

**DPO SVE
SignalVu Essentials Software
Programmer Manual**

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Overview

This document provides supplementary information about the remote commands for the DPO SVE SignalVu Essentials Software. The SignalVu software enables you to use the DPO7000, DPO70000/B and DSA70000/B Series Digital Oscilloscopes to analyze RF signal behavior with the same software on the RSA6100A Series Real-Time Spectrum Analyzers. The remote command details are described in the following manuals that can be downloaded from www.tektronix.com/manuals.

- RSA6100A Series Real-Time Spectrum Analyzers Programmer Manual (Tektronix part number 077-0249-xx)
- DPO7000, DPO70000/B and DSA70000/B Series Digital Oscilloscopes Programmer Manual (Tektronix part number 077-0010-xx)

The SignalVu software supports the use of the RSA6100A Series commands with some limitations. For example, commands that control output functions are not supported. The details are given in the following sections, *Measurement Display Support* and *Remote Command Support*. Some commands are added for the SignalVu software, which are described in *Additional Commands*. The error messages and codes are listed in the last section, *Error Messages and Codes*.

Setting Up Remote Communications

Connect your oscilloscope to a controller and set a unique device address. The default settings for the GPIB configuration are:

- GPIB Address 1
- GPIB Mode GPIB Talk/Listen

To change either of the GPIB settings, do the following:

1. Select **GPIB Configuration** from the Utilities menu.
2. Click the **Configuration Talk/Listen** button.
3. Change the **GPIB Address** to a unique address.
4. Click the **Close** button.

The instrument is now set up for bidirectional communication with your controller.

For details, refer to the *DPO7000, DPO70000/B and DSA70000/B Series Digital Oscilloscopes Programmer Manual*.

Measurement Display Support

The RSA6100A Series spectrum analyzers have various measurement displays, which are categorized into four groups. The following table lists all measurement displays available on the RSA6100A Series spectrum analyzers. The columns at right show whether or not a display is supported by the SignalVu software.

Measurement display support

Display group	Measurement display	Supported	Not supported
General signal viewing	Amplitude versus Time	X	
	Demodulate I&Q versus Time	X	
	DPX spectrum		X
	EVM versus Time	X	
	Eye Diagram	X	
	Frequency versus Time	X	
	Phase versus Time	X	
	RF I&Q versus Time	X	
	Spectrogram	X	
	Spectrum	X	
	Time overview	X	
Analog Modulation	Amplitude modulation	X	
	Frequency modulation	X	
	Phase modulation	X	
Phase Noise and Jitter Measurement (Option 11 only)	Phase Noise Display		X
General purpose digital modulation (Option 21 only)	Constellation	X	
	Demod I&Q versus Time	X	
	Frequency Deviation versus Time	X	
	Magnitude error versus Time	X	
	Phase error versus Time	X	
	Signal quality	X	
	Symbol table	X	
	Symbol maps	X	
User defined filters	X		

Measurement display support, (cont.)

Display group	Measurement display	Supported	Not supported
RF measurements	CCDF	X	
	Channel power and ACPR	X	
	MCPR	X	
	Occupied Bandwidth	X	
	Spurious	X	
Pulsed RF (Option 20 only)	Pulse statistics	X	
	Pulse table	X	
	Pulse trace	X	
DPX® Display (Option 200 only)	DPX® Density Trigger		X
	DPX® spectrum display		X

NOTE. Option 20 and 21 are called Option SVP and SVM, respectively for the SignalVu software.

Remote Command Support

The SignalVu software supports the use of the RSA6100A Series spectrum analyzer remote commands with some limitations. The following table summarizes the RSA6100A Series commands supported and not supported by the SignalVu software for each command group. For details on the RSA6100A Series remote commands, refer to the *RSA6100A Series Real-Time Spectrum Analyzers Programmer Manual*.

Command support summary

Command group	Function	Commands supported	Commands not supported
IEEE common	Conforms to the IEEE Std 488.2.	Use the oscilloscope IEEE common commands. ¹	
ABORt	Resets the trigger system and stops measurements.	ABORt (Aborts acquisitions and measurements.)	-
CALCulate	Controls the markers and the search operations.	All	CALCulate:DPSA:
CALibration	Calibrates the instrument.	Use the oscilloscope CALibrate commands. ¹	
DISPlay	Controls the presentation of text, graph, and trace.	All	DISPlay:DPSA: DISPlay:CCDF:
FETCh	Retrieves the measurements from the last acquired data.	All except in the right box.	FETCh:RFIN:IQ:SCALE? FETCh:DPSA:
INITiate	Controls the initiation of data acquisition.	All	-
INPut	Controls the characteristics of the signal input.	All except in the right box.	INPut[:RF]:ATTenuation INPut[:RF]:ATTenuation:AUTO INPut[:RF]:ATTenuation:MONitor:STATe INPut[:RF]:GAIN:STATe
MMEMory	Provides mass storage capabilities for the instrument.	All except in the right box. (See <i>Note</i> following this table.) You can also use the FILESystem commands of the oscilloscope. ¹	MMEMory:CALibration:LOAD:CORRection :EXternal:EDIT<x> MMEMory:CALibration:STORE:CORRection :EXternal:EDIT<x> MMEMory:DPSA:
OUTPut	Controls the characteristics of the signal output.	-	All
READ	Obtains the measurement results by acquiring fresh data.	All except in the right box.	READ:DPSA

Command support summary, (cont.)

Command group	Function	Commands supported	Commands not supported
SENSe	Sets up detailed conditions for each measurement.	All except in the right box. (See <i>Note</i> following this table.) You can also use the additional commands. (See page 6, <i>Additional Commands</i> .)	[SENSe]:ACQuisition:FFRame:ACTual? [SENSe]:ACQuisition:FFRame:Limit [SENSe]:ACQuisition:FFRame:STATe [SENSe]:ANALYsis:ADVanced:DITHer [SENSe]:ROSCillator:SOURce [SENSe]:DPSA:
STATus	Controls the status and event registers.	-	All
SYSTem	Sets or queries system parameters for operation.	All except in the right box.	SYSTem:COMMunicate:GPIB[:SELF]:ADDRESS SYSTem:DATE SYSTem:TIME SYSTem:VERSion SYSTem:HW:VERSion
TRACe	Controls trace activation and math operations.	All except in the right box.	TRACe:DPSA
TRIGger	Controls triggering.	Use the oscilloscope TRIGger commands. ¹	
UNIT	Specifies fundamental units for measurement.	-	UNIT:POWer (Use the [SENSe]:POWer:UNITs command.)

¹ Refer to the DPO7000, DPO7000/B and DSA7000/B Series Digital Oscilloscopes Programmer Manual.

- Note**
- The :MMEMory:LOAD:IQ command accepts the file extensions other than .tiq as well. In the RSA6100A Series spectrum analyzers, this command ignores the file extension passed in (if any), and assumes that it is .tiq. In the SignalVu software, the file extension can be either .tiq or .wfm, and so is not ignored. If no file extension is included, it is assumed to be .tiq.
 - To avoid conflicts with the oscilloscope commands, use the following syntax.
 - Use the command header [SENSe]:SIGNAlvu:ACQuisition for the [SENSe]:ACQuisition commands. For example, replace the [SENSe]:ACQuisition:BANDwidth command with [SENSe]:SIGNAlvu:ACQuisition:BANDwidth.
 - Replace the [SENSe]:MEASurement:FREQuency command with [SENSe]:FREQuency.

Additional Commands

This section describes the commands added for the SignalVu software.

Additional commands

Command	Description
[SENSe]:SIGNAlvu:ACQuisition:CHANnel	Selects or queries the oscilloscope data to be used for processing.
[SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal	Determines whether to enable controlling the oscilloscope horizontal settings.
[SENSe]:SIGNAlvu:ACQuisition:CONTRol:SAMPLerate	Determines whether to enable controlling the oscilloscope sample rate.
[SENSe]:SIGNAlvu:ACQuisition:CONTRol:VERTical	Determines whether to enable controlling the oscilloscope vertical settings.
[SENSe]:SIGNAlvu:ACQuisition:RESet	Resets the oscilloscope.

The oscilloscope settings are controlled automatically, based on its own settings. However, there may be some cases where you manually control these settings. Use [SENSe]:SIGNAlvu:ACQuisition:CONTRol commands to determine whether to control a group of oscilloscope settings automatically or manually.

[SENSe]:SIGNAlvu:ACQuisition:CHANnel

Selects or queries the oscilloscope channel or waveform to be used for processing. When the channel is changed, the new selected channel will be turned on (display on), and the previously selected channel will be turned off (display off). The selected channel is always set display on.

Conditions Measurement views: All

Group Sense commands

Syntax [SENSe]:SIGNAlvu:ACQuisition:CHANnel <string>
[SENSe]:SIGNAlvu:ACQuisition:CHANnel?

Arguments <string> ::= { "CH1" | "CH2" | "CH3" | "CH4"
| "MATH1" | "MATH2" | "MATH3" | "MATH4"
| "REF1" | "REF2" | "REF3" | "REF4" }

"CH1" to "CH4" selects the input channel 1 to 4, respectively (default: CH1).

"MATH1" to "MATH4" selects the math waveform 1 to 4, respectively.

"REF1" to "REF4" selects the reference waveform 1 to 4, respectively.

Examples `SENSE:SIGNALVU:ACQUISITION:CHANNEL "CH1"` selects the input channel 1 to be used for processing.

[SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal

Determines whether to set the oscilloscope horizontal settings automatically or manually including:

- Record length
- Acquisition sampling mode (automatically set to RT (Real-Time))
- Single shot mode (automatically set off)
- Horizontal mode (automatically set to Manual)
- Fast Acq (automatically set off)
- Acquisition Mode (automatically set to Sample)
- Fast Frame (automatically set off)

Conditions Measurement views: All

Group Sense commands

Syntax `[SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal { OFF | ON | 0 | 1 }`

`[SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal?`

Arguments OFF or 0 disables the SignalVu software to control the oscilloscope horizontal settings. You can set the horizontal settings manually.

ON or 1 enables the SignalVu software to control the oscilloscope horizontal settings (default). The horizontal settings are automatically set.

Examples `SENSE:SIGNALVU:ACQUISITION:CONTROL:HORIZONTAL ON` enables the SignalVu software to control the oscilloscope horizontal settings.

[SENSe]:SIGNAlvu:ACQuisition:CONTRol:SAMPLerate

Determines whether to set the oscilloscope sample rate automatically or manually. The sample rate is set to maximum automatically, to minimize the possibility of signal above the Nyquist rate causing errors. However, it may be desirable

to reduce sample rate if the maximum frequency of an input signal is known, allowing longer acquisition and faster measurement.

Conditions	Measurement views: All
Group	Sense commands
Syntax	[SENSE]:SIGNALvu:ACQUISITION:CONTROL:SAMPLERATE { OFF ON 0 1 } [SENSE]:SIGNALvu:ACQUISITION:CONTROL:SAMPLERATE?
Arguments	OFF or 0 disables the SignalVu software to control the oscilloscope sample rate. You can set the sample rate manually. ON or 1 enables the SignalVu software to control the oscilloscope sample rate (default). The sample rate is automatically set to the maximum value.
Examples	SENSE:SIGNALVU:ACQUISITION:CONTROL:SAMPLERATE ON enables the SignalVu software to control the oscilloscope sample rate.

[SENSE]:SIGNALvu:ACQUISITION:CONTROL:VERTICAL

Determines whether to set the oscilloscope vertical settings automatically or manually for the selected channel including:

- Digital Filters (DSP) (automatically set on)
- Bandwidth (automatically set to Maximum)
- Vertical scale of the selected channel
- Termination of the selected channel

Conditions	Measurement views: All
Group	Sense commands
Syntax	[SENSE]:SIGNALvu:ACQUISITION:CONTROL:VERTICAL { OFF ON 0 1 } [SENSE]:SIGNALvu:ACQUISITION:CONTROL:VERTICAL?

Arguments	OFF or 0 disables the SignalVu software to control the oscilloscope vertical settings. You can set the vertical settings manually. ON or 1 enables the SignalVu software to control the oscilloscope vertical settings (default). The vertical settings are automatically set.
Examples	<code>SENSE:SIGNALVU:ACQUISITION:CONTROL:VERTICAL ON</code> enables the SignalVu software to control the oscilloscope vertical settings.

[SENSe]:SIGNAlvu:ACQuisition:RESet (No Query Form)

Restores default settings to the oscilloscope and then sets the oscilloscope controls that the SignalVu software is enabled to control (refer to the [SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal, :SAMPLerate, and :VERTical commands).

Conditions	Measurement views: All
Group	Sense commands
Syntax	<code>[SENSe]:SIGNAlvu:ACQuisition:RESet</code>
Related Commands	<code>[SENSe]:SIGNAlvu:ACQuisition:CONTRol:HORizontal</code> , <code>[SENSe]:SIGNAlvu:ACQuisition:CONTRol:SAMPLerate</code> , <code>[SENSe]:SIGNAlvu:ACQuisition:CONTRol:VERTical</code>
Arguments	None
Examples	<code>SENSE:SIGNALVU:ACQUISITION:RESET</code> restores default settings to the oscilloscope and then sets the oscilloscope controls that the SignalVu software is enabled to control.

Error Messages and Codes

This section lists the device error messages and codes that are unique to the SignalVu software. For details on the oscilloscope error messages and codes, refer to the *DPO7000, DPO70000/B and DSA70000/B Series Digital Oscilloscopes Programmer Manual*.

Event codes and messages can be obtained by using the queries `SYSTEM:ERROR?` and `SYSTEM:ERROR:ALL?` These are returned in the following format:

```
<event_code>,"<event_message>"
```

Device Errors

These error codes are unique to the SignalVu software. They are classified into three groups: global, measurement, and source conditions, as shown in the following tables.

Device errors, global condition

Error code	Error message
2900	Setup error
2901	Disabled: data is from swept acquisition
2902	Disabled: swept settings; Acquire data while display is selected
2903	Acquisition bandwidth too small for current setup
2904	Can't get acquisition data record
2905	Can't open the requested display
2906	Analysis failure
2907	Trigger position not supported
2908	Analysis length too small for current setup
2909	No math trace: unmatched trace lengths
2910	Analysis time was adjusted
2911	Not enough samples for current setup
2912	Can't replay. Data is from swept acquisition.
2913	Can't replay. Live data needed for swept settings.
2914	Recall error: setup not completely restored
2915	Recall failure: problem with file or file contents
2916	Save failure: file not saved
2917	Unexpected software error. Please cycle power and try again.
2918	Export failure: file not saved
2919	Export failure: unable to open results file for export. File not saved.
2920	Search condition for this result is already defined.

Device errors, global condition, (cont.)

Error code	Error message
2921	Search condition for this result was not found.
2924	Load failed: <filename>
2925	Store error: file not saved.
2926	No Math trace: unmatched trace X range
2927	Not enough memory for measurement
2928	Incomplete analysis
2929	Not enough samples for current setup
2930	Mask creation error: <reason message>

Device errors, measurement condition

Error code	Error message
2940	TDBW actual (TDBW: Time Domain Bandwidth)
2941	Average transmit not available in volts units
2942	RBW increased to
2943	RBW limited by acquisition bandwidth to
2944	RBW conflict. Increase span or analysis length
2945	Analysis stopped: ambiguous pulse shape
2946	Setup error: Phase measurement location.
2947	No pulses found
2948	No FFT (not all pulses have results)
2949	No burst detected
2951	Audio disabled: configuration problem
2952	Audio Demod disabled: swept acquisition
2953	Audio Demod disabled: trigger in use
2954	Audio disabled: IF band outside Acq BW
2955	Calibration error. See Windows Event Viewer for error detail.
OBW errors	
2956	Analysis failure: $\text{AcqBW} < \text{MeasBW} + (5 \times \text{RBW})$
2957	Analysis failure: AcqBW must be 10 kHz or more
2958	$x \text{ dB BW} > \text{Meas BW}$
Pulse errors	
2959	AcqBW too low for current Chirp BW setting
2963	Not enough memory for measurement

Device errors, measurement condition, (cont.)

Error code	Error message
Other measurements	
2964	BW actual (limited by Acq BW)
2965	CISPR not available in FastFrame. Uncheck FastFrame in the Acquire panel.
2966	Analysis length must be in auto.
2967	Carrier not found
2969	CISPR accuracy limited by acq memory. Adjust RBW or freq range.
2970	CISPR: Acq BW too small for RBW. Try increasing span or freq range.
2971	Insufficient data for CISPR. Acquire while display is selected.
2972	VBW increased - Analysis Length too short
2973	VBW does not use full Analysis Length.

Device errors, source condition

Error code	Error message
2980	Freq/AcqBW exceed digitizer nyquist rate
2981	Insufficient time samples for current setup
2982	The decimation rate needed for downconversion to IQ is too high, and not supported
2983	Acq BW contains negative frequencies
2984	Please enable "Scope Settings> Other acquisition/horizontal settings"
2985	Scope Horizontal Position must be from 1 to 99%
2986	Digital IF downconverter out of virtual memory
2987	Downconversion failure