This document describes the following software options:

- R&S®SMBV-K52/-K116
  1415.8148.xx, 1427.8002.xx

This manual version corresponds to firmware version:
FW 3.50.082.xx and later of the R&S®SMBV100A

The following abbreviations are used throughout this manual: R&S®SMBV100A is abbreviated as R&S SMBV, R&S®WinIQSIM2™ is abbreviated as R&S WinIQSIM2; the license types 02/03/07/11/13/16/12 are abbreviated as xx.
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1 Preface

1.1 About this Manual

This operating manual provides all the information specific to the DVB-H/T and DVB-S2/S2X options R&S SMBV-K52/-K116. All general instrument functions and settings common to all applications and operating modes are described in the main R&S SMBV operating manual.

The main focus in this manual is on the provided settings and the tasks required to generate a signal. The following topics are included:

- **Welcome to the DVB options**
  Introduction to and getting familiar with the option

- **About the DVB options**
  Background information on basic terms and principles in the context of the signal generation

- **DVB Configuration and Settings**
  A concise description of all functions and settings available to configure signal generation with their corresponding remote control command

- **Remote Control Commands**
  Remote commands required to configure and perform signal generation in a remote environment, sorted by tasks
  (Commands required to set up the instrument or to perform common tasks on the instrument are provided in the main R&S SMBV operating manual)
  Programming examples demonstrate the use of many commands and can usually be executed directly for test purposes

- **List of remote commands**
  Alphabetical list of all remote commands described in the manual

- **Index**

The functions specific to the discontinued products R&S®SMU200A, R&S®SMATE200A, R&S®SMJ100A and R&S®AMU200A are not described here.

Find the description of the corresponding option at the following page:

https://www.rohde-schwarz.com/product/SMU200A > "Downloads"

1.2 Documentation Overview

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

www.rohde-schwarz.com/manual/smbv100a
1.2.1 Quick Start Guide Manual

Introduces the R&S SMBV 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.

1.2.2 Operating Manual 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 quick start guide manual.

- **Software option manual**
  Contains the description of the specific functions of an option. Basic information on operating the R&S SMBV is not included.

The contents of the user manuals are available as help in the R&S SMBV. 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.

1.2.3 Service Manual

Describes the performance test for checking the rated specifications, module replacement and repair, firmware update, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS, [https://gloris.rohde-schwarz.com](https://gloris.rohde-schwarz.com)).

1.2.4 Instrument Security Procedures

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

1.2.5 Basic Safety Instructions

Contains safety instructions, operating conditions and further important information. The printed document is delivered with the instrument.
1.2.6 Data Sheets and Brochures

The data sheet contains the technical specifications of the R&S SMBV. 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/smbv100a

1.2.7 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 open source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/smbv100a

1.2.8 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/smbv100a.
2 Welcome to the DVB-H/T and DVB-S2/S2X Options

The R&S SMBV-K52/-K116 are firmware applications that add functionality to generate signals in accordance with:

- The DVB-H/T (Digital Video Broadcasting - Transmission System for Handheld Terminals) standard
- The standards describing the second-generation DVB system for satellite communication DVB-S2 and the optional extension DVB-S2X.

DVB (digital video broadcasting) provides a communications infrastructure for powerful transmission of MPEG-2-based data. Besides satellite-based (DVB-S), terrestrial (DVB-T) and cable-bound (DVB-C) transmission schemes, the version (DVB-H) is for portable/handheld terminals. DVB-H is an extension to DVB and is compatible with the basic concept of the standard. The extensions bring advantages that are especially important for portable devices: low power consumption, small hardware and robustness against fading effects.

The DVB-S2 standard is introduced as successor the DVB-S for the transmission of digital video broadcasts over satellite links. The DVB-S2X standard is an optional extension of the DVB-S2 standard. DVB-S2X allows an efficiency gain of up to 51% compared to DVB-S2. With that, higher data rates can be transported over the same satellite transponder capacity.

The main advantages of the DVB-H / DVB-T digital standard option R&S SMBV-K52 are:

- Possibility to test both mobile communications standards (such as WCDMA 3GPP FDD, TD-SCDMA, GSM/EDGE) and DVB-H or DVB-T using only one signal generator
- Simple generation of standard-compliant DVB-H or DVB-T signals

Option R&S SMBV-K116 extends the functionalities with the following key features:

- Fully encoded DVB-S2 and DVB-S2X signal generation
- Support of the stream types: transport stream (TS), generic packetized (GP), generic continuos (GC), generic stream encapsulated high efficiency mode (GSE-HEM)
- Signal generation form arbitrary data sources and TS or GSE files
- Channel coding according to the standard, incl. scrambling, interleaving, outer code (BCH), inner code (LDPC) with varying code rates from 1/4 to 31/45
- Support of all specified Walsh-Hadamard sequences for VL-SNR (very low signal to noise ratio) mode
- Configurable header information, incl. baseband (BB) header, VL-SNR header, TS header, GSE header
- Supported modulation schemes:
  - For DVB-S2: QPSK, 8PSK, 16APSK, 32APSK
  - For DVB-S2X: QPSK, 8APSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK
– For VL-SNR: QPSK, π/2 BPSK

- Pilot insertion and configuration
- Signals suitable for testing of satellite transponders, components and ground modems

This operating 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 SMBV operating manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMBV100A

2.1 Accessing the DVB Dialog

To open the dialog with DVB settings

► In the block diagram of the R&S SMBV, select "Baseband > DVB".

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".

2.2 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 storing 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 configuring networks and remote operation
- Using the common status registers

For a description of such tasks, see the R&S SMBV operating manual.
2.3 Notes on Screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as much 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.
3 About the DVB Options

The digital video broadcasting (DVB) suite of standards described methods for data and video signals transmission through different medium including cable, terrestrial, mobile and satellite.

This section provides brief background information on basic terms and principles used in the DVB standards.

3.1 About the DVB-H/T

The Digital Video Broadcasting - Handheld (DVB-H) standard is based on the earlier standard DVB-T, which is used for terrestrial digital broadcasting.

The block diagram on Figure 3-1 shows the components of the DVB-H transmission system.

Figure 3-1: Components of the transmission system DVB-H

DVB-H provides features to meet the specific requirements for handheld, mobile terminals such as:

- Power off some part of the reception chain to increase the battery duration
- Ease access to the services when receivers switching to the next cell
- Mitigate the effects of man-made noise and severe mobile multipath channels on the receiving capabilities
- Offer sufficient flexibility and scalability to allow reception of services at various speeds
- Offer the flexibility to be used in various transmission bands and channel bandwidths

The basic technical extensions that make it possible to receive digital video broadcasting services on handheld terminals are:

- 4K mode and in-depth interleavers
- Time-slicing
3.2 About the DVB-S2/S2X

Figure 3-2 illustrates schematically the components of the DVB-S2/S2X transmission systems. The block diagram is a simplified version of the DVB-S2 system specified in the DVB standard.

The main improvements of the second-generation DVB system for satellites (DVB-S2) compared to DVB-S are:

- Input stream adapter, suitable for operation with single and multiple input streams and different formats (packetized or continuous)
- FEC system based on LDPC codes concatenated with BCH codes
- Range of code rates (from 1/4 up to 9/10); Four constellations with different spectrum efficiency and optimized for operation over non-linear transponders
- Three predefined spectrum shapes with rolloff factors 0.35, 0.25 and 0.20
- Adaptive coding and modulation (ACM) functionality for optimized channel coding and modulation on a frame-by-frame basis.

The DVB-S2X is an extension to the DVB-S2 standard. The DVB-S2X reuses the DVB-S2 system architecture and improves it with the following:

- Adds finer MODCOD steps, higher-order modulations and complex constellations
- Three new sharper spectrum shapes
- Defines the VL-SNR (low signal to noise ratio) mode for example for mobile applications
- Optional periodic pilots and physical layer scrambles for easy synchronization
- GSE-Lite compliant signaling and streaming
- Adds a high-efficiency mode (GSE-HEM) intended to transport GSE and GSE-Lite packets
4 DVB User Interface

Access:

- Select "Baseband > DVB".

The remote commands required to define these settings are described in Chapter 5, "Remote-control commands", on page 50.

- General Settings ................................................................. 13
- DVB-T/DVB-H System Configuration Settings ..................... 18
- DVB-T/DVB-H TPS Settings .................................................. 21
- DVB-S2/DVB-S2X System Configuration Settings .................. 25
- TS Header Settings ............................................................. 31
- GSE Header Settings .......................................................... 33
- BB Header Settings ............................................................ 35
- Filter/Clipping Settings ...................................................... 37
- Trigger/Marker/Clock Settings ............................................ 41

4.1 General Settings

The menu is split into several sections for configuring the standard.
The upper menu section is where the DVB-H digital standard is selected, enabled, and reset, and where the generated waveform file can be selected.

In the "Signal Parameters" section, the number of super-frames can be selected and signal relevant parameters are displayed, if a signal is being generated.

The buttons in the lower menu section lead to submenus to configure the system and setting the filter, trigger, and clock parameters.
State
Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Remote command:
[:SOURce<hw>]:BB:DVB:STATe on page 52

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Not affected by &quot;Set to default&quot;</td>
</tr>
<tr>
<td>Number of Super-Frames</td>
<td>1</td>
</tr>
<tr>
<td>Hierarchy Mode</td>
<td>Non-hierarchical</td>
</tr>
<tr>
<td>HP Source</td>
<td>PN 23</td>
</tr>
<tr>
<td>Filter Type</td>
<td>Cosine</td>
</tr>
<tr>
<td>Clipping</td>
<td>OFF</td>
</tr>
<tr>
<td>Trigger Mode</td>
<td>Auto</td>
</tr>
<tr>
<td>Cell Identification</td>
<td>ON</td>
</tr>
<tr>
<td>Time-Slicing</td>
<td>ON</td>
</tr>
<tr>
<td>ID [4 hex]</td>
<td>0000</td>
</tr>
<tr>
<td>MPE-FEC</td>
<td>OFF</td>
</tr>
<tr>
<td>PN Scrambler</td>
<td>ON</td>
</tr>
<tr>
<td>Outer Coder</td>
<td>ON</td>
</tr>
<tr>
<td>Outer Interleaver</td>
<td>ON</td>
</tr>
<tr>
<td>Inner Coder</td>
<td>ON</td>
</tr>
<tr>
<td>Rate</td>
<td>1/2</td>
</tr>
<tr>
<td>Inner Bit Interleaver</td>
<td>ON</td>
</tr>
<tr>
<td>Inner Symbol Interleaver</td>
<td>ON</td>
</tr>
<tr>
<td>Inner Interleaver Mode</td>
<td>Native</td>
</tr>
<tr>
<td>TX Mode</td>
<td>2 K</td>
</tr>
<tr>
<td>OFDM/RF Bandwith</td>
<td>8 MHz</td>
</tr>
<tr>
<td>Modulation</td>
<td>QPSK</td>
</tr>
<tr>
<td>Alpha</td>
<td>1</td>
</tr>
<tr>
<td>Guard Interval</td>
<td>1/8</td>
</tr>
</tbody>
</table>

Remote command:
[:SOURce<hw>]:BB:DVB:PRESet on page 52
Save/Recall...
Calls the "Save/Recall" dialog.

From the "Save/Recall" dialog, the "File Select" windows for saving and recalling DVB-H configurations and the "File Manager" is called.

DVB-H configurations are stored as files with the predefined file extension *.dvb. The file name and the directory they are stored in are user-definable.

The complete settings in the DVB-H menu are saved and recalled.

"Recall DVB-H Setting" Opens the "File Select" window for loading a saved DVB-H configuration.
The configuration of the selected (highlighted) file is loaded by pressing the "Select" button.

"Save DVB-H Setting" Opens the "File Select" window for saving the current DVB-H signal configuration.
The name of the file is specified in the File name entry field, the directory selected in the save into field. The file is saved by pressing the "Save" button.
The "Fast Save" checkbox determines whether the instrument performs an absolute or a differential storing of the settings. Enable this function to accelerate the saving process by saving only the settings with values different to the default ones. "Fast Save" is not affected by the "Preset" function.

"File Manager" Calls the "File Manager".
The dialog is used to copy, delete, and rename files and to create new directories.

Remote command:
[:SOURce<hw>]:BB:DVB:SETTING:CATalog? on page 52
[:SOURce<hw>]:BB:DVB:SETTING:LOAD on page 53
[:SOURce<hw>]:BB:DVB:SETTING:STORE on page 53
[:SOURce<hw>]:BB:DVB:SETTING:STORE:FAST on page 53
[:SOURce<hw>]:BB:DVB:SETTING:DELETE on page 52

Generate Waveform File...
With enabled signal generation, triggers the instrument to store the current settings as an ARB signal in a waveform file. Waveform files can be further processed by the ARB and/or as a multi-carrier or a multi-segment signal.
The filename and the directory it is stored in are user-definable; the predefined file extension for waveform files is *.wv.

Remote command:
[:SOURce<hw>]:BB:DVB:WAVEform:CREATE on page 53

DVB Standard
Selects the DVB standard to be used to generate the modulation signal.

Remote command:
[:SOURce<hw>]:BB:DVB:STANDARD on page 54
VL-SNR Mode
(requires option R&S SMBV-K116)
For "DVB Standard > DVB-S2/S2X", includes the VL-SNR (very low - signal to noise ratio) header in the physical layer frame.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:VSMode on page 54

Number of Super Frames
For "DVB Standard > DVB-T/H", sets the number of the transmitted super-frames. Each super-frame consists of four OFDM frames.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SFRames on page 54

Number of Frames
(requires option R&S SMBV-K116)
For "DVB Standard > DVB-S2/S2X", sets the number of the transmitted frames.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:FRAMes on page 54

Number of Samples / Duration
For "DVB Standard > DVB-T/H" and "State > On", displays the number of the transmitted samples and the signal duration.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPle:LENGth? on page 55
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:DURation? on page 55

Sample Rate / Data Rate
For "DVB Standard > DVB-T/H" and "State > On", displays the sample and data rates.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPle:RATE? on page 55
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:DRATe? on page 55

System Configuration...
Calls the System Configuration menu for configuring the DVB-H system.
The hierarchy mode and the data source are displayed next to the button.
The menu is described in Chapter 4.2, "DVB-T/DVB-H System Configuration Settings", on page 18.
Remote command:
n.a.

TPS Settings...
Calls the "TPS Settings" menu for setting the TPS parameters and viewing the status of the parameter bits.
The menu is described in Chapter 4.3, "DVB-T/DVB-H TPS Settings", on page 21.
Remote command:
n.a.
Filtering/Clipping
Calls the menu for setting baseband filtering and clipping. The current filter and the clipping state are displayed next to the button.
The menu is described in Chapter 4.8, "Filter/Clipping Settings", on page 37.
Remote command:
n.a.

Trigger/Marker
Calls the menu for selecting the trigger mode and trigger source, for configuring the marker signals, and for setting the time delay of an external trigger signal.
This menu is described in Chapter 4.9, "Trigger/Marker/Clock Settings", on page 41.
The currently selected trigger mode and trigger source are displayed next to the button.
Remote command:
n.a.

Execute Trigger
Executes the trigger manually. A manual trigger can be executed only if an internal trigger source and a trigger mode other than "Auto" have been selected.
Remote command:
[:SOURce<hw>:BB:DVB:TRIGger:EXECute on page 61

Arm
Stops signal generation manually. This button appears only with "Running" signal generation in the “Armed_Auto” and “Armed_Retrigger” trigger modes.
Remote command:
[:SOURce<hw>:BB:DVB:TRIGger:ARM:EXECute on page 60

Clock
Calls the menu for selecting the clock source and for setting a delay.
This menu is described in Chapter 4.9.4, "Clock Settings", on page 48.
Remote command:
n.a.

4.2 DVB-T/DVB-H System Configuration Settings

The "System Configuration" dialog allows you to configure the DVB system. The DVB system is displayed in form of a block diagram including all parameters necessary to configure the system.
The system diagram depends on the selected "Hierarchy Mode".
Settings:

Hierarchy Mode ............................................................................................................ 19
HP/LP Source .............................................................................................................. 19
PN Scrambler ............................................................................................................. 20
Outer Coder (RS) ........................................................................................................ 20
Outer Interleaver ........................................................................................................ 20
Inner Coder ................................................................................................................ 20
Rate .............................................................................................................................. 20
Inner Bit Interleaver ................................................................................................... 20
Inner Symbol Interleaver ............................................................................................. 20
Inner Interleaver Mode ............................................................................................... 21
Inner Interleaver Tx Mode ........................................................................................... 21
OFDM/RF Bandwidth .................................................................................................... 21
OFDM/RF Modulation .................................................................................................. 21
OFDM/RF Alpha .......................................................................................................... 21
OFDM/RF Guard Int .................................................................................................... 21

Hierarchy Mode
Selects the hierarchy mode.

"Hierarchical" Both inputs are used. The inputs are identical and simply differ in the
prioritization.

"Non-hierarchical" The high priority input is used.

Remote command:

[::SOURce<hw>]:BB:DVB:DVBH|DVBT:HMODE on page 70

HP/LP Source
Selects the data source.

LP is provided in hierarchical mode, see Hierarchy Mode.

Remote command:

[::SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:DATA on page 70
[::SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:DATA:DSSElection on page 70
PN Scrambler
Activates/deactivates the PN scrambling. The data packets of the incoming transport stream are transformed to a pseudo random binary sequence (PRBS). This transformation is performed to obtain a bit sequence that has a positive effect on the transmitted RF spectrum.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}[:\text{HP}|\text{LP}]:\text{PN}Scrambler[:\text{STATe}] \\
\text{on page 71}
\]

Outer Coder (RS)
Activates/deactivates the outer coder. The outer coder applies a Reed-Solomon error correction code to the PRBS data stream.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}[:\text{HP}|\text{LP}]:\text{OCODer[:STATe}] \\
\text{on page 71}
\]

Outer Interleaver
Activates/deactivates the outer convolutional interleaver.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}[:\text{HP}|\text{LP}]:\text{OINTerleaver[:STATe}] \\
\text{on page 71}
\]

Inner Coder
Activates/deactivates the inner coder. The inner coder is a punctured convolutional error-correcting coder.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}[:\text{HP}|\text{LP}]:\text{ICODer[:STATe}] \\
\text{on page 71}
\]

Rate
If "Inner Coder > On", selects the code rate of the inner coder.

The incoming bits (m) to be encoded is transformed into an bit symbol (containing n-bits), where m/n is the code rate.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}[:\text{HP}|\text{LP}]:\text{ICODer:RATE} \\
\text{on page 70}
\]

Inner Bit Interleaver
Activates/deactivates the inner bit interleaver.

The inner interleaver consists of a bit-wise interleaving followed by symbol interleaving. Both interleaving processes are block based.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}]:\text{IINTerleaver:BIT[:STATe]} \\
\text{on page 72}
\]

Inner Symbol Interleaver
Activates/deactivates the inner symbol interleaver.

Remote command:
\[
[:\text{SOURce<hw>}:\text{BB}:\text{DVB}:\text{DVBH}|\text{DVBT}]:\text{IINTerleaver:SYMBol[:STATe]} \\
\text{on page 72}
\]
Inner Interleaver Mode
Selects the inner interleaver mode. Interleaver mode in-depth is available only for transmission mode 2K and 4K.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINterleaver:SYMBol:MODE
on page 72

Inner Interleaver Tx Mode
Selects the transmission mode.
This setting determines the number of the OFDM subcarriers. For transmission mode 8K, the in-depth interleaver mode is not available.
Transmission mode 4K is available for DVB-H.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINterleaver:SYMBol:TMOde
on page 72

OFDM/RF Bandwidth
Selects the system bandwidth.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:BWIDth on page 73

OFDM/RF Modulation
Selects the constellation for the OFDM modulation.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:MODulation on page 73

OFDM/RF Alpha
For "Hierarchy Mode > Hierarchical" and "Modulation > 16-QAM/64-QAM", selects the alpha value.
This value is used to shape the constellation of the modulation. For nonhierarchical mode, this value is always 1 and cannot be changed.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:ALPHa on page 73

OFDM/RF Guard Int
Selects the value for the guard interval. The guard interval extends the length of the transmitted symbol. The guard intervals are given as fractions of a symbol period.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:GINterval on page 73

4.3 DVB-T/DVB-H TPS Settings

The "TPS Settings" dialog allows you to select the bits to transmit via the TPS signal and displays the status of the parameter bits.
**Settings:**

- **Cell Identification**
  Activates/deactivates the TPS cell identification. If activated, the cell from which the signal comes from is identified.
  Remote command: `[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:STATe` on page 82

- **ID [4 hex]**
  Sets the cell ID for cell identification.
  The cell ID identifies the cell from which the signal is transmitted. This value is read by the receiver if **Cell Identification** is activated.
  Remote command: `[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:PATTern` on page 82

- **Time Slicing**
  Indicates the status of the time-slicing bit.
  If activated, the average power consumption of the terminal is reduced.
  In this implementation, time-slicing information is not generated.
  Time slicing is always used for DVB-H and permanently disabled for DVB-T.
  Remote command: `[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:TSLicing[:STATe]?` on page 83

- **MPE FEC**
  Activates/deactivates the multiprotocol encapsulation forward error correction bit. MPE-FEC must be performed in the transport stream. This implementation does not support MPE-FEC.
  Remote command: `[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:MFEC[:STATe]` on page 82

- **TPS Table**
  The TPS parameter bit table displays the status of the transmitted TPS parameter bits.
### Table 4-1: TPS signaling information transmitted in DVB-H

<table>
<thead>
<tr>
<th>Bit number</th>
<th>Format</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0/1</td>
<td>Initialization bit for the differential 2PSK modulation. The modulation of the TPS initialization bit is derived from the PRBS sequence.</td>
</tr>
<tr>
<td>1-16</td>
<td></td>
<td>Bits 1 to 16 of the TPS are the synchronization words for the TPS blocks in the super-frames:</td>
</tr>
<tr>
<td></td>
<td>0011010011101110</td>
<td>Synchronization word for the first and the third TPS block in each super-frame</td>
</tr>
<tr>
<td></td>
<td>1001010000100001</td>
<td>Synchronization word for the second and the fourth TPS block in each super-frame</td>
</tr>
<tr>
<td>17-22</td>
<td></td>
<td>The first 6 bits of the TPS information is used as a TPS length indicator to signal the number of used bits of the TPS:</td>
</tr>
<tr>
<td></td>
<td>010111</td>
<td>Cell identification is not transmitted (23 TPS bits in use)</td>
</tr>
<tr>
<td></td>
<td>011111</td>
<td>Cell identification information is transmitted (31 TPS bits in use)</td>
</tr>
<tr>
<td></td>
<td>100001</td>
<td>Cell identification information is transmitted for DVB-H (33 TPS bits in use)</td>
</tr>
<tr>
<td>23-24</td>
<td></td>
<td>Indicates the frame in the super-frame. Four frames constitute a super-frame:</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>Frame 1 in the super-frame</td>
</tr>
<tr>
<td></td>
<td>01</td>
<td>Frame 2 in the super-frame</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Frame 3 in the super-frame</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Frame 4 in the super-frame</td>
</tr>
<tr>
<td>25-26</td>
<td></td>
<td>Indicates the constellation:</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>QPSK</td>
</tr>
</tbody>
</table>
### Bit number

<table>
<thead>
<tr>
<th>Bit number</th>
<th>Format</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>16-QAM</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>64-QAM</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Reserved</td>
<td></td>
</tr>
</tbody>
</table>

#### 27
Indicates the interleaver mode. The in-depth interleaver can be used for 2K and 4K transmission mode. For transmission mode 8K, only the native interleaver is used:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>The native interleaver is used</td>
</tr>
<tr>
<td>1</td>
<td>The in-depth interleaver is used</td>
</tr>
</tbody>
</table>

#### 28-29
Indicates the hierarchical transmission and the value of the alpha-factor

<table>
<thead>
<tr>
<th>Bit</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Transmission in nonhierarchical mode</td>
</tr>
<tr>
<td>01</td>
<td>Alpha = 1</td>
</tr>
<tr>
<td>10</td>
<td>Alpha = 2</td>
</tr>
<tr>
<td>11</td>
<td>Alpha = 4</td>
</tr>
</tbody>
</table>

#### 30-32
Indicates the code rate for the HP transmission stream

<table>
<thead>
<tr>
<th>Bit</th>
<th>Code Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>1/2</td>
</tr>
<tr>
<td>001</td>
<td>2/3</td>
</tr>
<tr>
<td>010</td>
<td>3/4</td>
</tr>
<tr>
<td>011</td>
<td>5/6</td>
</tr>
<tr>
<td>100</td>
<td>7/8</td>
</tr>
<tr>
<td>101</td>
<td>reserved</td>
</tr>
<tr>
<td>110</td>
<td>reserved</td>
</tr>
<tr>
<td>111</td>
<td>reserved</td>
</tr>
</tbody>
</table>

#### 33-35
Indicates the code rate for the LP transmission stream

<table>
<thead>
<tr>
<th>Bit</th>
<th>Code Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>1/2</td>
</tr>
<tr>
<td>001</td>
<td>2/3</td>
</tr>
<tr>
<td>010</td>
<td>3/4</td>
</tr>
<tr>
<td>011</td>
<td>5/6</td>
</tr>
<tr>
<td>100</td>
<td>7/8</td>
</tr>
<tr>
<td>101</td>
<td>reserved</td>
</tr>
<tr>
<td>110</td>
<td>reserved</td>
</tr>
<tr>
<td>111</td>
<td>reserved</td>
</tr>
</tbody>
</table>

#### 36-37
Indicates the value for the guard interval

<table>
<thead>
<tr>
<th>Bit</th>
<th>Guard Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1/32</td>
</tr>
</tbody>
</table>
### 4.4 DVB-S2/DVB-S2X System Configuration Settings

These settings require option R&S SMBV-K116.

Access:
1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"

<table>
<thead>
<tr>
<th>Bit number</th>
<th>Format</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>1/16</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1/8</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1/4</td>
<td></td>
</tr>
<tr>
<td>38-39</td>
<td></td>
<td>Indicates the transmission mode</td>
</tr>
<tr>
<td>00</td>
<td>2K mode</td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>8K mode</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4K mode</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>reserved</td>
<td></td>
</tr>
<tr>
<td>40-47</td>
<td>Cell_id</td>
<td>32 bits are used for the cell ID. Every frame contains 8 bits. The 8 bits are used to identify the cell from which the signal comes from.</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>Indicates the usage of time-slicing</td>
</tr>
<tr>
<td>0</td>
<td>Time-slicing is not used</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>At least one elementary stream uses time-slicing</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td></td>
<td>Indicates the usage of MPE-FEC</td>
</tr>
<tr>
<td>0</td>
<td>MPE-FEC is not used</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>At least one elementary stream uses MPE-FEC</td>
<td></td>
</tr>
<tr>
<td>50-53</td>
<td>reserved</td>
<td></td>
</tr>
<tr>
<td>54-67</td>
<td>xxxxxxxxxxxxxxxx</td>
<td>BCH error protection</td>
</tr>
</tbody>
</table>
2. Select “System”.

This dialog comprises the settings to configure the DVB system. The DVB system is displayed in form of a block diagram including all related parameters. The provided settings depend on the selected DVB Standard.

The four blocks indicate the first four logical signal processing parts:
- Mode adaptation:
  Input stream configuration, incl. configuration of the header information
- Stream adaptation:
  Baseband scrambling and FEC (forward error correction) encoding
- Constellation mapping:
  Modulation and coding
- Pilot:
  Insertion and scrambling of the optional pilot.

The last processing part is the baseband spectrum shaping. Find the required filter parameters in the "Filter" dialog, see Chapter 4.8.1, "Filter Settings", on page 37.

Settings:
- Stream Type .......................................................... 27
- Input Stream .......................................................... 27
- Data Source .......................................................... 27
- Data Length .......................................................... 28
- Auto Data Length .................................................. 28
- TS Header Config .................................................. 28
- GSE Header Config .............................................. 28
- BB Header Config .................................................. 29
- BB Scrambler ......................................................... 29
- Outer Coder .......................................................... 29
- Inner Coder .......................................................... 29
- Rate ................................................................. 29
- SF ................................................................. 29
- Bit Interleaver ........................................................ 29
- Code Type .......................................................... 30
MODCOD ........................................................................................................................................30
Modulation ....................................................................................................................................30
Pilot State .......................................................................................................................................30
PL Scrambler ..................................................................................................................................30
Scr. Sequence ..................................................................................................................................31

Stream Type
Selects the type of input stream:
- "Transport"
  Transport stream TS
- "GP"
  Generic packetized
- "GC"
  Generic continuous
- "GSE-HEM" ("DVB Standard > DVB-S2X")
  Generic stream encapsulation, high efficiency mode (HEM) packetized.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:STYPe on page 76

Input Stream
Indicates that the input stream is single (SIS).
Multiple input streams (MIS) are not supported.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ISTReam? on page 76

Data Source
Selects the data source.
The following standard data sources are available:
- "All 0, All 1"
  An internally generated sequence containing 0 data or 1 data.
- "PNxx"
  An internally generated pseudo-random noise sequence.
- "Pattern"
  An internally generated sequence according to a bit pattern.
  Use the "Pattern" box to define the bit pattern.
- "Data List/Select DList"
  A binary data from a data list, internally or externally generated.
  Select "Select DList" to access the standard "Select List" dialog.
  - Select the "Select Data List > navigate to the list file *.dm_iqd > Select" to select an existing data list.
  - Use the "New" and "Edit" functions to create internally new data list or to edit an existing one.
  - Use the standard "File Manager" function to transfer external data lists to the instrument.

See also "Main Dialog > Data List Management".
"TS File, Select File"
For "DVB Standard > DVB-S2", uses a transport stream (TS) file as data source. TS files are files with extension *.gts, *.ts or *.trp.

<table>
<thead>
<tr>
<th>File extension</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.gts</td>
<td>Rohde &amp; Schwarz proprietary</td>
<td></td>
</tr>
<tr>
<td>*.trp</td>
<td>MPEG-2</td>
<td>Standard DVB file format for HD video transport Contains High Definition Transport Stream</td>
</tr>
<tr>
<td>*.ts</td>
<td>MPEG</td>
<td>Standard digital container format for transmission and storage of audio, video, and Program and System Information Protocol (PSIP) data.</td>
</tr>
</tbody>
</table>

Select "Select File" to access the standard "File Select" dialog.

"GSE File, Select File"
For "DVB Standard > DVB-S2X", uses a generic stream encapsulation (GSE) file as data source. GSE files are files with extension *.gse.

Select "Select File" to access the standard "File Select" dialog.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA on page 76
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:DSELection|TSELection|GSELection on page 77
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:PATTern on page 76

Data Length
If "Auto Data Length > Off", sets the data length in bytes.

The value is used to calculate the value of the parameter Total Length.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:LENGth on page 77

Auto Data Length
Defines if the "Data Length" is set automatically or manually.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ADLength:STATe on page 77

TS Header Config
For "Stream Type > Transport", accesses the transport stream header settings, see Chapter 4.5, "TS Header Settings", on page 31.

GSE Header Config
For "Stream Type > GSE-HEM", accesses the GSE header settings, see Chapter 4.6, "GSE Header Settings", on page 33.
**BB Header Config**
Accesses the baseband header settings, see Chapter 4.7, "BB Header Settings", on page 35.

**BB Scrambler**
Activates baseband scrambling.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BSCRambler[:STATe]
```
on page 78

**Outer Coder**
Enables the BCH outer coder.
BCH codes are Bose-Chaudhuri-Hocquenghem multiple error correction binary block codes.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:OCODer[:STATe]
```
on page 78

**Inner Coder**
Applies LDPC (low-density parity check) encoding to data bits.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ICODer[:STATe]
```
on page 78

**Rate**
Selects the code rate of the inner LDPC coder.
The code rate is calculated as code rate = m/n, where:
1. m is the number of incoming bits
2. n are the number of bits in the coded output symbol
A wide range of code rates is specified. The available code rates depend on the selected "Modulation", modulation coder ("MODCOD") and if "VL-SNR Mode" is used or not.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ICODer:RATE
```
on page 78

**SF**
For "DVB Standard > DVB-S2X" with enabled VL-SNR Mode and "Code Type > Short", sets the spreading factor.
Per default, the VL-SNR mode uses "Modulation > pi/2 BPSK" and "SF = 2". The spreading factor of 2 means that encoded bits are repeated twice before they are mapped into the constellation.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBSX:SFACtor
```
on page 79

**Bit Interleaver**
If enabled, the output of the LDPC encoder is bit interleaved using a block interleaver.
Remote command:
```
[:SOURce<hw>]:BB:DVB:DVBSX:BINTerleaver[:STATe]
```
on page 79
**Code Type**
Selects the FEC code type.
"Code Type > Medium" is available if "VL-SNR Mode > On".
In VL-SNR mode, the required Walsh-Hadamard sequence is selected automatically as function of the parameters MODCOD and "Code Type".

Remote command:
[:\SOURce<hw>:]BB:DVB:DVBS|DVBX:CTYPe on page 79

**MODCOD**
Selects the MODCOD.

Remote command:
[:\SOURce<hw>:]BB:DVB:DVBS|DVBX:MCOD on page 80

**Modulation**
Selects the modulation scheme.
Suitable modulation schemes are selected automatically to fit the selected MODCOD.
The DVB-S2/S2X standards specify different modulation schemes, ranging in power and spectrum efficiency. The available values depend on the used "DVB Standard", the selected "MODCOD", "Code Type" and if "VL-SNR Mode" is used or not.
- "DVB Standard > DVB-S2"
  - QPSK, 8PSK, 16APSK, 32APSK
- "DVB Standard > DVB-S2X"
  - QPSK, 8APSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK, 256APSK
- "DVB Standard > DVB-S2X" with "VL-SNR Mode > On"
  - QPSK, pi/2 BPSK

The constellation diagram illustrates the selected modulation and coding.

**Example:**
"Modulation = (16 + 16 + 16 + 16) APSK" is an APSK modulation with 64 constellation points, distributed on 4 concentric rings with 16 constellation point each.
The radius of each ring is defined as function of the selected code rate.

Remote command:
[:\SOURce<hw>:]BB:DVB:DVBS|DVBX:MODulation on page 80

**Pilot State**
Activates/deactivates the pilot.

Remote command:
[:\SOURce<hw>:]BB:DVB:DVBS|DVBX:PSTate[:STATe] on page 81

**PL Scrambler**
Activates/deactivates pilot scrambling.
The pilot data is scrambled with the selected scrambling sequence (Scr. Sequence).

Remote command:
[:\SOURce<hw>:]BB:DVB:DVBS|DVBX:PSRambler[:STATe] on page 81
Scr. Sequence
For "DVB Standard > DVB-S2X", sets the bit sequence used to scramble the pilot.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:SSEQuence on page 81

4.5 TS Header Settings

These settings require option R&S SMBV-K116.

Access:
1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"
2. Select "System".
3. Select "Stream Type > Transport".
4. Select "TS Header Config".

The dialog lists the transport stream header settings.

Settings:

- TS Header Active ................................................................. 32
- Sync Byte (Hex) ................................................................. 32
- Transport Error Indication .................................................. 32
- Payload Unit Start Indication ............................................. 32
- Transport Priority .............................................................. 32
- PID (Hex) ........................................................................ 32
- Scrambling Control ............................................................ 32
- Adaptation Field ................................................................. 32
- Payload ........................................................................... 32
- Continuity Counter ............................................................ 33
**TS Header Active**
Inserts header information in the transport stream.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig[:STATe] on page 83
```

**Sync Byte (Hex)**
Displays the information carried by the synchronization byte. The value is in a hexadecimal format.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:SBYTe? on page 83
```

**Transport Error Indication**
Inserts transport error indication information in the header.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TEINdication[:STATe] on page 84
```

**Payload Unit Start Indication**
If enabled, the PES (packetized elementary streams), PSI (program specific information), or DVB-MIP (megaframe initialization) packet begin immediately after the header.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PUS on page 84
```

**Transport Priority**
Marks the current packet as high priority packet compared to packets with the same PID.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TPRiority on page 84
```

**PID (Hex)**
Sets the packet identifier PID in hexadecimal format.
Packet identifiers describe the payload data.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PID:PATTern on page 84
```

**Scrambling Control**
Sets the scrambling information.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:SCONtrol on page 85
```

**Adaptation Field**
Inserts an adaptation field in the packet.
Remote command:
```plaintext
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:AFIeld[:STATe] on page 85
```

**Payload**
Adds a payload field in packet.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PAYLoad[:STATe]
on page 85

Continuity Counter
Sets the sequence number of the first payload packet.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:CCOunter on page 85

4.6 GSE Header Settings

These settings require option R&S SMBV-K116.

Access:
1. Select "DVB > DVB Standard > DVB-S2X"
2. Select "System".
3. Select "Stream Type > GSE-HEM"
4. Select an arbitrary data source, e.g. "Data Source > PN15"
5. Select "GSE Header Config".

![GSE Header Configuration](image)

The dialog lists the generic stream encapsulation (GSE) header settings.

Settings:

- **GSE Header Active**
- **Label Type**
- **GSE Length**
- **Use, Fragment ID (Hex)**
- **Use, Total Length**
- **Use, Protocol Type (Hex)**
- **Use, Label (Hex)**

**GSE Header Active**
Inserts header information in the transport stream.
GSE Header Settings

Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig[:STATe] on page 86

**Label Type**
Set the type of the used label field.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LTYPe on page 86

**GSE Length**
Sets the number of bytes following in the GSE packet.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:GLENgth on page 87

**Use, Fragment ID (Hex)**
Indicates that a PDU fragment is included in the GSE packet.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FID:PATTern on page 87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FIUSe[:STATe] on page 87

**Use, Total Length**
Indicates the total length in bytes, calculated as follows:
"Total Length" = PDU length ("Data Length") + [2 bytes if "Use Protocol Type > On"] + [6 (or 3) bytes if "Use Label > On"].
Extension headers are not supported and hence not included in the calculation.

**Example:**
If "Data Length = 4000", "Use Protocol Type > On" and "Use Label > Off", the "Total Length = 4002"

Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLENgth? on page 87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLUSe[:STATe] on page 88

**Use, Protocol Type (Hex)**
Indicates the payload type carried in the PDU.
Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTYPe:PATTern on page 88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTUSe[:STATe] on page 88

**Use, Label (Hex)**
For "Label Type = 0 | 1", sets the label used for addressing.
The value range changes depending on the "Label Type".

<table>
<thead>
<tr>
<th>&quot;Label Type&quot; value</th>
<th>&quot;Label&quot; value range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>000000000000 to FFFFFFFF</td>
</tr>
<tr>
<td>1</td>
<td>000000 to FFFFF</td>
</tr>
</tbody>
</table>
4.7 BB Header Settings

These settings require option R&S SMBV-K116.

Access:
1. Select "DVB > DVB Standard > DVB-S2/DVB-S2X"
2. Select "System".
3. Select "BB Header Config".

The dialog lists the baseband (BB) header settings.

Use the "Filter" settings, to set the filter parameter Roll-off factor and determine the RO bits of the BB header.

Settings:

CCM/ACM .................................................................................................................... 35
ISSYI Active ................................................................................................................. 36
GSE-Lite Active ............................................................................................................ 36
NPD Active ................................................................................................................... 36
UPL ............................................................................................................................... 36
DFL ............................................................................................................................... 36
Auto DFL ....................................................................................................................... 36
Sync (Hex) ................................................................................................................... 36

CCM/ACM
Selects whether constant coding and modulation (CCM) or adaptive coding and modulation (ACM) communication is used.

In ACM mode, for instance, the receiver sends feedback information on received signal quality. Depending on this feedback, the channel coding and modulation is optimized on a frame-by-frame basis.

Remote command:
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LABel:PATTern on page 88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LUSE[:STATe] on page 89
**ISSYI Active**
If enabled, sets the ISSYI (input stream synchronization indicator) bit to 1. The ISSY field is inserted after the user packets (UP) or in the BB header of the GSE-HEM stream.
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:IACTive[:STATe]` on page 89

**GSE-Lite Active**
For Stream Type > "GSE-HEM", indicates that the GSE stream is GSE-Lite compliant.
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:GLACtive[:STATe]` on page 90

**NPD Active**
Activates null-packet deletion (NPD).
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:NACTive[:STATe]` on page 90

**UPL**
Indicates the user packet length (UPL).
The user packet length depends on the "Stream Type":
- For "Transport", "UPL = 188 Bytes"
- For "GC", "UPL = 0 Bytes" which results in a continuous stream
- For "GP", UPL is a configurable value.
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:UPL` on page 90

**DFL**
If "Auto DFL > Off", sets the data field length (DFL).
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:DFL` on page 91

**Auto DFL**
Defines if the "DFL" is set automatically or manually.
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:ADFL:STATe` on page 90

**Sync (Hex)**
Indicates the user packet synchronization byte.
The value and the value range depend on the used Stream Type:
- For "TS" and "GP", "Sync = 47". This value indicates MPEG transport stream packets.
- For "GC", the value is configurable.
Remote command:

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:SBYTE:PATTern` on page 91
4.8 Filter/Clipping Settings

Access:

► Select "Main dialog > Filter/Clipping Settings".

The dialog comprises the settings, necessary to configure the baseband filter and to enable clipping.

4.8.1 Filter Settings

Provided are the following settings:

Settings:

Filter.................................................................................................................................................. 37
Rolloff Range...................................................................................................................................... 38
Rolloff Factor or BxT......................................................................................................................... 38
Cutoff Frequency Shift...................................................................................................................... 38
Cutoff Frequency Factor.................................................................................................................. 39
Symbol/Sample Rate Variation......................................................................................................... 39

Filter
Selects the baseband filter.

The DVB-S2/S2X standards use the predefined root cosine (RRC) filter to shape the baseband signal spectrum.

Remote command:

[:SOURce<hw>]:BB:DVB:FILTer:TYPE on page 56
Rolloff Range
(requires option R&S SMBV-K116)
For "DVB Standard > DVB-S2X", selects whether the high or the low filter roll-off range is used, see Table 4-2.
Remote command:
[:SOURce<hw>]:BB:DVB:FILTer:RORange on page 57

Rolloff Factor or BxT
Sets the filter parameter.
The rolloff factor affects the steepness of the filter slopes. A "Rolloff Factor = 0" results in the steepest slopes; values near to 1 make the slopes more flat.

![Figure 4-1: Example of the frequency response of a filter with different rolloff factors](image)

For "DVB Standard > DVB-S2/S2X", the rolloff factors are predefined.
Table 4-2: Predefined sets of spectrum shapes

<table>
<thead>
<tr>
<th>&quot;DVB Standard&quot;</th>
<th>&quot;Rolloff Range&quot;</th>
<th>&quot;Rolloff Factor&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;DVB-S2&quot;</td>
<td>-</td>
<td>0.35, 0.25, 0.20</td>
</tr>
<tr>
<td>&quot;DVB-S2X&quot;</td>
<td>Low</td>
<td>0.15, 0.1, 0.05</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0.35, 0.25, 0.20</td>
</tr>
</tbody>
</table>

Remote command:
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:APCO25 on page 56
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:COSine on page 56
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:GAUSs on page 57
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:PGAuss on page 57
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:RCOSine on page 57
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:SPHase on page 57
[:SOURce<hw>]:BB:DVB:FILTer:ROFactor on page 57

Cutoff Frequency Shift
The cutoff frequency is a filter characteristic that defines the frequency at the 3 dB down point. The "Cut Off Frequency Shift" affects this frequency in the way that the fil-
fter flanks are “moved” and the transition band increases by "Cut Off Frequency Shift" “Sample Rate”.

- A "Cut Off Frequency Shift" = -1 results in a very narrow-band filter
- Increasing the value up to 1 makes the filter more broad-band
- By "Cut Off Frequency Shift" = 0, the -3 dB point is at the frequency determined by the half of the selected "Sample Rate".

Tip: Use this parameter to adjust the cutoff frequency and reach spectrum mask requirements.

Figure 4-2: Example of the frequency response of a filter with different cutoff frequency shift

Remote command:

\[:SOURce<hw>]:BB:DVB:FILTer:PARameter:COSine:COFS\] on page 56

Cutoff Frequency Factor
Sets the value for the cutoff frequency factor. The cutoff frequency of the filter can be adjusted to reach spectrum mask requirements.

Remote command:

\[:SOURce<hw>]:BB:DVB:FILTer:PARameter:LPASs\] on page 57
\[:SOURce<hw>]:BB:DVB:FILTer:PARameter:LPASSEVM\] on page 57

Symbol/Sample Rate Variation
Sets the symbol/sample rate of the signal. A variation of this parameter only affects the ARB clock rate; all other signal parameters remain unchanged.

Remote command:

\[:SOURce<hw>]:BB:DVB:SRATe:VARiation\] on page 58

4.8.2 Clipping Settings

DVB signals can have a high crest factor (~ 11dBm) because of high amplitude variations that come along with OFDM signals having a noise-like spectrum. High crest factors entail two basic problems:

- The nonlinearity of the power amplifier (compression) causes intermodulation which expands the spectrum (spectral regrowth).
Since the level in the D/A converter is relative to the maximum value, the average value is converted with a relatively low resolution. This results in a high quantization noise.

Both effects increase the adjacent-channel power.

Since clipping the signal not only changes the peak value but also the average value, the effect on the crest factor is unpredictable.

The following pictures demonstrate the effect of clipping with vector mode ($|i + jq|$), using the default signal configuration with a PN23 input sequence.

*Figure 4-3: Constellation diagram of the signal without clipping, shows the level mapping*

*Figure 4-4: Constellation diagram with clipping level 10 %, vector mode ($|i+jq|$)*
Settings:

Clipping State...............................................................................................................................................41
Clipping Level..............................................................................................................................................41
Clipping Mode............................................................................................................................................ 41

Clipping State
Switches baseband clipping on and off.
Baseband clipping is a simple and effective way of reducing the crest factor of the signal. Since clipping is done before to filtering, the procedure does not influence the spectrum. The EVM however increases.
Remote command:
[:SOURce<hw>]:BB:DVB:CLIPping:STATe on page 59

Clipping Level
Sets the limit for clipping.
This value indicates at what point the signal is clipped. It is specified as a percentage, relative to the highest level. 100% indicates that clipping does not take place.
Remote command:
[:SOURce<hw>]:BB:DVB:CLIPping:LEVel on page 58

Clipping Mode
Selects the clipping method. The dialog displays a graphical illustration on how this two methods work.

- "Vector | i + jq |
  The limit is related to the amplitude | i + q |. The I and Q components are mapped together, the angle is retained.

- "Scalar | i | , | q |
  The limit is related to the absolute maximum of all the I and Q values | i | + | q |.
  The I and Q components are mapped separately, the angle changes.

Remote command:
[:SOURce<hw>]:BB:DVB:CLIPping:MODE on page 59

4.9 Trigger/Marker/Clock Settings

To access this dialog, select "Main Menu > Trigger/Marker".
The "Trigger In" section is where the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.
The "Marker Mode" section is where the marker signals at the "Marker" output connectors are configured.

The "Marker Delay" section is where a marker signal delay can be defined, either without restriction or restricted to the dynamic section, i.e., the section in which it is possible to make settings without restarting signal and marker generation.

The "Clock Settings" section is where the clock source is selected and - in the case of an external source - the clock type.

The buttons in the last section lead to submenu for general trigger, clock and mapping settings.
4.9.1 Trigger Settings

The "Trigger In" section is where the trigger for the signal is set. Various parameters will be provided for the settings, depending on which trigger source - internal or external - is selected. The current status of signal generation ("Running" or "Stopped") is indicated for all trigger modes.

Trigger Mode
Selects trigger mode, i.e. determines the effect of a trigger event on the signal generation.

- "Auto"
  The signal is generated continuously.

- "Retrigger"
  The signal is generated continuously. A trigger event (internal or external) causes a restart.

- "Armed Auto"
  The signal is generated only when a trigger event occurs. Then the signal is generated continuously. An "Arm" stops the signal generation. A subsequent trigger event (internal with or external) causes a restart.

- "Armed Retrigger"
  The signal is generated only when a trigger event occurs. Then the signal is generated continuously. Every subsequent trigger event causes a restart. An "Arm" stops signal generation. A subsequent trigger event (internal with or external) causes a restart.

- "Single"
  The signal is generated only when a trigger event occurs. Then the signal is generated once to the length specified at "Signal Duration". Every subsequent trigger event (internal or external) causes a restart.

Remote command:
[:SOURce<hw>]:BB:DVB[:TRIGger]:SEQuence on page 63

Signal Duration Unit
Defines the unit for the entry of the length of the signal sequence to be output in the "Single" trigger mode.

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:SLUNit on page 61

Signal Duration
Defines the length of the signal sequence to be output in the "Single" trigger mode. It is possible to output deliberately just part of the signal, an exact sequence of the signal, or a defined number of repetitions of the signal.

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:SLENgth on page 61

Running/Stopped
With enabled modulation, displays the status of signal generation for all trigger modes.

- "Running"
The signal is generated; a trigger was (internally or externally) initiated in triggered mode.

- "Stopped"
The signal is not generated and the instrument waits for a trigger event.

Remote command:
```
[:SOURce<hw>]:BB:DVB:TRIGger:RMODe? on page 61
```

**Arm**
Stops signal generation manually. This button appears only with "Running" signal generation in the "Armed_Auto" and "Armed_Retrigger" trigger modes.

Remote command:
```
[:SOURce<hw>]:BB:DVB:TRIGger:ARM:EXECute on page 60
```

**Execute Trigger**
Executes the trigger manually. A manual trigger can be executed only if an internal trigger source and a trigger mode other than "Auto" have been selected.

Remote command:
```
[:SOURce<hw>]:BB:DVB:TRIGger:EXECute on page 61
```

**Trigger Source**
Selects trigger source. This setting is effective when a trigger mode other than "Auto" has been selected.

- "Internal"
The trigger event is executed by "Execute Trigger".
- "External"
The trigger event is the active edge of an external trigger signal, supplied at the TRIGGER connector.
  Use the "Global Trigger/Clock Settings" dialog to define the polarity, the trigger threshold and the input impedance of the trigger signal.

Remote command:
```
[:SOURce<hw>]:BB:DVB:TRIGger:SOURce on page 62
```

**Sync. Output to External Trigger**
(enabled for Trigger Source External)
Enables/disables output of the signal synchronous to the external trigger event.

For R&S SMBV instruments:

For or two or more R&S SMBVs configured to work in a master-slave mode for synchronous signal generation, configure this parameter depending on the provided system trigger event and the properties of the output signal. See the table below for an overview of the required settings.
### Table 4-3: Typical Applications

<table>
<thead>
<tr>
<th>System Trigger</th>
<th>Application</th>
<th>&quot;Sync. Output to External Trigger&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common External Trigger event for the master and the slave instruments</td>
<td>All instruments are synchronous to the external trigger event</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>All instruments are synchronous among themselves but starting the signal from first symbol is more important than synchronicity with external trigger event</td>
<td>OFF</td>
</tr>
<tr>
<td>Internal trigger signal of the master R&amp;S SMBV for the slave instruments</td>
<td>All instruments are synchronous among themselves</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**"On"**  
Corresponds to the default state of this parameter.  
The signal calculation starts simultaneously with the external trigger event but because of the instrument’s processing time the first samples are cut off and no signal is outputted. After elapsing of the internal processing time, the output signal is synchronous to the trigger event.

**"Off"**  
The signal output begins after elapsing of the processing time and starts with sample 0, i.e. the complete signal is outputted. This mode is recommended for triggering of short signal sequences with signal duration comparable with the processing time of the instrument.
Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut on page 61

**Trigger Delay**
Delays the trigger event of the signal from:
- The external trigger source
Use this setting to:
- Synchronize the instrument with the device under test (DUT) or other external devices
Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:DELay on page 62

**Trigger Inhibit**
Sets the duration for inhibiting a new trigger event subsequent to triggering. The input is to be expressed in samples.
In the "Retrigger" mode, every trigger signal causes signal generation to restart. This restart is inhibited for the specified number of samples.
This parameter is only available on external triggering.
Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:INHibit on page 62

### 4.9.2 Marker Mode

The marker output signal for synchronizing external instruments is configured in the marker settings section "Marker Mode".

The R&S SMBV supports only two markers.

**Marker Mode**
Selects a marker signal for the associated MARKER output.

- "Restart"  
  A marker signal is generated at the start of every sequence length loop.
- "Super Frame Start"  
  A marker signal is generated at the start of every super-frame period.
- "Frame Start"  
  A marker signal is generated at the start of each frame.
- "Pulse"  
  A regular marker signal is generated. The pulse frequency is defined by entering a divider. The frequency is derived by dividing the sample rate by the divider. The input box for the divider opens when "Pulse" is selected, and the resulting pulse frequency is displayed below it.

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULse:DIVider on page 65
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULse:FREQuency? on page 65
"Pattern" A marker signal that is defined by a bit pattern is generated. The pattern has a maximum length of 64 bits and is defined in an input field which opens when pattern is selected.

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PATTern on page 65

"ON/OFF Period" A regular marker signal that is defined by an ON/OFF ratio is generated. A period lasts one ON and OFF cycle. The "ON Time" and "OFF Time" are each expressed as a number of samples and are set in an input field which opens when ON/OFF ratio is selected.

ON time  OFF time  ON time  OFF time

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:ONTime on page 64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:OFFTime on page 64

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:MODE on page 64

4.9.3 Marker Delay

The delay of the signals on the MARKER outputs is set in the "Marker Delay" section. The R&S SMBV supports only two markers.

Marker x Delay
Enters the delay between the marker signal at the marker outputs and the start of the frame or slot.

The input is expressed as a number of samples. If the setting "Fix marker delay to dynamic range" is enabled, the setting range is restricted to the dynamic range. In this range the delay of the marker signals can be set without restarting the marker and signal.

Remote command:
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay on page 66

Current Range without Recalculation
Displays the dynamic range within which the delay of the marker signals can be set without restarting the marker and signal.

The delay can be defined by moving the setting mark.

Remote command:

Fix marker delay to current range
Restricts the marker delay setting range to the dynamic range. In this range the delay can be set without restarting the marker and signal.

4.9.4 Clock Settings

The clock settings are used to set the clock source and a delay if required.

Sync. Mode
(for R&S SMBV only)
Selects the synchronization mode.

This parameter is used to enable generation of very precise synchronous signal of several connected R&S SMBVs.

Note: If several instruments are connected, the connecting cables from the master instrument to the slave one and between each two consecutive slave instruments must have the same length and type.
Avoid unnecessary cable length and branching points.

"None" The instrument is working in stand-alone mode.

"Sync. Master" The instrument provides all connected instrument with its synchronisation (including the trigger signal) and reference clock signal.

"Sync. Slave" The instrument receives the synchronisation and reference clock signal from another instrument working in a master mode.

Remote command: [:SOURce<hw>]:BB:DVB:CLOCk:SYNChronization:MODE on page 67

Set Synchronization Settings
(for R&S SMBV only)
Performs automatically adjustment of the instrument's settings required for the synchronization mode, selected with the parameter "Synchronization Mode".

Remote command: [:SOURce<hw>]:BB:DVB:CLOCk:SYNChronization:EXECute on page 68

Clock Source
Selects the clock source.

"Internal" The internal clock reference is used to generate the sample clock.

"External" The external clock reference is fed in as the sample clock or multiple thereof via the CLOCK connector.
The sample rate must be correctly set to an accuracy of +/-2 % (see data sheet).
The polarity of the clock input can be changed with the aid of "Global Trigger/Clock Settings".

Remote command: [:SOURce<hw>]:BB:DVB:CLOCk:SOURce on page 67
**Clock Mode**
Enters the type of externally supplied clock.

"Sample"  A sample clock is supplied via the CLOCK connector.

"Multiple Sample"  A multiple of the sample clock is supplied via the CLOCK connector; the sample clock is derived internally from this.

Remote command:
```
{:SOURce<hw>:BB:DVB:CLOCK:MODE} on page 67
```

**Clock Multiplier**
Enters the multiplication factor for clock type "Multiple".

Remote command:
```
{:SOURce<hw>:BB:DVB:CLOCK:MULTiplier} on page 67
```

**Measured External Clock**
Provided for permanent monitoring of the enabled and externally supplied clock signal.

Remote command:
```
CLOCK:INPUT:FREQuency?
```

### 4.9.5 Global Settings

This section provides access general trigger, clock and mapping settings.

**Global Trigger/Clock Settings**
Accesses the "Global Trigger/Clock/Input Settings" dialog.

This dialog is to set the trigger threshold, the input impedance and the polarity of the clock and trigger inputs.

The parameters in this dialog affect all digital modulations and standards, and are described in chapter “Global Trigger/Clock/Input Settings” in the operating manual.
5 Remote-control commands

The following commands are required to perform signal generation with the DVB options in a remote environment. We assume that the R&S SMBV has already been set up for remote operation in a network as described in the R&S SMBV documentation. A knowledge about the remote control operation and the SCPI command syntax are assumed.

Conventions used in SCPI command descriptions

For a description of the conventions used in the remote command descriptions, see section “Remote Control Commands” in the R&S SMBV operating manual.

Common suffixes

The following common suffixes are used in remote commands:

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Value range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOURce&lt;hw&gt;</td>
<td>1</td>
<td>available baseband signals</td>
</tr>
<tr>
<td>OUTPut&lt;ch&gt;</td>
<td>1 .. 2</td>
<td>available markers</td>
</tr>
<tr>
<td>EXTernal&lt;ch&gt;</td>
<td>1</td>
<td>external trigger connectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R&amp;S SMBV supports two markers</td>
</tr>
</tbody>
</table>

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 (p)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 are described here:

- Primary Commands ................................................................. 51
- Filter Settings ........................................................................ 56
- Clipping Settings ................................................................. 58
- Trigger Settings ...................................................................... 60
- Marker Settings ....................................................................... 63
- Clock Settings .......................................................................... 66
- DVB-T/DVB-H System Configuration ......................................... 69
- DVB-S2/DVB-S2X System Configuration .................................... 74
- TPS Settings ........................................................................... 82
5.1 Primary Commands

Example: Saving and recalling settings
SOURce1:BB:DVB:STANdard DVBH
SOURce1:BB:DVB:HMODE HIER
SOURce1:BB:DVB:DVBH:SFRames 10
SOURce1:BB:DVB:DVBH:STATE 1
SOURce1:BB:DVB:WAVEform:CREate "/var/user/dvbh.wv"
SOURce1:BB:DVB:SAMPLE:LENGth?
// 6266880
SOURce1:BB:DVB:SAMPLE:DURation?
// 0.68544
SOURce1:BB:DVB:SAMPLE:RATE?
// 9142857.14285714
SOURce1:BB:DVB:SAMPLE:DRATE?
// 16.5882352941176
SOURce1:BB:DVB:SETTING:STORE "/var/user/dvbh"
SOURce1:BB:DVB:PRESet
SOURce1:BB:DVB:SETTING:CATalog?
// dvbh, dvbt, dvb_h
SOURce1:BB:DVB:SETTING:DELETE "dvb_h"
SOURce1:BB:DVB:SETTING:LOAD "/var/user/dvbt"

[:SOURCE<hw>]:BB:DVB:STATE..................................................................................52
[:SOURCE<hw>]:BB:DVB:PRESet...............................................................52
[:SOURCE<hw>]:BB:DVB:SETTING:CATalog?........................................52
[:SOURCE<hw>]:BB:DVB:SETTING:DELETE.........................................................52
[:SOURCE<hw>]:BB:DVB:SETTING:LOAD...........................................................53
[:SOURCE<hw>]:BB:DVB:SETTING:STORE.........................................................53
[:SOURCE<hw>]:BB:DVB:SETTING:STORE:FAST...............................................53
[:SOURCE<hw>]:BB:DVB:WAVEform:CREate.....................................................53
[:SOURCE<hw>]:BB:DVB:STANdard.................................................................54
[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:SFRames..............................................54
[:SOURCE<hw>]:BB:DVB:DVBXS:VSMode.........................................................54
[:SOURCE<hw>]:BB:DVB:DVBX|DVBT:FRAMES.................................................54
[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:SAMPLE:LENGth?..............................55
[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:DURation?.............................................55
[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:SAMPLE:RATE?.......................................55
[:SOURCE<hw>]:BB:DVB:DVBH|DVBT:DRATE?....................................................55
[:SOURce<hw>]:BB:DVB:STATe <State>
Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

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

Example: See Example "Saving and recalling settings" on page 51.

Manual operation: See "State" on page 15

[:SOURce<hw>]:BB:DVB: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:DVB:STATe.

Example: See Example "Saving and recalling settings" on page 51.

Usage: Event

Manual operation: See "Set To Default" on page 15

[:SOURce<hw>]:BB:DVB:SETTing:CATalog?
Queries the files with settings in the default directory. Listed are files with the file extension *.dvb.

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

Example: See Example "Saving and recalling settings" on page 51.

Usage: Query only

Manual operation: See "Save/Recall..." on page 16

[:SOURce<hw>]:BB:DVB:SETTing:DELETE <Filename>
Deletes the selected file from the default or specified directory. Deleted are files with the file extension *.dvb.

Setting parameters:
<Filename> string
Filename or complete file path; file extension can be omitted

Example: See Example "Saving and recalling settings" on page 51.

Usage: Setting only

Manual operation: See "Save/Recall..." on page 16
[:SOURce<hw>:BB:DVB:SETTing:LOAD <Filename>

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

**Setting parameters:**
- `<Filename>` string
  - Filename or complete file path; file extension can be omitted

**Example:** See Example "Saving and recalling settings" on page 51.

**Usage:** Setting only

**Manual operation:** See "Save/Recall..." on page 16

[:SOURce<hw>:BB:DVB:SETTing:STORe <Filename>

Stores the current settings into the selected file; the file extension (*.dvb) is assigned automatically.

**Setting parameters:**
- `<Filename>` string
  - Filename or complete file path

**Example:** See Example "Saving and recalling settings" on page 51.

**Usage:** Setting only

**Manual operation:** See "Save/Recall..." on page 16

[:SOURce<hw>:BB:DVB:SETTing:STORe:FAST <Fast>

Determines whether the instrument performs an absolute or a differential storing of the settings.

Enable this function to accelerate the saving process by saving only the settings with values different to the default ones.

**Note:** This function is not affected by the "Preset" function.

**Parameters:**
- `<Fast>` 0 | 1 | OFF | ON
- *RST:* 1

**Manual operation:** See "Save/Recall..." on page 16

[:SOURce<hw>:BB:DVB:WAVeform:CREate <Filename>

Stores the current settings as an ARB signal in a waveform file (*.wv).

**Setting parameters:**
- `<Filename>` string
  - Filename or complete file path; file extension is assigned automatically
Example:  
See Example "Saving and recalling settings" on page 51.

Usage: 
Setting only

Manual operation:  
See "Generate Waveform File…" on page 16

[:SOURce<hw>]:BB:DVB:STANdard <Standard>

Selects the DVB standard to be used.

Parameters:

<Standard>  
DVBH | DVBT | DVBS | DVBX

*RST:  
DVBH

Example:  
See Example "Saving and recalling settings" on page 51.

Options:

DVBS|DVBX require option R&S SMBV-K116

Manual operation:  
See "DVB Standard" on page 16

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:SFRames <SFrames>

Sets the number of super-frames to be transmitted.

Parameters:

<SFrames>  
integer

Range:  
1 to 1633 (dynamic)

*RST:  
1

Example:  
See Example "Saving and recalling settings" on page 51.

Manual operation:  
See "Number of Super Frames" on page 17

[:SOURce<hw>]:BB:DVBX:VSMode <VSMode>

Includes the VL-SNR (very low - signal to noise ratio) header in the physical layer frame.

Parameters:

<VSMode>  
0 | 1 | OFF | ON

*RST:  
0

Example:  
See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Options:  
R&S SMBV-K116

Manual operation:  
See "VL-SNR Mode" on page 17

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:FRAMes <Frames>

Sets the number of the transmitted frames.
### Parameters:

- **<Frames>**
  - Type: integer
  - Range: 1 to UINT_MAX
  - *RST*: 1

- **Example:**
  - See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

- **Options:**
  - R&S SMBV-K116

- **Manual operation:** See "Number of Frames" on page 17

### [:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPle:LENGth? 

Queries the number of the transmitted samples.

- **Return values:**
  - <Length> integer

- **Example:**
  - See Example "Saving and recalling settings" on page 51.

- **Usage:** Query only

- **Manual operation:** See "Number of Samples / Duration" on page 17

### [:SOURce<hw>]:BB:DVB:DVBH|DVBT:DURation? 

Queries the signal duration.

- **Return values:**
  - <Duration> float

- **Example:**
  - See Example "Saving and recalling settings" on page 51.

- **Usage:** Query only

- **Manual operation:** See "Number of Samples / Duration" on page 17

### [:SOURce<hw>]:BB:DVB:DVBH|DVBT:SAMPle:RATE? 

Queries the sample rate.

- **Return values:**
  - <Rate> float

- **Example:**
  - See Example "Saving and recalling settings" on page 51.

- **Usage:** Query only

- **Manual operation:** See "Sample Rate / Data Rate" on page 17

### [:SOURce<hw>]:BB:DVB:DVBH|DVBT:DRATe? 

Queries the data rate.
Return values:

- **<DRate>**
  - Type: float
  - Increment: 0.01

Example:
See Example "Saving and recalling settings" on page 51.

Usage:
Query only

Manual operation:
See "Sample Rate / Data Rate" on page 17

---

### 5.2 Filter Settings

```
[:SOURce<hw>]:BB:DVB:FILTER:TYPE
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:APCO25
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:COSine
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:COSine:COFS
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:GAUss
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:LPASs
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:LPASSEVM
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:PGAuss
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:RCOSine
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:SPHase
[:SOURce<hw>]:BB:DVB:FILTER:RORange
[:SOURce<hw>]:BB:DVB:FILTER:ROFactor
[:SOURce<hw>]:BB:DVB:SRATe:VARiation
```

**[:SOURce<hw>]:BB:DVB:FILTER:TYPE <Type>**

Selects the filter type.

**Parameters:**

```
<Type>
```

- RCOSine | COSine | GAUss | LGAuss | CONE | COF705 | COEQualiz... | C2K3x | APCO25 | SPHase | RECTangle | PGAuss | LPASs | DIRac | ENPShape | EWPShape | LPASSEVM

*RST: COSine

**Example:**

```
SOURce1:BB:DVB:STANDard DVBT
SOURce1:BB:DVB:FILTER:TYPE COSine
SOURce:BB:DM:FILTER:PARameter:COSine 0.1
SOURce:BB:DM:FILTER:PARameter:COFS -0.1
SOURce1:BB:DVB:SRATe:VARiation?
// 9142857.14285714
```

**Manual operation:**
See "Filter" on page 37

---

```
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:APCO25 <Apco25>
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:COSine <Cosine>
[:SOURce<hw>]:BB:DVB:FILTER:PARameter:COSine:COFS <Cofs>
```
Remote-control commands

Filter Settings

Filter Settings

[:SOURce<hw>]:BB:DVB:FILTer:PARameter:GAUSs <Gauss>
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:LPAs <LPass>
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:LPASSEVM <LPassEvm>
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:PGAuss <PGauss>
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:RCosine <RCosine>
[:SOURce<hw>]:BB:DVB:FILTer:PARameter:SPHase <SPhase>

Sets the filter parameter.

<table>
<thead>
<tr>
<th>Filter Type</th>
<th>Parameter</th>
<th>Parameter name</th>
<th>Min</th>
<th>Max</th>
<th>Increment</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>APCO25</td>
<td>Rolloff factor</td>
<td>&lt;Apco25&gt;</td>
<td>0.05</td>
<td>0.99</td>
<td>0.01</td>
<td>0.2</td>
</tr>
<tr>
<td>COSine</td>
<td>Cutoff frequency shift</td>
<td>&lt;Cosf&gt;</td>
<td>-1</td>
<td>1</td>
<td>0.01</td>
<td>-0.1</td>
</tr>
<tr>
<td>COSine</td>
<td>Rolloff factor</td>
<td>&lt;Cosine&gt;</td>
<td>0</td>
<td>1</td>
<td>0.01</td>
<td>0.1</td>
</tr>
<tr>
<td>GAUSs</td>
<td>BxT</td>
<td>&lt;Gauss&gt;</td>
<td>0.15</td>
<td>2.5</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>LPAsS</td>
<td>Cutoff frequency factor</td>
<td>&lt;LPass&gt;</td>
<td>0.05</td>
<td>2</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>LPASSEVM</td>
<td>Cutoff frequency factor</td>
<td>&lt;LPassEvm&gt;</td>
<td>0.05</td>
<td>2</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>PGAuss</td>
<td>BxT</td>
<td>&lt;PGauss&gt;</td>
<td>0.15</td>
<td>2.5</td>
<td>0.01</td>
<td>0.5</td>
</tr>
<tr>
<td>RCOSine</td>
<td>Rolloff factor</td>
<td>&lt;RCosine&gt;</td>
<td>0</td>
<td>1</td>
<td>0.01</td>
<td>0.22</td>
</tr>
<tr>
<td>SPHase</td>
<td>BxT</td>
<td>&lt;SPhase&gt;</td>
<td>0.15</td>
<td>2.5</td>
<td>0.01</td>
<td>2</td>
</tr>
</tbody>
</table>

Parameters:
- <SPhase>
  - float
  - Range: 0.15 to 2.5
  - Increment: 0.01
  - *RST: 2

Example:
- See [:SOURce<hw>]:BB:DVB:FILTer:TYPE on page 56

Manual operation:
- See "Rolloff Factor or BxT" on page 38

[:SOURce<hw>]:BB:DVB:FILTer:RORange <RORange>

Sets whether the high or the low filter roll-off range is used.

Parameters:
- <RORange>
  - HIGH | LOW
  - *RST: HIGH

Example:
- See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Options:
- R&S SMBV-K116

Manual operation:
- See "Rolloff Range" on page 38

[:SOURce<hw>]:BB:DVB:FILTer:ROFactor <ROff>

Sets the filter parameter.
5.3 Clipping Settings

[:SOURce<hw>]:BB:DVB:CLIPping:LEVel <Level>
Sets the limit for level clipping. This value indicates at what point the signal is clipped.

Parameters:
<Level>  integer
Value specified as a percentage, relative to the highest level.
100 PCT indicates that clipping does not take place.
Range: 1 to 100
*RST: 100

Example: SOURcel:BB:DVB:CLIPping:LEVel 80
SOURcel:BB:DVB:CLIPping:MODE SCAL
SOURcel:BB:DVB:CLIPping:STATe 1

Manual operation: See "Clipping Level" on page 41
[:SOURce<hw>]:BB:DVB:CLIPping:MODE <Mode>
Sets the method for level clipping.

Parameters:
<Mode> VECTor | SCALar
*RST: VECTor

Example: See [:SOURce<hw>]:BB:DVB:CLIPping:LEVel on page 58

Manual operation: See "Clipping Mode" on page 41

[:SOURce<hw>]:BB:DVB:CLIPping:STATe <State>
Activates level clipping.

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

Example: See [:SOURce<hw>]:BB:DVB:CLIPping:LEVel on page 58

Manual operation: See "Clipping State" on page 41
5.4 Trigger Settings

Example: Trigger configuration

SOURce1:BB:DVB:TRIGger:SOURce INTernal
SOURce1:BB:DVB:TRIGger:SEQUence ARETrigger
SOURce1:BB:DVB:STAT ON
SOURce1:BB:DVB:TRIGger:EXECute
SOURce1:BB:DVB:TRIGger:ARM:EXECute
SOURce1:BB:DVB:TRIGger:RMODe?
  // stopped
SOURce1:BB:DVB:TRIGger:EXECute
SOURce1:BB:DVB:TRIGger:RMODe?
  // run

  // SOURce1:BB:DVB:TRIGger:SEQUence SING
  // SOURce1:BB:DVB:TRIGger:SLUNit SEQ
  // SOURce1:BB:DVB:TRIGger:SLENgth 2
  // SOURce1:BB:DVB:TRIGger:SEQUence AAUT
  // SOURce1:BB:DVB:TRIGger:SOURce EXT
  // SOURce1:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut 1
  // SOURce1:BB:DVB:TRIGger:EXTernal1:INHibit 100
  // SOURce1:BB:DVB:TRIGger:EXTernal1:DELay 10
  // SOURce1:BB:DVB:TRIGger:SOURce OBAS
  // SOURce1:BB:DVB:TRIGger:OBASEband:DELay 100
  // SOURce1:BB:DVB:TRIGger:OBASEband:INHibit 10

[:SOURce<hw>]:BB:DVB:TRIGger:ARM:EXECute.............................................................. 60
[:SOURce<hw>]:BB:DVB:TRIGger:EXECute........................................................................61
[:SOURce<hw>]:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut.......................................61
[:SOURce<hw>]:BB:DVB:TRIGger:RMODe?........................................................................61
[:SOURce<hw>]:BB:DVB:TRIGger:SLUNit........................................................................61
[:SOURce<hw>]:BB:DVB:TRIGger:SLENgth......................................................................61
[:SOURce<hw>]:BB:DVB:TRIGger:SOURce........................................................................62
[:SOURce<hw>]:BB:DVB:TRIGger:[EXTernal<ch>].DELay....................................................62
[:SOURce<hw>]:BB:DVB:TRIGger:[EXTernal<ch>].INHibit..................................................62
[:SOURce<hw>]:BB:DVB:[TRIGger].SEQUence................................................................63

[:SOURce<hw>]:BB:DVB:TRIGger:ARM:EXECute

Stops signal generation; a subsequent trigger event restarts signal generation.

Example: See Example "Trigger configuration" on page 60

Usage: Event

Manual operation: See "Arm" on page 18
[:SOURce<hw>]:BB:DVB:TRIGger:EXECute

Executes a trigger.

Example: See Example "Trigger configuration" on page 60

Usage: Event

Manual operation: See "Execute Trigger" on page 18

[:SOURce<hw>]:BB:DVB:TRIGger:EXTernal:SYNChronize:OUTPut <Output>

Enables signal output synchronous to the trigger event.

Parameters:
<Output> 0 | 1 | OFF | ON
*RST: 1

Example: See Example "Trigger configuration" on page 60

Manual operation: See "Sync. Output to External Trigger" on page 44

[:SOURce<hw>]:BB:DVB:TRIGger:RMODe?

Queries the signal generation status.

Return values:
<RMode> STOP | RUN

Example: See Example "Trigger configuration" on page 60

Usage: Query only

Manual operation: See "Running/Stopped" on page 43

[:SOURce<hw>]:BB:DVB:TRIGger:SLUNit <SLunit>

Defines the unit for the entry of the signal sequence length.

Parameters:
<SLunit> FRAME | SEQuence
*RST: SEQuence

Example: See Example "Trigger configuration" on page 60

Manual operation: See "Signal Duration Unit" on page 43

[:SOURce<hw>]:BB:DVB:TRIGger:SLENgth <SLength>

Defines the length of the signal sequence that is output in the SINGle trigger mode.
Parameters:
<SLength> integer
Range: 1 to 7000
*RST: 4
Example: See Example "Trigger configuration" on page 60
Manual operation: See "Signal Duration" on page 43

[:SOURce<hw>]:BB:DVB:TRIGger:SOURce <Source>
Selects the trigger source:
• INTernal: manual trigger or *TRG.
• EXTernal: trigger signal on the TRIGGER connector.
Parameters:
<Source> INTernal|EXTernal
*RST: INTernal
Example: See Example "Trigger configuration" on page 60
Manual operation: See "Trigger Source" on page 44

[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:DELay <Delay>
Specifies the trigger delay for external triggering.
Parameters:
<Delay> float
Range: 0 to 65535
Increment: 0.01
*RST: 0
Default unit: Sample
Example: BB:DVB:TRIG:SOUR EXT
BB:DVB:TRIG:DEL 50
Manual operation: See "Trigger Delay" on page 46

[:SOURce<hw>]:BB:DVB:TRIGger[:EXTernal<ch>]:INHibit <Inhibit>
Specifies the duration by which a restart is to be inhibited following a trigger event.
Parameters:
<Inhibit> integer
Range: 0 to 67108863
*RST: 0
Example: BB:DVB:TRIG:SOUR EXT1
BB:DVB:TRIG:INH 200
Manual operation: See "Trigger Inhibit" on page 46
Remote-control commands

Marker Settings

[:SOURce<hw>]:BB:DVB[:TRIGger]:SEQUence <Sequence>

Selects the trigger mode:
- AUTO = auto
- RETRigger = retrigger
- AAUTO = armed auto
- AETrigger = armed retrigger
- SINGle = single

Parameters:

Example: See Example "Trigger configuration" on page 60

Manual operation: See "Trigger Mode" on page 43

5.5 Marker Settings

Example: Marker configuration

SOURcel:BB:DVB:TRIGger:OUTPut1:MODE PULS
// sets a pulse marker
SOURcel:BB:DVB:TRIGger:OUTPut1:PULSe:FREQuency?

SOURcel:BB:DVB:TRIGger:OUTPut1:MODE PATTern
// sets a bit pattern marker
SOURcel:BB:DVB:TRIGger:OUTPut1:PATTern #H2,2

SOURcel:BB:DVB:TRIGger:OUTPut1:MODE RAT
SOURcel:BB:DVB:TRIGger:OUTPut1:ONTime 10
SOURcel:BB:DVB:TRIGger:OUTPut1:OFFTime 10

// Marker delay configuration
// restricts the marker signal delay
// 0
// 2000
SOURcel:BB:DVB:TRIGger:OUTPut2:DELay 1600
// delays the marker signal output

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:MODE ...................................................... 64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:ONTime ................................................. 64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:OFFTime ............................................. 64
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PATTern .............................................. 65
Remote-control commands

Marker Settings

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:DIVider
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:FREQuency?
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut:DELay:FIxed
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MINimum?
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MAximum?

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:MODE <Mode>

Defines the signal for the selected marker output.

Parameters:

<Mode>  RESTart | SFRame | SFRAME | FRAMe | PULSe | PATTern | RATio | TRIGger

RESTart
Marks the start of every sequence length loop. Restart mode is available only for ETI data source.

SFRame
Marks the start of every super-frame period.

FRAMe
Marks the start of every frame.

PULSe
Generated continuously according to the frequency and frequency divider.

PATTern
A marker signal according to a bit pattern

RATio
A regular marker signal that is defined by an on/off ratio

TRIGger
A received internal or external trigger signal is output at the marker connector.

*RST: RESTart

Example: See Example "Marker configuration" on page 63

Manual operation: See "Marker Mode" on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:ONTime <Ontime>
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:OFFTime <OffTime>

Sets the number of samples during which the marker output is on or off.

* If R&S SMBV-B9 is installed, the minimum marker duration depends on the sample/symbol rate.

See chapter "Basics on ..." in the R&S SMBV operating manual.
Remote-control commands

**Marker Settings**

Parameters:
- **<OffTime>** integer
  - Range: 1 to 16777215
  - *RST*: 1

Example: See Example "Marker configuration" on page 63

Manual operation: See "Marker Mode" on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PATTERN <Pattern>

Defines the bit pattern used to generate the marker signal.

Parameters:
- **<Pattern>** 64 bits
  - 0 = marker off, 1 = marker on

Example: See Example "Marker configuration" on page 63

Manual operation: See "Marker Mode" on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:DIVider <Divider>

Sets the divider for pulse marker mode (PULSe).

*) If R&S SMBV-B9 is installed, the minimum marker duration depends on the sample/symbol rate.

See chapter "Basics on ..." in the R&S SMBV operating manual.

Parameters:
- **<Divider>** integer
  - Range: 2 to 1024
  - *RST*: 2

Example: See Example "Marker configuration" on page 63

Manual operation: See "Marker Mode" on page 46

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:PULSe:FREQuency?

Queries the pulse frequency of the pulsed marker signal PULSe.

Return values:
- **<Frequency>** float

Example: See Example "Marker configuration" on page 63

Usage: Query only

Manual operation: See "Marker Mode" on page 46
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay <Delay>

Defines the delay between the signal on the marker outputs and the start of the signals.

**Parameters:**

<Delay> 
float

- **Range:** 0 to 16777215
- **Increment:** 0.001
- **RST:** 0

**Example:** See Example "Marker configuration" on page 63

**Manual operation:** See "Marker x Delay" on page 47


Restricts the marker delay setting range to the dynamic range.

**Parameters:**

<Fixed> 
0 | 1 | OFF | ON

- **RST:** 0

**Example:** See Example "Marker configuration" on page 63

**Manual operation:** See "Fix marker delay to current range" on page 47

[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MINimum?
[:SOURce<hw>]:BB:DVB:TRIGger:OUTPut<ch>:DELay:MAXimum?

Queries the min/max marker delay.

**Return values:**

<Maximum> 
float

- **Range:** 0 to max

**Example:** See Example "Marker configuration" on page 63

**Usage:** Query only

**Manual operation:** See "Current Range without Recalculation" on page 47

### 5.6 Clock Settings

[:SOURce<hw>]:BB:DVB:CLOCk:MODE.................................................................67
[:SOURce<hw>]:BB:DVB:CLOCk:MULTiplier.......................................................67
[:SOURce<hw>]:BB:DVB:CLOCk:SOURce..........................................................67
[:SOURce<hw>]:BB:DVB:CLOCk:SYNChronization:MODE..................................67
[:SOURce<hw>]:BB:DVB:CLOCk:SYNChronization:EXECute..............................68
[:SOURce<hw>]:BB:DVB:CLOCK:MODE <Mode>

Sets the type of externally supplied clock.

**Parameters:**

- `<Mode>`
  - **SAMP** | **MSAMP**
  - **RST:** **SAMP**

**Example:**

```
SOURcel:BB:DVB:CLOCK:SOURce EXTernal
SOURcel:BB:DVB:CLOCK:MODE MSAMP
SOURcel:BB:DVB:CLOCK:MULTiplier 12
```

**Options:**

- R&S SMBV-B10

**Manual operation:** See "Clock Mode" on page 49

[:SOURce<hw>]:BB:DVB:CLOCK:MULTiplier <Multiplier>

The command specifies the multiplier for clock type "Multiple Sample" (:BB:DVB:CLOCK:MODE MSAMP) in the case of an external clock source.

**Parameters:**

- `<Multiplier>`
  - integer
  - **Range:** 1 to 64
  - **Increment:** 1
  - **RST:** 4

**Example:** See [:SOURce<hw>]:BB:DVB:CLOCK:MODE on page 67

**Manual operation:** See "Clock Multiplier" on page 49

[:SOURce<hw>]:BB:DVB:CLOCK:SOURce <Source>

Selects the clock source.

**Parameters:**

- `<Source>`
  - **INTernal** | **EXTernal**

- **INTernal**
  - The internal clock reference is used.

- **EXTernal**
  - The external clock reference is supplied to the CLOCK connector.

  - **RST:** **INTernal**

**Example:** See [:SOURce<hw>]:BB:DVB:CLOCK:MODE on page 67

**Manual operation:** See "Clock Source" on page 48

[:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:MODE <Mode>

Selects the synchronization mode.
Remote-control commands

**Clock Settings**

**Parameters:**

<Mode>  
- **NONE**  
  Standalone mode
- **MASTer**  
  The instrument provides all connected instrument with its synchronization (including the trigger signal) and reference clock signal.
- **SLAVe**  
  The instrument receives the synchronization and reference clock signal from another instrument working in a master mode.

`*RST: NONE`

**Example:**  
SOURcel:BB:DVB:CLOCK:SYNChronization:MODE MASTer  
SOURcel:BB:DVB:CLOCK:SYNChronization:EXECute

**Manual operation:** See "Sync. Mode" on page 48

**[:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:EXECute**

Adjusts the settings as required for the selected synchronization mode.

**Example:** See [:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:MODE on page 67.

**Usage:** Event

**Manual operation:** See "Set Synchronization Settings" on page 48
5.7 DVB-T/DVB-H System Configuration

Example: Example of a DVB-H configuration

```
SOURC1:BB:DVB:STANdard DVBH
SOURC1:BB:DVB:DVBH:HMODE HIER
SOURC1:BB:DVB:DVBH:SFRAMES 10
SOURC1:BB:DVB:DVBH:HP:DATA PN23
SOURC1:BB:DVB:DVBH:LP:DATA DLIS
SOURC1:BB:DVB:DVBH:LP:DATA:DSELECTION "/var/user/dvbh.gts"
SOURC1:BB:DVB:DVBH:HP:PNScrambler:STATE 1
SOURC1:BB:DVB:DVBH:HP:OCOrder:STATE 1
SOURC1:BB:DVB:DVBH:HP:INTERleaver:STATE 1
SOURC1:BB:DVB:DVBH:LP:DATA:DSSelection
SOURC1:BB:DVB:DVBH:LP:ICOrder:RATE CR7D8
SOURC1:BB:DVB:DVBH:INTERleaver:BIT:STATE 1
SOURC1:BB:DVB:DVBH:INTERleaver:SMBol:STATE 1
SOURC1:BB:DVB:DVBH:INTERleaver:SMBol:MODE IDEP
SOURC1:BB:DVB:DVBH:OFDM:BWIDth 8
SOURC1:BB:DVB:DVBH:OFDM:MODulation QAM64
SOURC1:BB:DVB:DVBH:OFDM:ALPHA 4
SOURC1:BB:DVB:DVBH:OFDM:GINterval GI1D32
SOURC1:BB:DVB:STATE 1
```

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[:SOURce<hw>]:BB:DVBDVBH|DVBT:HMODe <HMode>
Selects either to use one path or both path with different priority.

Parameters:

- <HMode>
  - NHierarchial | HIERarchical
  - *RST: NHierarchial

Example: See Example "Example of a DVB-H configuration" on page 69

Manual operation: See "Hierarchy Mode " on page 19

[:SOURce<hw>]:BB:DVBDVBH|DVBT[:HP|LP]:DATA <Data>
Selects the data source to be used.

Parameters:

- <Data>
  - PAC0 | PAC1 | PN15 | PN23 | DLISt
  - ZERO
    - Internal 0 is used.
  - ONE
    - Internal 1 is used.
  - PN15/23
    - Internally generated PRBS data as per CCITT with period lengths between \(2^{29}-1\) and \(2^{23}-1\).
  - DLISt
    - Internal data from a TS file is used.
  - *RST: PN23

Example: See Example "Example of a DVB-H configuration" on page 69

Manual operation: See "HP/LP Source " on page 19

[:SOURce<hw>]:BB:DVBDVBH|DVBT[:HP|LP]:DATA:DSELection <DSelection>
Selects an existing TS file from the default directory or from the specific directory.

TS files are files with extension *.gts, *.ts, or *.trp.

Parameters:

- <DSelection>
  - string
    - Filename incl. file extension or complete file path

Example: See Example "Example of a DVB-H configuration" on page 69

Manual operation: See "HP/LP Source " on page 19

[:SOURce<hw>]:BB:DVBDVBH|DVBT[:HP|LP]:ICODer:RATE <Rate>
Selects the code rate of the inner coder.
Parameters:

<Rate>  CR1D2 | CR2D3 | CR3D4 | CR5D6 | CR7D8
*RST:    CR1D2

Example:  See Example "Example of a DVB-H configuration" on page 69
Manual operation:  See " Rate " on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:ICODer[:STATe] <State>
Activates/deactivates the inner coder.

Parameters:

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

Example:  See Example "Example of a DVB-H configuration" on page 69
Manual operation:  See " Inner Coder " on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:OCODer[:STATe] <State>
Activates/deactivates the outer coder (RS).

Parameters:

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

Example:  See Example "Example of a DVB-H configuration" on page 69
Manual operation:  See " Outer Coder (RS) " on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:OINTerleaver[:STATe] <State>
Activates/deactivates the outer interleaver.

Parameters:

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

Example:  See Example "Example of a DVB-H configuration" on page 69
Manual operation:  See " Outer Interleaver " on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT[:HP|LP]:PNSCrambler[:STATe] <State>
Activates/deactivates the PN scrambler.

Parameters:

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

Example:  See Example "Example of a DVB-H configuration" on page 69
Remote-control commands

Manual operation: See "PN Scrambler" on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINTerleaver:BIT[:STATe] <State>
Activates/deactivates the inner bit interleaver.
Parameters:
<State> 0 | 1 | OFF | ON
*RST: 1
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "Inner Bit Interleaver" on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINTerleaver:SYMBOL:MODE <Mode>
Selects the inner interleaver mode.
Parameters:
<Mode> NATION | NATive | IDEPth
NATive The interleaver interleaves the bits over one OFDMA symbol.
IDEPth The interleaver interleaves the bits over two (4K transmission mode) or four (2K transmission mode) OFDMA symbols.
*RST: NATive
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "Inner Interleaver Mode" on page 21

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINTerleaver:SYMBOL:TMODE <TMode>
Selects the transmission mode.
Parameters:
<TMode> T2K | T4K | T8K
*RST: T2K
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "Inner Interleaver Tx Mode" on page 21

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:IINTerleaver:SYMBOL[:STATe] <State>
Activates/deactivates the inner symbol interleaver.
Parameters:
<State> 0 | 1 | OFF | ON
*RST: 1
Example: See Example "Example of a DVB-H configuration" on page 69
Remote-control commands

Manual operation: See "Inner Symbol Interleaver" on page 20

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:ALPHa <Alpha>
Selects the $\alpha$ value. This value is used to shape the constellation of the modulation.
For DVB-H, this value is always 1.
Parameters:
<Alpha> 1 | 2 | 4
*RST: 1
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "OFDM/RF Alpha" on page 21

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:BWIDth <BWidth>
Selects the system bandwidth.
Parameters:
<BWidth> 5 | 6 | 7 | 8
*RST: 8 MHz
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "OFDM/RF Bandwidth" on page 21

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:GINterval <GInterval>
Selects the OFDM/RF guard interval.
Parameters:
<GInterval> GI1D4 | GI1D8 | GI1D16 | GI1D32
*RST: GI1D8
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "OFDM/RF Guard Int" on page 21

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:OFDM:MODulation <Modulation>
Selects the constellation for the OFDM modulation.
Parameters:
<Modulation> QPSK | QAM16 | QAM64
*RST: QAM64
Example: See Example "Example of a DVB-H configuration" on page 69
Manual operation: See "OFDM/RF Modulation" on page 21
5.8 **DVB-S2/DVB-S2X System Configuration**

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

**Example: Configuring the DVB-S2/DVB-S2X settings**

```
SOURcel:BB:DVBX:STANdard DVBX
SOURcel:BB:DVBX:VSMode 0
SOURcel:BB:DVBX:FRAMes 5

SOURcel:BB:DVBX:STYPe TRAN
SOURcel:BB:DVBX:DATA PN9
SOURcel:BB:DVBX:ADLength:STATe 0
SOURcel:BB:DVBX:DATA:LENGTH 3000
SOURcel:BB:DVBX:BSCRambler:STATe 1
SOURcel:BB:DVBX:OCODer:STATe 1
SOURcel:BB:DVBX:ICODer:STATe 1
SOURcel:BB:DVBX:BINTerleaver:STATe 1
SOURcel:BB:DVBX:CTYPe NORM
SOURcel:BB:DVBX:MODulation APSK64_16_16_16
SOURcel:BB:DVBX:MCOD?
// APSK64_X_N3245L
SOURcel:BB:DVBX:ICODer:RATE?
// CR128D180
SOURcel:BB:DVBX:PSTate:STATe 1
SOURcel:BB:DVBX:PSCRambler:STATe 1
SOURcel:BB:DVBX:SSEQUence 3

SOURcel:BB:DVBX:THConfig:TEINdication:STATe 1
SOURcel:BB:DVBX:THConfig:SBYTE?
// #47,8
SOURcel:BB:DVBX:THConfig:PUS 1
SOURcel:BB:DVBX:THConfig:TPriority 1
SOURcel:BB:DVBX:THConfig:PID:PAETern #H0A00,13
SOURcel:BB:DVBX:THConfig:SCONtrol 1
SOURcel:BB:DVBX:THConfig:AField:STATe 1
SOURcel:BB:DVBX:THConfig:PAYLoad:STATe 1
SOURcel:BB:DVBX:THConfig:CCOunter 1
SOURcel:BB:DVBX:THConfig:STATe 1

SOURcel:BB:DVBX:BHConfig:CACM ACM
SOURcel:BB:DVBX:BHConfig:IACTive:STATe 1
SOURcel:BB:DVBX:BHConfig:NACTive:STATe 1
SOURcel:BB:DVBX:BHConfig:UPL?
// 188
SOURcel:BB:DVBX:BHConfig:ADF:STATe 0
SOURcel:BB:DVBX:BHConfig:DFL 464
SOURcel:BB:DVBX:BHConfig:SYNC:PAETern?
// #47,8
```
DVB-S2/DVB-S2X System Configuration

SOURce1:BB:DVB:X:VSMode 1
SOURce1:BB:DVB:X:STYPe GP
SOURce1:BB:DVB:X:STYPe GHEM

SOURce1:BB:DVB:X:GHConfig:LTYPE 1
SOURce1:BB:DVB:X:GHConfig:GLENgh 2048
SOURce1:BB:DVB:X:GHConfig:FID:PA TTern #H01,8
SOURce1:BB:DVB:X:GHConfig:FIUSE:STATe 1
SOURce1:BB:DVB:X:GHConfig:TLUSE:STATe 1
SOURce1:BB:DVB:X:GHConfig:TLENgh?
// 3005
SOURce1:BB:DVB:X:GHConfig:PTYPE:PA TTern #H0001,16
SOURce1:BB:DVB:X:GHConfig:PTUSE:STATe 1
SOURce1:BB:DVB:X:GHConfig:LABel:PA TTern #H000011,24
SOURce1:BB:DVB:X:GHConfig:LUSE:STATe 1
SOURce1:BB:DVB:X:GHConfig:STATe 1
SOURce1:BB:DVB:X:BHConfig:GLACTive:STATe 1
SOURce1:BB:DVB:X:BHConfig:DFL 464
SOURce1:BB:DVB:X:CTYPe MED
SOURce1:BB:DVB:X:MCOD BPSK_X_VM1145

SOURce1:BB:DVB:FILTER:RORange LOW
SOURce1:BB:DVB:FILTER:ROFactor RO10
SOURce1:BB:DVB:CLIPping:STATe 1

SOURce1:BB:DVB:STATe 1

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:STYPe ....................................................................76
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ISTReam? .................................................................. 76
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA .....................................................................76
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:PATTern ................................................................76
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:ADLength:STATe ............................................77
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:LENGth ............................................................77
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BS CRambler[STATe] .............................................78
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:OCODer[STATe] ......................................................78
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ICODe r[STATe] ......................................................78
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ICODer:RATE .........................................................78
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:SFACtor .................................................................79
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BINTeleaver[STATe] .............................................79
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:CTYPe ....................................................................79
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MCOD ....................................................................80
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MODulation .............................................................80
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:PSTate[STATe] .........................................................81
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:PSCRambler[STATe] ..............................................81
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:SSEQuence............................................................81
[:SOURce<hw>]:BB:DVB:DVBS|DVBX:STYPe <SType>
Selects the input stream type.

Parameters:
<SType> TRANsport | GP | GC | GHEM
*RST: TRANsport

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Stream Type" on page 27

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:ISTReam?
Queries the input stream type.

Return values:
<IStream> string

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Usage: Query only

Manual operation: See "Input Stream" on page 27

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA <Data>
Selects the data source.

Parameters:
<Data> ZERO | ONE | PATTern | PN9 | PN11 | PN15 | PN16 | PN20 | PN21 | PN23 | DLISt | TFILe | GFILe

PATTern
To set the bit pattern, use the command [:SOURce<hw>]:BB:DVBS:DVBX:DATA:PATTern.

DLISt|TFILe|GFILe
To select the data list, TS file or the GSE file, use the command [:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:DSELection|TSELection|GSELection.

*RST: PN9

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Data Source" on page 27

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:DATA:PATTern <Pattern>
Sets the the bit pattern.
Remote-control commands

Parameters:
<Pattern> 64 bits
*RST: \#H0,1

Example:
SOURcel:BB:DVB:DVBX:DATA PATTern

Manual operation: See "Data Source" on page 27

[:SOURce<hw>]:BB:DVB:DVBX:DATA:
DSElection|TSElection|GSElection <FSelection>

Selects an existing data list, transport file (TS) or GSE file from the default or from the specific directory.
• TS files are files with extension *.gts, *.ts, or *.trp.
• GSE files are files with extension *.gse
• Data lists are files with extension *.dm_iqd

Parameters:
<FSelection> string
Filename incl. file extension or complete file path

Example:
SOURcel:BB:DVB:DVBX:DATA TFILe
SOURcel:BB:DVB:DVBX:DATA:TSElection "/var/user/temp/dvb.gts"

Manual operation: See "Data Source" on page 27

[:SOURce<hw>]:BB:DVB:DVBX:ADLength:STATe <State>

Defines if the data length is set automatically or manually.

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

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Auto Data Length" on page 28

[:SOURce<hw>]:BB:DVB:DVBX:DATA:LENGth <DLength>

Sets the data length.

Parameters:
<DLength> integer
Range: 1 to 65536
*RST: 5000
Default unit: Bytes
Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “Data Length” on page 28

[:SOURce<hw>]:BB:DVB:DVBS|DVBSX:BSCRambler[:STATe] <BScrambler>
Activates baseband scrambling.

Parameters:
<BScrambler> 0 | 1 | OFF | ON
*RST: 1

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “BB Scrambler” on page 29

[:SOURce<hw>]:BB:DVB:DVBS|DVBSX:OCODer[:STATe] <OCoder>
Enables the BCH outer coder.

Parameters:
<OCoder> 0 | 1 | OFF | ON
*RST: 1

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “Outer Coder” on page 29

[:SOURce<hw>]:BB:DVB:DVBS|DVBSX:ICODer[:STATe] <ICoder>
Activates the inner coder.

Parameters:
<ICoder> 0 | 1 | OFF | ON
*RST: 1

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “Inner Coder” on page 29

[:SOURce<hw>]:BB:DVB:DVBS|DVBSX:ICODer:RATE <Rate>
Selects the code rate of the inner coder.
Parameters:

**<Rate>**

CR1D4 | CR1D3 | CR2D5 | CR1D2 | CR3D5 | CR2D3 | CR3D4 | CR4D5 | CR5D6 | CR8D9 | CR9D10 | CR2D9 | CR13D45 |

*RST: CR1D4

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Rate" on page 29

---

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:SFACtor <SFactor>

Sets the spreading factor.

Parameters:

**<SFactor>** integer

Range: 1 to 2

*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "SF" on page 29

---

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BINTerleaver[:STATe] <BInterleaver>

Enables the bit interleaver.

Parameters:

**<BInterleaver>** 0 | 1 | OFF | ON

*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Bit Interleaver" on page 29

---

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:CTYPe <CType>

Selects the code type.

Parameters:

**<CType>** NORMal | MEDium | SHORT

*RST: NORMal
Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Code Type" on page 30

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MCOD <Modcod>`

Selects the MODCOD.

Parameters:

`<Modcod>`

QPSK_S_14 | QPSK_S_13 | QPSK_S_25 | QPSK_S_12 | QPSK_S_35 | QPSK_S_23 | QPSK_S_34 | QPSK_S_45 | QPSK_S_56 | QPSK_S_89 | QPSK_S_910 | PSK8_S_23 | PSK8_S_34 | PSK8_S_56 | PSK8_S_89 | PSK8_S_910 | APSK16_S_23 | APSK16_S_34 | APSK16_S_45 | APSK16_S_56 | APSK16_S_89 | APSK16_S_910 | APSK32_S_56 | APSK32_S_89 | APSK32_S_910 | QPSK_X_N1345 | QPSK_X_N920 | QPSK_X_N1120 | APSK8_X_N59L | APSK8_X_N2645L | PSK8_X_N2336 | PSK8_X_N2536 | PSK8_X_N1318 | APSK16_X_N112L | APSK16_X_N815L | APSK16_X_N59L | APSK16_X_N2645 | APSK16_X_N2336 | APSK16_X_N236L | APSK16_X_N2845 | APSK16_X_N2536 | APSK16_X_N1318 | APSK16_X_N79 | APSK16_X_N7790 | APSK32_X_N3245 | APSK32_X_N1115 | APSK32_X_N79 | APSK64_X_N3245L | APSK64_X_N1115 | APSK64_X_N79 | APSK64_X_N45 | APSK64_X_N56 | APSK128_X_N34 | APSK128_X_N79 | APSK256_X_N2945L | APSK256_X_N234L | APSK256_X_N3145L | APSK256_X_N3245 | APSK256_X_N1115 | APSK256_X_N34 | QPSK_X_S1145 | QPSK_X_S415 | QPSK_X_S1445 | QPSK_X_S715 | QPSK_X_S815 | QPSK_X_S3245 | PSK8_X_S715 | PSK8_X_S815 | PSK8_X_S2645 | PSK8_X_S3245 | APSK16_X_S715 | APSK16_X_S815 | APSK16_X_S2645 | APSK16_X_S3245 | APSK16_X_S23 | APSK32_X_S3245 | QPSK_X_VN29 | BPSK_X_VM15 | BPSK_X_VM1145 | BPSK_X_VM13 | BPSK_X_VS15S | BPSK_X_VS1145 | BPSK_X_VS15 | BPSK_X_VS415 | BPSK_X_VS13

*RST: QPSK_S_14

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "MODCOD" on page 30

`[:SOURce<hw>]:BB:DVB:DVBS|DVBX:MODulation <Modulation>`

Selects the modulation scheme.
Remote-control commands

DVB-S2/DVB-S2X System Configuration

Parameters:

<Modulation> QPSK | APSK16 | APSK32 | PSK8 | P2BPsk | APSK16_8_8 |
| APSK32_4_12_16R | APSK64_8_16_20_20 | APSK8_2_4_2 |
| APSK32_4_8_4_16 | APSK64_16_16_16 |
| APSK64_4_12_20_28 | APSK128 | APSK256

*RST: QPSK

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Modulation" on page 30

[:SOURce<hw>]:BB:DVBS|DVBSX:PSTate[:STATe] <PState>

Activates the pilot.

Parameters:

<PState> 0 | 1 | OFF | ON

*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Pilot State" on page 30

[:SOURce<hw>]:BB:DVBS|DVBSX:PSCRambler[:STATe] <PScrambler>

Activates pilot scrambling.

Parameters:

<PScrambler> 0 | 1 | OFF | ON

*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "PL Scrambler" on page 30

[:SOURce<hw>]:BB:DVBS:DVBSX:SSEQuence <SSequence>

Sets the bit sequence number used to scramble the pilot.

Parameters:

<SSequence> integer

Range: 0 to 6

*RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Scr. Sequence" on page 31
5.9 TPS Settings

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:PATTern <Pattern>

Sets the pattern for cell identification.

Parameters:

<table>
<thead>
<tr>
<th>Pattern</th>
<th>16 bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range:</td>
<td>0000 to FFFF</td>
</tr>
<tr>
<td>*RST:</td>
<td>0000</td>
</tr>
</tbody>
</table>

Example:

SOURce1:BB:DVB:STANdard DVBH
SOURce1:BB:DVB:HMODe HIER
SOURce1:BB:DVBH|DVBT:TPS:TSLIcing:STATe?
  // 1
SOURce1:BB:DVBH|DVBT:TPS:ID:STATe?
  // 1
SOURce1:BB:DVBH:TPS:ID:PATTern #HAAAA,16
SOURce1:BB:DVBH:TPS:MFEC:STATe 1


[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:ID:STATe <State>

Activates/deactivates the TPS cell identification.

Parameters:

<table>
<thead>
<tr>
<th>State</th>
<th>0</th>
<th>1</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
</table>

Example:

See [:SOURce<hw>]:BB:DVBH|DVBT:TPS:ID:PATTern on page 82.

Manual operation: See " Cell Identification " on page 22

[:SOURce<hw>]:BB:DVB:DVBH|DVBT:TPS:MFEC[:STATe] <State>

Activates/deactivates the multiprotocol encapsulation forward error correction bit.

Parameters:

<table>
<thead>
<tr>
<th>State</th>
<th>0</th>
<th>1</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>*RST:</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example:

See [:SOURce<hw>]:BB:DVBH|DVBT:TPS:ID:PATTern on page 82.

Manual operation: See " MPE FEC " on page 22
Remote-control commands

[:SOURce<hw>:]:BB:DVB:DVBH|DVBT:TPS:TSLicing[:STATe]?

Queries the time slicing state.

Return values:
<State> 0 | 1 | OFF | ON
Always 1 for DVB-H
Always 0 for DVB-T

Example: See [:SOURce<hw>:]:BB:DVB:DVBH|DVBT:TPS:ID: PATTern on page 82.

Usage: Query only

Manual operation: See "Time Slicing" on page 22

5.10 TS Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig[:STATe] ................................................... 83
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:SBYTe? ................................................... 83
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:TEINdication[:STATe] ................................... 84
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:PUS ................................................................. 84
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:TPRiority ......................................................... 84
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:PID:PATTern .................................................. 84
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:SCONtrol .......................................................... 85
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:AFielda[:STATe] ........................................... 85
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:PAYLoad[:STATe] .......................................... 85
[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:CCOunter ....................................................... 85

[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig[:STATe] <State>

Inserts header information in the transport stream.

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

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "TS Header Active" on page 32

[:SOURce<hw>:]:BB:DVB:DVBS|DVBSX:THConfig:SBYTe?

Queries the information carried by the synchronization byte.

Return values:
<SByte> 8 bits
Hexadecimal value
Remote-control commands

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Usage: Query only

Manual operation: See " Sync Byte (Hex) " on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TEIIndication[:STATe] <TEIIndication>

Inserts transport error indication information in the header.

Parameters:
  <TEIIndication> 0 | 1 | OFF | ON
  *RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Transport Error Indication " on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PUS <PSUIndication>

If enabled, the PES (packetized elementary streams), PSI (program specific information), or DVB-MIP (megaframe initialization) packet begin immediately after the header.

Parameters:
  <PSUIndication> 0 | 1 | OFF | ON
  *RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Payload Unit Start Indication " on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:TPRiority <TPriority>

Marks the current packet as high priority packet compared to packets with the same PID.

Parameters:
  <TPriority> integer
  Range: 0 to 1
  *RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Transport Priority " on page 32

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:THConfig:PID:PATTern <Pattern>

Sets the packet identifier PID.
Remote-control commands

Parameters:
<br/>\[<\text{Pattern}>\] 13 bits
Hexadecimal value

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " PID (Hex) " on page 32

\[[:\text{SOURce<hw>}:\text{BB}:\text{DVBS|DVBX}:\text{THConfig}:\text{SCONtrol}<\text{SControl}>\]

Sets the scrambling information.

Parameters:
<br/>\[<\text{SControl}>\] integer
Range: 0 to 3
*RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Scrambling Control " on page 32

\[[:\text{SOURce<hw>}:\text{BB}:\text{DVBS|DVBX}:\text{THConfig}:\text{AFIleld}[:\text{STATe}]<\text{AFielde}>\]

Inserts an adaptation field in the packet.

Parameters:
<br/>\[<\text{AFielde}>\] 0 | 1 | OFF | ON
*RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Adaptation Field " on page 32

\[[:\text{SOURce<hw>}:\text{BB}:\text{DVBS|DVBX}:\text{THConfig}:\text{PAYLoad}[:\text{STATe}]<\text{Payload}>\]

Adds a payload field in packet.

Parameters:
<br/>\[<\text{Payload}>\] 0 | 1 | OFF | ON
*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Payload " on page 32

\[[:\text{SOURce<hw>}:\text{BB}:\text{DVBS|DVBX}:\text{THConfig}:\text{CCOunter}<\text{CCounter}>\]

Sets the sequence number of the first payload packet.

Parameters:
<br/>\[<\text{CCounter}>\] integer
Range: 0 to 1
*RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Payload " on page 32
5.11 GSE Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig[:STATe]............................................................ 86
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LTYPe.............................................................. 86
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:GLENgth...........................................................87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FIUSe[:STATe].................................................. 87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FiD:PATTern..................................................... 87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLENght?..........................................................87
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLUSE[:STATe]...................................................88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTYPe:PATTern................................................ 88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTUSE[:STATe]................................................ 88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LABel:PATTern..................................................88
[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LUSE[:STATe]................................................... 89

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig[:STATe] <GHActive>

Inserts header information in the transport stream.

Parameters:
<GHActive> 0 | 1 | OFF | ON
*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "GSE Header Active" on page 33

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LTYPe <LType>

Set the type of the used label field.

Parameters:
<LType> integer
Range: 0 to 3
*RST: 0

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.
Remote-control commands

DVB-H/T, DVB-S2/S2X

GSE Header

Manual operation: See "Label Type" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:GLength <GLength>

Sets the number of bytes following in the GSE packet.

Parameters:
<GLength>  integer
  Range:   1 to 4096
  *RST:    1024

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "GSE Length" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FIUSe[:STATe] <FIUse>

Includes a PDU fragment in the GSE packet.

Parameters:
<FIUse>  0 | 1 | OFF | ON
  *RST:    1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Fragment ID (Hex)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:FID:PATTern <FId>

Sets the PDU fragment ID.

Parameters:
<FId>  8 bits
  Hexadecimal value

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Fragment ID (Hex)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLENgth?

Queries the total length.

Return values:
<TLength>  integer
  Range:   1 to 65536
  *RST:    1
  Default unit: Bytes
Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Usage: Query only

Manual operation: See "Use, Total Length" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:TLUSE[:STATe] <TLUse>

Includes the total length indication in the GSE header.

Parameters:  
<TLUse>  0 | 1 | OFF | ON  
*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Total Length" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTYPe:PATTerN <PType>

Queries the payload type carried in the PDU.

Parameters:  
<PType>  16 bits  
Hexadecimal value

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Protocol Type (Hex)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:PTUSE[:STATe] <PTUse>

Includes the payload type indication in the GSE header.

Parameters:  
<PTUse>  0 | 1 | OFF | ON  
*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Protocol Type (Hex)" on page 34

[:SOURce<hw>]:BB:DVB:DVBX:GHConfig:LABel:PATTerN <Pattern>

Sets the label used for addressing.

Parameters:  
<Pattern>  48 bits  
Hexadecimal value
Remote-control commands

DVB-H/T, DVB-S2/S2X

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Label (Hex)" on page 34

[:SOURce<hw>]:BB:DVBS|DVBSX:GHConfig:LUSE[:STATe] <LUse>

Includes the label indication in the GSE header.

Parameters:

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

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "Use, Label (Hex)" on page 34

5.12 BB Header

Configuration of the DVB-S2/DVB-S2X settings require option R&S SMBV-K116.

[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:CACM..................................................... 89
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:IACTive[:STATe]..................................................... 90
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:GLACtive[:STATe]..................................................... 90
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:NACTive[:STATe]..................................................... 90
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:UPL..................................................... 90
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:ADFL:STATe..................................................... 90
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:SBYTe:PATTern..................................................... 91
[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:ADFL:STATe..................................................... 90

[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:CACM <CAcm>

Selects whether constant coding and modulation (CCM) or adaptive coding and modulation (ACM) communication is used.

Parameters:

<CAcm> CCM | ACM
*RST: CCM

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See "CCM/ACM" on page 35

[:SOURce<hw>]:BB:DVBS|DVBSX:BHConfig:IACTive[:STATe] <IActive>

Sets the ISSYI (input stream synchronization indicator) bit to 1.
Remote-control commands

DVB-H/T, DVB-S2/S2X

BB Header

Parameters:
<IActive> 0 | 1 | OFF | ON
*RST: 0

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “ISSYI Active” on page 36

[:SOURce<hw>]:BB:DVB:DVBX:BHConfig:GLACtive[:STATe] <GLActive>
Sets that the GSE stream is GSE-Lite compliant.

Parameters:
<GLActive> 0 | 1 | OFF | ON
*RST: 0

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “GSE-Lite Active” on page 36

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:NACTive[:STATe] <NActive>
Activates null-packet deletion (NPD).

Parameters:
<NActive> 0 | 1 | OFF | ON
*RST: 0

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “NPD Active” on page 36

[:SOURce<hw>]:BB:DVB:DVBS|DVBS|DVBSX:BHConfig:UPL <UPLength>
Sets the user packet length (UPL).

Parameters:
<UPLength> integer
Range: 1 to 8192
*RST: 100

Example: See Example “Configuring the DVB-S2/DVB-S2X settings” on page 74.

Manual operation: See “UPL” on page 36

[:SOURce<hw>]:BB:DVB:DVBS|DVBSX:BHConfig:ADFL:STATe <State>
Defines if the DFL is set automatically or manually.
Parameters:
<State> 0 | 1 | OFF | ON
*RST: 1

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Auto DFL" on page 36

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:DFL <DFLength>
Sets the data field length (DFL).

Parameters:
<DFLength> integer
Range: 1 to 7264
*RST: 1024

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " DFL" on page 36

[:SOURce<hw>]:BB:DVB:DVBS|DVBX:BHConfig:SBYTe:PATTern <Sync>
Sets the user packet synchronization byte.

Parameters:
<Sync> 8 bits
Hexadecimal value

Example: See Example "Configuring the DVB-S2/DVB-S2X settings" on page 74.

Manual operation: See " Sync (Hex) " on page 36
List of Commands

[D:SOURce<hw>]:BB:DVB:CLIPping:LEVel........................................................................................................ 58
[D:SOURce<hw>]:BB:DVB:CLIPping:MODE........................................................................................................ 59
[D:SOURce<hw>]:BB:DVB:CLOCK:MODE......................................................................................................... 67
[D:SOURce<hw>]:BB:DVB:CLOCK:MULTiplier................................................................................................. 67
[D:SOURce<hw>]:BB:DVB:CLOCK:SOURce...................................................................................................... 67
[D:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:EXECute......................................................................... 68
[D:SOURce<hw>]:BB:DVB:CLOCK:SYNChronization:MODE............................................................................. 67
[D:SOURce<hw>]:BB:DVB[DVB:T]:DRATe?........................................................................................................ 55
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[D:SOURce<hw>]:BB:DVB[DVB:T]:HMODE.................................................................................................... 70
[D:SOURce<hw>]:BB:DVB[DVB:T]:IlNterleaver:BIT[STATe]............................................................................... 72
[D:SOURce<hw>]:BB:DVB[DVB:T]:IlNterleaver:SYMBol:MODE.......................................................................... 72
[D:SOURce<hw>]:BB:DVB[DVB:T]:IlNterleaver:SYMBol:TMODE....................................................................... 72
[D:SOURce<hw>]:BB:DVB[DVB:T]:OFDM:ALPHA............................................................................................ 73
[D:SOURce<hw>]:BB:DVB[DVB:T]:OFDM:BWIDth........................................................................................... 73
[D:SOURce<hw>]:BB:DVB[DVB:T]:OFDM:GINTerval....................................................................................... 73
[D:SOURce<hw>]:BB:DVB[DVB:T]:OFDM:MODulation..................................................................................... 73
[D:SOURce<hw>]:BB:DVB[DVB:T]:SAMPle:LENGTH?........................................................................................ 55
[D:SOURce<hw>]:BB:DVB[DVB:T]:SAMPle:RATE?............................................................................................ 55
[D:SOURce<hw>]:BB:DVB[DVB:T]:SFrames.................................................................................................... 54
[D:SOURce<hw>]:BB:DVB[DVB:T]:TPS:ID:PATTern......................................................................................... 82
[D:SOURce<hw>]:BB:DVB[DVB:T]:TPS:ID:STATe.............................................................................................. 82
[D:SOURce<hw>]:BB:DVB[DVB:T]:TPS:MFEC[STATe]........................................................................................ 82
[D:SOURce<hw>]:BB:DVB[DVB:T]:TPS:TSLibxing[STATe]................................................................................ 83
[D:SOURce<hw>]:BB:DVB[DVB:T]:TPS:DATA.................................................................................................. 70
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:DATA................................................................................................ 70
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:DSELection...................................................................................... 70
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:ICODer:RATE.................................................................................... 70
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:ICODer[STATe].................................................................................. 71
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:OCODer[STATe]................................................................................ 71
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:ONIlterleaver[STATe]...................................................................... 71
[D:SOURce<hw>]:BB:DVB[DVB:T]:HP[LP]:PNSCrambler[STATe]...................................................................... 71
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:ADLength:STATe............................................................................. 77
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:ADFL:STATe.................................................................... 90
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:ACAM............................................................................. 89
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:DFL................................................................................... 91
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:IACtive[STATe]............................................................... 89
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:NACtive[STATe]............................................................. 90
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:SBYTe:PATTern................................................................................ 91
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BHConfig:UPL................................................................................ 90
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BINIlterleaver[STATe]...................................................................... 79
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:BSCrambler[STATe]......................................................................... 78
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:CTYPE............................................................................................ 79
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:DATA................................................................................................ 76
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:DATA:DSELection|TSELection|GSELection........................................... 77
[D:SOURce<hw>]:BB:DVB[DSBV]:DVBSX:DATA:LENGTH................................................................................ 77
<table>
<thead>
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<tr>
<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:DATA:PARTern</td>
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<td>DVBX:FRAMES</td>
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<tr>
<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:ICODe:RATE</td>
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<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:ICODe:STATe</td>
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<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:ISTREAM?</td>
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<tr>
<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:MCOD</td>
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<td>DVBX:THConfig:PUSe:STATe</td>
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<td>DVBX:THConfig:PASe</td>
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<td>[:SOURce&lt;hw&gt;:BB:DVB]:DVBS</td>
<td>DVBX:THConfig:PASe:VS</td>
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<tr>
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