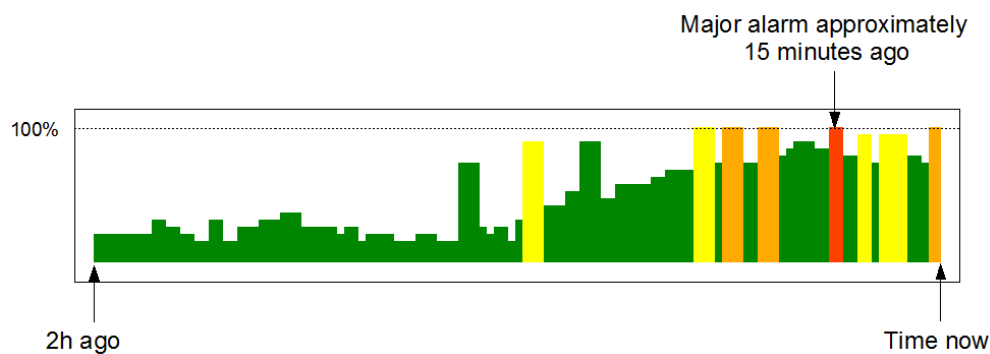


The profile health bar displayed at channel level shows an overview of current status for individual channel profiles. Different colors indicate status:

- Green: OK
- Yellow: Warning
- Orange: Error
- Red: Major
- Black/Dark red: Fatal

All enabled alarms may affect the profile health bar, and alarm severities can be assigned to each alarm in the **Alarms — Alarm setup** view.

C.2 OTT Profile Health Timeline



The OTT profile health timeline shows information about channel bitrate and channel alarm status for the last two hours, with a time resolution of one minute. Green parts of the timeline indicate profile download time versus segment length. The graph is scaled so that 100% indicates a segment download time identical to segment length (in seconds), segment length being signaled in the profile

manifest. Quick segment download times therefore result in a 'low' green graph, as seen in the left hand part of the graph above. When download times exceed the user-defined profile bitrate warning and error thresholds the graph is colored yellow and orange respectively.

In addition to profile bitrate indication the graph displays profile status information related to non-bitrate alarms. Active profile alarms are represented in the graph as 100% bars, the color reflecting the severity of the alarm. If several alarms are active within a one minute period the graph color will reflect the most severe alarm. Historical alarms can be examined in more detail by viewing the OTT alarm list.

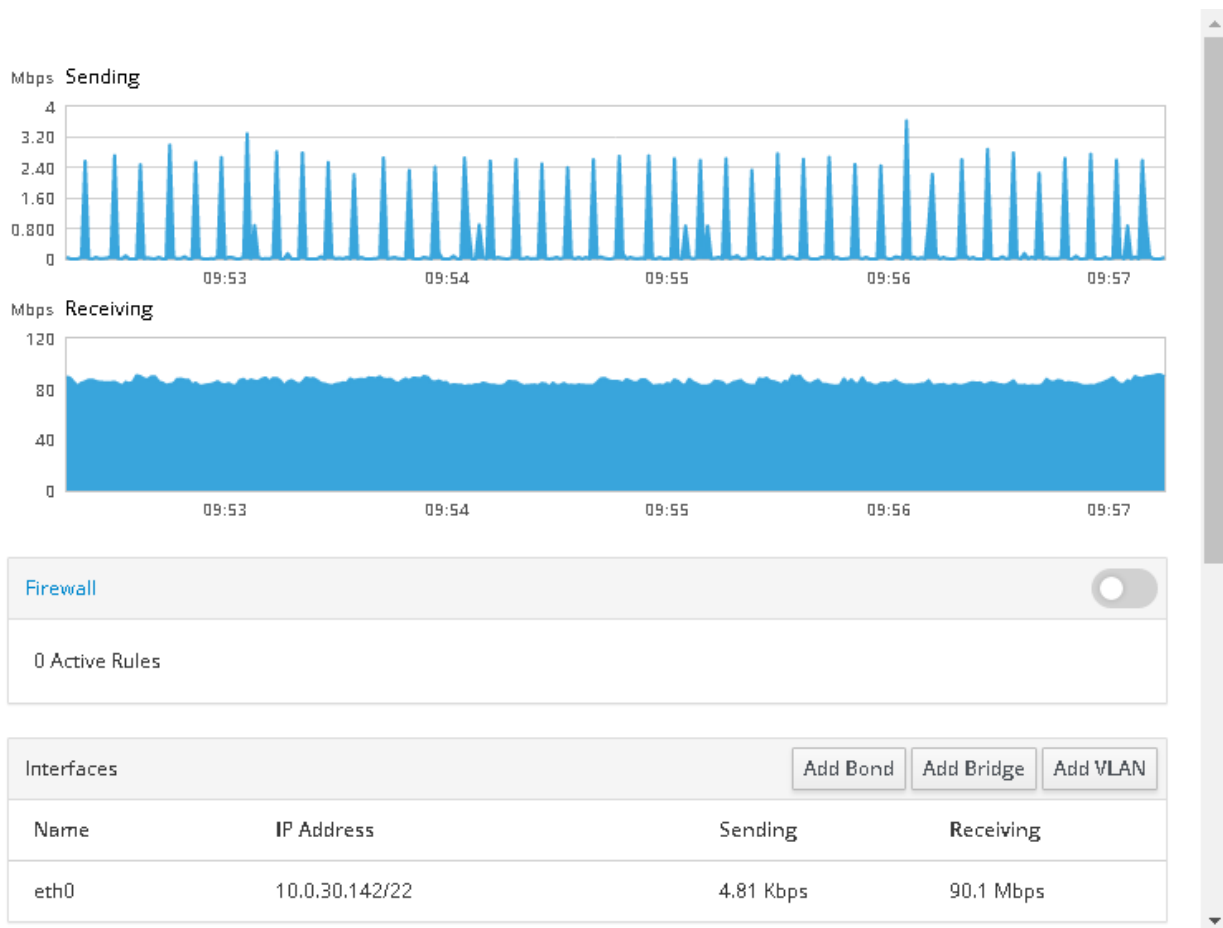
D Appendix: Network configuration

D.1 Web-based configuration

The system ships with a web-based network configuration module. If you are unable to access the system using the web interface, you will need to use the system console. Please see section D.2 for details on how to use the command-line based configuration tool from the console.

To access the web-based configuration module, open the Cockpit administrative interface, as described in section 3.4. The Cockpit administrative interface uses the same log-in credentials as the system accounts.

Click on the **Network** heading to open the network configuration.



For more information on how use Cockpit, please refer to the Cockpit documentation¹.

¹<https://cockpit-project.org/documentation.html>

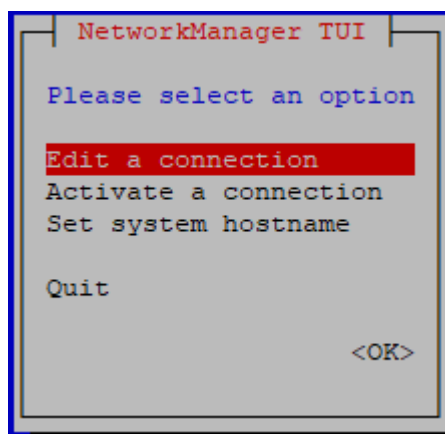
If you make changes here that causes you to lose web access to the server, you may need to use the command-line tools as described below.

D.2 Command-line based configuration

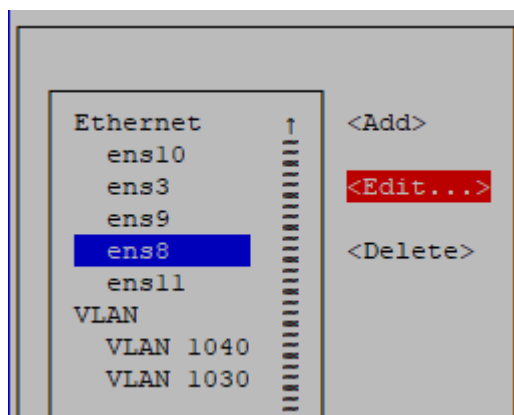
Changes to network configuration, adding new interface devices and VLANs can be done with the **nmtui** tool. Simply type **sudo nmtui** whilst logged into the server command shell². Navigate the nmtui menus using the cursor (arrow) keys and Enter to select.

Editing Network interface configuration

To edit a connection first select **Edit a connection** from the nmtui menu:

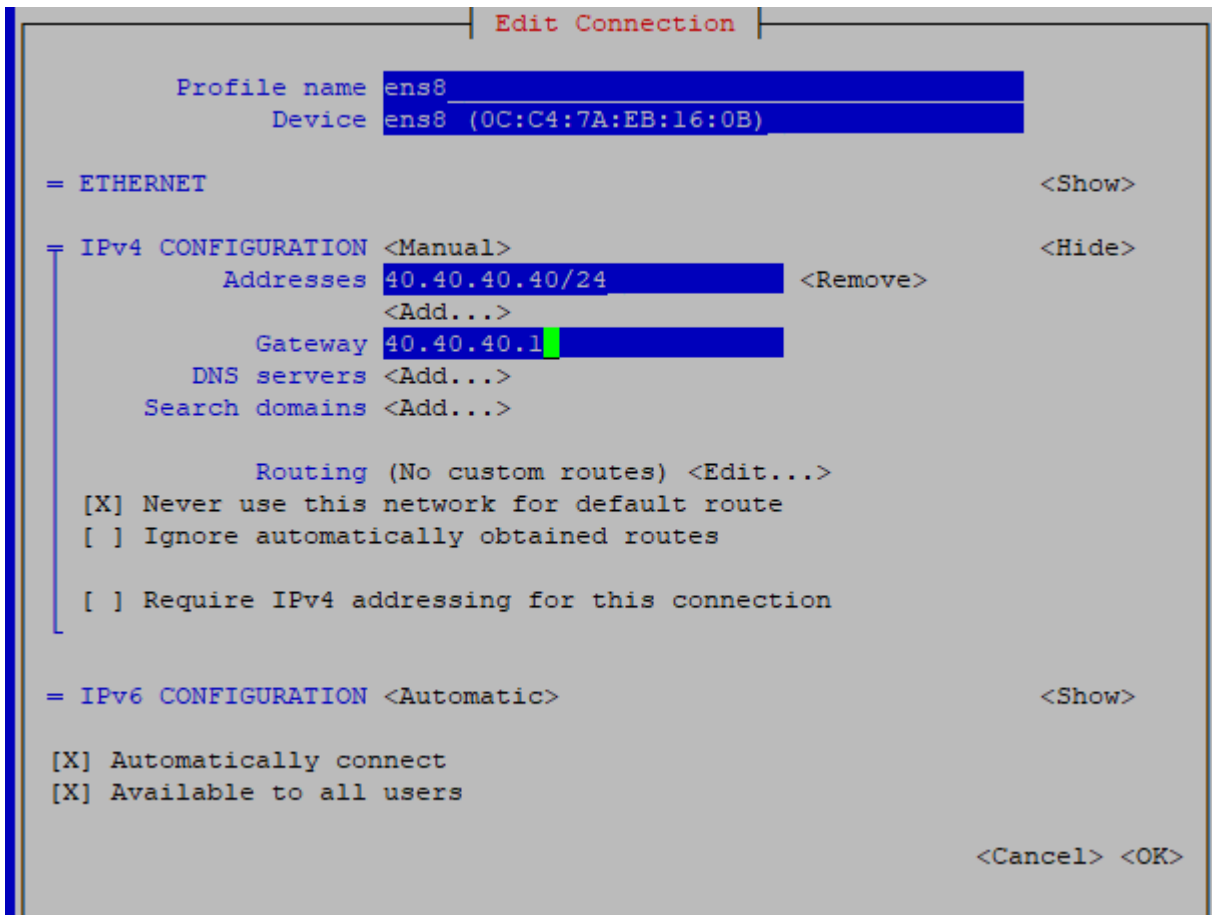


Select the interface to be edited and then select **Edit...** from the menu.



²If the **nmtui** tool is not available on your system, you can install it by issuing the command **sudo apt install network-manager**

Make the necessary changes to IPv4 and IPv6 configuration.



Selecting **Automatically connect** will ensure the interface is connected next time the system boots.

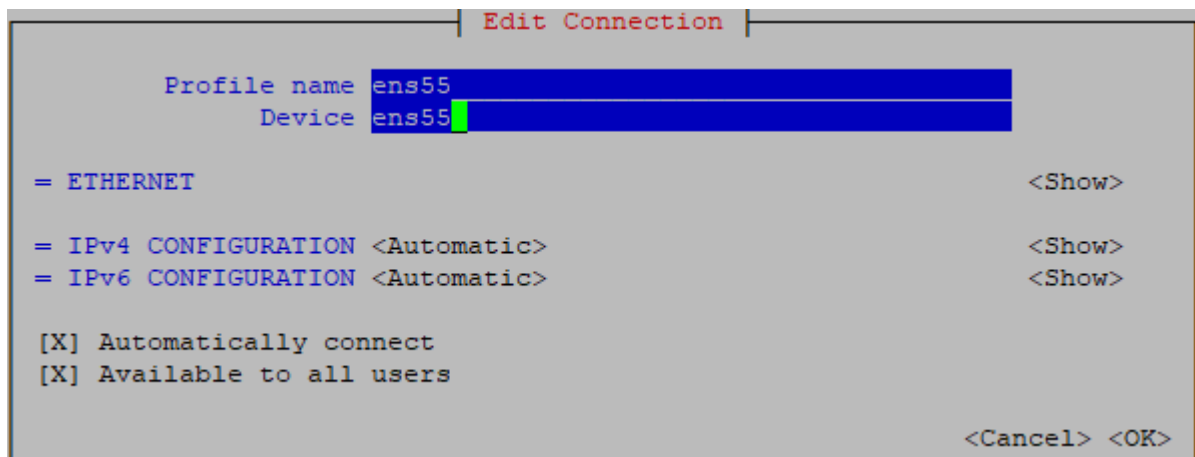
Sometimes it is desirable to select **Never use this interface for default route**, particularly if additional interfaces are only used for monitoring multicast traffic or when setting up a native interface for adding VLANs.

After making changes select **OK** to return the previous menu. Generally, network configuration changes will take effect the next time the interface is activated. This can be done by deactivating and reactivating the interface from the **Activate a connection** menu in nmtui or with the command line **ifdown ifname** followed by **ifup ifname**.

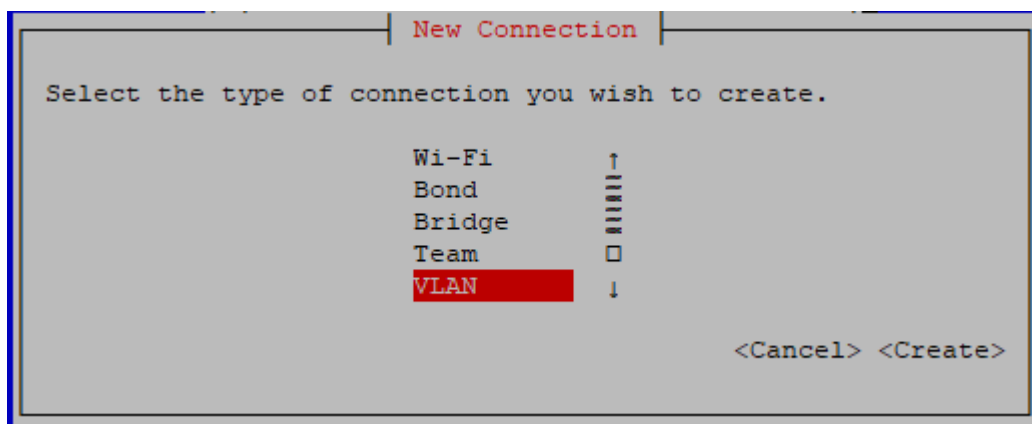
Adding new and VLAN interfaces

To add a new interface, in the nmtui main menu select **Edit a connection** followed by **Add** and select the interface type from the menu. Typically this is **Ethernet** but may also be used to create VLAN interfaces. Advanced configurations such as Bond and Bridge may be selected if they are required.

To find the system assigned name for a newly added hardware device use the command line **ifconfig** or search in the output of the **dmesg** tool. It can be helpful to keep the nmtui **Profile name** for the device the same as the device name itself, for example:



To add a VLAN interface from nmtui main menu select **Edit a connection** followed by **Add**. Scroll to the bottom of the list and select VLAN:



Edit the settings for the VLAN interface. The Device field should contain the name of the physical interface to be used for this VLAN and the VLAN number, for example `ens8.1040` means VLAN `1040` on interface `ens8`. The parent and VLAN ID fields should correspond to the values in the name field. In our example `ens8` is the parent and `1040` is the VLAN. Other settings are the same as for normal IPv4/6 interfaces.

Edit Connection

Profile name VLAN 1040
 Device ens8.1040

= VLAN <Hide>
 Parent ens8
 VLAN id 1040
 Cloned MAC address
 MTU (default)

= IPv4 CONFIGURATION <Manual> <Hide>
 Addresses 10.0.40.163/24 <Remove>
<Add...>
 Gateway
 DNS servers <Add...>
 Search domains <Add...>
 Routing (No custom routes) <Edit...>
☒ Never use this network for default route
☐ Ignore automatically obtained routes
☐ Require IPv4 addressing for this connection

= IPv6 CONFIGURATION <Automatic> <Show>
☒ Automatically connect
☒ Available to all users

<Cancel>
<OK>

After entering the configuration for the VLAN interface select **OK** to return the previous menu, then select **Back** and finally **Activate a connection** to activate the newly created VLAN interface.

D.3 Further reading

For more documentation, please refer to the *Introduction to networking*³.

³<https://ubuntu.com/server/docs/introduction-to-networking>

E Appendix: Enabling NTP time synchronization

It is strongly recommended that the server running the Software Probe be synchronized against an external NTP server.

If not set up correctly, alarms may be displayed with incorrect timestamps and out of alignment with other monitoring devices in the system.

NTP synchronization against public servers on the Internet is usually enabled automatically if they were detected during the operating system installation. It is possible to change the servers to use, for instance to set it to use a local NTP server, by changing the configuration in the file `/etc/chrony.conf` manually.

Setting the VBC IP address in the **Setup — Routing** view will automatically add it as a time synchronization source.

For more details on how to configure Chrony, please refer to *How to serve the Network Time Protocol with Chrony*¹.

¹<https://ubuntu.com/server/docs/how-to-serve-the-network-time-protocol-with-chrony>

F Appendix: SRT Streams

F.1 Introduction

F.1.1 Overview

SRT is a user-level transport protocol that ensures *secure, reliable transport* of video and audio across multiple unstable network connections. With the UDP data transfer protocol at its base, SRT introduces several enhancements such as end-to-end encrypted data packets (using AES), improved congestion control and efficient packet loss recovery.

F.1.2 Reception

The probe currently supports receiving up to 200 concurrent SRT streams. SRT reception is configured by editing a stream in the **Multicasts — Streams** Edit view and providing the necessary SRT parameters. In this manner the received SRT stream is turned into a stream for TS monitoring. More details are provided in section 6.4.8.

The probe can use the SRT protocol to receive streams in three modes of operation:

- **Caller:** the probe sends the connection request to the peer, which must be listener, and this way it initiates the connection.
- **Listener:** the probe waits to be contacted by any peer caller.
- **Rendezvous:** both parties are equivalent and both the probe and the peer attempt to initiate a connection simultaneously. Whichever party happens to start first (or succeeds in punching through the firewall first) is considered to have initiated the connection.

When using the probe in **Listener** mode it is mandatory to specify:

- **Port:** local port to listen for connections on

The **Host** field is ignored in **Listener** mode.

When using the probe in **Caller** or **Rendezvous** mode it is mandatory to specify:

- **Host:** remote IP address to connect to
- **Port:** remote port to connect to

All modes of operation may be encrypted and therefore accept a passphrase to decrypt the stream.

In all modes of operation the probe utilizes the network interface the stream is “joined” on, specified in the **General** tab in the **Multicasts — Streams** Edit view.

F.1.3 Transmission

The probe supports relaying up to two streams using **RDP (Return Data Path)**, and these may be transmitted using the SRT protocol. SRT transmission is configured in the **RDP — Setup** view.

When mode *Relay over IP* is selected, *Encapsulation* can be set to *SRT*.

Encapsulation can be set to *SRT* when the *Relay over IP* mode is selected. It is then possible to specify these SRT Transmit options:

- **Mode:** The SRT mode of operation utilized to transmit.
- **Passphrase:** passphrase to encrypt the forwarded stream. Must be between 10 and 79 characters long.
- **The latency value insisted upon by the sender side as a minimum value for the receiver.** Minimum 120ms.

The probe can use the SRT protocol to transmit streams in three modes of operation:

- **Caller:** the probe sends the connection request to the peer, which must be listener, and this way it initiates the connection.
- **Listener:** the probe waits to be contacted by any peer caller.
- **Rendezvous:** both parties are equivalent and both the probe and the peer attempt to initiate a connection simultaneously. Whichever party happens to start first (or succeeds in punching through the firewall first) is considered to have initiated the connection.

In all modes of operation the probe utilizes the network interface the stream is “relayed” over, specified by the *Relay via interface* configuration option in the RDP Setup page.

The current version of the SRT implementation is based on version 1.5.3 of the Haivision reference implementation.

G Appendix: On-line License Activation

G.1 Introduction

The Software Probe uses licenses which are activated and updated periodically over the Internet, without the need for human intervention. The license is only tied to the VB220-SW when it is used and is periodically renewed. To transfer the software to a new host, the license can simply be released from the software and applied to an instance running on a different server.

Please make sure you have the license key available before you release the license, as you must enter it again on the system you wish to transfer the license to. The license key is *not* displayed in the VB220-SW user interface.

If you have lost the license key, contact your dealer to retrieve it. Make sure you include all details from the **About — License** view in your request.

When the Software Probe sends the on-license activation over the Internet, it includes some basic information to verify the Software Probe. This includes a basic hardware footprint, as well as parts of the SNMP identification data configured in the **Setup — Params** view.

G.2 Requirements

The VB220-SW needs to be able to contact the license server either directly or via a proxy server, as described below. If proxy connectivity also is not available, an off-line activation procedure is available as well.

The VB220-SW must also be configured with a correct date and time. Please refer to E Appendix: Enabling NTP time synchronization for more information on configuring time synchronization.

Direct access to activation server

To activate the license automatically, the VB220-SW needs to be configured with a valid DNS server address (see D Appendix: Network configuration) which is able to look up the host name `license.microanalytics.org`. The VB220-SW needs to be able to contact the host this name resolves to using HTTPS on port 443.

Using the VBC server as a proxy

When installing the VBC software to a server, a proxy is automatically configured to allow its connected blades to connect to (and only to) the licensing system as described in the previous section.

When the VB220-SW has been configured with the address to the VBC server in the **Setup — Routing** view, the VB220-SW will automatically attempt to use this proxy if a direct connection fails.

Using an arbitrary proxy server

The Software Probe can be configured to use an arbitrary proxy server to connect to the licensing server. By adding the URL to a proxy server in the **Setup — Security — Ports** view, the VB220-SW will automatically attempt to use this proxy if a direct connection fails.

Off-line activation procedure

If the VB220-SW network is completely disconnected from the Internet, it is still possible to activate the license using the off-line activation procedure. When using this, the license will be tied to the system and will not be transferable to another server. The off-line activation procedure needs to be repeated whenever there is a need to have the license feature set upgraded, or when the software maintenance license needs to be extended, typically in connection with software upgrades across major versions. If the activated VB220-SW license is not **Permanent** – which is typically the case in cloud deployments or in pure software installations – the off-line activation procedure has to be repeated a minimum of once per year.

Click the **Renew license off-line** button to start the off-line activation procedure.

Renew license off-line

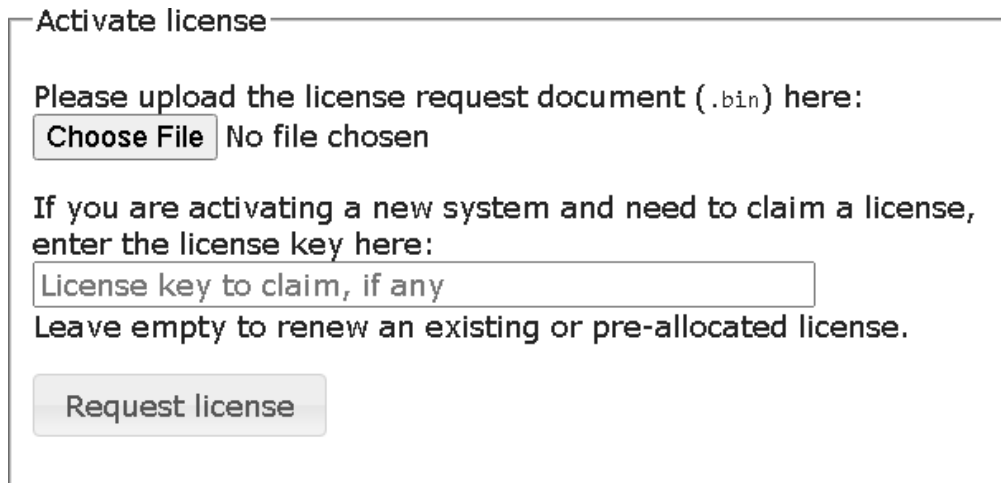
Perform the following steps to renew the license:
 1. Please verify that the system time is set correctly (time is now 2020-11-02 14:37:30 UTC).
 2. [Download the license request document to your computer.](#)
 3. Upload the license request document to the license activation interface by visiting <https://license.microanalytics.org/offline>
 4. Upload the license document received from the license activation interface:

Ingen fil har valts

Please note: If the system is restarted prior to completing step 4, you must start over from step 2.

Follow the steps described in the dialog to renew or activate the license. To abort the procedure, click the **License details** button to return to the previous screen.

First, download the license request document from the Software Probe to the computer you are browsing from. Once the file has been downloaded, connect the computer to the Internet if not already connected, and open the link to the off-line license manager¹.



Select the .bin file that was downloaded in the first step, and optionally add a license key if the system you are activating did not already have a license attached. Once done, click the **Request license** button and save the license document file to the computer.

If needed, re-connect to the VB220-SW network, return to the **Renew license off-line** view, select the .pem file that was generated by the license manager and press **Go!**

The license should now be added to the system. If this is a new or different license, the software will restart. Use the **License details** view to verify that the license was applied correctly.

¹<https://license.microanalytics.org/offline>

H Appendix: Software Maintenance

Purchasing yearly software maintenance enables future feature protection and guarantees access to the latest software for the Software Probe.

The software maintenance can be purchased for a two or four year period, typically initially purchased together with the system itself, during which new major releases can be installed.

The current software maintenance period is displayed in the **About — License** view, see chapter 6.15.2 for more details. For an overview of software maintenance periods for multiple units, please refer to the **Equipment** view on the VideoBRIDGE Controller server.

Use the **Data — Software** view to update the VB220-SW software, please refer to chapter 6.14.2. While this procedure should only allow upgrades allowed by the currently activated software maintenance license, it is possible to do a manual upgrade to such a version. If the new software version detects that it is not properly licensed, the Software Probe starts in unlicensed mode.

I Appendix: Software Upload

The process of performing a software upload to the probe involves the following steps:

1. Obtain the software image.
2. Export and save the probe configuration.
3. Transfer the image to the probe using the software upload functionality in the **Data — Software** view or by using ssh, and save the new software image on the system.
4. Wait while the software is being saved.
5. Verify the new image.

I.1 Obtain the software image

The image will have a **.tea** extension and is distributed in a compressed ZIP archive together with the readme file detailing changes for this patch release.

Please study the **readme** file to be aware of any important information related to your current software patch. Subsequent patch details may indicate that significant bugs were identified and resolved after your current version and indicate where special care is recommended.

You can find the current version number under **About — Release**.

When upgrading to a new major version, please also study the release notes and **readme** files for all versions between your currently installed major version and the one you are upgrading to, as there might be important changes that you need to be aware of.

If you require any assistance understanding the release notes or readme files please contact your first line support service.

If you would rather re-install the system from scratch instead of using the upgrade procedure, please refer to chapter 3.

I.2 Export and save the probe configuration

Software upgrade should not alter the probe configuration, however for safety is a good idea to export the probe configuration (from the **Data — Configuration** view) and save it to a file. Please refer to chapter 6.14.1.

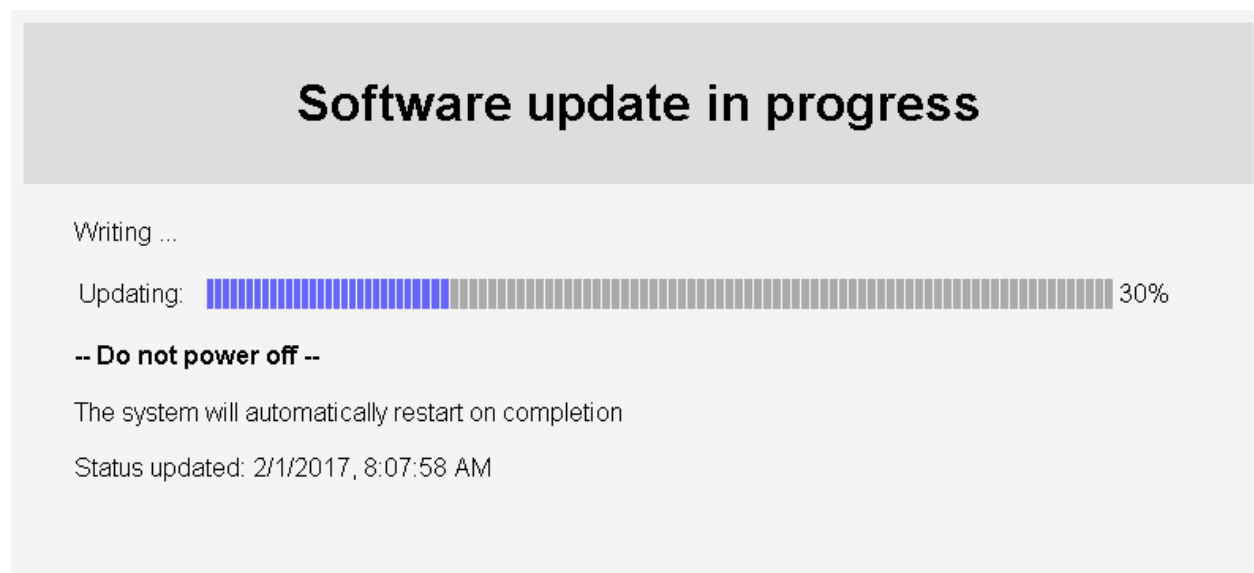
I.3 Transfer the image to the probe and save

Using the software upload functionality in the Data view

From the **Data — Software** view select the software image file to be uploaded and click the **Go!** button. When the software has been successfully transferred to the probe click the **Update software** button and confirm.



Progress bars are displayed to show the software update status.



Note that the probe will restart when the new software has been installed, and the probe's user interface will be unresponsive until restart has completed.

Using scp/sftp and ssh

Using a Secure Shell (ssh) client, such as PuTTY¹, first transfer (scp/sftp) the software image to the system.

Next, log in to the system shell to get a command prompt. If you copied the file as the same user you are logging in as, the file should be in the directory you just logged in to. If not, navigate to the directory you uploaded to using the **cd** command.

Copy the downloaded file to the `/var/opt/btech/probe` directory and issue the command `/opt/btech/probe/bin/vprobe_upgrade` to begin the upgrade procedure.

```
cd /path/to/download
sudo cp filename.tea /var/opt/btech/probe
sudo /opt/btech/probe/bin/vprobe_upgrade
```

I.4 Wait while the software is being saved

This will take a few minutes. The probe software will then restart automatically. The probe should state that the software image has been saved successfully.

When using the alternate method do not disconnect the ssh session before the software upgrade is completed.

I.5 Verify the new image

Connect a browser towards the probe and verify the version and build time in the **About — Release info** view.

I.6 Software upload troubleshooting

If the upgrade is rejected, verify that the software version you are trying to upload is covered by software maintenance. Refer to H Appendix: Software Maintenance for more details.

If the system running the probe is not connected to the internet, the software upload progress may in some cases be blocked by the PackageKit software trying to refresh its software package database. If this happens, it is recommended to disable the internet-based package repositories.

To make it possible for the system to receive security and bug fix updates, it is in this case recommended to replace these internet-based package repositories with locally hosted mirrors and update the configuration accordingly. Use the **Software Updates** view in the Cockpit administrative interface.

If the web interface does not appear to work correctly straight after upgrading the probe it may be because the web browser is using files that are cached. Files may be cached for up to one hour in the web browser. To fix the issue, clear the cache manually:

¹<https://www.chiark.greenend.org.uk/~sgtatham/putty/>

Google Chrome: Settings — Privacy and security — Delete browsing data — Cached images and files

Mozilla Firefox: Settings — Privacy & Security — Cookies and Site Data — Clear Data — Temporary cached files and pages

Microsoft Edge: Settings — Privacy, search and services — Clear browsing data — Choose what to clear — Cached images and files

Note that the probe configuration may be lost when downgrading to an older software version. In this case the saved configuration file may be useful.

A log file from the last upgrade process is included in the debug data, which can be downloaded from the **Data — Configuration** view. If you are unable to access the GUI after the upgrade, you can inspect the log file manually by logging in to the system and opening the file `/opt/btech/probe/log/upgrade.log` manually.