Multi-TS Streaming Software Application Note



Products:

- I R&S[®]CLG I R&S[®]CLGD
- I R&S[®]SLG I R&S[®]SFD

The R&S[®]TSStream multi-TS streaming software streams a number of MPEG transport stream files simultaneously over a single IP interface. The individual transport streams result in a high overall bit rate. To make the streams available on a standard PC, the R&S[®]TSStream software does not play the transport stream files directly from the hard disk but first loads them into the RAM. The maximum number and length of the transport streams depends solely on the PC's available RAM.

This software has previously been sold as product R&S[®]TSStream and is now freely available as application note.

Note:

Please find the most up-to-date document on our homepage www.rohde-schwarz.com.

This document is complemented by software. The software may be updated even if the version of the document remains unchanged.

Application Note Thomas Lechner 1.2017 – 1e



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1 Description

1.1 Overview

The R&S®TSStream multi-TS streaming software streams a number of MPEG transport stream files simultaneously over a single IP interface. The individual transport streams result in a high overall bit rate. To make the streams available on a standard PC, the R&S[®]TSStream software does not play the transport stream files directly from the hard disk but first loads them into the RAM. The maximum number and length of the transport streams depends solely on the PC's available RAM. For uninterrupted operation, TV receivers require a continuous signal. This is why R&S[®]TSStream plays out all transport stream files at the MPEG level in a seamless loop. The PCR, PTS, DTS and continuity counter parameters are continuously restamped. When a transport stream file contains a seamless elementary stream, the receiver even delivers an interruption-free video and audio signal. R&S®TSStream is especially suitable for feeding data into the R&S[®]CLG cable load generator, R&S[®]CLGD cable load generator DOCSIS and R&S[®]SLG satellite load generator. This makes it possible to reproducibly simulate real-world cable TV network configurations and satellite transponder assignments in the lab. R&S[®]TSStream can also be used as a signal source to test IPTV equipment.

R&S[®]TSStream features an intuitive graphical user interface. Status, memory occupancy and processor load are continuously displayed. Drag & drop operation makes it easier to work with a large number of transport streams. A special feature is the import function for configuration files from the R&S[®]CLG and R&S[®]SLG, which quickly and easily adopts these instruments' settings in R&S[®]TSStream.

1.2 Key facts

- I Total streaming bit rate ≥ 5 Gbit/s
- More than 128 transport streams simultaneously
- I All MPEG transport stream formats

1.3 Benefits and key features

1.3.1 Streaming of multiple MPEG transport streams over IP

- Feeding of data into the R&S[®]CLG, R&S[®]CLGD, R&S[®]SFD and the R&S[®]SLG
- I Simulation of real-world network configurations in the lab
- I Testing and stress testing of IPTV equipment

1.3.2 Seamless playout at the MPEG level

- I Interruption-free receiver operation by restamping PCR, PTS, DTS and continuity counter in all transport streams
- I Channel scan function test using transport streams with NIT
- Service-level receiver tests using transport streams with continuous elementary stream

1.3.3 Convenient operation thanks to straightforward graphical user interface

- I Overview of current transport stream status, total streaming bit rate, memory occupancy and processor load
- I Intuitive drag & drop operation
- I Import of R&S[®]CLG/R&S[®]SLG configuration files

Lo	ad Sav	e		Destination IP Stre
	Alias	TS File	Destination Port	Status
5	057 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\057 MHz.trp	10000	
1	065 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\065 MHz.trp	10001	
8	073 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\073 MHz.trp	10002	
5	081 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\081 MHz.trp	10003	
5	089 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\089 MHz.trp	10004	
7	097 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\097 MHz.trp	10005	
2	105 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\105 MHz.trp	10006	
2	113 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\113 MHz.trp	10007	
3	121 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\121 MHz.trp	10008	
5	129 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\129 MHz.trp	10009	
3	137 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\137 MHz.trp	10010	
2	145 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\145 MHz.trp	10011	
2	153 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\153 MHz.trp	10012	
2	161 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\161 MHz.trp	10013	
2	169 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\169 MHz.trp	10014	
5	177 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\177 MHz.trp	10015	
5	185 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\185 MHz.trp	10016	
2	193 MHz	C:\Program Files\Rohde-Schwarz\TSSTREAM\ts\Live\193 MHz trp	10017	
2	201 MH7	C\Program Files\Robde_Schwarz\TSSTRF4M\ts\Live\201 MHz tro	10018	

Fig. 1-1: Configuration view

oud Sr	2 /*								V 172.29.31.71 Destination IP St
057 MHz	Pos 58 4% at 50 87 MBit/s	065 MHz	Pcs 58.3% at 50.87 MBt/s	€ 073 MHz	Pos 58 4% at 50.87 MBt/s	081 MHz	Pos 58 3% at 50 87 MBits	🔁 089 MHz	Pos 58.3% at 50.87 MBk/s
097 MHz	Pos 58 3% at 50 87 MBit/s	105 MHz	Pcs 58.4% at 50.87 MBt/s	113 MHz	Pos 58.3% at 50.87 MBt/s	💌 121 MHz	Pos 58.3% at 50.87 MBitis	129 MHz	Pos 58 3% at 50.87 MBit/s
137 MHz	Pos 58.3% at 50 87 MBM/s	145 MHz	Pos 58 3% at 50.87 MBE/s	153 MHz	Pos 58 4% at 50 87 MBt/s	• 161 MHz	Pos 58.4% at 50.87 MB/Es	169 NHz	Pos 58.4% at 50.65 MB#/s
177 MHz	Pos 50.4% at 50.85 MBK/s	📀 185 MHz		193 MHz	Pos 58.4% at 50.67 MB6/a	201 MHz	Pos 56.3% et 50.89 MBRIS	209 MHz	Pos 50.3% at 50.05 MBM/s
217 MHz	Pos 58.3% at 50.87 MBMs	225 MHz	Pes 50.3% at 50.87 MB#s	233 MHz	Pos 58 3% at 50 85 MBMa	241 MHz	Pos 58.3% at 50.85 MBits	249 MHz	Pos 58.4% at 50.85 M84/s
257 MHz	Pos 58.4% at 50.87 MBR/s	265 MHz	Pes 58.4% at 50.85 MBUs	273 MHz	Pos 58.4% at 50.87 MBMs	281 MHz	Pos 58.4% at 50.85 MBit/s	289 MHz	Pos 58.4% at 50.87 MB#/s
297 MHz	Pos 58 3% at 50 87 M8#/s	😳 305 MHz	Pes 58 3% at 50 87 MBt/s	313 MHz	Pos 58 3% at 50.87 MBH/s	2 321 MHz	Pos 58 4% at 50.87 MB#s	329 MHz	Pos 58 4% at 50 87 MBK/s
337 MHz	Pos 58 4% at 50 87 MBt/s	345 MHz	Pos 58 3% at 50 87 MBt/s	353 MHz	Pos 58 3% at 50.85 WB#/s	361 MHz	Pos 58.3% at 50.87 MBitis	369 MHz	Pois 58.3% at 50.87 MBit/s
377 MHz	Pos 58.3% at 50.85 MBM/s	385 MHz	Pos 58 3% at 50 87 MBt/s	393 MHz	Pos 58 3% at 50.87 MBt/s	0 401 MHz	Pos 58 3% at 50.87 MBits	409 MHz	Pos 58 3% at 50 87 MBMs
	Pos 58.3% at 50.87 MBit/s	125 MHz	Pcs 58.3% at 50.87 MBt/s	33 MHz	Pos 58.4% at 50.87 MBi/s	441 MHz	Pos 58.4% at 50.85 MBit/s	• 449 NHz	Pos 58.3% at 50.87 MBM/s
457 MHz	Pos 58/3% at 50/87 MBt/s	📀 465 MHz	Pos 58.3% at 50.87 WBt/s	473 MHz	Pos 58 3% at 50.87 WBI/s	😎 481 MHz	Pos 58 3% at 50.87 MB#s	2489 MHz	Pos 58 3% at 50.85 M8#/s
497 MHz	Pos 58.4% at 50.85 MBM/s	😌 505 MHz	Pos 58.3% at 50.85 MBUs	13 MHz	Pos 58.3% at 50.85 MBI/s	521 MHz	Pos 58.3% at 50.87 MB#s	529 NHz	Pos 58 3% at 50.87 MBK/s
537 MHz	Pos 58.4% at 50.87 MBMs	€ 545 MHz	Pcs 58.4% at 50.87 MBt/s	553 MHz	Pos 58 4% at 50.87 MBI/s	561 MHz	Pos 58 4% at 50 87 MBR/s	569 NHz	Pos 58 4% at 50.87 MBK/s
		385 MHz	Pos 50,4% at 50.85 MBMs	593 MHz		601 MHz	Pos 58.4% at 50.87 MBR/s	609 MHz	
617 MH2	Pos 58.4% at 50.85 MBR/s	625 MHz	Pcs 58.4% at 50.87 MBMs	633 MHz	Pos 58 4% at 50.87 I/Bi/s	📀 641 MH2	Pos 58 4% at 50 90 MBits	649 WHz	Pois 58 4% at 50.90 MBR/s
657 NHz	Pos 58.4% at 50.87 MBMs	€ 665 MHz	Pos 58 4% at 50 85 MB#s	673 MHz	Pos 58 4% at 50 87 MBMs	681 MHz	Pos 58 3% at 50 87 MBits	2689 MHz	Pos 58 3% at 50 87 MBMs
697 MHz	Pos 58 4% at 50 85 M8 t/s	3 705 MHz	Pos 58 3% at 50.87 MBMs	2 713 MHz	Pos 58 3% at 50 87 MBt/s	🥑 721 MHz	Pos 58 3% at 50.85 MBMs	€ 729 NHz	Pos 58 3% at 50.85 MBK/s
737 MHz	Pos 58.3% at 50.87 MBit/s	3 745 MHz	Pos 58.3% at 50.87 MBt/s	3 753 MHz	Pos 58.3% at 50.87 MBI/s	361 MHz	Pos 58.3% at 50.87 MBit/s	€ 769 NHz	Pos 58.3% at 50.87 MBit/s
777 MHz	Pos 58 4% at 50.87 MBit/s	• 785 MHz	Pcs 58.4% at 50.87 MBt/s	193 MHz	Pos 58 4% at 50.87 MBt/s	🖲 801 MHz	Pos 58.3% at 50.85 MBitis	€ 809 NHz	Pos 58.4% at 50.85 MBK/s
	Pos 58.4% at 50.87 MBM/s								
		Thread load [*	4		4883.8~		Output [Mbible]		
60- 60-					4883.8- 4883.7- 4683.6-	Will	MMMMAA	MAA	MAMMAN
HQ 20					4853.5- 4853.4-		*	ŤΨV	VYYVIVU

Fig. 1-2: Streaming view

2 Specifications

Heading		
Maximum output data rate	with Intel [®] i7-3770 CPU	 > 5.0 Gbit/s total data rate of all streams, > 1.7 Gbit/s per stream
Total available memory for TS files		total available RAM minus 500 Mbyte system reserve
Size of input TS files and loop time of output streams	32 Gbyte RAM and 96 output streams, all with different content 32 Gbyte RAM and 96 output streams, all with identical content	max. 328 Mbyte per TS file, yields 52 s loop time at 50 Mbit/s max. 31.5 Gbyte per TS file, yields 84 min loop time at 50 bit/s
Streaming protocol		MPEG TS over UDP/IP
Seamless loop at MPEG-2 TS level	for unencrypted TS files	restamping of PCR, PTS, DTS and continuity counter
	for encrypted TS files	restamping of continuity counter
TS packet length	input	188 byte, 204 byte, 208 byte
	output	188 byte

System requirements	
Operating system	Windows 7, 64 bit
CPU	multicore recommended: Intel [®] i7-3770 or better
RAM	min. 1 Gbyte recommended: ≥ 8 Gbyte
Hard disk capacity	≥ 30 Mbyte free memory
Display resolution	min. 800 × 600 pixel SVGA, 256 colors
Ethernet interface	network adapter matching the streaming target device
User rights	administrator rights for installation

3 Installation and operation of the software

Download files "TSStream_ReleaseNotes.pdf", "TSStream_Setup_V1_05.zip" and "TSStream_Manual.pdf" from the application note 1GP113 web site.

For the installation, follow the instructions in the release note.

For the operation, please see the separate manual.

With the installation and launch of the software, the user acknowledges the Terms and Conditions for royalty-free Products (see document "Terms_of_use_gratissoftware_en.pdf").

4 Ordering information

Designation	Туре	Order No.
Cable Load Generator	R&S [®] CLG	2116.9170.02
DOCSIS Cable Load Generator	R&S [®] CLGD	2118.6956.02
Satellite Load Generator	R&S [®] SLG	2116.9193.02
DOCSIS Signal Generator	R&S [®] SFD	2118.7400.02

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PAD-T-M: 3573.7380.02/02.05/EN/

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