

R&S[®]SMCVB-K157

DVB-C

User Manual



1179468602
Version 03

ROHDE & SCHWARZ
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This document describes the following software options:

- R&S®SMCVB-K157 DVB-C (1434.3754.xx)

This manual describes firmware version FW 5.20.043.xx and later of the R&S®SMCV100B.

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The following abbreviations are used throughout this manual: R&S®SMCV100B is abbreviated as R&S SMCVB, R&S®WinIQSIM2 is abbreviated as R&S WinIQSIM2

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1 Welcome to the DVB-C option

The R&S SMCVB-K157 is a firmware application that adds functionality to generate signals in accordance with the DVB-C digital standard.

The R&S SMCVB-K157 option features:

- DVB-C signal generation

This user manual contains a description of the functionality that the application provides, including remote control operation.

All functions not discussed in this manual are the same as in the base unit and are described in the R&S SMCV100B user manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMCV100B

Installation

You can find detailed installation instructions in the delivery of the option or in the R&S SMCV100B service manual.

1.1 Accessing the DVB-C dialog

To open the dialog with DVB-C settings

- ▶ In the block diagram of the R&S SMCV100B, select "Baseband > DVB-C".

A dialog box opens that displays the provided general settings.

The signal generation is not started immediately. To start signal generation with the default settings, select "State > On".

1.2 What's new

This manual describes firmware version FW 5.20.043.xx and later of the R&S®SMCV100B.

Compared to the previous version, it provides information on how to load and play stream library files. See "[To load and play a stream library file](#)" on page 39.

1.3 Documentation overview

This section provides an overview of the R&S SMCV100B user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/smcv100b

1.3.1 Getting started manual

Introduces the R&S SMCV100B and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

1.3.2 User manuals and help

Separate manuals for the base unit and the software options are provided for download:

- Base unit manual
Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.
- Software option manual
Contains the description of the specific functions of an option. Basic information on operating the R&S SMCV100B is not included.

The contents of the user manuals are available as help in the R&S SMCV100B. The help offers quick, context-sensitive access to the complete information for the base unit and the software options.

All user manuals are also available for download or for immediate display on the Internet.

1.3.3 Service manual

Describes the performance test for checking compliance with rated specifications, firmware update, troubleshooting, adjustments, installing options and maintenance.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS):

<https://gloris.rohde-schwarz.com>

1.3.4 Instrument security procedures

Deals with security issues when working with the R&S SMCV100B in secure areas. It is available for download on the internet.

1.3.5 Printed safety instructions

Provides safety information in many languages. The printed document is delivered with the product.

1.3.6 Data sheets and brochures

The data sheet contains the technical specifications of the R&S SMCV100B. It also lists the options and their order numbers and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/smcv100b

1.3.7 Release notes and open source acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The software makes use of several valuable open source software packages. An open-source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/smcv100b

1.3.8 Application notes, application cards, white papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/application/smcv100b

1.3.9 Videos

Find various videos on Rohde & Schwarz products and test and measurement topics on YouTube: <https://www.youtube.com/@RohdeundSchwarz>

1.4 Scope



Tasks (in manual or remote operation) that are also performed in the base unit in the same way are not described here.

In particular, it includes:

- Managing settings and data lists, like saving and loading settings, creating and accessing data lists, or accessing files in a particular directory.
- Information on regular trigger, marker and clock signals and filter settings, if appropriate.
- General instrument configuration, such as checking the system configuration, configuring networks and remote operation
- Using the common status registers

For a description of such tasks, see the R&S SMCV100B user manual.

1.5 Notes on screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as many as possible of the provided functions and possible interdependencies between parameters. The shown values may not represent realistic usage scenarios.

The screenshots usually show a fully equipped product, that is: with all options installed. Thus, some functions shown in the screenshots may not be available in your particular product configuration.

2 About the DVB-C option

The transmission standard complies with the specification ETSI EN 300429, J.83/A and ISDB-C (J.83/C).

2.1 Required options

The equipment layout for generating DVB-C signals includes:

- Base unit
- Option Enable Broadcast Standard (R&S SMCVB-K519)
- Option DVB-C (R&S SMCVB-K157)

3 DVB-C configuration and settings

Access:

- ▶ Select "Baseband > DVB-C".

The remote commands required to define these settings are described in [Chapter 5](#), "Remote-control commands", on page 43.

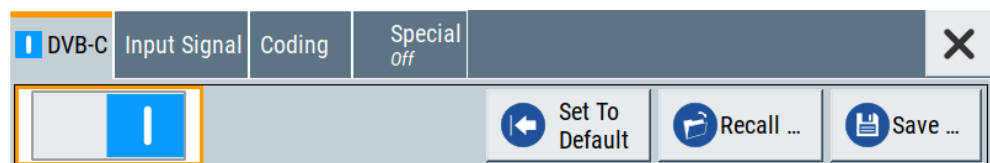
Settings:

• General settings	10
• Input Signal settings	11
• Coding settings	21
• Special settings	22
• Global connector settings	23
• TS player	23
• Local IP data network settings	32

3.1 General settings

Access:

- ▶ Select "Baseband > DVB-C".



This tab provides functionality for calling default settings, save and recall settings.

Settings:

State	10
Set To Default	10
Save/Recall	11

State

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Remote command:

[:SOURce<hw>] :BB:DVBC:STATe on page 44

Set To Default

Calls the default settings. The values of the main parameters are listed in the following table.

Parameter	Value
State	Not affected by the "Set to Default"

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PRESet](#) on page 44

Save/Recall

Accesses the "Save/Recall" dialog, that is the standard instrument function for saving and recalling the complete dialog-related settings in a file. The provided navigation possibilities in the dialog are self-explanatory.

The settings are saved in a file with predefined extension. You can define the filename and the directory, in that you want to save the file.

See also, chapter "File and Data Management" in the R&S SMCV100B user manual.

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:SETTING:LOAD](#) on page 45-

[\[:SOURCE<hw>\]:BB:DVBC:SETTING:STORE](#) on page 44

[\[:SOURCE<hw>\]:BB:DVBC:SETTING:DELETE](#) on page 45

[\[:SOURCE<hw>\]:BB:DVBC:SETTING:CATALOG?](#) on page 45

3.2 Input Signal settings

Access:

- ▶ Select "Baseband > DVB-C > Input Signal".

The dialog provides settings to configure the input signal.



Most broadcast standards share the following parameters, i.e. they have the same setting independent from the standard:

- "Source"
- "Input"
- "IP TS Channel"

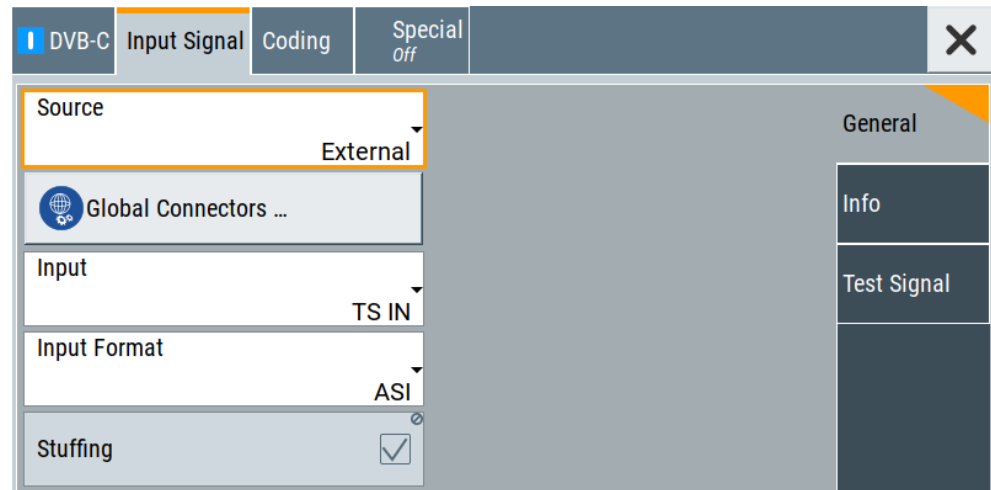
Settings:

- [General settings](#)..... 12
- [Info](#)..... 14
- [Test Signal settings](#)..... 16
- [IP channel x settings](#)..... 17

3.2.1 General settings

Access:

- ▶ Select "Input Signal > General".



The dialog provides settings to configure the input signal. Also, it provides physical layer information for external signals and transport stream (TS) signals. For internal test signals, you can configure payload and structure of test packets.

Settings:

Source.....	12
Input.....	13
Input Format.....	13
IP TS Channel.....	13
Stuffing.....	13
Test Signal.....	14

Source

Sets the modulation source for the input signal.

"External" Uses a transport stream, that is input at the "TS IN"/"IP Data" interface.

For more information about connecting to the interfaces, see also:

- "TS IN" interface: Section "Configuring the Global Connectors" in the R&S SMCV100B user manual.
- "IP Data" interface: [Chapter 3.7, "Local IP data network settings"](#), on page 32.

"TS Player" Uses an internal transport stream with TS packet data played from a file. The player requires no option. Playing encrypted files with extension `_c` requires a stream library option R&S SMCVB-KSx.

See also:

- [Chapter 3.6, "TS player"](#), on page 23
- [Supported TS player file types](#)

"Test Signal" Uses an internal test signal as specified in [Chapter 3.2.3, "Test Signal settings"](#), on page 16.

Remote command:

`[:SOURce<hw>] :BB:DVBC:SOURce` on page 46

Input

Requires "Source > External".

Sets the external input interface.

"TS IN" Input for serial transport stream data. The signal is input at the "User 1" connector.

"IP" Input for IP-based transport stream data (TSoverIP). The signal is input at the "IP Data" connector.

Remote command:

`[:SOURce<hw>] :BB:DVBC:INPut` on page 46

Input Format

Requires "Input > TS IN".

Sets the format of the input signal.

"ASI" [ASI format](#)

"SMPTE 310" [SMPTE 310 format](#)

Remote command:

`[:SOURce<hw>] :BB:DVBC:INPut:FORMat` on page 47

IP TS Channel

Requires "Input > IP".

Selects the IP-based transport stream (TS) channel. You can select 1 out of 4 IP TS channels as input at the "IP Data" interface.

To configure a particular channel, see [Chapter 3.2.4, "IP channel x settings"](#), on page 17.

Remote command:

`[:SOURce<hw>] :BB:DVBC:INPut:TSCHannel` on page 47

Stuffing

Requires "Source > External/TS Player".

Displays that stuffing is active.

The installed input interface provides the transport stream data rate required for the current modulation parameters (regardless of the input data rate of the external transport stream).

Remote command:

[:SOURCE<hw>] :BB:DVBC:STUFFing? on page 47

Test Signal

Defines the test signal data.

Use the parameter to measure the bit error rate before the Viterbi decoder with the BER application, the R&S ETL measurement receivers, and its serial outputs (clock and data).

"Test TS Packet"

Standardized packet data used as modulation data in the transport stream.

To configure the packet structure, select the side tab "Test Signal > Test TS Packet". See also [Chapter 3.2.3, "Test Signal settings"](#), on page 16.

"PRBS before Conv. Enc."

Pure pseudo-random bit sequence (PRBS) data used as modulation data with no packet structure. The sequence is inserted before the convolutional encoder. PRBS data conforms with [ITU-T O.151](#) specification.

To configure the PRBS type, select the side tab "Test Signal > PRBS". See also ["PRBS"](#) on page 17.

"PRBS after Conv. Enc."

Pure pseudo-random bit sequence (PRBS) data used as modulation data with no packet structure. The sequence is inserted after the convolutional encoder.

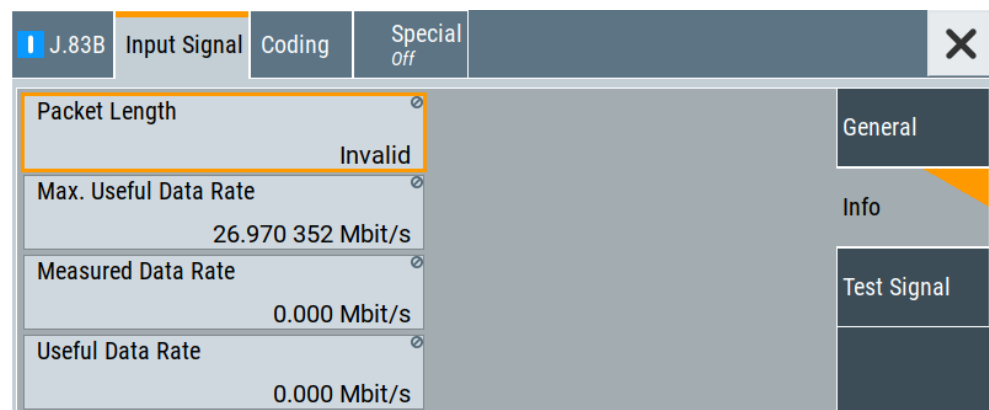
Remote command:

[:SOURCE<hw>] :BB:DVBC:TESTsignal on page 48

3.2.2 Info

Access:

- ▶ Select "Input Signal > Info".



The tab displays the information on the input signal.

Settings:

Packet Length.....	15
Max. Useful Data Rate.....	15
Measured Data Rate.....	15
Useful Data Rate.....	15

Packet Length

Requires "Source > External".

Displays the packet length of the external transport stream in bytes.

If the packet length does not match the specified length, the output signal is erroneous. "Packet Length > Invalid" is displayed.

"188"	188 byte packets specified for serial input ("Input > TS IN") and parallel input ("Input > IP").
"204"	204 byte packets specified for serial input ("Input > TS IN") and parallel input ("Input > IP").
"Invalid"	Packet length ≠ 188 bytes, 204 bytes, i.e. the length is not as specified.

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PACKetlength?](#) on page 49

Max. Useful Data Rate

Requires "Source > External/TS Player".

Displays the maximum data rate, that is derived from the current modulation parameter settings.

The value is the optimal value at the TS input interface, that is necessary for the modulator.

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:USEFu1\[:RATE\]:MAX?](#) on page 50

Measured Data Rate

Requires "Source > External".

Displays the measured value of the data rate r_{meas} of one of the following:

- External transport stream including null packets input at "User 1" connector
- External transport stream including null packets input at "IP Data/LAN" connector (TSoverIP)

The value r_{meas} equals the sum of useful data rate r_{useful} and the rate of null packets r_0 :

$$r_{\text{meas}} = r_{\text{useful}} + r_0$$

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC\[:INPut\]:DATarate?](#) on page 50

Useful Data Rate

Requires "Source > External/TS Player".

Displays the data rate of useful data r_{useful} of the external transport stream. The data rate is measured at the input of the installed input interface.

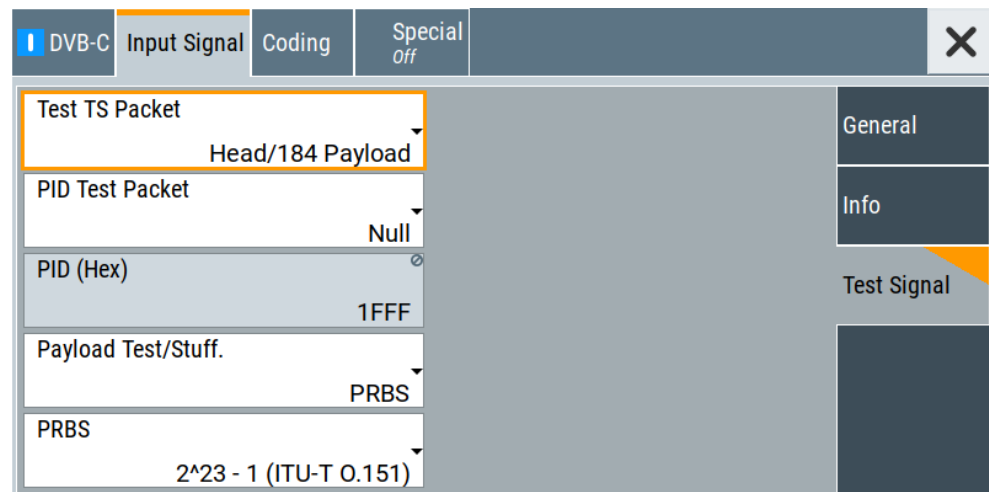
Remote command:

[:SOURce<hw>] :BB:DVBC:USEFUL [:RATE] ? on page 50

3.2.3 Test Signal settings

Access:

- ▶ Select "Input Signal > Test Signal".



The tab provides settings to configure the input test signal.

Settings:

Test TS Packet.....	16
PID Test Packet.....	17
PID (Hex).....	17
Payload Test/Stuff.....	17
PRBS.....	17

Test TS Packet

Specifies the structure of the test transport stream packet that is fed to the modulator.

"Head/184 Payload"

A sync byte (0x47) followed by three header bytes and 184 payload bytes.

"Sync/187 Payload"

A sync byte (0x47) followed by 187 payload bytes.

Remote command:

[:SOURce<hw>] :BB:DVBC:TSPacket on page 52

PID Test Packet

If a header is present in the test packet ("Test TS Packet > Head/184 Payload"), you can specify a fixed or variable packet identifier (PID).

- "Null" The header of the test transport stream packets has a fixed setting of null packet header 1FFF (hex).
- "Variable" Uses the header value defined with "PID (Hex)".

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PIDTestpack](#) on page 52

PID (Hex)

Sets the **PID**.

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PID](#) on page 52

Payload Test/Stuff.

Defines the payload area content of the **TS** packet.

For "Source > Test Signal", the packet is a test packet.

For "Stuffing > On", the packet is a null packet. Null packets are inserted into the external transport stream to adapt the stream data rate.

- "PRBS" PRBS data in accordance with [ITU-T O.151](#)
- "0x00" Exclusively 00 (hex) data
- "0xFF" Exclusively FF (hex) data

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PAYLoad](#) on page 52

PRBS

Sets the length of the PRBS sequence.

You can select a PRBS 15 or a PRBS 23 sequence as specified by [ITU-T O.151](#).

Remote command:

[\[:SOURCE<hw>\]:BB:DVBC:PRBS](#) on page 53

3.2.4 IP channel x settings

Access:

1. Select "Input Signal > General".
2. Select "Source > External"
3. Select "Input > IP"

4. Select "Input Signal > IP Channel x"

Input IP <input type="checkbox"/>	Alias	Alias 1	General
Type Unicast	Multicast Address	226.0.0.0	Info
Port 6 002	IGMPv3 Source Address	0.0.0.0	Test Signal
Ping Source Address	Local IP Data Network ...		IP Channel 1
Ping Result			

The tab provides settings to configure IP channel x.

You can configure settings for 4 IP channels $x = 1$ to 4 individually, see also "Input Signal > General > IP TS Channel".



IP channel settings affect input IP data of the local IP data network. The settings are independent from the used broadcast standard configuration.

Saving/recalling a certain IP channel or local IP data network configuration is not possible via the broadcast standard-specific functionality.

Use the global save/recall functionality instead, see section "Saving and Recalling Instrument Settings" in the R&S SMCV100B user manual.

The table below shows the availability of the tab in the broadcast standard configuration.

Table 3-1: IP channel configuration support in broadcast standards

Baseband standard	"IP Channel x"	Baseband standard	"IP Channel x"
"ATSC/ATSC-M/H"	Yes	"DVB-S"	Yes
"ATSC 3.0"	No	"DVB-S2"	Yes
"DTMB"	Yes	"DVB-C"	Yes
"DVB-T"	Yes	"J.83/B"	Yes
"DVB-T2"	Yes	"DRM"	No
"ISDB-T"	Yes	"Audio AM"	No
"T-DMB/DAB"	Yes	"Audio FM"	No

See also:

- [Chapter 4.1.1, "How to apply an external IP input signal"](#), on page 35
- [Chapter 3.7, "Local IP data network settings"](#), on page 32

Requirements

At your IP source, set the "transport stream packets per internet protocol packet" (TP per IP) parameter as follows:

- If TP packet length = 188 bytes: Set TP per IP to 7 or 6.
- If TP packet length = 204/208 bytes: Set TP per IP to 6.

We recommend that you use a separate LAN infrastructure to stream the transport streams via IP to the IP connector of the baseband board. Also, avoid TS packet losses during IP transmission.

Settings:

Input IP.....	19
Alias.....	19
Type.....	19
Multicast Address.....	19
Port.....	20
IGMPv3 Source Address.....	20
Ping Source Address.....	20
Ping Result.....	20
Local IP Data Network.....	20

Input IP

Activates/deactivates the IP input.

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch> [:STATe] on page 54

Alias

Sets a unique name for the IP connection.

The definition of a name is optional but facilitates identification in the measurement views. The name input fits maximum 16 characters in ASCII format.

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:ALIAS on page 54

Type

Sets the input signal type.

- | | |
|-------------|---|
| "Unicast" | Analyzes all unicast IP packets that arrive at the specified "Port". |
| "Multicast" | When an IP address is in the multicast address range, an attempt is made to join a multicast group using IGMP.
Set "Multicast Address" and "Port". |

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:TYPE on page 55

Multicast Address

Editing requires "Type > Multicast".

Sets the destination IP address (IPv4) of the IP connection.

You can set addresses from "224.0.0.0" to "239.255.255.255".

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:MULticast:ADDRes on page 55

Port

Sets the destination UDP port.

Due to [UDP/RTP](#) autosensing, we recommend that you set a port offset of at least 6 between neighboring IP TS channels.

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:PORT on page 55

IGMPv3 Source Address

Requires "Type > Multicast".

Sets the [IGMPv3](#) source address.

If you need to filter the data sent to the multicast address, specify the source address. A source address different from "0.0.0.0" accepts only data originating from the specified IP address.

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:IGMP [:SOURce] :ADDRes on page 56

Ping Source Address

Clicking "Ping Source Address" triggers pinging of the IGMPv3 source address.

If you set a different value from "IGMPv3 Source Address = 0.0.0.0" and click the button, the software checks if the address is reachable.

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:IGMP [:SOURce] :PING on page 56

Ping Result

Displays the result after pinging the source address.

If "Ping Result > Ping: Successful", the source address is available in the network.

If "Ping Result > Ping: Transmit Failed. xxx", the source address is not available in the network. "xxx" can be, e.g. "General Failure". Try another "IGMPv3 Source Address".

Remote command:

[:SOURce<hw>] :BB:INPut:IP<ch>:IGMP [:SOURce] :RESult? on page 56

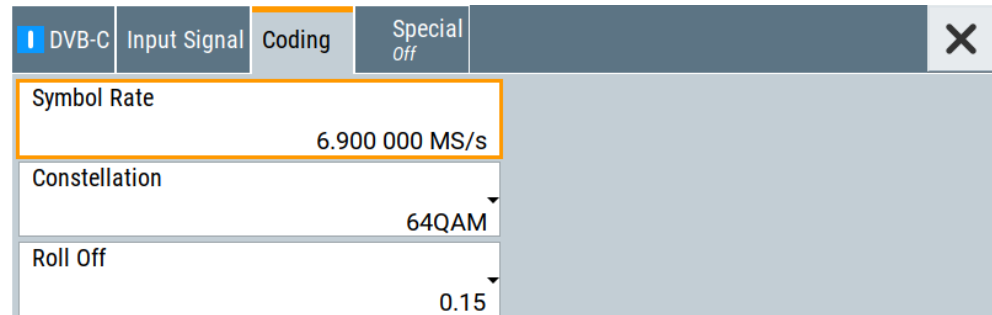
Local IP Data Network

Accesses local IP data network settings, see [Chapter 3.7, "Local IP data network settings"](#), on page 32.

3.3 Coding settings

Access:

- ▶ Select "Baseband > DVB-C > Coding".



The tab provides settings for coding.

Settings:

Symbol Rate.....	21
Constellation.....	21
Roll Off.....	21

Symbol Rate

Sets the symbol rate.

In the transmission spectrum, the symbol rate represents the 3 dB bandwidth.

Remote command:

[:SOURce<hw>] :BB:DVBC:SYMBOLs on page 57

Constellation

Defines the constellation.

Remote command:

[:SOURce<hw>] :BB:DVBC:CONSTel on page 57

Roll Off

Displays the roll-off factor.

The output signal is filtered with a root raised cosine characteristic. The 3 dB point of the modulation spectrum is the same for all alpha values.

"0.13" Conforming to the specification of ISDB-C (J.83/C Japan).

"0.15" Conforming to the specification of DVB-C (J.83/A DVB-C Europe).

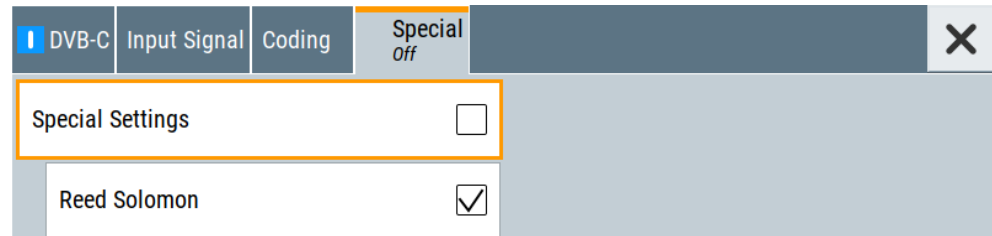
Remote command:

[:SOURce<hw>] :BB:DVBC:ROLLoff on page 57

3.4 Special settings

Access:


- ▶ Select "Baseband > DVB-C > Special".



The tab provides settings, that differ from the specification of the broadcast standard.



Settings different from the broadcast standard can be useful for research and development. Applying these settings requires "Special Settings > On".

If you set a parameter different from the specification, the warning icon  is displayed to the left of the parameter.

Settings:

Special Settings.....	22
Reed Solomon.....	22

Special Settings

Enables/disables special settings.

The setting allows you to switch between standard-compliant and user-defined channel coding.

Remote command:

`[:SOURCE<hw>] :BB:DVBC [:SPECIAL] :SETTING [:STATE]` on page 58

Reed Solomon

Enables/disables the Reed-Solomon encoder.

The standard stipulates a Reed-Solomon RS (204, 188), i.e. "Reed Solomon > On". Incoming packets of the TS frame have a length of 188 bytes or, in special cases, a length of 204 bytes. The packet length defines the behavior of the coder.

- "On"
- "Packet Length = 188": The Reed-Solomon encoder adds 16 Reed-Solomon bytes to the incoming 188 bytes of an MPEG transport stream frame. The Reed-Solomon decoder can correct up to 8 erroneous bytes in a Reed-Solomon packet (= 204 bytes). The number of incorrect bits in an errored byte is irrelevant.
 - "Packet Length = 204": Of the incoming 204 bytes of an MPEG transport stream frame, the Reed-Solomon encoder overwrites the last 16 bytes with its own Reed-Solomon bytes.

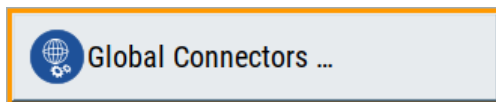
- "Off"
- "Packet Length = 188": 16 dummy bytes are transmitted instead of the 16 Reed-Solomon bytes. The data rate is not changed.
 - "Packet Length = 204": All 204 bytes of an MPEG frame are forwarded unchanged. The data rate is not changed.

Remote command:

`[:SOURCE<hw>] :BB:DVBC [:SPECial] :REEDsolomon` on page 58

3.5 Global connector settings

The "Input Signal" dialog, the "Trigger/Marker/Clock" dialog and "Trigger In", "Marker" and "Clock" tabs in "Baseband > ARB/Custom Digital Mod" configuration dialogs provide quick access to the related connector settings. Click the "Global Connectors" button to access the settings.



See also chapter "Global connector settings" in the user manual.

3.6 TS player

The "TS Player" application allows you to play stream files for simulation of dedicated transport stream (TS) scenarios. Also, the R&S SMCV100B offers stream libraries containing stream files with a wide range of ready-made signals for testing systems with different transmission parameters. For supported file types, see [Table 3-2](#).

Key features

The key features for playing stream files with "TS Player" application are:

- Support of numerous broadcast transmission standards
- Streaming of high-quality video contents
- Streaming of high-quality audio contents
- Efficient use with dedicated streams

Required options

The equipment layout for processing files of waveform libraries includes:

- R&S SMCV100B base unit (64 MSample ARB memory, 60 MHz RF bandwidth)
- Broadcast standard option for the "TS Player" application (R&S SMCVB-Kxxx)
- Enable Broadcast Standards option (R&S SMCVB-K519)
- Stream library option (R&S SMCVB-KSxx)

For more information, see data sheet.

To access and download a stream library file

The steps to access a stream library and to download stream library files is analogous as for waveform libraries. See chapter "Installation" in the user manual of the stream library at:

www.rohde-schwarz.com/manual/smcv100b/ksxx-kvxx-stream-and-waveform-libraries-user-manuals-manuals-gb1_78701-972224.html

To access the "TS Player" application

1. Select "Baseband > DVB-C > Input Signal".
2. Select "Source > TS Player".
3. Select "TS Player" button.

Opens the TS player dialog, where you can load files.

Support in broadcast standard configuration

Various broadcast baseband standards of the R&S SMCV100B support the "TS Player" application. For an overview, see the table below.

Baseband standard	"Source > TS Player"	Baseband standard	"Source > TS Player"
"ATSC/ATSC-M/H"	Yes	"DVB-S"	Yes
"ATSC 3.0"	Yes	"DVB-S2"	Yes
"DTMB"	Yes	"DVB-C"	Yes
"DVB-T"	Yes	"J.83/B"	Yes
"DVB-T2"	Yes	"DRM"	No
"ISDB-T"	Yes	"Audio AM"	No
"T-DMB/DAB"	Yes	"Audio FM"	No

The remote commands required to define these settings are described in [Chapter 5.5, "TSGen subsystem"](#), on page 59.

Settings:

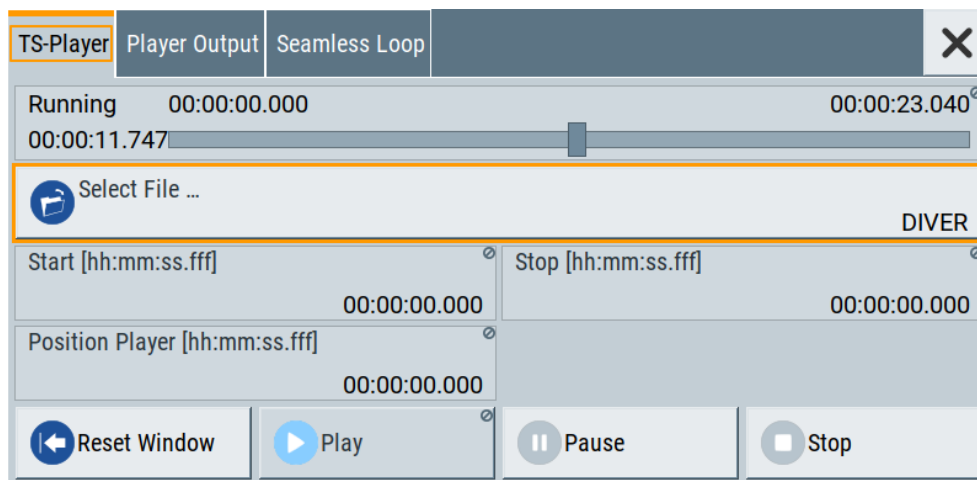
- [TS Player settings](#)..... 24
- [Player output settings](#)..... 27
- [Seamless loop settings](#)..... 31

3.6.1 TS Player settings

Access:

1. Follow the steps in ["To access the "TS Player" application"](#) on page 24.

2. Select "TS Player > TS-Player".



The tab provides settings to configure the general settings of the TS player application.

Settings:

Running/Position Player [hh:mm:ss.fff]..... 25
 Select File..... 25
 Start [hh:mm:ss.fff]..... 26
 Position Player [hh:mm:ss.fff]..... 27
 Stop [hh:mm:ss.fff]..... 27
 Reset Window..... 27
 Play..... 27
 Pause..... 27
 Stop..... 27

Running/Position Player [hh:mm:ss.fff]

Displays the current position in time, while playing the file.

You can set an individual position via [Position Player \[hh:mm:ss.fff\]](#).

Remote command:

:TSGen:CONFigure:SEEK:POSition on page 63

Select File

Provides access to the standard "File Select" function of the instrument. The provided navigation possibilities in the dialog are self-explanatory.

See also, chapter "File and Data Management" in the R&S SMCV100B User Manual.

The dialog allows you to select user-defined, predefined and recent files. [Table 3-2](#) lists file extensions of supported files.

Table 3-2: Supported TS player file types

File extension	Stream libraries	Remark	Option
*.atsc_c	ATSC/ATSC & Mobile DTV	Encrypted	R&S SMCVB-KS13
*.dab	T-DMB/DAB	Unencrypted	-

File extension	Stream libraries	Remark	Option
*.dab_c	T-DMB/DAB	Encrypted	R&S SMCVB-KS10
*.dabp_c	DAB+	Encrypted	R&S SMCVB-KS11
*.eti	T-DMB/DAB	Unencrypted	-
*.xeti	T-DMB/DAB	Unencrypted	-
*.emc_c	EMC	Encrypted	R&S SMCVB-KS15
*.isdbt_c	ISDB-T	Encrypted	R&S SMCVB-KS12
*.pcap	-	Captured IPv4 stream for ATSC 3.0 player	-
*.t2mi ¹⁾	-	Unencrypted	-
*.t2mi_c	DVB-T2 MI	Encrypted	R&S SMCVB-KS14
*.t2trp_c	DVB-T2 MI	Encrypted	R&S SMCVB-KS14
*.trp	-	Unencrypted	-
*.trp_c	-	Encrypted Included in various stream libraries	R&S SMCVB-KS12 R&S SMCVB-KS17 R&S SMCVB-KS18 R&S SMCVB-KS19 R&S SMCVB-KS20
*.bin	-	Unencrypted	-
*.ts	-	Unencrypted	-
*.mpg	-	Unencrypted	-
*.t10	-	-	-

¹⁾ For T2MI stream files, the data rate of a T2MI file is determined automatically, if the following applies:

- Data rate is not part of the TRP file header information.
- PCR information is not available.
- T2MI TRP file is not encrypted, that means not of type *.t2mi_c.
- TRP file has the *.t2mi file extension.

Remote command:

[:TSGen:CONFigure:PLAYfile](#) on page 62

[:TSGen:READ:PLAYfile:LENGth?](#) on page 66

[:TSGen:READ:FMEMory](#) on page 66

Start [hh:mm:ss.fff]

Sets the start position in the loaded player file. Data which chronologically precedes the start position is not replayed by the player.

The entered time stamp must chronologically always precede the entry under [Stop](#).

Remote command:

[:TSGen:CONFigure:SEEK:START](#) on page 64

Position Player [hh:mm:ss.fff]

Displays the current play position in the file.

Remote command:

[:TSGen:CONFigure:SEEK:POSition](#) on page 63

Stop [hh:mm:ss.fff]

Sets the end position in the player file. Data which chronologically follows the end position is not replayed by the player.

When the player reaches the "Stop" position, it returns to the "Start" position (continuous play).

The entered time stamp must chronologically always follow the entry under [Play](#).

Remote command:

[:TSGen:CONFigure:SEEK:STOP](#) on page 64

Reset Window

Resets "Start/Stop/Position Player" parameters.

Remote command:

[:TSGen:CONFigure:SEEK:RESet](#) on page 64

Play

Plays the selected file.

For supported file types, see [Table 3-2](#).

Remote command:

[:TSGen:CONFigure:COMMand](#) on page 61

Pause

Pauses the player.

After pausing, you can resume playing the file by clicking "Play" again.

Remote command:

[:TSGen:CONFigure:COMMand](#) on page 61

Stop

Stops the player and returns to the start position.

Remote command:

[:TSGen:CONFigure:COMMand](#) on page 61

3.6.2 Player output settings

Access:

- ▶ Select "TS Player > Player Output".

The tab provides settings to configure the output of the TS player.

3.6.2.1 General settings

The tab provides settings to configure general player output properties.

Data Rate	28
Orig. Data Rate	28
Packet Length	28
Nullpacket Stuffing	28
Stop Data	29

Data Rate

Sets the output data rate of the player.

Note: If "Nullpacket Stuffing > Off", we recommend that you set the output data rate equal to the original data rate.

If you want to use a different data rate, activate "Nullpacket Stuffing". The function ensures that the data stream is replayed in the same way as it was recorded. The time references in the tables of the TS stream are also correct during replay.

Remote command:

[:TSGen:CONFigure:TSRate](#) on page 65

Orig. Data Rate

Displays the calculated original TS data rate.

Remote command:

[:TSGen:READ:ORIGtsrate](#) on page 66

Packet Length

Requires a *.trp, *.trp_c, *.emc or *.emc_c file loaded into the "TS Player" dialog. *.trp files are previously recorded files.

Displays the packet length of the loaded TS player file.

Remote command:

[:TSGen:CONFigure:PLENght](#) on page 62

Nullpacket Stuffing

Requires a *.trp, *.trp_c, *.emc or *.emc_c file loaded into the "TS Player" dialog. *.trp files are previously recorded files.

Activates nullpacket stuffing.

By default nullpacket stuffing is deactivated. The output data rate of the TS player equals the original data rate as defined in the TS player file. Equal rates ensure that the time references in the tables of the played TS stream are correct during replay.

- "On" Activate stuffing, if you need a higher rate than the original data rate. Null packets are inserted into the data stream. To ensure correct time references in the stream tables, activate program clock reference correction. See "[PCR, DTS/PTS](#)" on page 32.
- "Off" Deactivate stuffing, if you want to use the same data rate as the original data rate.

Remote command:

[:TSGen:CONFigure:STUFFing](#) on page 65

Stop Data

Requires a *.trp, *.trp_c, *.emc or *.emc_c file loaded into the "TS Player" dialog. *.trp files are previously recorded files.

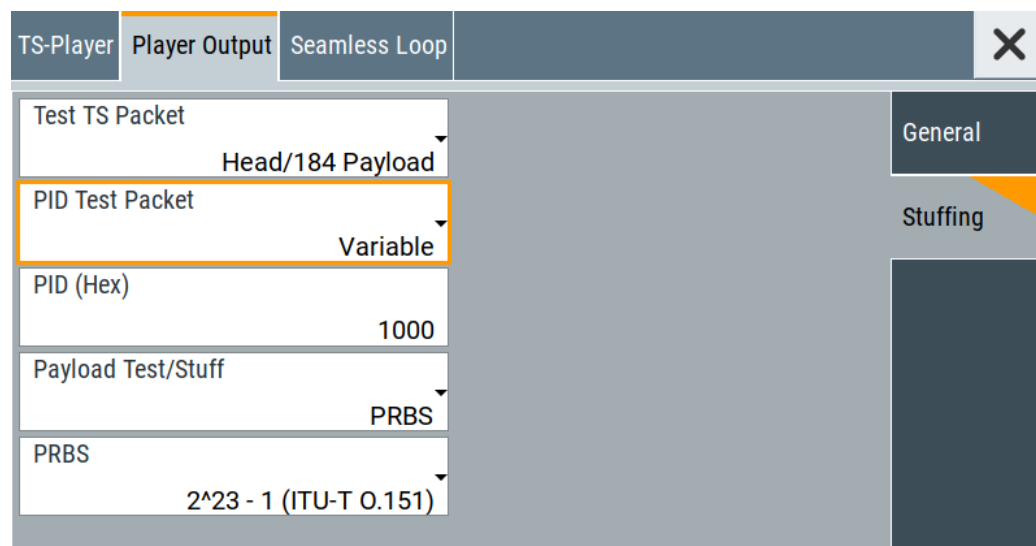
Ensures that a standardized TS data stream is always output at the TS output at the rear of the R&S SMCV100B.

In pause or stop status, the TS generator generates "test packets", which have data and header parts that can be configured using the [Test TS Packet](#).

Remote command:

[:TSGen:CONFigure:STOPdata](#) on page 65

3.6.2.2 Stuffing settings



The tab provides settings to configure stuffing.

Settings

Test TS Packet.....	30
PID Test Packet.....	30
PID (Hex).....	30
Payload Test/Stuff.....	30
PRBS.....	31

Test TS Packet

Specifies the structure of the test transport stream packet that is fed to the modulator.

"Head/184 Payload"

A sync byte (0x47) followed by three header bytes and 184 payload bytes.

"Sync/187 Payload"

A sync byte (0x47) followed by 187 payload bytes.

"Head/200 Payload"

A sync byte (0x47) followed by three header bytes and 200 payload bytes.

"Sync/203 Payload"

A sync byte (0x47) followed by 203 payload bytes.

"Head/204 Payload"

A sync byte (0x47) followed by three header bytes and 204 payload bytes.

"Sync/207 Payload"

A sync byte (0x47) followed by 207 payload bytes.

Remote command:

[:TSGen:CONFigure:TSPacket](#) on page 65

PID Test Packet

If a header is present in the test packet ("Test TS Packet > Head/184 Payload"), you can specify a fixed or variable packet identifier (PID).

"Null" The header of the test transport stream packets has a fixed setting of null packet header 1FFF (hex).

"Variable" Uses the header value defined with [PID \(Hex\)](#).

Remote command:

[:TSGen:CONFigure:PIDTestpack](#) on page 62

PID (Hex)

Sets the [PID](#).

If "PID Test Packet > Null", "PID (Hex) = 1FFF" is fixed.

If "PID Test Packet > Variable", you can edit the value.

Remote command:

[:TSGen:CONFigure:PID](#) on page 61

Payload Test/Stuff

Defines the payload area content of the [TS](#) packet.

"PRBS" [PRBS](#) data in accordance with [ITU-T O.151](#)
See also chapter "Internal Modulation Data" in the R&S SMCV100B User Manual.

"0x00" Exclusively 00 (hex) data

"0xFF" Exclusively FF (hex) data

Remote command:

[:TSGen:CONFigure:PAYLoad](#) on page 61

PRBS

Sets the length of the PRBS sequence.

You can select a PRBS 15 or a PRBS 23 sequence as specified by [ITU-T O.151](#).

Remote command:

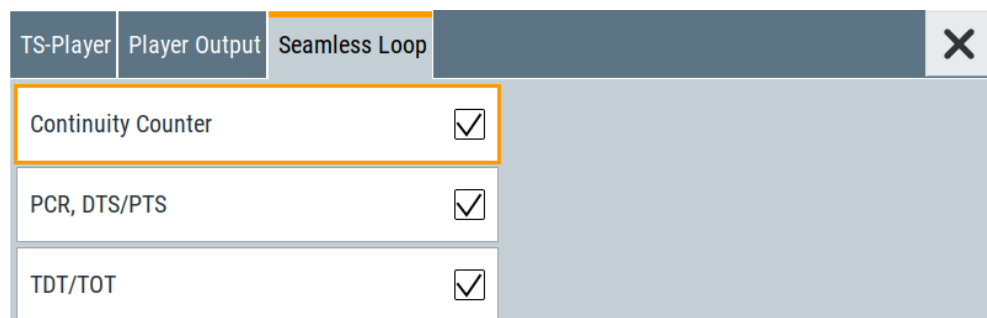
[:TSGen:CONFigure:PRBS\[:SEquence\]](#) on page 62

3.6.3 Seamless loop settings

Displaying the tab requires a *.trp, *.trp_c, *.emc or *.emc_c file loaded into the "TS Player" dialog. *.trp files are previously recorded files.

Access:

- ▶ Select "TS Player > Seamless Loop".



The tab provides settings to configure settings for playing the file in a loop.

Settings:

Continuity Counter	31
PCR, DTS/PTS	32
TDT/TOT	32

Continuity Counter

Activates the correction of the continuity counters in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

Remote command:

[:TSGen:CONFigure:SEAMless:CC](#) on page 63

PCR, DTS/PTS

Activates the correction of time stamps in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

If you set "Nullpacket Stuffing = On" and "PCR, DTS/PTS = On", the time stamps in the streams are corrected when nullpackets are inserted into the stream.

Remote command:

[:TSGen:CONFigure:SEAMless:PCR](#) on page 63

TDT/TOT

Activates the correction of the time and date table in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

Remote command:

[:TSGen:CONFigure:SEAMless:TT](#) on page 63

3.7 Local IP data network settings

Access:

1. Select "Input Signal > General > Source > External".
2. Select "Input Signal > General > Input > IP"
3. Select "Input Signal > IP Channel x > Local IP Data Network".

Board Address		
Address Mode	Protocol	Show Connector ...
Auto (DHCP)	UDP	
IP Address	Subnet Mask	MAC Address
10.214.2.24	255.255.252.0	90:b8:21:71:2e

The tab provides access to local IP data settings to configure the board address.

The remote commands to configure local IP data network settings are described in [Chapter 5.6, "BCIP subsystem"](#), on page 67.

How to: [Chapter 4.1.1, "How to apply an external IP input signal"](#), on page 35

Settings:

Network Status.....	33
Restart Network.....	33
Hostname.....	33
Address Mode.....	33
IP Address.....	34
Protocol.....	34
Subnet Mask.....	34
Show Connector.....	34
MAC Address.....	34

Network Status

Indicates that the instrument is connected to the network.

If the instrument is disconnected, try "Restart Network".

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:STATus` on page 69

Restart Network

Terminates the network connection of the instrument and sets it up again later. You can use this function to fix network problems.

Note: This function restarts only the connection of the instrument to the network. It does not impact the network itself.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:REStart` on page 69

Hostname

Displays the hostname.

Displayed is the board name, that is the name of the IP data board of the R&S SMCV100B, e.g. SMCV100B-123456-IP-Data.

Each instrument is delivered with an assigned hostname, a logical name which can be used instead of the IP address. With the default network settings, the IP address is allocated by the DHCP server. This address can change each time the instrument is reconnected. Unlike the IP address, the hostname name does not change.

Note:

This function is password-protected. Unlock the protection level 1 to access it.

We recommend that you do not change the default network settings or the hostname to avoid problems with the network connection.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:COMMon:HOSTname` on page 68

Address Mode

Selects the mode for assigning the IP address.

"Auto (DHCP)"

Assigns the IP address automatically, provided the network supports DHCP.

"Static"

Enables you to assign the IP address manually.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPAdDress:MODE` on page 68

IP Address

Displays the IP address of the instrument in the local IP data network.

By default, the R&S SMCV100B is configured to use dynamic TCP/IP configuration and to obtain the whole address information automatically.

If the network does not support DHCP or the attempt does not succeed, the instrument tries to obtain the IP address via Zeroconf (APIPA) protocol. IP addresses assigned via Zeroconf start with the number blocks 169.254.*.*.

Note: An IP address that is assigned via the Zeroconf protocol although the network requires an IP address assigned via the DHCP server can cause network connection failures.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPAdDress` on page 68

Protocol

Sets the protocol type of the input IP data.

The current firmware supports **UDP** and **UDP/RTP**.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:PROTOcol` on page 69

Subnet Mask

Displays the bit group of the subnet in the host identifier.

To assign the subnet mask manually, select "Address Mode > Static".

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPAdDress:SUBNet:MASK`
on page 68

Show Connector

Accesses a dialog that displays the physical location of the selected connector on the front/rear panel of the instrument.

MAC Address

Displays the MAC address, a unique identifier of the network adapter in the R&S SMCV100B.

Remote command:

`:SYSTem:COMMunicate:BCIP<hw>:NETWork:MACAddress` on page 68

4 Performing DVB-C signal generation tasks

This chapter tells you how to configure the R&S SMCV100B to generate signals for simple receiver tests.

- [Configuring the input signal](#).....35
- [Monitoring the input signal](#)..... 40

4.1 Configuring the input signal

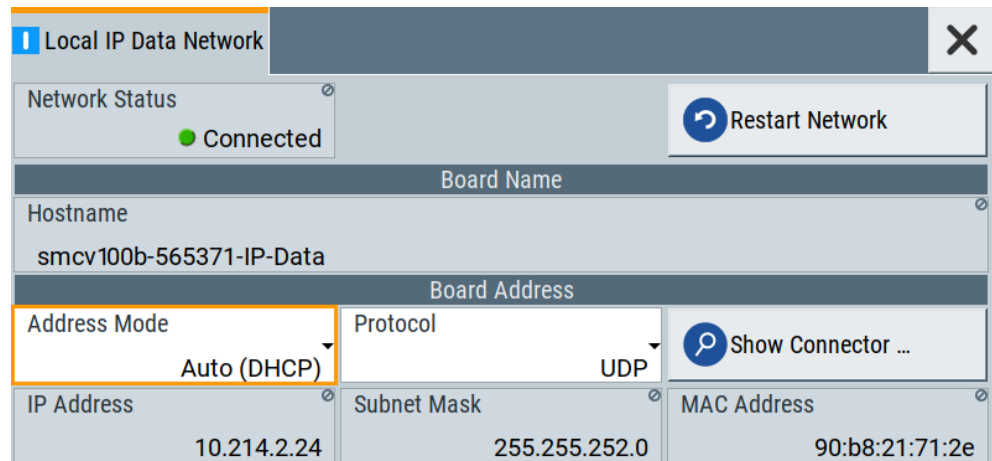
This chapter provides an overview of the different input signals, that the R&S SMCV100B uses as modulation data.

- [How to apply an external IP input signal](#).....35
- [How to apply an external TS input signal](#).....38
- [How to generate an internal TS signal](#)..... 39

4.1.1 How to apply an external IP input signal

To connect the R&S SMCV100B to local IP data network

1. Connect the IP source to the "IP Data" connector of the R&S SMCV100B.
See chapter "Connecting to IP Data Interface" in the R&S SMCV100B Getting Started user manual.
2. Select "Input Signal > General > Source > External".
3. Select "Input Signal > General > Input > IP".
4. In the "IP Channel x" side tab, click "Local IP Data Network".
By default, the R&S SMCV100B assigns the IP address automatically using DHCP ("Address Mode > Auto (DHCP)").
5. If "Network Status > Disconnected", try "Restart Network".



The R&S SMCV100B is connected to the local IP data network.

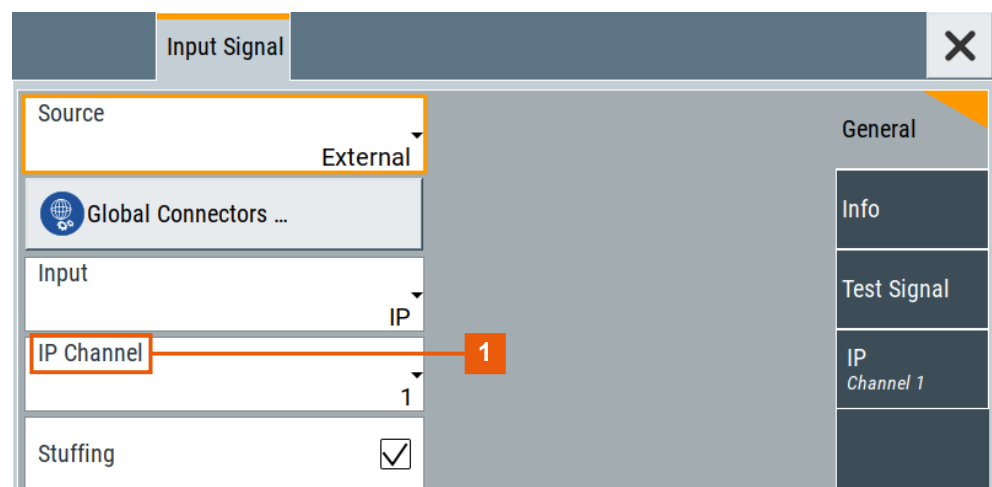
6. If DHCP does not assign an IP address, assign the IP address manually.
See chapter "How to Assign the IP Address" in the R&S SMCV100B user manual.
7. Specify the protocol type of the input IP data.
The current firmware supports [UDP](#) and [UDP/RTP](#).

To configure an external IP input signal

The R&S SMCV100B is connected to a local IP data network, see ["To connect the R&S SMCV100B to local IP data network"](#) on page 35.

1. Specify general IP input signal properties:
 - a) Select "Input Signal > General > Source > External".
 - b) Select "Input > IP".
 - c) Specify the IP TS Channel, e.g. "IP TS Channel > 1".

The "IP Channel 1" side tab appears, where you can configure the IP connection for channel 1 and channel-independent local IP network settings.



1 = IP channel notation: IP TS Channel

2. Optionally, if supported, activate "Stuffing" to adjust the TS data rate.
3. Specify IP TS channel properties, e.g. for "IP TS Channel > 1":
 - a) Define the input type, e.g. "Type > Multicast".
 - b) Specify the "Multicast Address" that is the destination IPv4 address of the IP connection.
Note: Use the destination address also in the IP data source, e.g. a stream program.
 - c) Specify the port that is the destination port of the IP connection.
Note: Use the destination port also in the IP data source.
 - d) Specify the **IGMPv3** source address that is the source IPv4 address of the IP connection.
 A source address different from "0.0.0.0" accepts only data originating from the specified IP address.
 - e) Optionally, to check availability of the "IGMPv3 Source Address", click "Ping Source Address"
 - If "Ping Result > Ping: Successful", the source address is available.
 - If "Ping Result > Ping: Transmit Failed. Destination Host Unreachable", try another address.
 - f) Optionally, specify a name for the IP connection, e.g. "Alias > Service".
 - g) Select "Input IP > On", to activate the IP channel.

Input Signal				
Input IP <input checked="" type="checkbox"/>	Alias	Service	General	
Type Multicast	Multicast Address	224.3.2.1	Info	
Port 6 002	IGMPv3 Source Address	123.4.5.6	Test Signal	
Ping Source Address	Local IP Data Network ...	IP Channel 1		
Ping Result				

The R&S SMCV100B is prepared for receiving IP TS data that is input at the "IP Data" connector.

Monitor IP data stream properties in the "Info" side tab, see [Chapter 4.2.1, "How to monitor external IP input data"](#), on page 41.

4.1.2 How to apply an external TS input signal

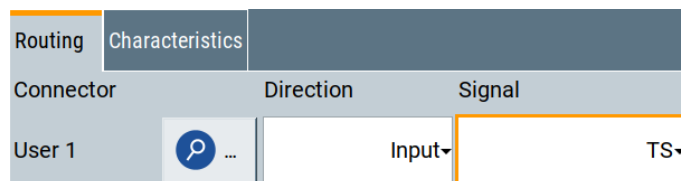
To connect to the external TS input interface

1. Use a double-shielded 75 Ω BNC cable for connection between R&S SMCV100B and the external [MPEG](#) TS data source.
See also Section "Cable selection and electromagnetic interference (EMI)" in the R&S SMCV100B Getting Started user manual.
2. At the R&S SMCV100B, connect the cable to the "User 1" connector.
The connector is on the rear panel of the R&S SMCV100B.
How to: Section "To connect to pluggable connectors" in the R&S SMCV100B Getting Started user manual.

To specify the TS input interface at the R&S SMCV100B

The R&S SMCV100B is [connected](#) to an [MPEG](#) TS data source via the "User 1" connector.

1. Select "Input Signal > General > Source > External".
2. Select "General > Global Connectors".
3. In the "Global Connectors" dialog, configure the "User 1" connector for a TS input signal:
 - a) Select "Direction > Input".
 - b) Select "Signal > TS".

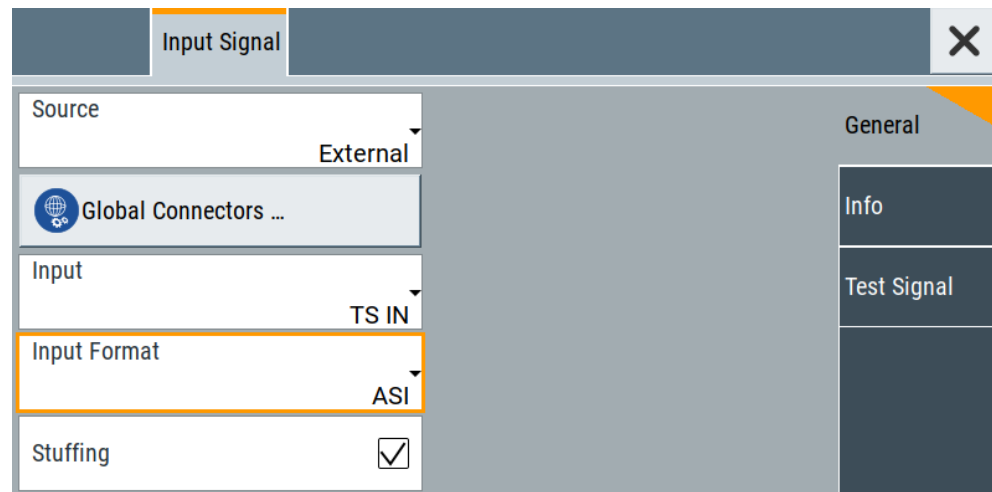


To configure an external TS input signal

The R&S SMCV100B is [prepared](#) for receiving a TS input signal at the "User 1" connector.

1. Specify general TS input signal properties:
 - a) Select "Input Signal > General > Source > External".
 - b) Select "Input > TS IN".
 - c) Specify the format of the input signal:
 - Select "ASI", if you have a source supporting [ASI](#) format.
 - Select "SMPTE 310", if you have a source supporting [SMPTE 310](#) format.
2. Optionally, activate "Stuffing" to adjust the TS data rate.

You can further specify the payload of the stuffing data, see "Test Signal > Payload Test/Stuff."



The R&S SMCV100B is prepared for receiving TS data that is input at the "User 1" connector.

Monitor TS data stream properties in the "Info" side tab, see [Chapter 4.2.2, "How to monitor an external TS input signal"](#), on page 41.

4.1.3 How to generate an internal TS signal

To play a TS file with the "TS Player"

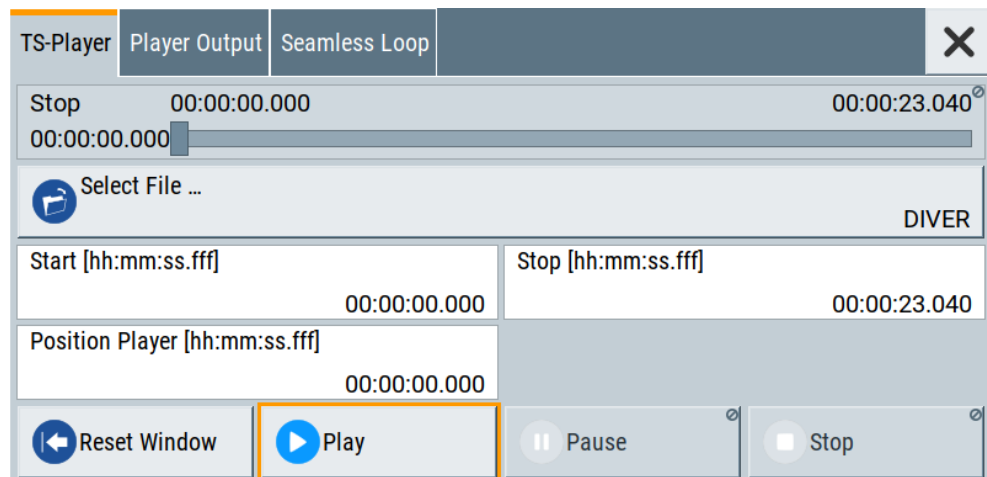
1. Select "Input Signal > Source > TS Player".
The "TS Player" button appears below.
2. Click "TS Player".
The "TS Player" dialog for playing TS data files opens.
3. Click "Play" to play the default file `DIVER.trp`.
Playing the file requires no option.

To load and play a stream library file

1. Load the file from its storage location:
 - External storage device (HDD, memory stick): Load the file from the `/usb/` directory.
 - Internal memory (SSD): Load the file from the user directory `/var/user/`

Note: Library files are encrypted files. Loading the library file at the R&S SMCV100B requires installation of the corresponding library option. See ["Required options"](#) on page 23.

2. To load the file at the R&S SMCV100B, open the "TS Player" application in digital broadcast standard ("**<Broadcast_Standard>**") dialogs:
 - a) Select "Baseband" > "**<Broadcast_Standard>**" > "Input Signal".
 - b) Select "Source" > "TS Player".
 - c) Select "TS Player" button.
 - d) Select "Select File".
3. To select the file, navigate to the storage location (1).
4. Select "TS-Player" > "Play".



The R&S SMCV100B processes the stream file.

5. Select "**<Broadcast_Standard>**" > "State" > "On", to activate the baseband signal.
6. In the block diagram, select "RF" > "On".

The stream file is modulated onto the RF carrier and output at the "RF 50 Ω" connector.

4.2 Monitoring the input signal

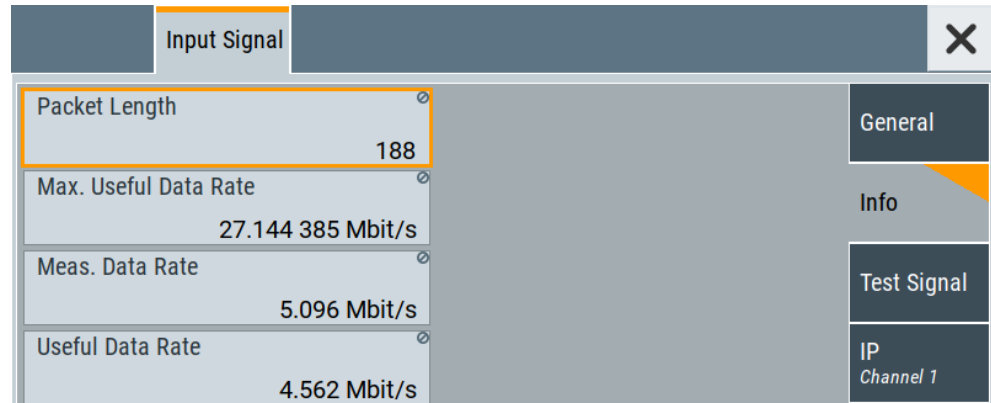
This chapter provides an overview of the different input signals, that the R&S SMCV100B uses as modulation data.

- [How to monitor external IP input data](#).....41
- [How to monitor an external TS input signal](#)..... 41
- [How to monitor an internal TS player signal](#)..... 42

4.2.1 How to monitor external IP input data

The R&S SMCV100B receives external IP input data as described in [Chapter 4.1.1, "How to apply an external IP input signal"](#), on page 35.

- ▶ Select "Input Signal > Info"



Input Signal		General
Packet Length	188	Info
Max. Useful Data Rate	27.144 385 Mbit/s	Test Signal
Meas. Data Rate	5.096 Mbit/s	IP Channel 1
Useful Data Rate	4.562 Mbit/s	

The "Info" side tab displays physical properties of the input IP stream data.

The standard packet length is 188 byte. The maximum useful data rate is specified by the broadcast standard.

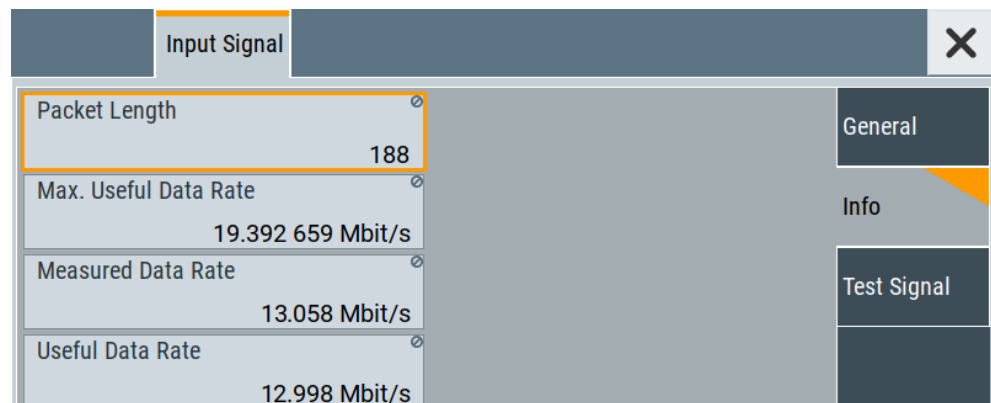
The measured data rate is lower and depends on the [TS](#) source settings. The useful data rate is lower than the measured data rate due to null packets present in the transport stream.

If "Stuffing > On", the useful data rate can be lower than the maximum useful data rate.

4.2.2 How to monitor an external TS input signal

The R&S SMCV100B receives external TS input data as described in [Chapter 4.1.2, "How to apply an external TS input signal"](#), on page 38.

- ▶ Select "Input Signal > Info"



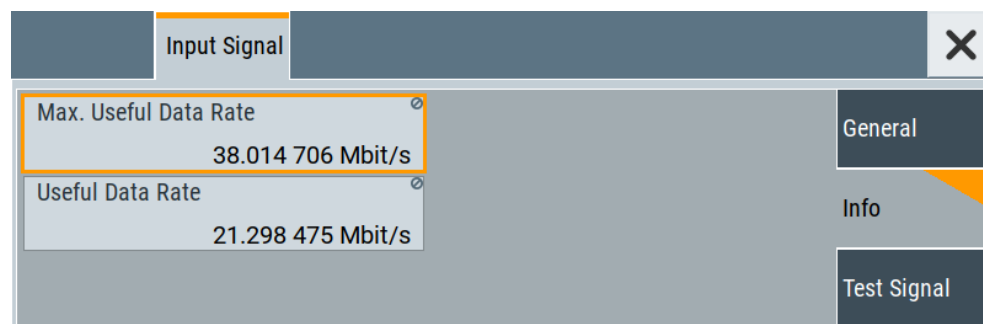
Input Signal		General
Packet Length	188	Info
Max. Useful Data Rate	19.392 659 Mbit/s	Test Signal
Measured Data Rate	13.058 Mbit/s	
Useful Data Rate	12.998 Mbit/s	

The "Info" side tab displays physical properties of the input TS stream data.

4.2.3 How to monitor an internal TS player signal

The R&S SMCV100B receives internal TS input data as described in [Chapter 4.1.3, "How to generate an internal TS signal"](#), on page 39.

- ▶ Select "Input Signal > Info"



The "Info" side tab displays physical properties of the TS player stream data.

5 Remote-control commands

The following commands are required to generate signals with the DVB-C option in a remote environment. We assume that the R&S SMCV100B has already been set up for remote operation in a network as described in the R&S SMCV100B documentation. A knowledge about the remote control operation and the SCPI command syntax is assumed.

Common suffixes

The following common suffixes are used in the remote commands:

Suffix	Value range	Description
SOURce<hw>	1	Available baseband signals

Programming examples

This description provides simple programming examples. The purpose of the examples is to present **all** commands for a given task. In real applications, one would rather reduce the examples to an appropriate subset of commands.

The programming examples have been tested with a software tool which provides an environment for the development and execution of remote tests. To keep the example as simple as possible, only the "clean" SCPI syntax elements are reported. Non-executable command lines (e.g. comments) start with two // characters.

At the beginning of the most remote control program, an instrument preset/reset is recommended to set the instrument to a definite state. The commands *RST and SYSTem:PRESet are equivalent for this purpose. *CLS also resets the status registers and clears the output buffer.

The following commands specific to the DVB-C are described here:

• General commands	44
• Input commands	46
• Coding commands	56
• Special commands	58
• TSGen subsystem	59
• BCIP subsystem	67

5.1 General commands

Example: Saving current configuration

```
SOURce1:BB:DVBC:SETTing:STORe "/var/user/my_dvbc"
// Saves the file "my_dvbc.dvbc" in the directory as above.
*RST
SOURce1:BB:DVBC:SETTing:CATalog?
// Response: "my_dvbc"
SOURce1:BB:DVBC:SETTing:LOAD "/var/user/my_dvbc"
SOURce1:BB:DVBC:SETTing:DELeTe "my_dvbc"
SOURce1:BB:DVBC:SETTing:STATe 1
```

[:SOURce<hw>]:BB:DVBC:STATe.....	44
[:SOURce<hw>]:BB:DVBC:PRESet.....	44
[:SOURce<hw>]:BB:DVBC:SETTing:STORe.....	44
[:SOURce<hw>]:BB:DVBC:SETTing:LOAD.....	45
[:SOURce<hw>]:BB:DVBC:SETTing:DELeTe.....	45
[:SOURce<hw>]:BB:DVBC:SETTing:CATalog?.....	45

[:SOURce<hw>]:BB:DVBC:STATe <State>

Enables/disables the DVB-S standard.

Parameters:

<State> 1 | ON | 0 | OFF
 *RST: 0

Example: See [Example "Saving current configuration"](#) on page 44.

Manual operation: See ["State"](#) on page 10

[:SOURce<hw>]:BB:DVBC:PRESet

Sets the parameters of the digital standard to their default values (*RST values specified for the commands).

Not affected is the state set with the command `SOURce<hw>:BB:DVBC:STATe`.

Setting parameters:

<Preset> select

Example: See [Example "Saving current configuration"](#) on page 44.

Usage: Event

Manual operation: See ["Set To Default"](#) on page 10

[:SOURce<hw>]:BB:DVBC:SETTing:STORe <Save>

Saves the current settings into the selected file; the file extension (*.dvbc) is assigned automatically.

Parameters:

<Save> "<filename>"
 Filename or complete file path

Example: See [Example"Saving current configuration"](#) on page 44.

Manual operation: See ["Save/Recall"](#) on page 11

[:SOURce<hw>]:BB:DVBC:SETTing:LOAD <Recall>

Loads the selected file from the default or the specified directory. Loaded are files with extension * .dvbc.

Parameters:

<Recall> "<filename>"
 Filename or complete file path; file extension can be omitted.

Example: See [Example"Saving current configuration"](#) on page 44.

Manual operation: See ["Save/Recall"](#) on page 11

[:SOURce<hw>]:BB:DVBC:SETTing:DELete <Delete>

Deletes the selected file from the default or the specified directory. Deleted are files with extension * .dvbc.

Setting parameters:

<Delete> "<filename>"
 Filename or complete file path; file extension can be omitted.

Example: See [Example"Saving current configuration"](#) on page 44.

Usage: Setting only

Manual operation: See ["Save/Recall"](#) on page 11

[:SOURce<hw>]:BB:DVBC:SETTing:CATalog?

Queries the files with settings in the default directory. Listed are files with the file extension * .dvbc.

Return values:

<Catalog> <filename1>,<filename2>,...
 Returns a string of filenames separated by commas.

Example: See [Example"Saving current configuration"](#) on page 44.

Usage: Query only

Manual operation: See ["Save/Recall"](#) on page 11

5.2 Input commands

• General commands	46
• Info commands	48
• Test signal commands	51
• IP subsystem	53

5.2.1 General commands

Example: Configuring general input signal properties

```
SOURce1:BB:DVBC:SOURce EXT
SOURce1:BB:DVBC:INPut?
// Response: "TS"
SOURce1:BB:DVBC:INPut:FORMat?
// Response: "ASI"
SOURce1:BB:DVBC:INPut IP
SOURce1:BB:DVBC:INPut:TSCHannel 2
SOURce1:BB:DVBC:STUFFing?
// Response: "1"
// Stuffing is always activated.
```

[:SOURce<hw>]:BB:DVBC:SOURce	46
[:SOURce<hw>]:BB:DVBC:INPut	46
[:SOURce<hw>]:BB:DVBC:INPut:FORMat	47
[:SOURce<hw>]:BB:DVBC:INPut:TSCHannel	47
[:SOURce<hw>]:BB:DVBC:STUFFing?	47
[:SOURce<hw>]:BB:DVBC:TESTsignal	48

[:SOURce<hw>]:BB:DVBC:SOURce <InpSigSource>

Sets the modulation source for the input signal.

Parameters:

<InpSigSource> EXTernal | TSPLayer | TESTsignal
*RST: EXTernal

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Manual operation: See ["Source"](#) on page 12

[:SOURce<hw>]:BB:DVBC:INPut <InpSigInput>

Sets the external input interface.

Parameters:

<InpSigInput> TS | IP

TS

Input for serial transport stream data. The signal is input at the "User 1/2" connectors.

IP

Input for IP transport stream data. The signal is input at the "IP Data" connector.

*RST: TS

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Manual operation: See ["Input"](#) on page 13

[:SOURce<hw>]:BB:DVBC:INPut:FORMat <InpSigFormat>

Sets the format of the input signal.

Parameters:

<InpSigFormat> ASI | SMPTE

*RST: ASI

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Manual operation: See ["Input Format"](#) on page 13

[:SOURce<hw>]:BB:DVBC:INPut:TSCHannel <InpSigTSChannel>

Selects the IP-based transport stream (TS) channel. You can select 1 out of 4 IP TS channels as input at the "IP Data" interface.

To configure a particular channel, see [Chapter 3.2.4, "IP channel x settings"](#), on page 17.

Parameters:

<InpSigTSChannel> 1 | 2 | 3 | 4

*RST: 1

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Manual operation: See ["IP TS Channel"](#) on page 13

[:SOURce<hw>]:BB:DVBC:STUFFing?

Queries the stuffing state that is active.

Return values:

<InpSigStuffing> 1 | ON

*RST: 1

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Usage: Query only
Manual operation: See ["Stuffing"](#) on page 13

[:SOURce<hw>]:BB:DVBC:TESTsignal <InpSigTestSig>

Defines the test signal data.

Parameters:

<InpSigTestSig> TTSP | PBDE | PBEM

TTSP

Test TS packet with standardized packet data used as modulation data in the transport stream.

PBDE

PRBS before differential encoder

Pure pseudo-random bit sequence (PRBS) data used as modulation data with no packet structure. The sequence is inserted before the differential encoder. PRBS data conforms with [ITU-T O.151](#) specification.

PBEM

PRBS before mapper

Pure pseudo-random bit sequence (PRBS) data used as modulation data with no packet structure. The sequence is inserted before the mapper.

*RST: TTSP

Example: See [Example "Configuring general input signal properties"](#) on page 46.

Manual operation: See ["Test Signal"](#) on page 14

5.2.2 Info commands

Example: Querying input signal properties

```
*****
// Query properties of signals at TS IN interface.
*****
SOURce1:BB:DVBC:SOURce EXT
SOURce1:BB:DVBC:INPut TS
SOURce1:BB:DVBC:PACKetlength?
// Response: "P188"
SOURce1:BB:DVBC:USEFul:RATE:MAX?
// Response in MBit/s: "19.392659"
SOURce1:BB:DVBC:USEFul:RATE?
// Response in MBit/s: "17.654321"
SOURce1:BB:DVBC:INPut:DATarate?
// Response in MBit/s: "18.765432"
```



```

*****
// Query properties of signals at IP Data interface.
*****
SOURcel:BB:DVBC:SOURce EXT
SOURcel:BB:DVBC:INPut IP
// You can query input signal properties for one IP TS channel only.
// Query properties for, e.g., IP TS channel 2.
SOURcel:BB:DVBC:INPut:TSCHannel 2
SOURcel:BB:DVBC:PACKetlength?
// Response: "P188"
SOURcel:BB:DVBC:USEFul:RATE:MAX?
// Response in MBit/s: "432.109876"
SOURcel:BB:DVBC:INPut:DATarate?
// Response in MBit/s: "400.000000"
SOURcel:BB:DVBC:INPut:DATarate?
// Response in MBit/s: "399.876543"

*****
// Query properties of internal TS player input signals.
*****
SOURcel:BB:DVBC:SOURce TSPL
SOURcel:BB:DVBC:USEFul:RATE:MAX?
// Response in MBit/s: "19.392659"
SOURcel:BB:DVBC:USEFul:RATE?
// Response in MBit/s: "17.654321"

```

For configuring IP channel settings and local IP data network parameters, see:

- [Chapter 5.2.4, "IP subsystem"](#), on page 53
- [Chapter 5.6, "BCIP subsystem"](#), on page 67

[:SOURce<hw>]:BB:DVBC:PACKetlength?	49
[:SOURce<hw>]:BB:DVBC:USEFul[:RATE]:MAX?	50
[:SOURce<hw>]:BB:DVBC[:INPut]:DATarate?	50
[:SOURce<hw>]:BB:DVBC:USEFul[:RATE]?	50

`[:SOURce<hw>]:BB:DVBC:PACKetlength?`

Queries the packet length of the external transport stream in bytes.

Return values:

<InpSigPLength> P188 | P204 | INValid

P188|P204

188/204 byte packets specified for serial input and parallel input.

INValid

Packet length does not match the specified length.

Example:

See [Example "Configuring general input signal properties"](#) on page 46.

Usage:

Query only

Manual operation:

See ["Packet Length"](#) on page 15

[[:SOURce<hw>]:BB:DVBC:USEFul[:RATE]:MAX?

Queries the maximum data rate, that is derived from the current modulation parameter settings.

The value is the optimal value at the TS input interface, that is necessary for the modulator.

Return values:

<InpSigMaxRate> float
 Range: 0 to 999999999
 Increment: 0.000001
 *RST: 0

Example: See [Example"Configuring general input signal properties"](#) on page 46.

Usage: Query only

Manual operation: See "[Max. Useful Data Rate](#)" on page 15

[[:SOURce<hw>]:BB:DVBC[:INPut]:DATarate?

Queries the measured value of the data rate of one of the following:

External transport stream including null packets input at "User 1" connector

External transport stream including null packets input at "IP Data/LAN" connector (TSoverIP)

The value equals the sum of useful data rate r_{meas} and the rate of null packets r_0 :

$$r_{meas} = r_{meas} + r_0$$

Return values:

<InpSigDatarate> float
 Range: 0 to 999999999
 Increment: 0.001
 *RST: 0

Example: See [Example"Configuring general input signal properties"](#) on page 46.

Usage: Query only

Manual operation: See "[Measured Data Rate](#)" on page 15

[[:SOURce<hw>]:BB:DVBC:USEFul[:RATE]?

Queries the data rate of useful data r_{useful} of the external transport stream. The data rate is measured at the input of the installed input interface.

Return values:

<InpSigUsefull> float
 Range: 0 to 999999999
 Increment: 0.001
 *RST: 0

Example: See [Example"Configuring general input signal properties"](#) on page 46.

Usage: Query only

Manual operation: See ["Useful Data Rate"](#) on page 15

5.2.3 Test signal commands

Example: Configuring test signal properties

```

SOURCE1:BB:DVBC:SOURCE TEST
SOURCE1:BB:DVBC:TESTsignal TTSP
// Sets a test TS packet as test signal.

*****
// Alternatively, set more specific test signals with PRBS parts within the
// test packet.
*****
SOURCE1:BB:DVBC:TESTsignal PBDE
// Inserts the PRBS sequence before the differential encoder.
SOURCE1:BB:DVBC:TESTsignal PBEM
// Inserts the PRBS sequence after the mapper.

*****
// Configure test signal properties.
*****
SOURCE1:BB:DVBC:TSPacket H184
SOURCE1:BB:DVBC:PIDTestpack NULL
SOURCE1:BB:DVBC:PID?
// Response in decimal representation: "8191"
// Response in hexadecimal representation: "1FFF"
SOURCE1:BB:DVBC:PIDTestpack VAR
SOURCE1:BB:DVBC:PID 4607
// Corresponds to "11FF" in hexadecimal representation.
SOURCE1:BB:DVBC:PAYLoad PRBS
SOURCE1:BB:DVBC:PRBS P23_1

[:SOURCE1<hw>]:BB:DVBC:TSPacket.....52
[:SOURCE1<hw>]:BB:DVBC:PIDTestpack.....52
[:SOURCE1<hw>]:BB:DVBC:PID.....52
[:SOURCE1<hw>]:BB:DVBC:PAYLoad.....52
[:SOURCE1<hw>]:BB:DVBC:PRBS.....53

```

[:SOURCE<hw>]:BB:DVBC:TSPacket <SetTSPacket>

Specifies the structure of the test transport stream packet that is fed to the modulator.

Parameters:

<SetTSPacket> H184 | S187
H184
Head/184 Payload
S187
Sync/187 Payload
*RST: H184

Example: See [Example"Configuring test signal properties"](#) on page 51.

Manual operation: See ["Test TS Packet"](#) on page 16

[:SOURCE<hw>]:BB:DVBC:PIDTestpack <SetPIDTestpack>

If a header is present in the test packet ("Test TS Packet > Head/184 Payload"), you can specify a fixed or variable packet identifier (PID).

Parameters:

<SetPIDTestpack> NULL | VARIABLE
*RST: NULL

Example: See [Example"Configuring test signal properties"](#) on page 51.

Manual operation: See ["PID Test Packet"](#) on page 17

[:SOURCE<hw>]:BB:DVBC:PID <SetPID>

Sets the [PID](#).

Parameters:

<SetPID> integer
Range: 0 to 8191
*RST: 8191

Example: See [Example"Configuring test signal properties"](#) on page 51.

Manual operation: See ["PID \(Hex\)"](#) on page 17

[:SOURCE<hw>]:BB:DVBC:PAYLoad <SetPayload>

Defines the payload area content of the [TS](#) packet.

Parameters:

<SetPayload> PRBS | H00 | HFF
PRBS
PRBS data in accordance with [ITU-T O.151](#)
H00
Exclusively 00 (hex) data

HFF

Exclusively FF (hex) data

*RST: PRBS

Example: See [Example"Configuring test signal properties"](#) on page 51.**Manual operation:** See ["Payload Test/Stuff."](#) on page 17**[:SOURce<hw>]:BB:DVBC:PRBS <SetPRBS>**

Sets the length of the PRBS sequence.

You can select a PRBS 15 or a PRBS 23 sequence as specified by [ITU-T O.151](#).**Parameters:**

<SetPRBS> P23_1 | P15_1

P23_1PRBS 23 sequence as specified by [ITU-T O.151](#).**P15_1**PRBS 15 sequence as specified by [ITU-T O.151](#).

*RST: P23_1

Example: See [Example"Configuring test signal properties"](#) on page 51.**Manual operation:** See ["PRBS"](#) on page 17

5.2.4 IP subsystem

The `SOURCE:BB:INPUT:IP` subsystem contains the commands for configuring input IP data from a local IP data network.

To configure local IP data network parameters, see [Chapter 5.6, "BCIP subsystem"](#), on page 67.

Common suffixes

The following common suffixes are used in the `SOURCE:BB:INPUT:IP` remote commands:

Suffix	Value range	Description
IP<ch>	1 to 4	IP channel number

Example: Configure IP channel 2 properties

```
// Use the data from IP channel 2 as input for modulation data.
```

```
SOURce1:BB:INPut:IP2:STATe ON
```

```
// Specify alias as "Alias 2".
```

```
SOURce1:BB:INPut:IP2:ALIAS "Alias 2"
```

```
//*****
```

```
// Define Unicast properties.
```

```

//*****
SOURCE1:BB:INPut:IP2:TYPe UNI
// Local IP data interface is configured for Unicast reception
SOURCE1:BB:INPut:IP2:PORT 6002

//*****
// Define multicast properties.
//*****
SOURCE1:BB:INPut:IP2:TYPe MULT
// Local IP data interface is configured for Multicast reception
SOURCE1:BB:INPut:IP2:MULTicast:ADDRess?
// Response: "226.0.0.0"
SOURCE1:BB:INPut:IP2:IGMP:SOURce:ADDRess?
// Response: "0.0.0.0"
SOURCE1:BB:INPut:IP2:IGMP:SOURce:ADDRess "192.168.10.1"
SOURCE1:BB:INPut:IP2:IGMP:SOURce:PING
SOURCE1:BB:INPut:IP2:IGMP:SOURce:RESult?
// Response: "Ping: Successful"

```

Commands

[:SOURCE<hw>]:BB:INPut:IP<ch>[:STATe]	54
[:SOURCE<hw>]:BB:INPut:IP<ch>:ALias	54
[:SOURCE<hw>]:BB:INPut:IP<ch>:PORT	55
[:SOURCE<hw>]:BB:INPut:IP<ch>:TYPe	55
[:SOURCE<hw>]:BB:INPut:IP<ch>:MULTicast:ADDRess	55
[:SOURCE<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:ADDRess	56
[:SOURCE<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:PING	56
[:SOURCE<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:RESult?	56

[\[:SOURCE<hw>\]:BB:INPut:IP<ch>\[:STATe\]](#) <Alias>

Activates/deactivates the "IP Channel x" as IP input.

Specify the current IP TS Channel with the command

`SOURCE1:BB:DigStd:INPut:TSCHannel`. `DigStd` stands for the IP TS Channel in the corresponding broadcast standard.

Parameters:

<Alias> 1 | ON | 0 | OFF
 *RST: 0

Example: See [Example "Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["Input IP"](#) on page 19

[\[:SOURCE<hw>\]:BB:INPut:IP<ch>:ALias](#) <Alias>

Specifies an alias, i.e. name for the IP connection.

Parameters:

<Alias> string

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["Alias"](#) on page 19

[:SOURce<hw>]:BB:INPut:IP<ch>:PORT <Port>

Sets the port of the input IP data at the "IP Data" connector.

Parameters:

<Port> integer
 Range: 0 to 65535
 *RST: 6002

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["Port"](#) on page 20

[:SOURce<hw>]:BB:INPut:IP<ch>:TYPE <Type>

Sets the IP input type.

Parameters:

<Type> UNicast | MULTicast

UNicast

Analyzes all unicast IP packets that arrive at the specified port. See [\[:SOURce<hw>\]:BB:INPut:IP<ch>:PORT](#) on page 55.

MULTicast

When an IP address is in the multicast address range, an attempt is made to join a multicast group using IGMP. Set multi-cast address and port.

See:

[\[:SOURce<hw>\]:BB:INPut:IP<ch>:MULTicast:ADDRESS](#) on page 55

[\[:SOURce<hw>\]:BB:INPut:IP<ch>:PORT](#) on page 55

*RST: UNicast

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["Type"](#) on page 19

[:SOURce<hw>]:BB:INPut:IP<ch>:MULTicast:ADDRESS

Sets the destination IP address (IPv4) of the IP connection.

Parameters:

<Address> string
 Range: 224.0.0.0 to 239.255.255.255

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["Multicast Address"](#) on page 19

[:SOURce<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:ADDRess

Specifies the IGMP source address of the network.

Parameters:

<Address> string

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Manual operation: See ["IGMPv3 Source Address"](#) on page 20

[:SOURce<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:PING

Triggers pinging of the IGMP source address in the local IP data network. Query the result via `[:SOURce<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:RESult?` on page 56.

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Usage: Event

Manual operation: See ["Ping Source Address"](#) on page 20

[:SOURce<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:RESult?

Queries the result of pinging the IGMP source address.

See `[:SOURce<hw>]:BB:INPut:IP<ch>:IGMP[:SOURce]:PING` on page 56.

Return values:

<PingResult> string
Returns ping messages.

Example: See [Example"Configure IP channel 2 properties"](#) on page 53.

Usage: Query only

Manual operation: See ["Ping Result"](#) on page 20

5.3 Coding commands

Example: Configuring coding properties

```
SOURce1:BB:DVBC:SYMBOLs 8000000
// Symbol rate is 8 mega samples per second.
SOURce1:BB:DVBC:CONStel C64
// Constellation is 64QAM.
SOURce1:BB:DVBC:ROLLoff 0.15
// Roll-off factor is 0.15.
SOURce1:BB:DVBC:STATe 1
```


[:SOURce<hw>]:BB:DVBC:SYMBOLs.....	57
[:SOURce<hw>]:BB:DVBC:CONStel.....	57
[:SOURce<hw>]:BB:DVBC:ROLLoff.....	57

[:SOURce<hw>]:BB:DVBC:SYMBOLs <Symbolrate>

Sets the symbol rate.

Parameters:

<Symbolrate> integer
 Range: 1.00E+05 to 8.00E+07
 *RST: 6.9e6

Example: See [Example"Configuring coding properties"](#) on page 56.

Manual operation: See ["Symbol Rate"](#) on page 21

[:SOURce<hw>]:BB:DVBC:CONStel <Constel>

Defines the constellation.

Parameters:

<Constel> C16 | C32 | C64 | C128 | C256
 C16|C32|C64|C128|C256
 16/32/64/128/256QAM
 *RST: C64

Example: See [Example"Configuring coding properties"](#) on page 56.

Manual operation: See ["Constellation"](#) on page 21

[:SOURce<hw>]:BB:DVBC:ROLLoff <RollOff>

Displays the roll-off factor.

Parameters:

<RollOff> 0.13 | 0.15
 *RST: 0.15

Example: See [Example"Configuring coding properties"](#) on page 56.

Manual operation: See ["Roll Off"](#) on page 21

5.4 Special commands

Example: Configuring special settings

```
*****
// Query standard-compliant configuration.
*****
SOURCE1:BB:DVBC:SPECIAL:REEDsolomon?
// Response: "1"
// Standard-compliant configuration implies an active Reed Solomon encoder.
SOURCE1:BB:DVBC:SPECIAL:SETTINGS:STATE?
// Response: "0"
// Standard-compliant configuration implies disabled special settings.

*****
// Set non-standard configuration.
*****
SOURCE1:BB:DVBC:SPECIAL:REEDsolomon 0
SOURCE1:BB:DVBC:SPECIAL:SETTING:STATE 1

[:SOURCE<hw>]:BB:DVBC[:SPECIAL]:SETTING[:STATE].....58
[:SOURCE<hw>]:BB:DVBC[:SPECIAL]:REEDsolomon.....58
```

[:SOURCE<hw>]:BB:DVBC[:SPECIAL]:SETTING[:STATE] <SpecialState>

Enables/disables special settings.

The setting allows you to switch between standard-compliant and user-defined channel coding.

Parameters:

<SpecialState> 1 | ON | 0 | OFF
*RST: 0

Example: See [Example"Configuring special settings"](#) on page 58.

Manual operation: See ["Special Settings"](#) on page 22

[:SOURCE<hw>]:BB:DVBC[:SPECIAL]:REEDsolomon <ReedSolomon>

Enables/disables the Reed-Solomon encoder.

Parameters:

<ReedSolomon> 1 | ON | 0 | OFF
*RST: 1

Example: See [Example"Configuring special settings"](#) on page 58.

Manual operation: See ["Reed Solomon"](#) on page 22

5.5 TSGen subsystem

The TSGen subsystem contains the commands for configuring the TS player.

Example: Playing a TS player file

```
//*****
// Select a file, e.g. a user-defined setting.
//*****
TSGen:CONFigure:PLAYfile "/var/user/my_test_player_test.trp"
// Selects the file "my_test_player_test" with extension *.trp.

//*****
// Within the file, define a section, that you want to play.
// You can set start/stop position for a maximum section length of 10 hours.
//*****
TSGen:CONFigure:SEEK:START 60000 // milliseconds
// Section start is after one minute from the original file start.
// The first minute is ignored.
TSGen:CONFigure:SEEK:STOP 120000 // milliseconds
// Section stop is after one minute from the original file start.
// The total section length is one minute.

//*****
// Navigate to a certain position within the file/section of the file.
//*****
TSGen:CONFigure:SEEK:POSition 100000 // milliseconds
// The current player position of file/section of the file is at 1 minute 40 seconds.

//*****
// Reset play-related settings
//*****
TSGen:CONFigure:SEEK:RESet

//*****
// Pause, stop, play the file.
//*****
TSGen:CONFigure:COMManD PAUS
// Pauses playing the file.
TSGen:CONFigure:COMManD STOP
// Stops playing the file.
TSGen:CONFigure:COMManD PLAY
// Activates playing the file.
```

Example: Configuring and monitoring TS player output

```

//*****
// Configure general and stuffing parameters of the TS player output.
//*****
TSGen:CONFigure:STUFFing ON
TSGen:CONFigure:STOPdata TTSP
TSGen:CONFigure:TSPacket H184
TSGen:CONFigure:PIDTestpacket VAR
TSGen:CONFigure:PID 8100
// Corresponds to a PID = 1FA4 in hexadecimal representation.
TSGen:CONFigure:PAYLoad PRBS
TSGen:CONFigure:PRBS:SEQuence P23_1

//*****
// Monitor TS player output data.
//*****
// You can only change the data rate, if you stop the TS player.
TSGen:CONFigure:COMMand STOP
TSGen:CONFigure:TSRate 350E6
// Corresponds to a net data rate of 350 MBit/s.
TSGen:CONFigure:COMMand PLAY

TSGen:CONFigure:PLENght?
// Response: "P188"
// Packet length is 188 bytes.
TSGen:READ:ORIGtsrate?
// Response in bit/s: "5018502"

```

Example: Configuring seamless loop parameters

```

TSGen:CONFigure:SEAMless:CC ON
TSGen:CONFigure:SEAMless:PCR OFF
TSGen:CONFigure:SEAMless:TT ON

```

Commands

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:TSGen:READ:ORIGtsrate.....	66
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:TSGen:CONFigure:COMMand <PlayerStatus>

Triggers playing, pausing and stopping of the TS player file selected with `:TSGen:CONFigure:PLAYfile`.

Parameters:

<PlayerStatus> STOP | PAUSE | PLAY | RESet
 *RST: STOP

Example: See [Example"Playing a TS player file"](#) on page 59.

Manual operation: See ["Play"](#) on page 27
 See ["Pause"](#) on page 27
 See ["Stop"](#) on page 27

:TSGen:CONFigure:PAYLoad <PayLoad>

Determines the payload of the test packet. Also influences the payload of the generated stuffing packets while the TS player is running.

Parameters:

<PayLoad> HFF | H00 | PRBS
 *RST: PRBS

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Payload Test/Stuff"](#) on page 30

:TSGen:CONFigure:PID <PID>

The available values depend on the settings of `:TSGen:CONFigure:PIDTestpack`.

If `:TSGen:CONFigure:PIDTestpack` is set to NULL,
 then `:TSGen:CONFigure:PID` is 1FFF (hex).

Otherwise the values are variable.

Parameters:

<PID> integer
 Range: 0 to 8191
 *RST: 8191

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["PID \(Hex\)"](#) on page 30

:TSGen:CONFigure:PIDTestpack <PIDTestpack>

Sets the PID, if `:TSGen:CONFigure:TSPacket` is H184 | H200 | H204.

Parameters:

<PIDTestpack> VARIable | NULL
 *RST: NULL

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["PID Test Packet"](#) on page 30

:TSGen:CONFigure:PLAYfile <PlayFile>

Specifies the file path and filename of the TS player file.

Parameters:

<PlayFile> string

Example: See [Example"Playing a TS player file"](#) on page 59.

Manual operation: See ["Select File"](#) on page 25

:TSGen:CONFigure:PLENgtH <PLength>

Queries the packet length of the loaded file.

Parameters:

<PLength> P188 | P204 | P208 | INV
 *RST: INV

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Packet Length"](#) on page 28

:TSGen:CONFigure:PRBS[:SEQuence] <PRBS>

Sets the length of the PRBS sequence.

Parameters:

<PRBS> P15_1 | P23_1
 *RST: P23_1

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["PRBS"](#) on page 31

:TSGen:CONFigure:SEAMless:CC <CC>

Activates the correction of the continuity counters in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

Parameters:

<CC> 1 | ON | 0 | OFF
*RST: 0

Example: See [Example"Configuring seamless loop parameters"](#) on page 60.

Manual operation: See ["Continuity Counter"](#) on page 31

:TSGen:CONFigure:SEAMless:PCR <PCR>

Activates the correction of time stamps in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

Parameters:

<PCR> 1 | ON | 0 | OFF
*RST: 0

Example: See [Example"Configuring seamless loop parameters"](#) on page 60.

Manual operation: See ["PCR, DTS/PTS"](#) on page 32

:TSGen:CONFigure:SEAMless:TT <TT>

Activates the correction of the time and date table in the replayed TS data stream. The correction allows you to decode the stream without interruption when the play file is looping.

Parameters:

<TT> 1 | ON | 0 | OFF
*RST: 0

Example: See [Example"Configuring seamless loop parameters"](#) on page 60.

Manual operation: See ["TDT/TOT"](#) on page 32

:TSGen:CONFigure:SEEK:POSition <Position>

Sets the position, that is the current playing time position.

You can select a value in a 10-hour range.

Parameters:

<Position> float
 Range: 0 to 36000000
 Increment: 0.1
 *RST: 0

Example: See [Example"Playing a TS player file"](#) on page 59.

Manual operation: See ["Running/Position Player \[hh:mm:ss.fff\]"](#) on page 25
 See ["Position Player \[hh:mm:ss.fff\]"](#) on page 27

:TSGen:CONFigure:SEEK:RESet

Resets the following parameters to their default state:

- [:TSGen:CONFigure:SEEK:START](#) on page 64
- [:TSGen:CONFigure:SEEK:STOP](#) on page 64

Example: See [Example"Playing a TS player file"](#) on page 59.

Usage: Event

Manual operation: See ["Reset Window"](#) on page 27

:TSGen:CONFigure:SEEK:START <Start>

Sets an individual start time.

You can select a value in a 10-hour range.

Parameters:

<Start> float
 Range: 0 to 36000000
 Increment: 0.1
 *RST: 0

Example: See [Example"Playing a TS player file"](#) on page 59.

Manual operation: See ["Start \[hh:mm:ss.fff\]"](#) on page 26

:TSGen:CONFigure:SEEK:STOP <Stop>

Sets an individual stop time.

You can select a value in a 10-hour range.

Parameters:

<Stop> float
 Range: 0 to 36000000
 Increment: 0.1
 *RST: 23040.2

Example: See [Example"Playing a TS player file"](#) on page 59.

Manual operation: See ["Stop \[hh:mm:ss.fff\]"](#) on page 27

:TSGen:CONFigure:STOPdata <StopData>

Ensures that a standardized TS data stream is always output at the TS output at the rear of the R&S SMCV100B.

Parameters:

<StopData> TTSP | NONE
*RST: NONE

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Stop Data"](#) on page 29

:TSGen:CONFigure:STUFFing <Stuffing>

Activates nullpacket stuffing.

Parameters:

<Stuffing> 1 | ON | 0 | OFF
*RST: 0

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Nullpacket Stuffing"](#) on page 28

:TSGen:CONFigure:TSPacket <TSPaket>

Sets the structure of the generated test packets in pause or stop status.

Parameters:

<TSPaket> H184 | H200 | H204 | S187 | S203 | S207
S187|S203|S207
A sync byte (0x47) followed by 187/203/207 payload bytes.
H184|H200|H204
A sync byte (0x47) followed by three header bytes and 184/200/204 payload bytes.
*RST: H184

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Test TS Packet"](#) on page 30

:TSGen:CONFigure:TSRate <TSRate>

Sets the output data rate of the player.

Parameters:

<TSRate> integer
 Range: 1 to 35E7
 *RST: 5018502

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Data Rate"](#) on page 28

:TSGen:READ:FMEemory <FMemory>

Queries the file size of the TS player file.

Parameters:

<FMemory> integer
 Range: 0 to 10
 *RST: 0

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Select File"](#) on page 25

:TSGen:READ:ORIGtsrate <ORIGtsrate>

Displays the calculated original TS data rate.

Parameters:

<ORIGtsrate> integer
 Range: 1 to 350000000
 *RST: 5018502

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Manual operation: See ["Orig. Data Rate"](#) on page 28

:TSGen:READ:PLAYfile:LENGth?

Queries calculated original loop time.

Return values:

<Length> integer
 Range: 0 to 100
 *RST: 0

Example: See [Example"Configuring and monitoring TS player output"](#) on page 60.

Usage: Query only

Manual operation: See ["Select File"](#) on page 25

5.6 BCIP subsystem

The `SYSTEM:COMMunicate:BCIP` subsystem contains the commands for configuring local IP data network parameters.

Common suffixes

The following common suffixes are used in the remote commands:

Suffix	Value range	Description
BCIP<hw>	1	Available local IP LAN interfaces

Example: Retrieving information on local network-related settings

```
//*****
// Monitor IP interface 1 local network status.
//*****
SYSTEM:COMMunicate:BCIP1:NETWork:STATus?
// Response: "0"
// The instrument is disconnected from the local IP network.
SYSTEM:COMMunicate:BCIP1:NETWork:REStart
SYSTEM:COMMunicate:BCIP1:NETWork:STATus?
// Response: "1"

//*****
// Query local IP data network properties.
//*****
SYSTEM:COMMunicate:BCIP1:NETWork:COMMOn:HOSTname?
// Response: "SMCV100B-123456-IP-Data"
SYSTEM:COMMunicate:BCIP1:NETWork:IPAdDress:MODE STAT
SYSTEM:COMMunicate:BCIP1:NETWork:IPAdDress "10.113.0.104"
SYSTEM:COMMunicate:BCIP1:NETWork:IPAdDress:SUBNet:MASK "255.255.252.0"
SYSTEM:COMMunicate:BCIP1:NETWork:MACAdDress?
// Response: "00 90 B8 21 89 F8"
SYSTEM:COMMunicate:BCIP1:NETWork:PROTOcol?
// Response: "UDP"
```

Commands

<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:COMMOn:HOSTname</code>	68
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:IPAdDress</code>	68
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:IPAdDress:MODE</code>	68
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:IPAdDress:SUBNet:MASK</code>	68
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:MACAdDress</code>	68
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:PROTOcol</code>	69
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:REStart</code>	69
<code>:SYSTEM:COMMunicate:BCIP<hw>:NETWork:STATus</code>	69

:SYSTem:COMMunicate:BCIP<hw>:NETWork:COMMon:HOSTname <Hostname>

Sets an individual hostname for the vector signal generator.

Note: We recommend that you do not change the hostname to avoid problems with the network connection. If you change the hostname, be sure to use a unique name.

Parameters:

<Hostname> string

Example: See [Example "Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["Hostname"](#) on page 33

:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPADdress

Sets the IP address.

Example: See [Example "Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["IP Address"](#) on page 34

:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPADdress:MODE <IPMode>

Selects manual or automatic setting of the IP address.

Parameters:

<IPMode> AUTO | STATic
*RST: AUTO

Example: See [Example "Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["Address Mode"](#) on page 33

:SYSTem:COMMunicate:BCIP<hw>:NETWork:IPADdress:SUBNet:MASK

Sets the subnet mask.

Example: See [Example "Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["Subnet Mask"](#) on page 34

:SYSTem:COMMunicate:BCIP<hw>:NETWork:MACAddress <MACAddress>

Queries the MAC address of the network adapter.

Parameters:

<MACAddress> string
Range: 00:00:00:00:00:00 to ff:ff:ff:ff:ff:ff

Example: See [Example"Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["MAC Address"](#) on page 34

:SYSTem:COMMunicate:BCIP<hw>:NETWork:PROTOcol <Protocol>

Specifies the network protocol.

Parameters:

<Protocol> UDP
*RST: UDP

Example: See [Example"Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["Protocol"](#) on page 34

:SYSTem:COMMunicate:BCIP<hw>:NETWork:REStart

Triggers a restart of the network.

Example: See [Example"Retrieving information on local network-related settings"](#) on page 67.

Usage: Event

Manual operation: See ["Restart Network"](#) on page 33

:SYSTem:COMMunicate:BCIP<hw>:NETWork:STATus <NetworkStatus>

Queries the network connection state.

Parameters:

<NetworkStatus> 1 | ON | 0 | OFF
*RST: n.a. (no preset. default: 0)

Example: See [Example"Retrieving information on local network-related settings"](#) on page 67.

Manual operation: See ["Network Status"](#) on page 33

Glossary: Abbreviations

A

ASI: Asynchronous Serial Interface

D

DHCP: Dynamic Host Configuration Protocol

DVB-C: Digital Video Broadcast - Cable

I

IGMPv3: Internet Group Management Protocol version 3

M

MAC: Media Access Control

MPEG: Moving Picture Experts Group

<https://mpeg.chiariglione.org/>

P

PID: Packet Identifier

PRBS: Pseudo-Random Bit Sequence

R

RTP: Real-Time Transport Protocol

S

SMPTE: Society of Motion Picture and Television Engineers

<https://www.smpite.org/>

T

TCP: Transmission Control Protocol

TS: Transport Stream

U

UDP: User Datagram Protocol

Glossary: Specifications

E

ETSI EN 300 429: Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems

https://www.etsi.org/deliver/etsi_en/300400_300499/300429

I

ITU-T O.151: ITU-T Recommendation O.151

<https://www.itu.int/rec/T-REC-O.151-199210-I/en>

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