R&S®TSStream
Multi-TS Streaming Software
Manual

ROHDE&SCHWARZ

The manual describes the following R&S®Multi-TS Streaming Software.

● 2116.8945.02

The following abbreviations are used throughout this manual:

R&S®XYZ is abbreviated as R&S XYZ

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1 Range of Functions

The R&S Multi-TS Streaming Software plays out a large number of MPEG-2 transport streams via an IP network interface in seamless loop simultaneously.

One typical application is the provision of input feed for the multi-channel TV signal generators R&S CLG or R&S SLG of Rohde & Schwarz. Furthermore, testing of IPTV-equipment is addressed.

2 Getting Started

2.1 System Requirements

For details refer to the release notes.

2.2 Installation Instructions

For details refer to the release notes.

2.3 Licensing

From version 1.05, R&S Multi-TS Streaming Software is free software. No licensing is required.

3 Graphical User Interface

The installation instructions are provided in the release notes.

The graphical user interface consists of two views, which are described in the following sections.

3.1 Configuration View

This is the startup view of the R&S Multi-TS Streaming Software, allowing the configuration and management of the individual transport stream files to be played out.

Fig. 1: Configuration view

3.1.1 Configuration management

Use the buttons to save or load the settings done in this view.

3.1.2 Stream configuration table

One table row refers to one output stream and consists of the following columns:

- Selection
  Use the checkbox to select/deselect the row. Row selection affects transport stream file assignment and deletion of rows (both see below).

- Alias
  This user-defined text will uniquely represent the row's output stream settings (TS file and destination port) in the streaming view (3.2.1).

- TS (transport stream) File
  Click on this cell to assign the desired transport stream file to the row's destination port.

  If more than one row has been selected before, then a multi-file selection dialog will be shown. Selecting then fewer files than rows previously will assign the files to more than one row. (E.g. selecting all rows but only one file is the quickest way of assigning this file to all rows.)

  Selecting more than one row will also activate "Drag and Drop" functionality. Instead of the multi-file selection dialog, file(s) can then also be directly dragged from the Windows Explorer into the stream configuration table.

- Destination Port
  The UDP destination port for the row's stream.

- Status
  This column cannot be edited. It is used to display row specific status information after streaming start has been initiated (3.1.5).

3.1.3 Stream configuration table controls

- Import from R&S CLG / R&S SLG
  This feature analyzes an R&S CLG / R&S SLG configuration file to extract all active UDP destination ports, which thus have to be fed with content. In addition, the related RF modulation frequency is taken as the related row alias for quick identification.

- Add row
  Adds a row at the bottom of the stream configuration table.

- Delete selected rows
  Deletes all rows which previously have been selected in the stream configuration table.

- Select all
  Selects all rows in the stream configuration table.

- Deselect all
  Deselects all rows in the stream configuration table.

3.1.4 RAM usage preview

In order to achieve reliably high output stream data rates, all transport stream files selected in the stream configuration table are loaded to RAM before streaming finally starts. Assigning the same transport stream file to multiple table rows will not require additional RAM, since this resource will be shared between all affected output streams.

This real-time RAM usage preview allows already during configuration to check, how much system memory is required for the current transport stream file assignment, and how much is still available for further assignments:

- The white figure shows the currently required absolute amount of Mbytes.

- The green bar shows the percentage of the white figure compared to the currently available RAM.
  This currently available RAM figure is always 500 Mbytes lower than the physically free RAM to keep a reserve for long-term system operation stability.

- A red warning border will show up, if the current transport stream file assignment exceeds the available RAM.

3.1.5 Streaming control

This area consists of two items:

- Destination IP
  Defines the destination IP address for all entries of the stream configuration table.

- Start streaming button
  Before the software switches to the streaming view (3.2), the following preparation procedure is run for every row in the stream configuration table:

    o The related transport stream input file is cached into RAM.

    o Subsequently, the timings of this input stream are analyzed to determine play out data rate and restamping positions for seamless looping.

    o The progress can be tracked in the related status column.

    o In case the remaining available RAM is not sufficient or the analysis cannot sync on the transport stream input file format, these errors will also be reported in the status column.

3.2 Streaming View

This view is being switched to after a successful streaming start initiated by the streaming control (3.1.5).


Fig. 2: Streaming view

3.2.1 Stream status monitor matrix

The purpose of this matrix is to provide an overview about the complete streaming status at a glance. For each output stream, the following information is provided:

1. Seamless loop mode:

   = Seamless Continuity Counter and PCR/PTS/DTS timestamps.

   = Seamless Continuity Counter only because of encrypted elementary streams.

2. Alias, to quickly identify the output stream.

3. Current position within transport stream and data rate.
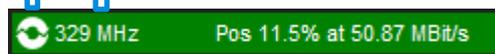
Further details are provided by a tooltip:

- First line: [Alias]=>[UDP destination port] @ [Data rate] ([Loop time]).

- Second line: Transport stream input file.

- Further lines: List of packet PIDs in hexadecimal and decimal notation, for which seamless PCR/PTS/DTS restamping is applied.
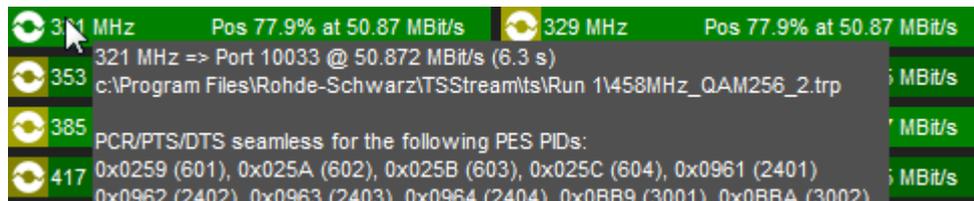
Fig. 3: Tooltip in streaming view

3.2.2 Thread load monitor

This graph shows the load of the individual streaming threads over the last 60 seconds. This information can be used to quickly check the PC performance being sufficient enough to process an error-free IP stream output.
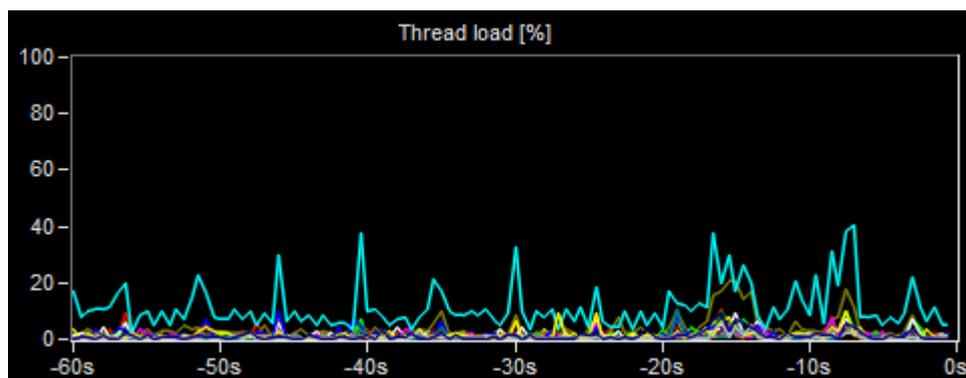
Fig. 4: Thread load monitor

If e.g. a scheduled background process like antivirus or defragmentation tool is unintendedly getting active and taking too much performance, this effect will be clearly and immediately get visible in this view.

For a reliable IP stream output, it is recommended to run a configuration, which does not drive the thread load above 50% on average to keep enough reserves for performance peaks.

In case of thread loads exceeding 50%, either upgrade to a processor with higher performance or reduce the total IP output data rate by either reducing the data rate per streams or the number of streams.

3.2.3 Output data rate monitor

Supportive to the thread load monitor (3.2.2) this view also confirms correct system operation and stream output quality by tracking the total stream output data rate over the last 60 seconds.
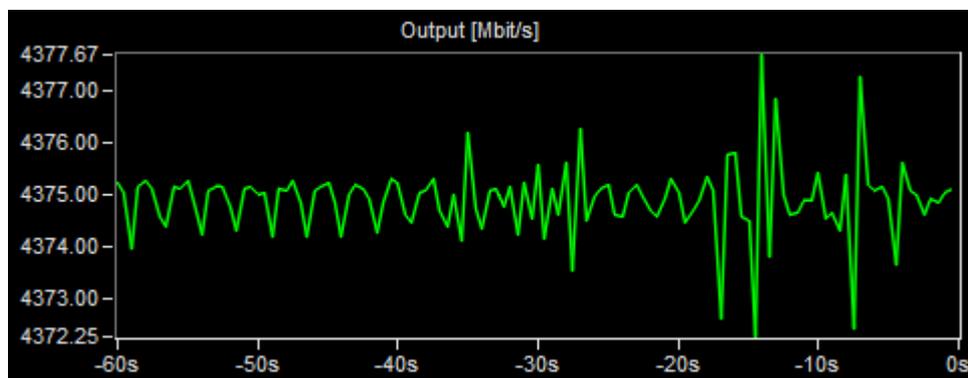

Fig. 5: Output data rate monitor

Due to the y-axis auto-scaling mode, the data rate precision can be quickly rated by evaluating the min/max values.

3.2.4 Streaming control

This area shows the streaming destination IP address and provides the button to stop streaming.

4 Troubleshooting

4.1 Configuration

PCR information not found error

The format of the related transport stream input file is not supported.
Common reasons are:

- The MPEG-2 packet length is not 188 bytes, 204 bytes or 208 bytes.

- The transport stream does not contain any elementary stream with valid PCR timestamps.

- The transport stream file content is encrypted. The R&S Multi-TS Streaming Software does not support decryption.

4.2 Streaming

4.2.1 General

No IP packet reaches the streaming destination

Check cabling, firewall settings, target IP address and subnet mask.

The streaming screen indicates errors and/or the thread load reaches 100%

The average available computer performance does not seem to be sufficient. Refer to chapter 3.2.2 for more details.

4.2.2 Operation with R&S CLG / R&S SLG

Less PCR accuracy

The R&S CLG does not perform PCR correction and this may result in PCR irregularities. These irregularities can be minimized by feeding the R&S CLG a pre-corrected data stream near the maximum data rate. There would still likely be some PCR mismatch due to differences between the source clock and the R&S CLG clock, and occasional null packet insertion.

Loss of transport stream packets

This happens, when the transport stream data rate exceeds the capacity of the targeted channel. Either select a transport stream file with a lower data rate or increase the channel capacity by adjusting the instrument's modulation parameters (e.g. increase symbol rate).