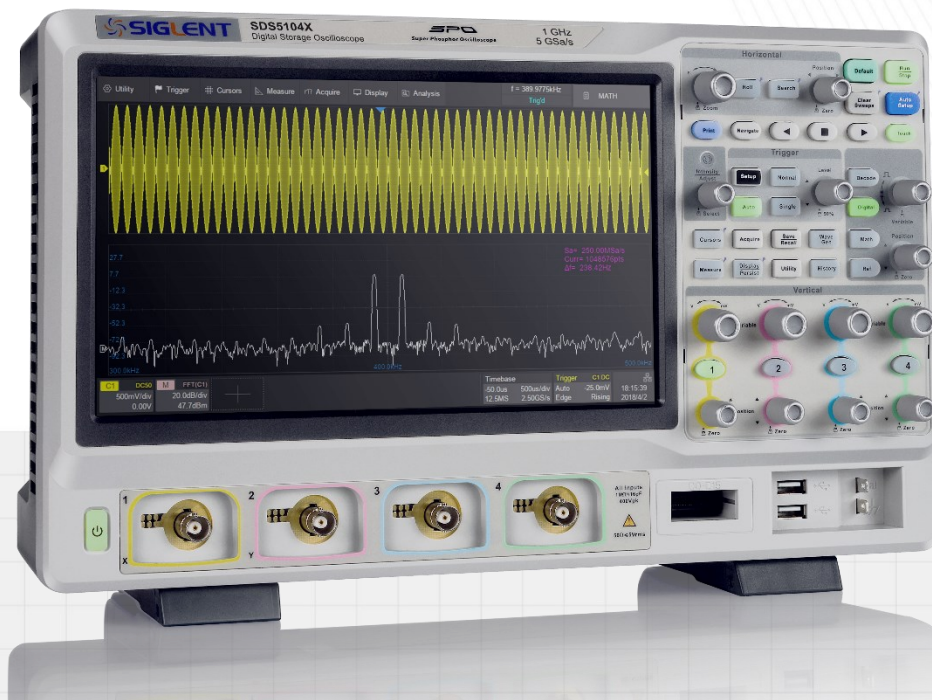


# Digital Oscilloscopes

## IVI-C Programming Guide

E01C  
Dec, 2023



SIGLENT TECHNOLOGIES CO.,LTD

## Revision History

This chapter declares the modifications of IVI driver in the most recent release of the programming guide version.

### Version E01A at Introduction

This version, as the first version, will be compared with later versions. When the next version is released, the differences between the two versions will be marked.

### Version E01B at Introduction

The following are the main revisions:

- ◆ New support models: SDS5000X , SDS6000A and SDS6000 Pro series.
- ◆ Added attribute of measurement subsystem:  
SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEA,  
SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEB,  
SDS\_ATTR\_MEASURE\_ADVANCED\_TYPE,  
SDS\_ATTR\_MEASURE\_ADVANCED\_VALUE

### Version E01C at Introduction

The following are the main revisions:

- ◆ New support models: SDS800X HD, SDS1000X HD, SDS2000X HD, SDS3000X HD, SDS7000A and SDS6000L series.
- ◆ Modified measurement subsystem attribute range values:  
SDS\_ATTR\_MEASURE\_SIMPLE\_SOURCE,  
SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEA,  
SDS\_ATTR\_MEASURE\_ADVANCED\_TYPE,

SDS\_ATTR\_MEASURE\_THRESHOLD\_SOURCE,  
SDS\_ATTR\_MEASURE\_THRESHOLD\_ABS,  
SDS\_ATTR\_MEASURE\_THRESHOLD\_PERC,  
SDS\_ATTR\_MEASURE\_THRESHOLD\_SOURCE,  
SDS\_ATTR\_MEASURE\_THRESHOLD\_TYPE.

- ◆ Add attributes of acquisition/trigger subsystem:

SDS\_ATTR\_ADC\_RES,  
SDS\_ATTR\_NUM\_AVERAGES,  
SDS\_ATTR\_TRIGGER\_COUPLING,  
SDS\_ATTR\_NOISE\_REJECT,  
SDS\_ATTR\_TRIGGER\_STATUS,  
SDS\_ATTR\_TRIGGER\_SINGLE.

- ◆ Add High Level Custom Functions:

sds\_ConfigureAbsRefLevels,  
sds\_ConfigureTriggerSingle,  
sds\_FetchWaveformDelayMeasurement.

- ◆ Modified High Level Functions

sds\_InitiateAcquisition,  
sds\_ConfigureGlitchTriggerSource,  
sds\_ConfigureWidthTriggerSource,  
sds\_ConfigureRefLevels,  
sds\_ConfigureEdgeTriggerSource,  
sds\_ConfigureTriggerCoupling,  
sds\_ConfigureTrigger,  
sds\_FetchWaveform,  
sds\_ReadWaveform.

## Models Supported

The series of SIGLENT digital oscilloscopes supporting this IVI-C driver is shown below.

Series	Release Version Supporting IVI-C Driver
SDS5000X	0.9.3R2 and higher
SDS2000X Plus	1.3.5R3 and higher
SDS6000A	1.3.4.0 and higher
SDS6000 Pro	1.3.4.0 and higher
SDS2000X HD	1.2.0.0 and higher
SDS6000L	1.0.2.0 and higher
SDS1000X HD	1.0.8.0 and higher
SDS3000X HD	1.0.1.2 and higher
SDS7000A	1.1.2.0 and higher
SDS800X HD	1.0.1.2 and higher

## Software Requirement

This chapter describes how to configure the IVI driver to control the instrument. If you want to use the IVI Driver, you must install NI-VISA, the IVI Compliance Package, and a C language development system that supports the IVI driver library.

## Install NI-MAX

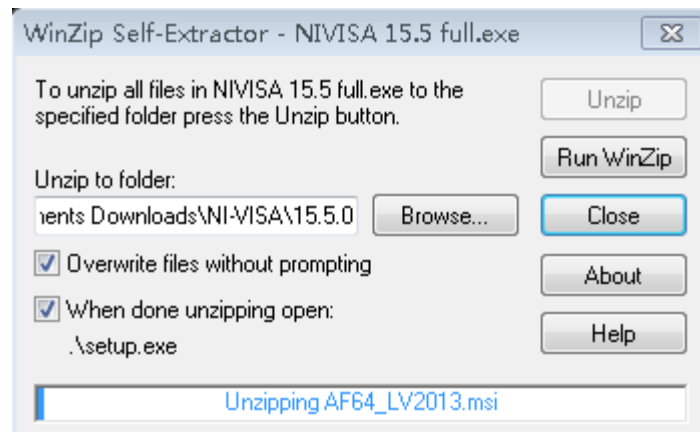
Currently, NI-VISA is packaged in two versions: Full version and Run-Time Engine version. The full version includes the NI device drivers and a tool named NI-MAX which is a user

interface to control and test remotely connected devices. You need to install the full version of NI-VISA.

You can get the NI-VISA 15.5 full version or higher version from

<https://www.ni.com/en-us/support/downloads/drivers/download.ni-visa.html#306031>.

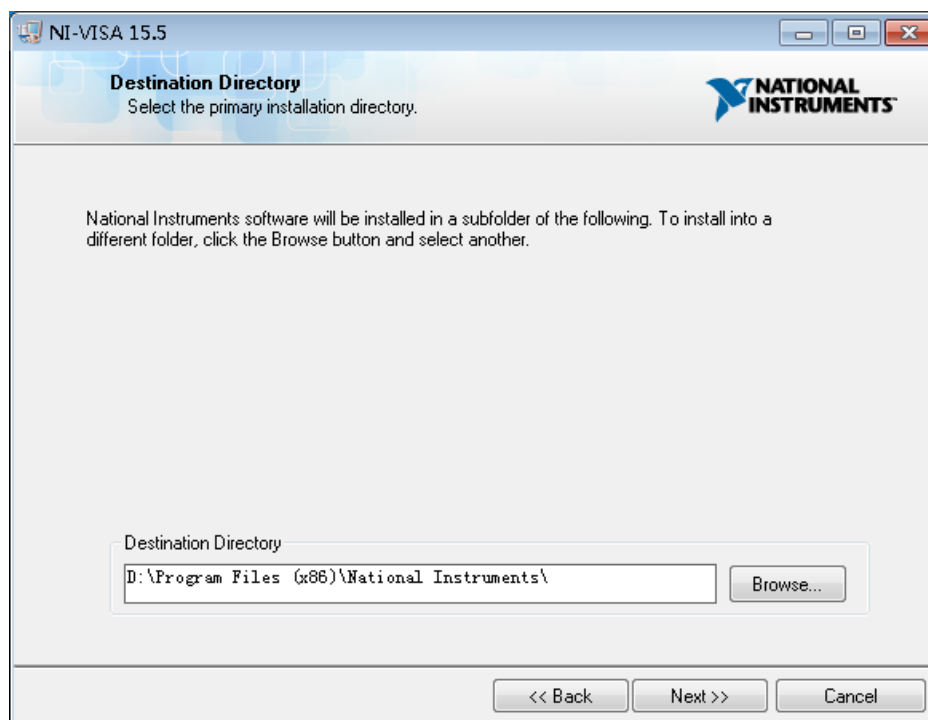
- a. Double click the NIVISA 15.5 full.exe, a dialog will be shown as below:



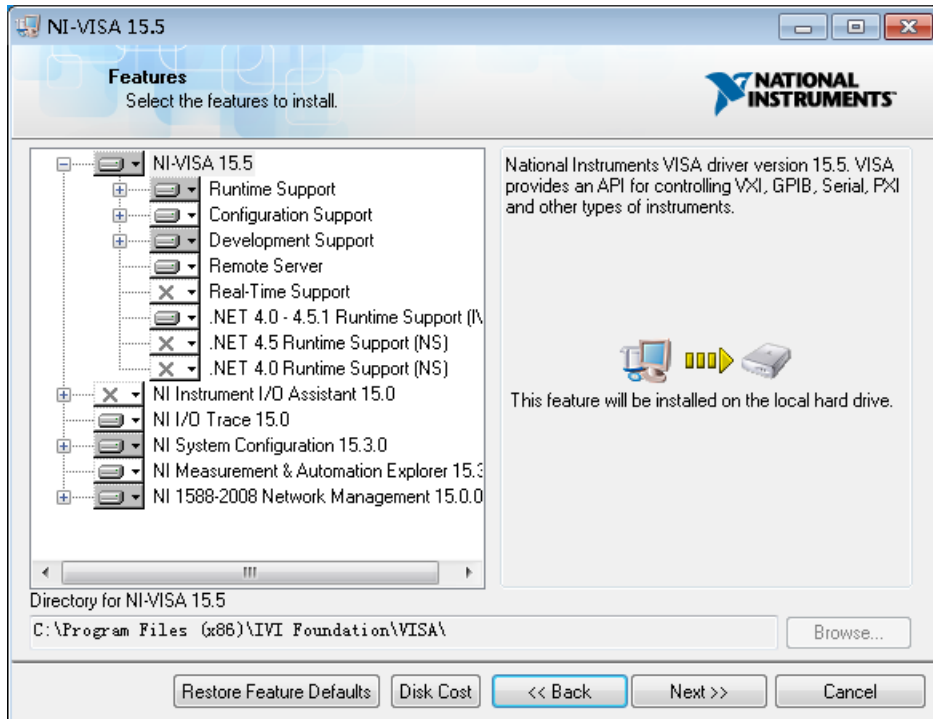
- b. Click Unzip, the installation process will automatically launch after unzipping files. If your computer needs to install .NET Framework 4, it may auto start.



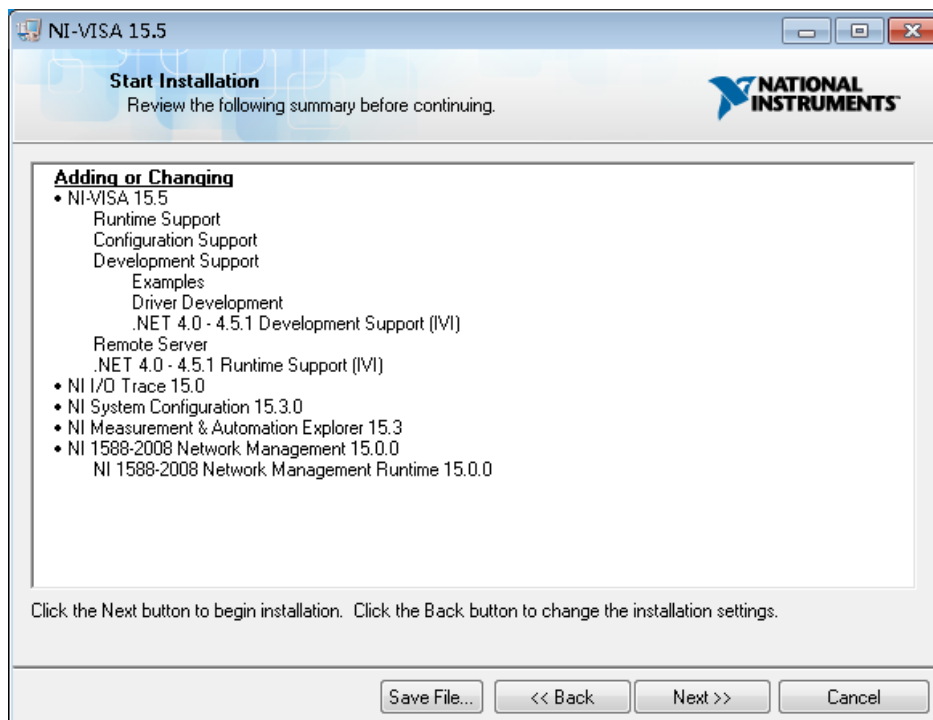
- c. The NI-VISA installing dialog is shown above. Click Next to start the installation process.



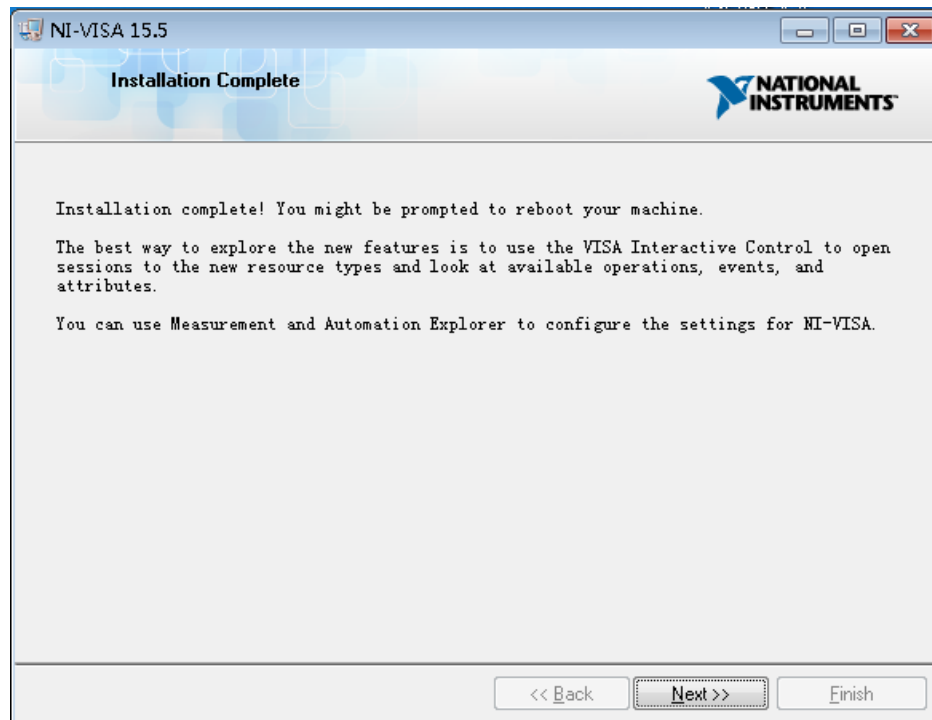
- d. Set the install path. The default path is “C:\Program Files\National Instruments\”. You can change it. Click Next.



- e. Click Next twice, in the License Agreement dialog, select “I accept the above 2 License Agreement(s).” ,and click Next.



- f. Click Next to begin the installation.



- g. Wait until the installation is completed, and then reboot your PC.

## Install the IVI Compliance Package

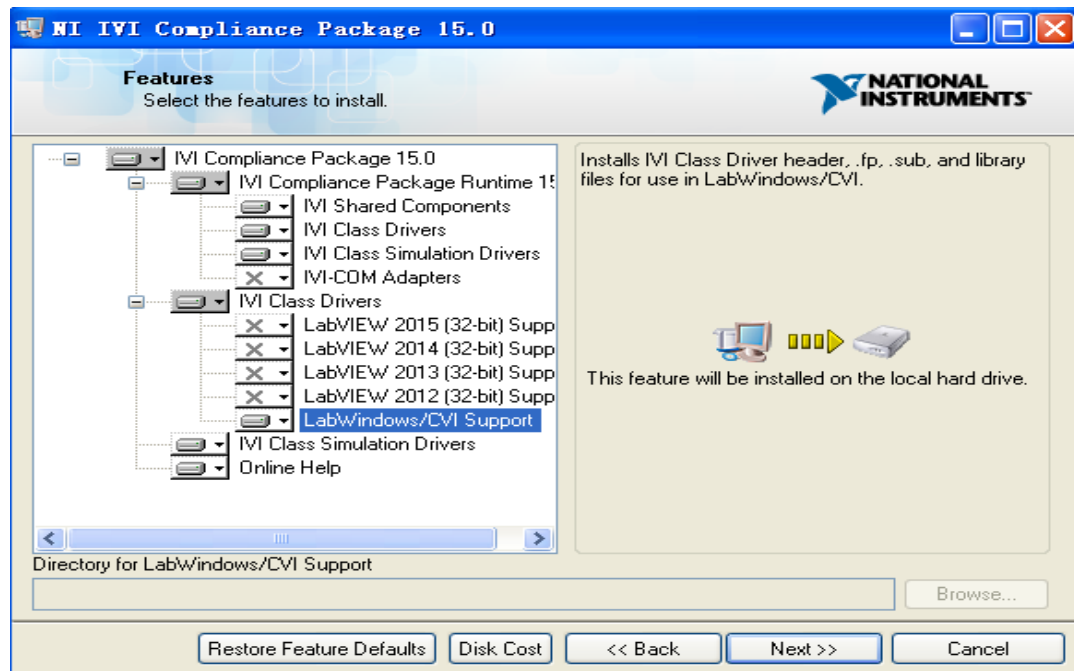
The IVI Compliance Package contains the IVI class drivers and supported libraries for developing and leveraging IVI-based applications.

You can get the IVI Compliance Package from

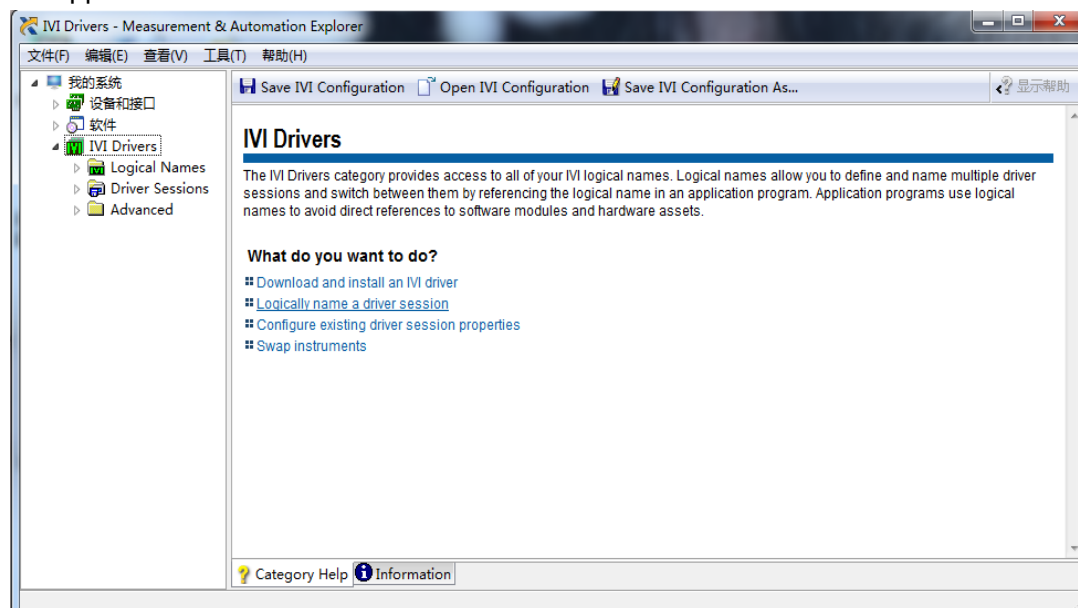
<https://www.ni.com/zh-cn/support/downloads/drivers/download.ivi-compliance-package.html#329444>

- a. If the IVI Compliance Package is not installed, there is no IVI Drivers option in "My System".
- b. Install the IVI Compliance Package (ICP).





- c. Restart your computer after the installation. After the reboot, the IVI Drivers option appears.



## SDS IVI-C Driver Package List

The SDS IVI-C driver package provides three kinds of files: sds.dll file, sds.h file and sds.lib file.

File	Description
sds.dll/sds_64.dll	A dynamic link library file, including variables, functions, and data interfaces for various attributes.
sds.lib/sds_64.lib	An import library file, including the symbolic name and optional identification number of each exported function in the sds.dll file.
sds.h	A header file, including declarations of variables, functions, and data interfaces.

You include the sds.h when programming the Siglent oscilloscope with the IVI driver, and load the sds.dll dynamic file or sds.lib import library file into your own project.

You will find an example that show you how to use these files at the end of this document.

## Introduction to IVI

IVI (Interchangeable Virtual Instruments) is a new generation of instrument driver technology specifications introduced by the IVI Foundation. IVI can realize the interchangeability with the instrument, the instrument simulation, and the instrument state tracking and buffer function. All references to IVI drivers in this document refer to IVI-C drivers that are created using NI tools and that rely on the IVI Engine.

## IVI Data Type

There are six data types for the attributes of the IVI Engine: ViInt32, ViReal64, ViString, ViBoolean, ViSession and ViAddr.

Table 1 Data Type

Data Type	Description
ViInt32	32-bit signed integer
ViReal64	64-bit floating-point number
ViString	String type
ViBoolean	Boolean value
ViSession	A VISA session handle
ViAddr	Logical address type

## Access IVI Attribute

User-callable functions are typically implemented by manipulating attributes. You can call `sds_SetAttribute` or `sds_GetAttribute` functions.

## SetAttribute Function Group

- `sds_SetAttributeViInt32` (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

Example: When you want to set the channel coupling, you can call the SetAttribute function to change the channel coupling.

```
sds_SetAttributeViInt32(session,"C1",SDS_ATTR_VERTICAL_COUPLING,0);
```

where,

**session**: The instrument handle.

**"C1"**: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_VERTICAL\_COUPLING** attribute is corresponding to that specific channel.

**0**: Set the coupling mode to AC.

- `sds_SetAttributeViReal64` (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)

Example: When you want to set the probe attenuation, you can call SetAttribute or GetAttribute function to change or obtain the probe attenuation value.

```
sds_SetAttributeViReal64(session,"C1",SDS_ATTR_PROBE_ATTENUATION,10);
```

where,

**session**: Instrument Handle.

**"C1"**: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_PROBE\_ATTENUATION** attribute is corresponding to this specific channel.

**10:** Set the probe attenuation to x10.

- `sds_SetAttributeViString` (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)

Example: When you want to set the channel label text, you can call `SetAttribute` or `GetAttribute` function to change or obtain the channel label text.

```
sds_SetAttributeViString(session,"C1",SDS_ATTR_CHANNEL_LABLE_TEXT,"  
Channel1");
```

where,

**session:** The instrument handle.

**"C1":** A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_CHANNEL\_LABLE\_TEXT** attribute is corresponding to this specific channel.

**"Channel1":** Set the label text of Channel 1 to "Channel1".

- `sds_SetAttributeViBoolean` (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)

Example: When you want to set a channel on or off, you can call `SetAttribute` or `GetAttribute` function to change or obtain the state of the channel.

```
sds_SetAttributeViBoolean(session,"C1",SDS_ATTR_CHANNEL_ENABLED,  
VI_FALSE);
```

where,

**session:** The instrument handle.

**“C1”**: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_CHANNEL\_ENABLED** attribute is corresponding to this channel.

**VI\_FALSE**: This means turning channel 1 off.

## GetAttribute Function Group

- `sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)`

Example: When you want to set the probe attenuation, you can call `SetAttribute` or `GetAttribute` function to change or obtain the probe attenuation value.

**`sds_GetAttributeViReal64(session, "C1", SDS_ATTR_PROBE_ATTENUATION, &value64);`**

where,

**session**: The instrument handle.

**“C1”**: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_PROBE\_ATTENUATION** attribute is corresponding to this channel.

**value64**: A `ViReal64` type variable which is used to store the returned value of the probe attenuation query.

- `sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)`

Example: When you want to set the channel coupling, you can call `SetAttribute` or

GetAttribute function to change or obtain the channel coupling.

```
sds_GetAttributeViInt32(session,"C1",SDS_ATTR_VERTICAL_COUPLING,  
&value32);
```

where,

**session**: The instrument handle.

**"C1"**: A constant string that represents the analog channel 1 and shows that this

**SDS\_ATTR\_VERTICAL\_COUPLING** attribute is corresponding to this specific channel.

**value32**: A ViInt32 type variable which is used to store the returned value of the coupling query.

- **sds\_GetAttributeViBoolean** (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean \*value)

Example: When you want to set a channel on or off, you can call SetAttribute or GetAttribute function to change or obtain the state of channel.

```
sds_GetAttributeViBoolean(session,"C1",SDS_ATTR_CHANNEL_ENABLED,  
&boolean);
```

where,

**session**: The instrument handle.

**"C1"**: A constant string that represents the analog channel 1 and shows that this

**SDS\_ATTR\_CHANNEL\_ENABLED** attribute is corresponding to this specific channel.

**boolean**: A ViBoolean type variable which is used to store the returned value.

- `sds_GetAttributeViString` (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])

Example: When you want to set the channel label text, you can call `SetAttribute` or `GetAttribute` function to change or obtain the channel label text.

```
sds_GetAttributeViString(session,"C1",SDS_ATTR_CHANNEL_LABLE_TEXT,  
bufferSize,str);
```

where,

**session:** The instrument handle.

**"C1":** A constant string that represents the analog channel 1 and shows that this

**SDS\_ATTR\_CHANNEL\_LABLE\_TEXT** attribute is corresponding to this specific channel.

**bufferSize:** A ViInt32 type variable.

**str:** A ViString type variable which is used to store the returned value.



## Attribute

This chapter describes the attributes of the SIGLENT IVI driver. The following table lists the supported IVI base class attributes and SIGLENT custom attributes.

System	Attribute
Channel Subsystem	SDS_ATTR_MAX_INPUT_FREQUENCY
	SDS_ATTR_INPUT_IMPEDANCE
	SDS_ATTR_VERTICAL_COUPLING
	SDS_ATTR_PROBE_ATTENUATION
	SDS_ATTR_VERTICAL_OFFSET
	SDS_ATTR_VERTICAL_RANGE
	SDS_ATTR_CHANNEL_ENABLED
	SDS_ATTR_CHANNEL_LABEL_TEXT
	SDS_ATTR_SAMPLE_MODE
Acquisition Subsystem	SDS_ATTR_ACQUISITION_TYPE
	SDS_ATTR_HORZ_RECORD_LENGTH
	SDS_ATTR_HORZ_SAMPLE_RATE
	SDS_ATTR_HORZ_TIME_PER_RECORD
	SDS_ATTR_ACQUISITION_START_TIME
	SDS_ATTR_INTERPOLATION
	SDS_ATTR_ADC_RES
	SDS_ATTR_NUM_AVERAGES
	SDS_ATTR_HORZ_MIN_NUM_PTS
	SDS_ATTR_INITIATE_CONTINUOUS
	SDS_ATTR_SAMPLE_MODE
Trigger Subsystem	SDS_ATTR_TRIGGER_TYPE
	SDS_ATTR_TRIGGER_SINGLE
	SDS_ATTR_TRIGGER_STATUS
	SDS_ATTR_NOISE_REJECT
	SDS_ATTR_TRIGGER_HOLDOFF
	SDS_ATTR_TRIGGER_SOURCE
	SDS_ATTR_TRIGGER_LEVEL
	SDS_ATTR_TRIGGER_MODIFIER
	SDS_ATTR_TRIGGER_COUPLING
	SDS_ATTR_TRIGGER_SLOPE
	SDS_ATTR_TV_TRIGGER_LINE_NUMBER
	SDS_ATTR_TV_TRIGGER_SIGNAL_FORMAT
	SDS_ATTR_RUNT_HIGH_THRESHOLD
	SDS_ATTR_RUNT_LOW_THRESHOLD
	SDS_ATTR_RUNT_POLARITY
	SDS_ATTR_AC_LINE_TRIGGER_SLOPE
	SDS_ATTR_GLITCH_CONDITION

	SDS_ATTR_GLITCH_POLARITY
	SDS_ATTR_GLITCH_WIDTH
	SDS_ATTR_WIDTH_CONDITION
	SDS_ATTR_WIDTH_POLARITY
	SDS_ATTR_WIDTH_HIGH_THRESHOLD
	SDS_ATTR_WIDTH_LOW_THRESHOLD
Measurement Subsystem	SDS_ATTR_MEASURE_ENABLED
	SDS_ATTR_MEASURE_MODE
	SDS_ATTR_MEASURE_GATE
	SDS_ATTR_MEASURE_GATE_GA
	SDS_ATTR_MEASURE_GATE_GB
	SDS_ATTR_MEASURE_SIMPLE_SOURCE
	SDS_ATTR_MEASURE_ADVANCED_SOURCEA
	SDS_ATTR_MEASURE_ADVANCED_SOURCEB
	SDS_ATTR_MEASURE_ADVANCED_TYPE
	SDS_ATTR_MEASURE_ADVANCED_VALUE
	SDS_ATTR_MEASURE_ADVANCED_STYLE
	SDS_ATTR_MEASURE_ADVANCED_LINENUMBER
	SDS_ATTR_MEASURE_ADVANCED_STATISTICS
	SDS_ATTR_MEASURE_ADVANCED_STATISTICS_HISTOGRAM
	SDS_ATTR_MEASURE_ADVANCED_STATISTICA_MAXCOUNT
	SDS_ATTR_MEASURE_ADVANCED_STATISTICS_RESET
	SDS_ATTR_MEAS_LOW_REF
	SDS_ATTR_MEAS_MID_REF
	SDS_ATTR_MEAS_HIGH_REF
	SDS_ATTR_MEASURE_THRESHOLD_TYPE
	SDS_ATTR_MEASURE_THRESHOLD_PERC
	SDS_ATTR_MEASURE_THRESHOLD_ABS
	SDS_ATTR_MEASURE_THRESHOLD_SOURCE

## Channel Subsystem

The channel group properties are used to set or read channel-related parameters. The channel group has the following attributes:

- ◆ **SDS\_ATTR\_MAX\_INPUT\_FREQUENCY**
- ◆ **SDS\_ATTR\_INPUT\_IMPEDANCE**
- ◆ **SDS\_ATTR\_VERTICAL\_COUPLING**
- ◆ **SDS\_ATTR\_PROBE\_ATTENUATION**
- ◆ **SDS\_ATTR\_VERTICAL\_OFFSET**
- ◆ **SDS\_ATTR\_VERTICAL\_RANGE**
- ◆ **SDS\_ATTR\_CHANNEL\_ENABLED**
- ◆ **SDS\_ATTR\_CHANNEL\_LABEL\_TEXT**
- ◆ **SDS\_ATTR\_SAMPLE\_MODE**

## SDS\_ATTR\_MAX\_INPUT\_FREQUENCY

<b>Description</b>	This attribute specifies the channel bandwidth limit.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_MAX_INPUT_FREQUENCY macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<p>(0,2e+7) means the bandwidth is limited to 20M.  (2e+7,2e+8) means bandwidth is limited to 200M.  (2e+8,1e+38) means bandwidth is Full.</p> <p><b>Notes:</b> Some models only support 20M bandwidth and full bandwidth</p>
<b>Related Attribute</b>	SDS_ATTR_INPUT_IMPEDANCE
<b>High Level Functions</b>	sds_ConfigureChanCharacteristics

## SDS\_ATTR\_INPUT\_IMPEDANCE

<b>Description</b>	This attribute specifies the channel impedance.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_INPUT_IMPEDANCE macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<p>50 means the impedance is 50 <math>\Omega</math> .</p> <p>1 e+6 means the impedance is 1M <math>\Omega</math> .</p> <p><b>Notes:</b> SDS800X HD does not support this attribute</p>
<b>Related Attribute</b>	SDS_ATTR_MAX_INPUT_FREQUENCY
<b>High Level Functions</b>	sds_ConfigureChanCharacteristics

## SDS\_ATTR\_VERTICAL\_COUPLING

Description	This attribute specifies channel coupling.												
Data Type	ViInt32												
Access	R/W												
Common Control Functions	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8. <b>attributeld</b> is SDS_ATTR_VERTICAL_COUPLING macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>												
Value Range	<table><tr><th>Type</th><th>Discrete Value</th><th>Value</th></tr><tr><td>AC</td><td>SDS_VAL_AC</td><td>0</td></tr><tr><td>DC</td><td>SDS_VAL_DC</td><td>1</td></tr><tr><td>GND</td><td>SDS_VAL_GND</td><td>2</td></tr></table>	Type	Discrete Value	Value	AC	SDS_VAL_AC	0	DC	SDS_VAL_DC	1	GND	SDS_VAL_GND	2
Type	Discrete Value	Value											
AC	SDS_VAL_AC	0											
DC	SDS_VAL_DC	1											
GND	SDS_VAL_GND	2											
Related Attribute	SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_VERTICAL_RANGE SDS_ATTR_CHANNEL_ENABLED SDS_ATTR_PROBE_ATTENUATION												
High Level Functions	sds_ConfigureChannel												

## SDS\_ATTR\_PROBE\_ATTENUATION

<b>Description</b>	This attribute specifies channel probe attenuation.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_PROBE_ATTENUATION macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	The range of value is [1E-6, 1E6].
<b>Related Attribute</b>	SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_VERTICAL_RANGE SDS_ATTR_CHANNEL_ENABLED SDS_ATTR_VERTICAL_COUPLING
<b>High Level Functions</b>	sds_ConfigureChannel

## SDS\_ATTR\_VERTICAL\_OFFSET

<b>Description</b>	This attribute specifies channel vertical offset.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_VERTICAL_OFFSET macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<ul style="list-style-type: none"> <li>● <b>Range of value for SDS800XHD /SDS1000XHD/SDS2000XHD/SDS3000XHD/SDS6000A/SDS6000 Pro/SDS6000L/ SDS7000A:</b>                      When the channel scale is between <math>[5e-4*probe, 5e-3*probe]</math>, the range of value is <math>[-1.6*probe, 1.6*probe]</math>.                       When the channel scale is between <math>(5e-3*probe, 1e-2*probe]</math>, the range of value is <math>[-4*probe, 4*probe]</math>.                       When the channel scale is between <math>(1e-2*probe, 2e-2*probe]</math>, the range of value is <math>[-8*probe, 8*probe]</math>.                       When the channel scale is between <math>[2e-2*probe, 1e-1*probe]</math>, the range of value is <math>[-16*probe, 16*probe]</math>.                       When the channel scale is between <math>(1e-1*probe, 2e-1*probe]</math>, the range of value is <math>[-80*probe, 80*probe]</math>.                       When the channel scale is between <math>(2e-1*probe,</math> </li> </ul>



1\*probe], the range of value is [-160\*probe, 160\*probe].

When the channel scale is between (1\*probe, 1e+1\*probe], the range of value is [-400\*probe, 400\*probe].

- **Range of value for SDS5000X/SDS2000X Plus:**

When the channel scale is between [5e-4\*probe, 1e-1\*probe], the range of value is [-2\*probe, 2\*probe].

When the channel scale is between (1e-1\*probe, 1\*probe], the range of value is [-20\*probe, 20\*probe].

When the channel scale is between (1\*probe, 10\*probe], the range of value is [-200\*probe, 200\*probe].

**Note:**

Probe is the value of channel attenuation.

**Related Attribute**

SDS\_ATTR\_VERTICAL\_OFFSET  
SDS\_ATTR\_VERTICAL\_RANGE  
SDS\_ATTR\_CHANNEL\_ENABLED  
SDS\_ATTR\_VERTICAL\_COUPLING  
SDS\_ATTR\_PROBE\_ATTENUATION

**High Level Functions**

sds\_ConfigureChannel

## SDS\_ATTR\_VERTICAL\_RANGE

<b>Description</b>	This attribute specifies channel vertical range.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_VERTICAL_RANGE macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<p>When the channel impedance is set to 50Ω, the value range is [5e-4*probe, 1e+0*probe].</p> <p>When the channel impedance is set to 1MΩ, the value range is [5e-4*probe, 1e+1*probe].</p> <p><b>Note:</b>            Probe is the value of channel attenuation, SDS800XHD does not support modulation impedance, defaults to 1MΩ</p>
<b>Related Attribute</b>	SDS_ATTR_CHANNEL_ENABLED SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_VERTICAL_COUPLING SDS_ATTR_PROBE_ATTENUATION
<b>High Level Functions</b>	sds_ConfigureChannel

## SDS\_ATTR\_CHANNEL\_ENABLED

<b>Description</b>	This attribute specifies the status of channel.
<b>Data Type</b>	ViBoolean
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p>sds_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>ChannelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8.  <b>attributeld</b> is SDS_ATTR_CHANNEL_ENABLED macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<p>VI_TRUE means to turn on the channel.</p> <p>VI_FALSE means to turn off the channel.</p>
<b>Related Attribute</b>	<p>SDS_ATTR_VERTICAL_OFFSET</p> <p>SDS_ATTR_VERTICAL_RANGE</p> <p>SDS_ATTR_CHANNEL_ENABLED</p> <p>SDS_ATTR_VERTICAL_COUPLING</p> <p>SDS_ATTR_PROBE_ATTENUATION</p>
<b>High Level Functions</b>	sds_ConfigureChannel

## SDS\_ATTR\_CHANNEL\_LABEL\_TEXT

<b>Description</b>	This attribute specifies the label text of the source
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is one of the following analog inputs: C1, C2, C3, C4, C5, C6, C7 or C8. <b>attributeld</b> is SDS_ATTR_CHANNEL_LABEL_TEXT macro. <b>bufSize</b> is the number of bytes you specified for the Attribute Value parameter in the ViChar array. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	The limit of the label text is 20 bytes.
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## SDS\_ATTR\_CHANNEL\_COUNT

<b>Description</b>	This attribute gets the channel counts.
<b>Data Type</b>	ViInt32
<b>Access</b>	RO
<b>Common Control Functions</b>	<p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_CHANNEL_COUNT macro.  <b>value</b> is used to store the value of function returned by <b>attributeld</b>.</p>
<b>Value Range</b>	None
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## Acquisition Subsystem

The acquisition group properties are used to set or read acquisition related parameters.

The acquisition group has the following attributes:

- ◆ **SDS\_ATTR\_ACQUISITION\_TYPE**
- ◆ **SDS\_ATTR\_HORZ\_RECORD\_LENGTH**
- ◆ **SDS\_ATTR\_HORZ\_SAMPLE\_RATE**
- ◆ **SDS\_ATTR\_HORZ\_TIME\_PER\_RECORD**
- ◆ **SDS\_ATTR\_ACQUISITION\_START\_TIME**
- ◆ **SDS\_ATTR\_INTERPOLATION**
- ◆ **SDS\_ATTR\_HORZ\_MIN\_NUM\_PTS**
- ◆ **SDS\_ATTR\_ADC\_RES**
- ◆ **SDS\_ATTR\_NUM\_AVERAGES**
- ◆ **SDS\_ATTR\_SAMPLE\_MODE**
- ◆ **SDS\_ATTR\_INITIATE\_CONTINUOUS**

## SDS\_ATTR\_ACQUISITION\_TYPE

## SDS\_ATTR\_HORZ\_RECORD\_LENGTH

<b>Description</b>	This attribute gets the length of the waveform record.
<b>Data Type</b>	ViInt32
<b>Access</b>	RO
<b>Common Control Functions</b>	<p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_HORZ_RECORD_LENGTH macro.  <b>value</b> is used to store the value of function returned by <b>attributeld</b>.</p>
<b>Value Range</b>	None
<b>Related Attribute</b>	<p>SDS_ATTR_HORZ_MIN_NUM_PTS</p> <p>SDS_ATTR_HORZ_TIME_PER_RECORD</p>
<b>High Level Functions</b>	sds_ActualRecordLength



## SDS\_ATTR\_HORZ\_SAMPLE\_RATE

<b>Description</b>	This attribute gets the sampling rate.
<b>Data Type</b>	ViReal64
<b>Access</b>	RO
<b>Common Control Functions</b>	<p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_HORZ_SAMPLE_RATE macro.  <b>value</b> is used to store the value of function returned by <b>attributeld</b>.</p>
<b>Value Range</b>	None
<b>Related Attribute</b>	SDS_ATTR_HORZ_TIME_PER_RECORD
<b>High Level Functions</b>	sds_SampleRate

## SDS\_ATTR\_HORZ\_TIME\_PER\_RECORD

**Description** This attribute specifies the horizontal scale of the main window.

**Data Type** ViReal64

**Access** R/W

**Common Control Functions** sds\_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)

sds\_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is

SDS\_ATTR\_HORZ\_TIME\_PER\_RECORD macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

In the IVI-4.1 specification, values are default coerced up. And the following range make effect on the time base of the main window. So that,

(2e-10,5e-10) means 500ps/div

(5e-10,1e-9) means 1ns/div

(1e-9,2e-9) means 2ns/div

(2e-9,5e-9) means 5ns/div

(5e-9,1e-8) means 10ns/div

(1e-8,2e-8) means 20ns/div

(2e-8,5e-8) means 50ns/div

(5e-8,1e-7) means 100ns/div

(1e-7,2e-7) means 200ns/div

(2e-7,5e-7) means 500ns/div

(5e-7,1e-6) means 1us/div

(1e-6,2e-6) means 2us/div

(2e-6,5e-6) means 5us/div

(5e-6,1e-5) means 10us/div

(1e-5,2e-5) means 20us/div

(2e-5,5e-5) means 50us/div

(5e-5,1e-4) means 100us/div

(1e-4,2e-4) means 200us/div

(2e-4,5e-4) means 500us/div

(5e-4,1e-3) means 1ms/div  
(1e-3,2e-3) means 2ms/div  
(2e-3,5e-3) means 5ms/div  
(5e-3,1e-2) means 10ms/div  
(1e-2,2e-2) means 20ms/div  
(2e-2,5e-2) means 50ms/div  
(5e-2,1e-1) means 100ms/div  
(1e-1,2e-1) means 200ms/div  
(2e-1,5e-1) means 500ms/div  
(5e-1,1e+0) means 1s/div  
(1e+0,2e+0) means 2s/div  
(2e+0,5e+0) means 5s/div  
(5e+0,1e+1) means 10s/div  
(1e+1,2e+1) means 20s/div  
(2e+1,5e+1) means 50s/div  
(5e+1,1e+2) means 100s/div  
(1e+2,2e+2) means 200s/div  
(2e+2,5e+2) means 500s/div  
(5e+2,1e+3) means 1ks/div

**Related Attribute** SDS\_ATTR\_ACQUISITION\_START\_TIME

**High Level Functions** sds\_ConfigureAcquisitionRecord

## SDS\_ATTR\_ACQUISITION\_START\_TIME

<b>Description</b>	This attribute specifies the horizontal delay (trigger delay).
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_GetAttributeViReal64(ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value);</p> <p>sds_SetAttributeViReal64(ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value);</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_ACQUISITION_START_TIME macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	The value range is [-10*timebase, (10000-5)*timebase].
<b>Related Attribute</b>	SDS_ATTR_HORZ_TIME_PER_RECORD
<b>High Level Functions</b>	sds_ConfigureAcquisitionRecord

## SDS\_ATTR\_INTERPOLATION

Description	This attribute specifies the way of interpolation.									
Data Type	ViInt32									
Access	R/W									
Common Control Functions	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_INTERPOLATION macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>									
Value Range	<table><tr><th>Type</th><th>Discrete Value</th><th>Value</th></tr><tr><td>Sinc</td><td>SDS_VAL_SINE_X</td><td>2</td></tr><tr><td>x</td><td>SDS_VAL_LINEAR</td><td>3</td></tr></table>	Type	Discrete Value	Value	Sinc	SDS_VAL_SINE_X	2	x	SDS_VAL_LINEAR	3
Type	Discrete Value	Value								
Sinc	SDS_VAL_SINE_X	2								
x	SDS_VAL_LINEAR	3								
Related Attribute	SDS_ATTR_HORZ_TIME_PER_RECORD									
High Level Functions	sds_ConfigureInterpolation									

## SDS\_ATTR\_HORZ\_MIN\_NUM\_PTS

**Description** This attribute specifies the maximum memory depth.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_HORZ\_MIN\_NUM\_PTS macro.

**value** is used to store or set the value of function represented by **attributeld**.

### Value Range

Model	Type	Discrete Value	Value
SDS6000A/Pro	1.25k	SDS_VAL_1_25K	1.25e+3
SDS6000A/Pro	2.5k	SDS_VAL_2_5K	2.5e+3
SDS6000A/Pro	5k	SDS_VAL_5K	5e+3
SDS6000A/Pro	12.5k	SDS_VAL_12_5K	12.5e+3
SDS6000A/Pro	25k	SDS_VAL_25K	25e+3
SDS6000A/Pro	50k	SDS_VAL_50K	50e+3
SDS6000A/Pro	125k	SDS_VAL_125K	125e+3
SDS6000A/Pro	250k	SDS_VAL_250K	250e+3
SDS6000A/Pro	500k	SDS_VAL_500K	500e+3
SDS6000A/Pro	1.25M	SDS_VAL_1_25M	1.25e+6
SDS6000A/Pro	2.5M	SDS_VAL_2_5M	2.5e+6
SDS6000A/Pro	5M	SDS_VAL_5M	5e+6
SDS6000A/Pro	12.5M	SDS_VAL_12_5M	12.5e+6
SDS6000A/Pro	25M	SDS_VAL_25M	25e+6
SDS6000A/Pro	50M	SDS_VAL_50M	50e+6
SDS6000A/Pro	62.5M	SDS_VAL_62_5M	62.5e+6
SDS6000A/Pro	125M	SDS_VAL_125M	125e+6
SDS6000A/Pro	250M	SDS_VAL_250M	250e+6
SDS6000A/Pro	500M	SDS_VAL_500M	500e+6
SDS5000X	5k	SDS_VAL_5K	5e+3
SDS5000X	10k	SDS_VAL_10K	10e+3

SDS5000X	25k	SDS_VAL_25K	25e+3
SDS5000X	50k	SDS_VAL_50K	50e+3
SDS5000X	125k	SDS_VAL_125K	125e+3
SDS5000X	250k	SDS_VAL_250K	250e+3
SDS5000X	625k	SDS_VAL_625K	625e+3
SDS5000X	1.25M	SDS_VAL_1_25M	1.25e+6
SDS5000X	2.5M	SDS_VAL_2_5M	2.5e+6
SDS5000X	6.25M	SDS_VAL_6_25M	6.25e+6
SDS5000X	12.5M	SDS_VAL_12_5M	12.5e+6
SDS5000X	25M	SDS_VAL_25M	25e+6
SDS5000X	62.5M	SDS_VAL_62_5M	62.5e+6
SDS5000X	125M	SDS_VAL_125M	125e+6
SDS5000X	250M	SDS_VAL_250M	250e+6
SDS2000X Plus	10k	SDS_VAL_10K	10e+3
SDS2000X Plus	20k	SDS_VAL_20K	20e+3
SDS2000X Plus	100k	SDS_VAL_100K	100e+3
SDS2000X Plus	200k	SDS_VAL_200K	200e+3
SDS2000X Plus	1M	SDS_VAL_1M	1e+6
SDS2000X Plus	2M	SDS_VAL_2M	2e+6
SDS2000X Plus	10M	SDS_VAL_10M	10e+6
SDS2000X Plus	20M	SDS_VAL_20M	20e+6
SDS2000X Plus	50M	SDS_VAL_50M	50e+6
SDS2000X Plus	100M	SDS_VAL_100M	100e+6
SDS2000X Plus	200M	SDS_VAL_200M	200e+6
SDS2000X HD	10k	SDS_VAL_10K	10e+3
SDS2000X HD	20k	SDS_VAL_20K	20e+3
SDS2000X HD	100k	SDS_VAL_100K	100e+3
SDS2000X HD	200k	SDS_VAL_200K	200e+3
SDS2000X HD	1M	SDS_VAL_1M	1e+6
SDS2000X HD	2M	SDS_VAL_2M	2e+6
SDS2000X HD	10M	SDS_VAL_10M	10e+6
SDS2000X HD	20M	SDS_VAL_20M	20e+6
SDS2000X HD	100M	SDS_VAL_100M	100e+6
SDS2000X HD	200M	SDS_VAL_200M	200e+6
SDS6000L	2.5k	SDS_VAL_2_5K	2.5e+3
SDS6000L	5k	SDS_VAL_5K	5e+3
SDS6000L	25k	SDS_VAL_25K	25e+3
SDS6000L	50k	SDS_VAL_50K	50e+3
SDS6000L	250k	SDS_VAL_250K	250e+3
SDS6000L	500k	SDS_VAL_500K	500e+3
SDS6000L	2.5M	SDS_VAL_2_5M	2.5e+6
SDS6000L	5M	SDS_VAL_5M	5e+6
SDS6000L	12.5M	SDS_VAL_12_5M	12.5e+6
SDS6000L	25M	SDS_VAL_25M	25e+6

SDS6000L	50M	SDS_VAL_50M	50e+6
SDS6000L	125M	SDS_VAL_125M	125e+6
SDS6000L	250M	SDS_VAL_250M	250e+6
SDS6000L	500M	SDS_VAL_500M	500e+6
SDS3000X HD	1K	SDS_VAL_1K	1e+3
SDS3000X HD	2K	SDS_VAL_2K	2e+3
SDS3000X HD	5K	SDS_VAL_5K	5e+3
SDS3000X HD	10K	SDS_VAL_10K	10e+3
SDS3000X HD	20K	SDS_VAL_20K	20e+3
SDS3000X HD	50K	SDS_VAL_50K	50e+3
SDS3000X HD	100K	SDS_VAL_100K	100e+3
SDS3000X HD	200K	SDS_VAL_200K	200e+3
SDS3000X HD	500K	SDS_VAL_500K	500e+3
SDS3000X HD	1M	SDS_VAL_1M	1e+6
SDS3000X HD	2M	SDS_VAL_2M	2e+6
SDS3000X HD	5M	SDS_VAL_5M	5e+6
SDS3000X HD	10M	SDS_VAL_10M	10e+6
SDS3000X HD	20M	SDS_VAL_20M	20e+6
SDS3000X HD	50M	SDS_VAL_50M	50e+6
SDS3000X HD	100M	SDS_VAL_100M	100e+6
SDS3000X HD	200M	SDS_VAL_200M	200e+6
SDS3000X HD	400M	SDS_VAL_400M	400e+6
SDS7000A	1K	SDS_VAL_1K	1e+3
SDS7000A	5K	SDS_VAL_5K	5e+3
SDS7000A	10K	SDS_VAL_10K	10e+3
SDS7000A	50K	SDS_VAL_50K	50e+3
SDS7000A	100K	SDS_VAL_100K	100e+3
SDS7000A	500K	SDS_VAL_500K	500e+3
SDS7000A	1M	SDS_VAL_1M	1e+6
SDS7000A	5M	SDS_VAL_5M	5e+6
SDS7000A	10M	SDS_VAL_10M	10e+6
SDS7000A	50M	SDS_VAL_50M	50e+6
SDS7000A	100M	SDS_VAL_100M	100e+6
SDS7000A	500M	SDS_VAL_500M	500e+6
SDS7000A	1G	SDS_VAL_1G	1e+9
SDS1000X HD	10K	SDS_VAL_10K	10e+3
SDS1000X HD	100K	SDS_VAL_100K	100e+3
SDS1000X HD	1M	SDS_VAL_1M	1e+6
SDS1000X HD	10M	SDS_VAL_10M	10e+6
SDS1000X HD	25M	SDS_VAL_25M	25e+6
SDS1000X HD	50M	SDS_VAL_50M	50e+6
SDS1000X HD	100M	SDS_VAL_100M	100e+6
SDS1000X HD	250M	SDS_VAL_250M	250e+6
SDS800X HD	10K	SDS_VAL_10K	10e+3



SDS800X HD	100K	SDS_VAL_100K	100e+3
SDS800X HD	1M	SDS_VAL_1M	1e+6
SDS800X HD	10M	SDS_VAL_10M	10e+6
SDS800X HD	25M	SDS_VAL_25M	25e+6
SDS800X HD	50M	SDS_VAL_50M	50e+6
SDS800X HD	100M	SDS_VAL_100M	100e+6

**Related Attribute** SDS\_ATTR\_HORZ\_TIME\_PER\_RECORD

**High Level Functions** sds\_ConfigureInterpolation

## SDS\_ATTR\_ADC\_RES

**Description** This attribute sets/query the ADC resolution for SDS2000X Plus oscilloscope.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_ADC\_RES macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
8Bits	SDS_VAL_8BITS	0
10Bits	SDS_VAL_10BITS	1

**Notes:**

This attribute is only supported by SDS2000X Plus.

**Related Attribute** None

**High Level Functions** None

## SDS\_ATTR\_NUM\_AVERAGES

<b>Description</b>	This attribute sets/queries the average number of times of average collection mode.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_NUM_AVERAGES macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>The range value:</p> <p>[1, 4] = 4;  (4, 16] = 16 ;  (16, 32] = 32;  (32, 64] = 64;  (64, 128] = 128;  (128, 256] = 256;  (256, 512] = 512;  (512, 1024] = 1024;  (1024, 2048] = 2048;  (2048, 4096] = 4096;  (4096, 8192] = 8192.</p> <p><b>Notes:</b>  This attribute is different in the setting range of different models.</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## SDS\_ATTR\_SAMPLE\_MODE

**Description** This attribute returns the sample mode the oscilloscope is currently using.

**Data Type** ViInt32

**Access** R

**Common Control Functions** sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_SAMPLE\_MODE macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
YT	SDS_VAL_REAL_TIME	0
XY	SDS_VAL_EQUIVALENT_TIME	1
ROLL	SDS_VAL_ROLL_TIME	2

**Related Attribute** None

**High Level Functions** sds\_SampleMode

## SDS\_ATTR\_INITIATE\_CONTINUOUS

<b>Description</b>	This attribute configures the continuous acquisition.
<b>Data Type</b>	ViBoolean
<b>Access</b>	W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>ChannelName</b> is None.  <b>attributeld</b> is SDS_ATTR_INITIATE_CONTINUOUS macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p>
<b>Value Range</b>	<p>VI_TRUE means to turn on the acquisition.</p> <p>VI_FALSE means to turn off the acquisition.</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureInitiateContinuous

## Trigger Subsystem

The triggering group properties are used to set or read trigger related parameters. The triggering group has the following attributes:

- ◆ **SDS\_ATTR\_TRIGGER\_TYPE**
- ◆ **SDS\_ATTR\_TRIGGER\_HOLDOFF**
- ◆ **SDS\_ATTR\_TRIGGER\_SOURCE**
- ◆ **SDS\_ATTR\_TRIGGER\_LEVEL**
- ◆ **SDS\_ATTR\_TRIGGER\_MODIFIER**
- ◆ **SDS\_ATTR\_TRIGGER\_COUPLING**
- ◆ **SDS\_ATTR\_TRIGGER\_SLOPE**
- ◆ **SDS\_ATTR\_TV\_TRIGGER\_LINE\_NUMBER**
- ◆ **SDS\_ATTR\_TV\_TRIGGER\_SIGNAL\_FORMAT**
- ◆ **SDS\_ATTR\_RUNT\_HIGH\_THRESHOLD**
- ◆ **SDS\_ATTR\_RUNT\_LOW\_THRESHOLD**
- ◆ **SDS\_ATTR\_RUNT\_POLARITY**
- ◆ **SDS\_ATTR\_GLITCH\_CONDITION**
- ◆ **SDS\_ATTR\_GLITCH\_POLARITY**
- ◆ **SDS\_ATTR\_WIDTH\_CONDITION**
- ◆ **SDS\_ATTR\_WIDTH\_POLARITY**
- ◆ **SDS\_ATTR\_WIDTH\_HIGH\_THRESHOLD**
- ◆ **SDS\_ATTR\_WIDTH\_LOW\_THRESHOLD**
- ◆ **SDS\_ATTR\_GLITCH\_WIDTH**
- ◆ **SDS\_ATTR\_AC\_LINE\_TRIGGER\_SLOPE**
- ◆ **SDS\_ATTR\_TRIGGER\_SINGLE**
- ◆ **SDS\_ATTR\_TRIGGER\_STATUS**
- ◆ **SDS\_ATTR\_NOISE\_REJECT**

## SDS\_ATTR\_TRIGGER\_TYPE

<b>Description</b>	This attribute specifies the trigger type.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p>

### Note:

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_TRIGGER\_TYPE macro.

**value** is used to store or set the value of function represented by **attributeld**.

### Value Range

Type	Discrete Value	Value
Edge	SDS_VAL_EDGE_TRIGGER	1
Runt	SDS_VAL_RUNT_TRIGGER	3
Pluse	SDS_VAL_GLITCH_TRIGGER	4
Video	SDS_VAL_TV_TRIGGER	5
Slope	SDS_VAL_SLOPE_TRIGGER	8
Pattern	SDS_VAL_PATTERN_TRIGGER	9
Qualified	SDS_VAL_QUALIFIED_TRIGGER	10
Window	SDS_VAL_WINDOW_TRIGGER	11
Interval	SDS_VAL_INTERVAL_TRIGGER	12
Dropout	SDS_VAL_DROPOUT_TRIGGER	13

<b>Related Attribute</b>	SDS_ATTR_TRIGGER_HOLDOFF SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_TRIGGER_SOURCE
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<b>High Level Functions</b>	sds_ConfigureTrigger sds_ConfigureGlitchTriggerSource sds_ConfigureEdgeTriggerSource
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## SDS\_ATTR\_TRIGGER\_HOLDOFF

<b>Description</b>	This attribute specifies the trigger holdoff time.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_TRIGGER_HOLDOFF macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>[8.00e-09, 3.00e+01]s</p> <p><b>Note:</b>  Only when the SDS_ATTR_TRIGGER_TYPE is Edge, Slope, Pulse, Window, Interval, Dropout, Runt, Pattern SDS_ATTR_TRIGGER_HOLDOFF can be set.</p>
<b>Related Attribute</b>	SDS_ATTR_TRIGGER_TYPE
<b>High Level Functions</b>	sds_ConfigureTrigger



## SDS\_ATTR\_TRIGGER\_SOURCE

<b>Description</b>	This attribute specifies the trigger source.
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_TRIGGER_SOURCE macro.  <b>bufSize</b> is the number of bytes you specified for the Attribute Value parameter in the ViChar array.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>The source can be set to: {Cn Dd EX EX5 LINE}  n can be set from 1 to 8.  d can be set from 0 to 15.</p> <p><b>Notes:</b> Only the SDS6000L 8-channel series has 8 channels.</p> <p><b>Example:</b>  If you want to set the source to C1, enter "C1".  If you want to set the source to D0, enter "D0".</p> <p><b>Note:</b>  when the SDS_ATTR_TRIGGER_TYPE is Edge trigger, the SDS_ATTR_TRIGGER_SOURCE can be set as {Cn Dd EX EX5 LINE}. SDS800XHD does not support EX and EX5</p> <p>when the SDS_ATTR_TRIGGER_TYPE is Window, Runt, Slope, or TV trigger, the SDS_ATTR_TRIGGER_SOURCE can be set as {Cn}.</p>

when the SDS\_ATTR\_TRIGGER\_TYPE is Dropout, Interval, Pulse trigger, the SDS\_ATTR\_TRIGGER\_SOURCE can be set as {Cn|Dd}.

### Related Attribute

SDS\_ATTR\_TRIGGER\_LEVEL  
SDS\_ATTR\_TRIGGER\_TYPE

### High Level Functions

sds\_ConfigureEdgeTriggerSource  
sds\_ConfigureRuntTriggerSource  
sds\_ConfigureGlitchTriggerSource  
sds\_ConfigureTVTriggerSource

## SDS\_ATTR\_TRIGGER\_LEVEL

<b>Description</b>	This attribute specifies the trigger level.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_TRIGGER_LEVEL macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A:  <math>[-4.5 * \text{vertical\_scale} - \text{vertical\_offset}, 4.5 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD:  <math>[-4.1 * \text{vertical\_scale} - \text{vertical\_offset}, 4.1 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p><b>Note:</b>  Only when the SDS_ATTR_TRIGGER_TYPE is Edge, Pulse, Interval, Dropout TV trigger type, the SDS_ATTR_TRIGGER_LEVEL can be set.</p>
<b>Related Attribute</b>	SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_LEVEL
<b>High Level Functions</b>	sds_ConfigureTrigger sds_ConfigureGlitchTriggerSource sds_ConfigureEdgeTriggerSource

## SDS\_ATTR\_TRIGGER\_MODIFIER

## SDS\_ATTR\_TRIGGER\_COUPLING

**Description** This attribute specifies the coupling mode of the edge trigger.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_TRIGGER\_COUPLING macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
AC	SDS_VAL_AC_TRIGGER	0
DC	SDS_VAL_DC_TRIGGER	1
HF Reject	SDS_VAL_HF_REJECT	3
LF Reject	SDS_VAL_LF_REJECT	4
Noise Reject	SDS_VAL_NOISE_REJECT	5

**Related Attribute** None

**High Level Functions** sds\_ConfigureTriggerCoupling

## SDS\_ATTR\_TRIGGER\_SLOPE

**Description** This attribute specifies the slope of the edge trigger.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_TRIGGER\_SLOPE macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
Falling	SDS_VAL_NEGATIVE	0
Rising	SDS_VAL_POSITIVE	1
Alternating	SDS_VAL_ALTERNATE	2

**Related Attribute** SDS\_ATTR\_TRIGGER\_SOURCE  
SDS\_ATTR\_TRIGGER\_LEVEL

**High Level Functions** sds\_ConfigureEdgeTriggerSource

## SDS\_ATTR\_TV\_TRIGGER\_LINE\_NUMBER

<b>Description</b>	This attribute specifies the line number of the video trigger.
<b>Data type</b>	ViInt32
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is  SDS_ATTR_TV_TRIGGER_LINE_NUMBER macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[1,1125]
<b>Related Attribute</b>	SDS_ATTR_TV_TRIGGER_SIGNAL_FORMAT
<b>High Level Functions</b>	sds_ConfigureTVTriggerLineNumber

## SDS\_ATTR\_TV\_TRIGGER\_SIGNAL\_FORMAT

**Description** This attribute specifies the video standard of the video trigger.

**Data type** ViInt32

**Access** R/W

**Common control functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is

SDS\_ATTR\_TV\_TRIGGER\_SIGNAL\_FORMAT macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
NTSC	SDS_VAL_NTSC	1
PAL	SDS_VAL_PAL	2
720p/50	SDS_VAL_720P50	4
720p/60	SDS_VAL_720P60	5
1080p/50	SDS_VAL_1080P50	6
1080p/60	SDS_VAL_1080P60	7
1080i/50	SDS_VAL_1080I50	8
1080i/60	SDS_VAL_1080I60	9
Custom	SDS_VAL_CUSTOM	10

**Related Attribute** SDS\_ATTR\_TV\_TRIGGER\_LINE\_NUMBER

**High Level Functions** sds\_ConfigureTVTriggerSource



## SDS\_ATTR\_RUNT\_HIGH\_THRESHOLD

<b>Description</b>	This attribute specifies the upper trigger level of the runt trigger.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_RUNT_HIGH_THRESHOLD macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A:  <math>[-4.5 * \text{vertical\_scale} - \text{vertical\_offset}, 4.5 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD:  <math>[-4.1 * \text{vertical\_scale} - \text{vertical\_offset}, 4.1 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p><b>Note:</b>  The value cannot be less than the value of the SDS_ATTR_RUNT_LOW_THRESHOLD attribute.</p>
<b>Related Attribute</b>	SDS_ATTR_RUNT_LOW_THRESHOLD SDS_ATTR_GLITCH_POLARITY
<b>High Level Functions</b>	sds_ConfigureRuntTriggerSource

## SDS\_ATTR\_RUNT\_LOW\_THRESHOLD

<b>Description</b>	This attribute specifies the lower trigger level of the runt trigger.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributId, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributId, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributId</b> is SDS_ATTR_RUNT_LOW_THRESHOLD macro.  <b>value</b> is used to store or set the value of function represented by <b>attributId</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A:  <math>[-4.5 * \text{vertical\_scale} - \text{vertical\_offset}, 4.5 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD::  <math>[-4.1 * \text{vertical\_scale} - \text{vertical\_offset}, 4.1 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p><b>Note:</b>  The value cannot exceed the value of the SDS_ATTR_RUNT_HIGH_THRESHOLD attribute.</p>
<b>Related Attribute</b>	<p>SDS_ATTR_RUNT_HIGH_THRESHOLD</p> <p>SDS_ATTR_GLITCH_POLARITY</p>
<b>High Level Functions</b>	sds_ConfigureRuntTriggerSource

## SDS\_ATTR\_RUNT\_POLARITY

Description	This attribute specifies the polarity of the runt trigger.									
Data type	ViInt32									
Access	R/W									
Common control functions	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_RUNT_POLARITY macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>									
Value Range	<table><tr><th>Type</th><th>Discrete Value</th><th>Value</th></tr><tr><td>Positive</td><td>SDS_VAL_RUNT_POSITIVE</td><td>1</td></tr><tr><td>Negative</td><td>SDS_VAL_RUNT_NEGATIVE</td><td>2</td></tr></table>	Type	Discrete Value	Value	Positive	SDS_VAL_RUNT_POSITIVE	1	Negative	SDS_VAL_RUNT_NEGATIVE	2
Type	Discrete Value	Value								
Positive	SDS_VAL_RUNT_POSITIVE	1								
Negative	SDS_VAL_RUNT_NEGATIVE	2								
Related Attribute	SDS_ATTR_RUNT_HIGH_THRESHOLD SDS_ATTR_RUNT_LOW_THRESHOLD SDS_ATTR_RUNT_POLARITY									
High Level Functions	sds_ConfigureRuntTriggerSource									

## SDS\_ATTR\_GLITCH\_CONDITION

**Description** This attribute specifies the limit range type of the pulse trigger.

**Data type** ViInt32

**Access** R/W

**Common control functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_GLITCH\_CONDITION macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
Less than	SDS_VAL_GLITCH_LESS_THAN	1
Greater than	SDS_VAL_GLITCH_GREATER_THAN	2

**Related Attribute** SDS\_ATTR\_GLITCH\_POLARITY

**High Level Functions** sds\_ConfigureGlitchTriggerSource

## SDS\_ATTR\_GLITCH\_POLARITY

**Description** This attribute specifies the polarity of the pulse trigger.

**Data type** ViInt32

**Access** R/W

**Common control functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_GLITCH\_POLARITY macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
Positive	SDS_VAL_GLITCH_POSITIVE	1
Negative	SDS_VAL_GLITCH_NEGATIVE	2

**Related Attribute** SDS\_ATTR\_GLITCH\_CONDITION

**High Level Functions** sds\_ConfigureGlitchTriggerSource

## SDS\_ATTR\_WIDTH\_CONDITION

**Description** This attribute specifies the limit range type of the pulse trigger.

**Data type** ViInt32

**Access** R/W

**Common control functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_WIDTH\_CONDITION macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
INNER	SDS_VAL_WIDTH_WITHIN	1
OUTER	SDS_VAL_WIDTH_OUTSIDE	2

**Related Attribute** SDS\_ATTR\_GLITCH\_CONDITION

**High Level Functions** sds\_ConfigureWidthTriggerSource

## SDS\_ATTR\_WIDTH\_POLARITY

**Description** This attribute specifies the polarity of the pulse trigger.

**Data type** ViInt32

**Access** R/W

**Common control functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_WIDTH\_POLARITY macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
Positive	SDS_VAL_GLITCH_POSITIVE	1
Negative	SDS_VAL_GLITCH_NEGATIVE	2

**Related Attribute** SDS\_ATTR\_GLITCH\_CONDITION

**High Level Functions** sds\_ConfigureWidthTriggerSource

## SDS\_ATTR\_WIDTH\_HIGH\_THRESHOLD

<b>Description</b>	This attribute specifies the higher trigger level when the limit condition of the pulse trigger is INNER and OUTER.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributId, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributId, ViReal64 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributId</b> is SDS_ATTR_WIDTH_HIGH_THRESHOLD macro. <b>value</b> is used to store or set the value of function represented by <b>attributId</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A: [-4.5*vertical_scale-vertical_offset,4.5*vertical_scale-vertical_offset].</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD: [-4.1*vertical_scale-vertical_offset,4.1*vertical_scale-vertical_offset].</p> <p><b>Note:</b> The value cannot exceed the value of the SDS_ATTR_WIDTH_LOW_THRESHOLD attribute.</p>
<b>Related Attribute</b>	SDS_ATTR_RUNT_HIGH_THRESHOLD
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource



## SDS\_ATTR\_WIDTH\_LOW\_THRESHOLD

<b>Description</b>	This attribute specifies the lower trigger level when the limit condition of the pulse trigger is INNER and OUTER.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_WIDTH_LOW_THRESHOLD macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A:  <math>[-4.5 * \text{vertical\_scale} - \text{vertical\_offset}, 4.5 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD:  <math>[-4.1 * \text{vertical\_scale} - \text{vertical\_offset}, 4.1 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p><b>Note:</b>  The value cannot exceed the value of the SDS_ATTR_WIDTH_HIGH_THRESHOLD attribute.</p>
<b>Related Attribute</b>	SDS_ATTR_RUNT_HIGH_THRESHOLD
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource

## SDS\_ATTR\_GLITCH\_WIDTH

<b>Description</b>	This attribute specifies the trigger level when the limit condition of the pulse trigger is Less and Greater.
<b>Data type</b>	ViReal64
<b>Access</b>	R/W
<b>Common control functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_GLITCH_WIDTH macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>Range of values for SDS6000A/SDS6000 Pro/SDS6000L/SDS3000X HD/SDS7000A:  <math>[-4.5 * \text{vertical\_scale} - \text{vertical\_offset}, 4.5 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p> <p>Range of values for SDS5000X/SDS2000X Plus/SDS2000X HD/SDS1000X HD/SDS800X HD:  <math>[-4.1 * \text{vertical\_scale} - \text{vertical\_offset}, 4.1 * \text{vertical\_scale} - \text{vertical\_offset}]</math>.</p>
<b>Related Attribute</b>	SDS_ATTR_RUNT_HIGH_THRESHOLD
<b>High Level Functions</b>	sds_ConfigureGlitchTriggerSource

## SDS\_ATTR\_AC\_LINE\_TRIGGER\_SLOPE

**Description** This attribute specifies the slope when the source of the edge trigger is ACLine.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_AC\_LINE\_TRIGGER\_SLOPE macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
Falling	SDS_VAL_NEGATIVE	0
Rising	SDS_VAL_POSITIVE	1
Alternating	SDS_VAL_ALTERNATE	2

**Related Attribute** None

**High Level Functions** sds\_ConfigureAcLineTriggerSlope

## SDS\_ATTR\_TRIGGER\_SINGLE

<b>Description</b>	This attribute configures the single trigger mode.
<b>Data Type</b>	ViBoolean
<b>Access</b>	W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>ChannelName</b> is None. <b>attributeld</b> is SDS_ATTR_TRIGGER_SINGLE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>VI_TRUE means to turn on the single trigger mode. VI_FALSE means to turn off the single trigger mode.</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureTriggerSingle

## SDS\_ATTR\_TRIGGER\_STATUS

Description	This attribute obtains the trigger status.																					
Data Type	ViInt32																					
Access	R																					
Common Control Functions	<p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_TRIGGER_STATUS macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>																					
Value Range	<table><tr><th>Type</th><th>Discrete Value</th><th>Value</th></tr><tr><td>Auto</td><td>SDS_VAL_TSTATUS_AUTO</td><td>0</td></tr><tr><td>Ready</td><td>SDS_VAL_TSTATUS_READY</td><td>1</td></tr><tr><td>Arm</td><td>SDS_VAL_TSTATUS_ARM</td><td>2</td></tr><tr><td>Trig' d</td><td>SDS_VAL_TSTATUS_TRIG</td><td>3</td></tr><tr><td>Stop</td><td>SDS_VAL_TSTATUS_STOP</td><td>4</td></tr><tr><td>Roll</td><td>SDS_VAL_TSTATUS_ROLL</td><td>5</td></tr></table>	Type	Discrete Value	Value	Auto	SDS_VAL_TSTATUS_AUTO	0	Ready	SDS_VAL_TSTATUS_READY	1	Arm	SDS_VAL_TSTATUS_ARM	2	Trig' d	SDS_VAL_TSTATUS_TRIG	3	Stop	SDS_VAL_TSTATUS_STOP	4	Roll	SDS_VAL_TSTATUS_ROLL	5
Type	Discrete Value	Value																				
Auto	SDS_VAL_TSTATUS_AUTO	0																				
Ready	SDS_VAL_TSTATUS_READY	1																				
Arm	SDS_VAL_TSTATUS_ARM	2																				
Trig' d	SDS_VAL_TSTATUS_TRIG	3																				
Stop	SDS_VAL_TSTATUS_STOP	4																				
Roll	SDS_VAL_TSTATUS_ROLL	5																				
Related Attribute	None																					
High Level Functions	sds_ConfigureAcLineTriggerSlope																					

## SDS\_ATTR\_NOISE\_REJECT

**Description** This attribute sets/obtains the status of noise reject.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_NOISE\_REJECT macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
ON	SDS_VAL_NOISE_STATUS_ON	0
OFF	SDS_VAL_NOISE_STATUS_OFF	1

**Related Attribute** None

**High Level Functions** sds\_ConfigureTriggerCoupling

## Measurement Subsystem

The waveform measurement group properties are used to set or read Measurement related parameters. The waveform measurement group has the following attributes:

- ◆ **SDS\_ATTR\_MEASURE\_ENABLED**
- ◆ **SDS\_ATTR\_MEASURE\_MODE**
- ◆ **SDS\_ATTR\_MEASURE\_GATE**
- ◆ **SDS\_ATTR\_MEASURE\_GATE\_GA**
- ◆ **SDS\_ATTR\_MEASURE\_GATE\_GB**
- ◆ **SDS\_ATTR\_MEASURE\_SIMPLE\_SOURCE**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEA**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEB**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_TYPE**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_VALUE**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_STYLE**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_LINENUMBER**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_HISTOGRAM**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_RESET**
- ◆ **SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_MAXCOUNT**
- ◆ **SDS\_ATTR\_MEAS\_LOW\_REF**
- ◆ **SDS\_ATTR\_MEAS\_MID\_REF**
- ◆ **SDS\_ATTR\_MEAS\_HIGH\_REF**
- ◆ **SDS\_ATTR\_MEASURE\_THRESHOLD\_TYPE**
- ◆ **SDS\_ATTR\_MEASURE\_THRESHOLD\_ABS**
- ◆ **SDS\_ATTR\_MEASURE\_THRESHOLD\_PERC**
- ◆ **SDS\_ATTR\_MEASURE\_THRESHOLD\_SOURCE**

## SDS\_ATTR\_MEASURE\_ENABLED

<b>Description</b>	This attribute turns on or off measurements.
<b>Data Type</b>	ViBoolean
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p>sds_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEASURE_ENABLED macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value range</b>	<p>VI_TRUE means measurement is on</p> <p>VI_FALSE means measurement is off</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None



## SDS\_ATTR\_MEASURE\_MODE

Description	This attribute specifies the mode of measurement.									
Data Type	ViInt32									
Access	R/W									
Common Control Functions	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_MEASURE_MODE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>									
Value Range	<table><tr><th>Type</th><th>Discrete Value</th><th>Value</th></tr><tr><td>Simple</td><td>SDS_VAL_MEAS_MODE_SIMPLE</td><td>0</td></tr><tr><td>Advanced</td><td>SDS_VAL_MEAS_MODE_ADVANCED</td><td>1</td></tr></table>	Type	Discrete Value	Value	Simple	SDS_VAL_MEAS_MODE_SIMPLE	0	Advanced	SDS_VAL_MEAS_MODE_ADVANCED	1
Type	Discrete Value	Value								
Simple	SDS_VAL_MEAS_MODE_SIMPLE	0								
Advanced	SDS_VAL_MEAS_MODE_ADVANCED	1								
Related Attribute	SDS_ATTR_MEASURE_ENABLED									
High Level Functions	None									

## SDS\_ATTR\_MEASURE\_GATE

<b>Description</b>	This attribute turns on or off the measurement gate.
<b>Data Type</b>	ViBoolean
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p>sds_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEASURE_GATE macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>VI_TRUE means enable the measurement gate</p> <p>VI_FALSE means to disable the measurement gate</p>
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_GATE_GA</p> <p>SDS_ATTR_MEASURE_GATE_GB</p>
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_GATE\_GA

<b>Description</b>	This attribute specifies the position of gate A.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEASURE_GATE_GA macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>[-5*timebase, 5*timebase].</p> <p><b>Notes:</b>  The value cannot exceed SDS_ATTR_MEASURE_GATE_GB.</p>
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_GATE</p> <p>SDS_ATTR_MEASURE_GATE_GB</p>
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_GATE\_GB

<b>Description</b>	This attribute specifies the position of gate B
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEASURE_GATE_GB macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>[-5*timebase, 5*timebase].</p> <p><b>Notes:</b>  The value cannot be less than the value of the SDS_ATTR_MEASURE_GATE_GA</p>
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_GATE</p> <p>SDS_ATTR_MEASURE_GATE_GA</p>
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_SIMPLE\_SOURCE

<b>Description</b>	This attribute specifies the source of the simple measurement.
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEASURE_SIMPLE_SOURCE macro.  <b>bufSize</b> is passed the number of bytes you specified for the Attribute Value parameter in the ViChar array.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>The source can be set to: {Cn Zn Fx Mm Dd ZDd REFA REFB REFC REFD REFE REFF REFG REFH}.</p> <p>n can be set from 1 to 8  x can be set from 1 to 4  d can be set from 0 to 15</p> <p><b>Notes:</b>  Only the SDS6000L 8-channel series supports 8 channels (C1-C8/Z1-Z8) and 8 reference waveforms.</p> <p><b>Example:</b>  If you want to set the source to C1, enter "C1".  If you want to set the source to D0 in the Zoom window, enter "ZD0".</p>
<b>Related Attribute High Level Functions</b>	<p>None</p> <p>None</p>

## SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEA

**Description** This attribute sets the source A of the specified advance measurement.

**Data Type** ViString

**Access** R/W

**Common Control Functions**

sds\_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)

sds\_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])

**Note:**

**vi** is the instrument handle.

**channelName** is the position of advance measurement item.

**attributeld** is

SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEA macro.

**bufSize** is passed the number of bytes you specified for the Attribute Value parameter in the ViChar array.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

The position can be set to: {Pn}.

n can be set from 1 to 12

The source can be set to: {Cn|Zn|Fx|Mm

|Dd|ZDd|REFA|REFB|REFC|REFD|REFE|REFF|REFG|REFH }.

n can be set from 1 to 8

x can be set from 1 to 4

d can be set from 0 to 15

**Notes:**

Only the SDS6000L 8-channel series supports 8 channels (C1-C8/Z1-Z8) and 8 reference waveforms.

**Example:**

If you want to set the source of the first measurement item to C1, channelName enter P1, value enter "C1".

If you want to set the source of the second measurement

item to D0, channelName enter P2, value enter "D0".

**Related Attribute**                      SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEB

**High Level Functions**              None

## SDS\_ATTR\_MEASURE\_ADVANCED\_SOURCEB

<b>Description</b>	This attribute sets the source B of the specified advance measurement. Only the delay measurement item needs to set source B, and only supports setting as analog channel.
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is the position of advance measurement item.  <b>attributeld</b> is  SDS_ATTR_MEASURE_ADVANCED_SOURCEB  macro.  <b>bufSize</b> is passed the number of bytes you specified for the Attribute Value parameter in the ViChar array.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>The position can be set to: {Pn}.  n can be set from 1 to 12  The source can be set to: {Cn}.  n can be set from 1 to 8</p> <p><b>Notes:</b>  Only the SDS6000L 8-channel series supports 8 channels (C1-C8)</p> <p><b>Example:</b>  If you want to set the source of the first measurement item to C1, channelName enter P1, value enter "C1".</p>
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_SOURCEA
<b>High Level Functions</b>	None



## SDS\_ATTR\_MEASURE\_ADVANCED\_TYPE

<b>Description</b>	This attribute sets the type of the specified advance measurement item.
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is the position of advance measurement item.  <b>attributeld</b> is  SDS_ATTR_MEASURE_ADVANCED_TYPE macro.  <b>bufSize</b> A is passed the number of bytes you specified for the Attribute Value parameter in the ViChar array.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	<p>The position can be set to: {Pn}.  n can be set from 1 to 12  The type can be set to:  {PKPK MAX MIN AMPL TOP BASE LEVELX CMEAN M  EAN STDEV VSTD RMS CRMS MEDIAN CMEDIAN OV  SN FPRE OVSP RPRE PER FREQ TMAX TMIN PWID   NWID DUTY NDUTY WID NBWID DELAY TIMEL RISE   FALL CCJ RISE10T90 FALL90T10 PAREA NAREA AR  EA ABSAREA PACA NACA ACA ABSACA CYCLES RE  DGES FEDGES EDGES PPULSES NPULSES PHA SK  EW FRR FRF FFR FFF LRR LRF LFR LFF TSR TSF TH  R THF}</p>
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_VALUE
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_VALUE

<b>Description</b>	This attribute returns the value of the specified advance measurement item. If the measured value is invalid, it returns -9999.99.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/O
<b>Common Control Functions</b>	<p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is the position of advanced measurement item.  <b>attributeld</b> is SDS_ATTR_MEASURE_ADVANCED_VALUE macro.  <b>value</b> is used to store the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	The position can be set to: {Pn}. n can be set from 1 to 12
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_TYPE
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STYLE

**Description** This attribute specifies the display mode of the advanced measurement.

**Data Type** ViInt32

**Access** R/W

**High Level Functions** None

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is

SDS\_ATTR\_MEASURE\_ADVANCED\_STYLE macro.

**value** is used to store or set the value of function represented by **attributeld**.

**Value Range**

Type	Discrete Value	Value
M1	SDS_VAL_MEAS_ADV_STYLE_M1	0
M2	SDS_VAL_MEAS_ADV_STYLE_M2	1

**Related Attribute** SDS\_ATTR\_MEASURE\_MODE

**High Level Functions** None

## SDS\_ATTR\_MEASURE\_ADVANCED\_LINENUMBER

<b>Description</b>	This attribute specifies the total number of advanced measurement items displayed.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_MEASURE_ADVANCED_LINENUMBER macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[1,12]
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_STYLE
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS

<b>Description</b>	This attribute turns on or off the measurement statistics.
<b>Data Type</b>	ViBoolean
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p>sds_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean *value)</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is None. <b>attributeld</b> is SDS_ATTR_MEASURE_ADVANCED_STATISTICS macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	VI_TRUE means to enable measurement statistics VI_FALSE means to disable measurement statistics
<b>Related Attribute</b>	SDS_ATTR_MEASURE_MODE
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_HISTOGRAM

<b>Description</b>	This attribute turns on or off the measurement histogram.
<b>Data Type</b>	ViBoolean
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p>sds_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is  SDS_ATTR_MEASURE_ADVANCED_STATISTICS_HISTOGRAM macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	VI_TRUE means to enable measurement histogram VI_FALSE means to disable measurement histogram
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_STATISTICS
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICA\_MAXCOUNT

<b>Description</b>	This attribute specifies the maximum value of the statistics count.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 value)</p> <p>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is  SDS_ATTR_MEASURE_ADVANCED_STATISTICA_MAXCOUNT macro.  <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[0,1024]
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_STATISTICS
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_RESET

<b>Description</b>	This attribute resets the measurement statistics.
<b>Data Type</b>	ViBoolean
<b>Access</b>	WO
<b>Common Control Functions</b>	<p>sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is  SDS_ATTR_MEASURE_ADVANCED_STATISTICS_RESET macro.  <b>value</b> is used to set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	VI_TRUE means to restart measurement statistics
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ADVANCED_STATISTICS
<b>High Level Functions</b>	None



## SDS\_ATTR\_MEAS\_LOW\_REF

<b>Description</b>	This attribute sets/queries the low value of the measurement threshold.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEAS_LOW_REF macro.  <b>value</b> is used to store the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[1,97]%
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p> <p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p>
<b>High Level Functions</b>	sds_ConfigureRefLevels

## SDS\_ATTR\_MEAS\_MID\_REF

<b>Description</b>	This attribute sets/queries the mid value of the measurement threshold.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEAS_MID_REF macro.  <b>value</b> is used to store the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[2,98]%
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p> <p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p>
<b>High Level Functions</b>	sds_ConfigureRefLevels

## SDS\_ATTR\_MEAS\_HIGH\_REF

<b>Description</b>	This attribute sets/queries the high value of the measurement threshold.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 value)</p> <p>sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributeld</b> is SDS_ATTR_MEAS_HIGH_REF macro.  <b>value</b> is used to store the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	[3,99]%
<b>Related Attribute</b>	<p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p> <p>SDS_ATTR_MEASURE_ADVANCED_TYPEREF</p>
<b>High Level Functions</b>	sds_ConfigureRefLevels

## SDS\_ATTR\_MEASURE\_THRESHOLD\_TYPE

**Description** This attribute sets/obtains the measurement threshold type.

**Data Type** ViInt32

**Access** R/W

**Common Control Functions** sds\_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributId, ViInt32 value)

sds\_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributId, ViInt32 \*value)

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributId** is

SDS\_ATTR\_MEASURE\_THRESHOLD\_TYPE macro.

**value** is used to store or set the value of function represented by **attributId**.

**Value Range**

Type	Discrete Value	Value
PERC	SDS_VAL_TH_PERC	0
ABS	SDS_VAL_TH_ABS	1

**Related Attribute** SDS\_ATTR\_MEASURE\_ENABLED  
SDS\_ATTR\_MEASURE\_ENABLED

**High Level Functions** sds\_ConfigureAbsRefLevels  
sds\_ConfigureRefLevels

## SDS\_ATTR\_MEASURE\_THRESHOLD\_PERC

<b>Description</b>	This attribute sets the measurement threshold in percentage.
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributId, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributId, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b>  <b>vi</b> is the instrument handle.  <b>channelName</b> is None.  <b>attributId</b> is  SDS_ATTR_MEASURE_THRESHOLD_PERC macro.  <b>bufSize</b> is the number of bytes you specified for the Attribute Value parameter in the ViChar array.  <b>value</b> is used to store or set the value of function represented by <b>attributId</b>.</p>
<b>Value Range</b>	<p>The string format is as follows: "high, mid, low"</p> <p>Like: 90, 50, 10</p> <p>High value range:3-99</p> <p>Mid value range:2-98</p> <p>Low value range:1-97</p> <p>Unit: %</p>
<b>Related Attribute</b>	SDS_ATTR_MEASURE_ENABLED SDS_ATTR_MEASURE_ENABLED
<b>High Level Functions</b>	sds_ConfigureRefLevels

## SDS\_ATTR\_MEASURE\_THRESHOLD\_ABS

**Description** This property sets the metric threshold in absolute values.

**Data Type** ViString

**Access** R/W

**Common Control Functions**

sds\_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViConstString value)

sds\_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 bufSize, ViChar value[])

**Note:**

**vi** is the instrument handle.

**channelName** is None.

**attributeld** is SDS\_ATTR\_MEASURE\_THRESHOLD\_ABS macro.

**bufSize** is the number of bytes you specified for the Attribute Value parameter in the ViChar array.

**value** is used to store or set the value of function represented by **attributeld**.

**Notes:** Only the SDS6000L 8-channel series has 8 channels.

**Value Range** The string format is as follows: "high, mid, low"  
Like: 1.2, 1.0, 0.8

- **Range of value for SDS6000A/SDS6000 Pro/ SDS6000L/SDS3000XHD/SDS7000A:**

High value range:

$[-3.98 \times \text{probe-offset}, 4 \times \text{probe-offset}]$ .

Mid value range:

$[-3.99 \times \text{probe--offset}, 3.99 \times \text{probe-offset}]$ .

Low value range:

$[-4 \times \text{probe-offset}, 3.98 \times \text{probe-offset}]$ .

- **Range of value for/SDS800X HD/SDS1000X HD/SDS2000X HD / SDS5000/SDS2000X Plus:**

High value range:

$[-3.97 \times \text{probe-offset}, 4 \times \text{probe-offset}]$ .

Mid value range:

$[-3.98 * \text{probe--offset}, 3.98 * \text{probe-offset}]$ .  
Low value range:  
 $[-4 * \text{probe-offset}, 3.97 * \text{probe-offset}]$ .

Unit: V/A

### Related Attribute

SDS\_ATTR\_MEASURE\_ENABLED  
SDS\_ATTR\_MEASURE\_ENABLED

### High Level Functions

sds\_ConfigureAbsRefLevels

## SDS\_ATTR\_MEASURE\_THRESHOLD\_SOURCE

<b>Description</b>	This attribute sets/ obtains the source of the measurement threshold
<b>Data Type</b>	ViString
<b>Access</b>	R/W
<b>Common Control Functions</b>	<p>sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributId, ViConstString value)</p> <p>sds_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributId, ViInt32 bufSize, ViChar value[])</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is Cn/Zn/Dd/Fx/Mm/Rr. <b>attributId</b> is SDS_ATTR_CHANNEL_LABEL_TEXT macro. <b>bufSize</b> is the number of bytes you specified for the Attribute Value parameter in the ViChar array. <b>value</b> is used to store or set the value of function represented by <b>attributId</b>.</p>
<b>Value Range</b>	<p>The source can be set to: {Cn Zn Fx Mm Dd ZDd REFA REFB REFC REFD REFE REFF REFG REFH}.</p> <p>n can be set from 1 to 8 x can be set from 1 to 4 d can be set from 0 to 15</p> <p><b>Notes:</b> SDS6008L series supports 8 channels (C1-C8/Z1-Z8) and 8 reference waveforms. SDS2000X Plus/SDS5000X: Only supports 2 math traces</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureAbsRefLevels sds_ConfigureRefLevels



## High Level Functions

Some high level functions are available to set multiple attributes.

- **sds\_InitWithOptions(ViRsrc resourceName, ViBoolean IDQuery, ViBoolean resetDevice, ViConstString optionString, ViSession \*newVi)**

This function creates a new IVI session.

Parameter	Description
resourceName	This parameter specifies the resource name of the instrument
IDQuery	To perform ID query or not
resetDevice	To reset the device or not
optionString	This parameter is the option string sets to the InitWithOptions function of the instrument driver. It includes settings for Simulate, RangeCheck, QueryInstrStatus and Cache
*newVi	Instrument handle
<b>Example:</b>  <pre>sds_InitWithOptions("USB0::0xF4EC::0x1013::0123456789::INSTR", VI_TRUE, VI_FALSE, "Simulate=0,RangeCheck=1,QueryInstrStatus=0,Cache=0", &amp;session);</pre>	

**Notes:** Siglent's driver 1.0 does not support simulation, cache, range check and querying instrument status. Therefore, it is only useful when connecting to an actual instrument. You should initiate the instrument by calling sds\_InitWithOptions() before using it, and input the parameters we suggested except argument resourceName.

- **sds\_Abort (ViSession vi)**

This function aborts a previously initiated acquisition.

Parameter	Description
vi	Instrument handle
<b>Example:</b> sds_Abort(session);	

- **sds\_FetchWaveform(ViSession vi, ViConstString channel, ViInt32 waveformSize, ViReal64 waveform[], ViInt32 \*actualPoints, ViReal64 \*initialX, ViReal64 \*xIncrement)**

This function fetches a waveform from a specified channel from a previously initiated acquisition.

Parameter	Description
vi	Instrument handle
channel	Name of the channel from which to fetch a waveform.
waveformSize	Specifies the number of elements in the waveform array.
waveform[]	A user-allocated buffer into which the acquired waveform is stored.
*actualPoints	Number of points actually placed in the waveform array.
*initialX	The time in relation to the Trigger Event of the first point in the waveform in seconds.
*xIncrement:	The effective time between points in the acquired waveform in seconds.
<b>Example:</b> sds_FetchWaveform(session,"C1",256,waveform,&actualPoints,&initialX,&xIncrement);	

- **sds\_ReadWaveform (ViSession vi, ViConstString channel, ViInt32 waveformSize, ViInt32 maxTime, ViReal64 waveform[], ViInt32 \*actualPoints,**

**ViReal64 \*initialX, ViReal64 \*xIncrement)**

This function initiates a new waveform acquisition and returns a waveform from a specific channel.

Parameter	Description
vi	Instrument handle
channel	Name of the channel from which to read a waveform
waveformSize	Specifies the number of elements in the waveform array.
maxTime	Specifies the maximum time the end-user allows for this function to complete in milliseconds.
waveform[]	A user-allocated buffer into which the acquired waveform is stored.
*actualPoints	Contains the number of points the driver actually places in the waveform array.
*initialX	Contains the time of the first point in the waveform.
*xIncrement:	Contains the effective time between points in the waveform. The units are seconds.
<b>Example:</b>  sds_ReadWaveform(session,"C1",200,256,waveform, &actualPoints, &initialX, &xIncrement);	

➤ **sds\_ActualRecordLength (ViSession vi,Vilnt32 \*actualRecordLength)**

This function returns the actual waveform record length the oscilloscope acquires.

Parameter	Description
vi	Instrument handle
*actualRecordLength	Record length

**Example:**

```
sds_ActualRecordLength(session,&value32);
```

➤ **sds\_InitiateAcquisition (ViSession vi)**

This function initiates waveform acquisition.

Parameter	Description
vi	Instrument handle
<b>Example:</b> <pre>sds_InitiateAcquisition(session);</pre>	

➤ **sds\_SampleRate (ViSession vi, ViReal64 \*sampleRate)**

This function returns the effective sample rate of the oscilloscope.

Parameter	Description
vi	Instrument handle
*sampleRate	Effective sample rate
<b>Example:</b> <pre>sds_SampleRate(session,&amp;value64);</pre>	

➤ **sds\_IsInvalidWfmElement (ViSession vi, ViReal64 elementValue, ViBoolean \*isInvalid)**

This function takes one of the Waveform Array's element value that you obtain from the ReadWaveform or FetchWaveform function and determines if the value is a valid measurement value or a value indicating that the oscilloscope could not sample a voltage.

Parameter	Description
-----------	-------------

vi	Instrument handle
elementValue	Specify the value for which you want to determine the type
*isInvalid	The result of judgment
<b>Example:</b>  sds_IsInvalidWfmElement(session,1,&isinvalid);	

➤ **sds\_GetChannelName (ViSession vi, ViInt32 index, ViInt32 bufferSize, ViChar name[])**

This function returns the highest-level channel name that corresponds to the specific driver channel string that is in the channel table at an index you specify.

Parameter	Description
vi	Instrument handle
index	Specified index
bufferSize	The length of the channel name
name[]	Channel name storage location
<b>Example:</b>  sds_GetChannelName(session,1,256,str);	

➤ **sds\_ConfigureAcquisitionType (ViSession vi, ViInt32 acquisitionType)**

This function sets the acquisition mode.

Parameter	Description
vi	Instrument handle
acquisitionType	Acquisition mode
<b>Example:</b>  sds_ConfigureAcquisitionType (session,0);	

- **sds\_ConfigureAcquisitionRecord (ViSession vi, ViReal64 timePerRecord, ViInt32 minimumRecordLength, ViReal64 acqStartTime)**

This function configures the most common attributes of the horizontal subsystem

Parameter	Description
vi	Instrument handle
timePerRecord	Time base
minimumRecordLength	Memory depth
acqStartTime	Time delay
<b>Example :</b>  sds_ConfigureAcquisitionRecord (session, 1e-3, 5, 2e-3);	

- **sds\_ConfigureInterpolation (ViSession vi, ViInt32 interpolation)**

This function sets the interpolation method.

Parameter	Description
vi	Instrument handle
interpolation	The way of interpolation
<b>Example:</b>  sds_ConfigureInterpolation (session, 2);	

- **sds\_ConfigureChannel (ViSession vi, ViConstString channel, ViReal64 range, ViReal64 offset, ViInt32 coupling, ViReal64 probeAttenuation, ViBoolean enabled)**

This function configures the vertical subsystem.

Parameter	Description
vi	Instrument handle

channel	Channel name
range	Vertical scale
offset	Vertical offset
coupling	Coupling mode
probeAttenuation	Probe attenuation
enabled	The state of the selected channel
<b>Example:</b> <code>sds_ConfigureChannel(session,"C1",1e+1,2e+1,0,1e+1,VI_TRUE);</code>	

- **sds\_ConfigureChanCharacteristics (ViSession vi, ViConstString channel, ViReal64 inputImpedance, ViReal64 maxInputFrequency)**

This function configures the less common attributes of the vertical subsystem.

Parameter	Description
vi	Instrument handle
channel	Channel name
inputImpedance	Impedence
maxInputFrequency	Bandwidth limit
<b>Example:</b> <code>sds_ConfigureChanCharacteristics (session,"C1", 5e+1, 2e+7);</code>	

- **sds\_ConfigureTrigger (ViSession vi, ViInt32 triggerType, ViReal64 holdoff)**

This function configures the common triggering attributes.

Description	Description
vi	Instrument handle
triggerType	Trigger type
holdoff	Holdoff time

**Example:**

```
sds_ConfigureTrigger (session, 1, 8e-6);
```

➤ **sds\_ConfigureTriggerCoupling (ViSession vi, ViInt32 coupling)**

This function configures the trigger coupling.

Description	Description
vi	Instrument handle
coupling	Coupling mode
<b>Example:</b> sds_ConfigureTriggerCoupling (session, 0);	

➤ **sds\_ConfigureTriggerModifier (ViSession vi, ViInt32 modifier)**

This function configures the trigger modifier.

Description	Description
vi	Instrument handle
modifier	Trigger mode
<b>Example:</b> sds_ConfigureTriggerModifier (session, 1);	

➤ **sds\_ConfigureEdgeTriggerSource (ViSession vi, ViInt32 source, ViReal64 level, ViInt32 slope)**

This function configures the edge triggering.

Description	Description
vi	Instrument handle
source	Trigger source
level	Trigger level



slope	Trigger slope
<b>Example:</b> sds_ConfigureEdgeTriggerSource (session, "C1", 1e+0, 1);	

- **sds\_ConfigureTVTriggerSource (ViSession vi, ViConstString source, ViInt32 TVSignalFormat, ViInt32 TVEvent, ViInt32 TVPolarity)**

This function configures the TV triggering.

Description	Description
vi	Instrument handle
source	Trigger source
TVSignalFormat	The video standard
TVEvent	Not supported. Can be set to any value
TVPolarity	Not supported. Can be set to any value
<b>Example:</b> sds_ConfigureTVTriggerSource (session, "C1", 1, 0, 0);	

- **sds\_ConfigureTVTriggerLineNumber (ViSession vi, ViInt32 lineNumber)**

This function configures the line number of TV triggering.

Description	Description
vi	Instrument handle
lineNumber	The line number
<b>Example:</b> sds_ConfigureTVTriggerLineNumber (session, 200);	

- **sds\_ConfigureRunTriggerSource (ViSession vi, ViConstString source, ViReal64 runtLowThreshold, ViReal64 runtHighThreshold, ViInt32 runtPolarity)**

This function configures the runt triggering.

Description	Description
vi	Instrument handle
source	Trigger source
runtLowThreshold	The lower trigger level
runtHighThreshold	The upper trigger level
runtPolarity	Trigger polarity
<b>Example:</b> sds_ConfigureRuntTriggerSource (session, "C1", -1e+0, 1e+0, 1);	

- **sds\_ConfigureGlitchTriggerSource (ViSession vi, ViConstString source, ViReal64 level, ViReal64 glitchWidth, ViInt32 glitchPolarity, ViInt32 glitchCondition)**

This function configures the glitch triggering.

Description	Description
vi	Instrument handle
source	Trigger source
level	Trigger level
glitchWidth	Limits of the value
glitchPolarity	Trigger polarity
glitchCondition	The limit range type
<b>Example:</b> sds_ConfigureGlitchTriggerSource(session, "C1", 1e+0, 15e-1, 1, 1);	

- **sds\_ConfigureWidthTriggerSource (ViSession vi, ViConstString source, ViReal64 level, ViReal64 widthLowThreshold, ViReal64 widthHighThreshold, ViInt32 widthPolarity,, ViInt32 widthCondition)**

This function configures the glitch triggering.

Description	Description
vi	Instrument handle
source	Trigger source
level	Trigger level
widthLowThreshold	Lower limit value
widthHighThreshold	Upper limit value
widthPolarity	Trigger polarity
widthCondition	The limit range type
<b>Example:</b> sds_ConfigureWidthTriggerSource(session, "C1", 1e+0, 4e-9, 5e-9, 1, 1);	

- **sds\_AutoSetup(ViSession vi)**

This function performs an autoseup on the instrument.

Description	Description
vi	Instrument handle
<b>Example:</b> sds_AutoSetup(session);	

- **sds\_ReadWaveformMeasurement (ViSession vi, ViConstString channel, ViInt32 measurementFunction, ViInt32 maxTime, ViReal64 \*measurement)**

This function initiates a new waveform acquisition and returns a specified waveform measurement from a specific channel.

Description	Description
vi	Instrument handle
channel	Name of the channel
measurementFunction	Select measurement item
Max time	Specifies the maximum time the end-user allows for this function to complete in milliseconds.
*measurement	Return measurement value
<b>Example:</b> sds_ReadWaveformMeasurement (session,"C1",1,5000, *measurement);	

**Notes:** measurementFunction include

0	RISE	1	FALL	2	FREQ
3	PER	4	RMS	5	PKPK
6	MAX	7	MIN	8	TOP
9	BASE	10	MEAN	11	NWID
12	PWID	13	NDUTY	14	DUTY
15	AMPL	16	CRMS	17	CMEAN
18	OUSP	19	PRRE	1001	FPRE
1002	OVSN	1003	LEVELX	1004	STDEV
1005	VSTD	1006	MEDIAN	1007	CMEDIAN
1008	TMAX	1009	TMIN	1010	WID
1011	NBWID	1012	DELAY	1013	TIMEL
1014	RISE10T90	1015	FALL90T10	1016	CCJ
1017	PAREA	1018	NAREA	1019	AREA
1020	ABSAREA	1021	CYCLES	1022	EDGES
1023	REDGES	1024	FEDGES	1025	PPULSES
1026	NPULSES	1027	PACArea	1028	NACArea
1029	ACArea	1030	ABSACArea	1031	PSLOPE
1032	NSLOPE				

➤ **sds\_FetchWaveformMeasurement (ViSession vi, ViConstString channel, ViInt32 measurementFunction, ViReal64 \*measurement)**

This function fetches a specified waveform measurement from a specific channel from a previously initiated waveform acquisition.

Description	Description
vi	Instrument handle
channel	Name of the channel
measurementFunction	Select measurement item
*measurement	Return measurement value
<b>Example:</b> sds_FetchWaveformMeasurement (session,"C1",1, *measurement);	

**Notes:**

MeasurementFunction parameter reference **sds\_ReadWaveformMeasurement**.

➤ **sds\_SampleMode (ViSession vi, \*sampleMode)**

This function returns the sample mode the oscilloscope uses for the acquisition.

Description	Description
vi	Instrument handle
sampleMode	Value of sampling mode
<b>Example:</b> sds_SampleMode (session, *sampleMode);	

➤ **sds\_ConfigureAcLineTriggerSlope (ViSession vi, ViInt32 acLineSlope)**

This function sets the slope of the ACLine trigger.

Description	Description
vi	Instrument handle
acLineSlope	Value of AC Line Slope
<b>Example:</b> sds_ConfigureAcLineTriggerSlope (session, SDS_VAL_NEGATIVE);	

➤ **sds\_ConfigureRefLevels (ViSession vi, ViReal64 lowRef, ViReal64 midRef,**

**ViReal64 highRef)**

This function configures the reference levels for waveform measurements in percentage.

Description	Description
vi	Instrument handle
LowRef	The Low Ref levels of measurement
MidRef	The Mid Ref levels of measurement
HighRef	The High Ref levels of measurement
<b>Example:</b> sds_ConfigureRefLevels (session, 10,50,90);	

➤ **sds\_ConfigureAbsRefLevels (ViSession vi, ViConstString channel,ViReal64 lowRef, ViReal64 midRef, ViReal64 highRef)**

This function configures the reference level for waveform measurement with absolute values.

Description	Description
vi	Instrument handle
channel	The Source of the measurement threshold
LowRef	The Low Ref levels of measurement
MidRef	The Mid Ref levels of measurement
HighRef	The High Ref levels of measurement
<b>Example:</b> sds_ConfigureAbsRefLevels (session,"C1", 1.2, 1.0, 0.8);	

➤ **sds\_ConfigureTriggerSingle (ViSession vi)**

This function sets the single trigger mode.

Description	Description
vi	Instrument handle
<b>Example:</b> sds_ConfigureTriggerSingle (session);	

- **sds\_FetchWaveformDelayMeasurement** (ViSession vi, ViConstString channelA, ViConstString channelB, ViInt32 measurementFunction, ViReal64 \*measurement)

This function configures the reference level for waveform measurement with absolute values.

Description	Description
vi	Instrument handle
channelA	The Source of the measurement
channelB	The Source of the measurement
measurementFunction	Select measurement item
*measurement	Return measurement value
<b>Example:</b>  sds_FetchWaveformDelayMeasurement (session,"C1", "C2" , SDS_VAL_PHASE, *measurement);	

**Notes:**

- 1.To use this function, it is necessary to also set the corresponding measurement item on the oscilloscope;
- 2.measurementFunction include.

SDS_VAL_PHASE	Phase difference between two edges
SDS_VAL_SKEW	Time of source A edge minus time of nearest source B edge
SDS_VAL_FRFR	The time between the first rising edge of source A and the first rising edge of source B at the middle threshold
SDS_VAL_FRFF	The time between the first rising edge of source A and the first falling edge of source B at the middle threshold
SDS_VAL_FFRF	The time between the first falling edge of source A and the first rising edge of source B at the middle threshold
SDS_VAL_FFFF	The time between the first falling edge of source A and the first



	falling edge of source B at the middle threshold
SDS_VAL_FRLR	The time between the first rising edge of source A and the last rising edge of source B at the middle threshold
SDS_VAL_FRLF	The time between the first rising edge of source A and the last falling edge of source B at the middle threshold
SDS_VAL_FFLR	The time between the first falling edge of source A and the last rising edge of source B at the middle threshold
SDS_VAL_FFLF	The time between the first falling edge of source A and the last falling edge of source B at the middle threshold
SDS_VAL_TSUR	Data setup time before the clock rising edge
SDS_VAL_TSUF	Data setup time before the clock falling edge
SDS_VAL_THR	Data hold time after the clock rising edge
SDS_VAL_THF	Data hold time after the clock falling edge

## IVI-C Driver Programming Example

The example is running in an environment where NI VISA 5.4, LabWindow/CVI 2017, and IVI Compliance Package 15.0 are installed.

### Using dynamic link library

```
#include <Windows.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "sds.h"

#define SDS_EXAMPLE_INSTR_RES_ADDR
"TCPIP0::10.12.255.127::inst0::INSTR" // Configure IP Or VISA
Name(USB0::...:INSTR)
#define SDS_EXAMPLE_INIT_OPTION
"Simulate=0,RangeCheck=0,QueryInstrStatus=0,Cache=1"
#define BUFFER_SIZE 512L
#define SIZE 20000000

ViSession session;
ViStatus status;
ViReal64 waveform[SIZE];

typedef ViStatus _VI_FUNC (*setAttr)(ViSession vi, ViConstString channelName,
                                     ViAttr attribute, ViBoolean value);
typedef ViStatus _VI_FUNC (*getAttr)(ViSession vi, ViConstString channelName,
                                     ViAttr attribute, ViInt32 bufSize, ViChar value[]);
typedef ViStatus _VI_FUNC (*sdsInit)(ViRsrc resourceName,
                                     ViBoolean IDQuery, ViBoolean resetDevice,
                                     ViConstString optionString, ViSession *newVi);

int main (int argc, char *argv[])
{
    HINSTANCE hDLL = LoadLibrary("sds.dll");

    sdsInit sds_InitWithOptions = (sdsInit)GetProcAddress(hDLL, "sds_InitWithOptions");
```

```

    setAttr sds_SetAttributeViBoolean =
(setAttr)GetProcAddress(hDLL,"sds_SetAttributeViBoolean");
    getAttr sds_GetAttributeViString =
(getAttr)GetProcAddress(hDLL,"sds_GetAttributeViString");

    ViChar    str[BUFFER_SIZE];
    //Connect the instrument
    status = sds_InitWithOptions(SDS_EXAMPLE_INSTR_RES_ADDR, VI_TRUE,
VI_FALSE, SDS_EXAMPLE_INIT_OPTION, &session);
    //Open measurement
    sds_SetAttributeViBoolean(session,VI_NULL,SDS_ATTR_MEASURE_ENABLED,VI
_TRUE);
    sds_SetAttributeViBoolean(session,"C2",SDS_ATTR_CHANNEL_ENABLED,VI_TR
UE);
    sds_GetAttributeViString(session, VI_NULL, SDS_ATTR_TRIGGER_SOURCE,
BUFFER_SIZE, str);
    printf("source=%s\n",str);
    FreeLibrary(hDLL);

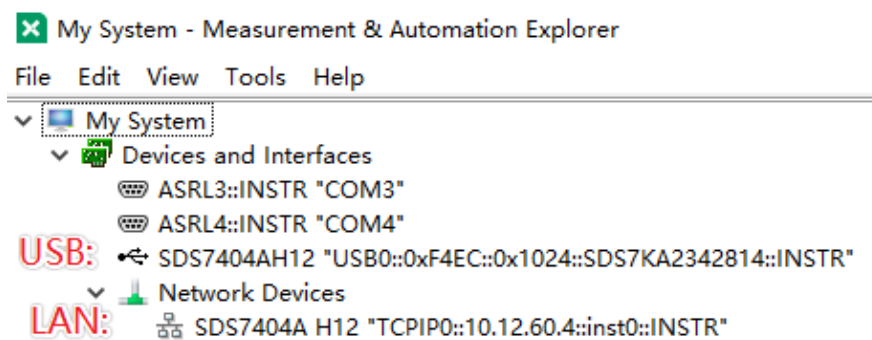
    system("cmd /C pause");
}

```

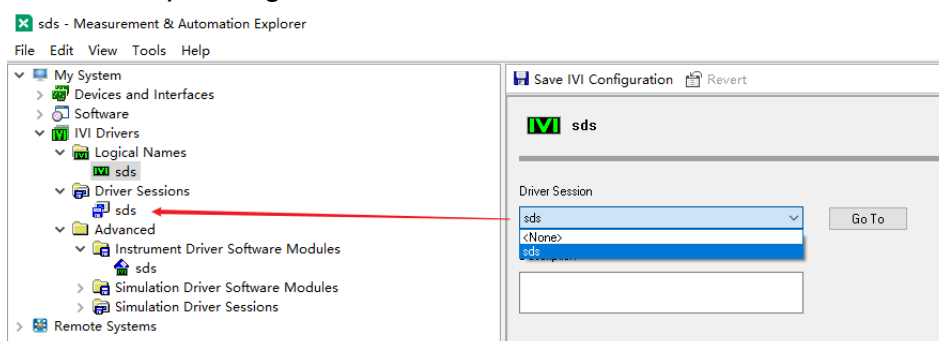
## Using IVI Driver in LabWindows/CVI

**Step1:** Use NI MAX to modify the IVI configuration file

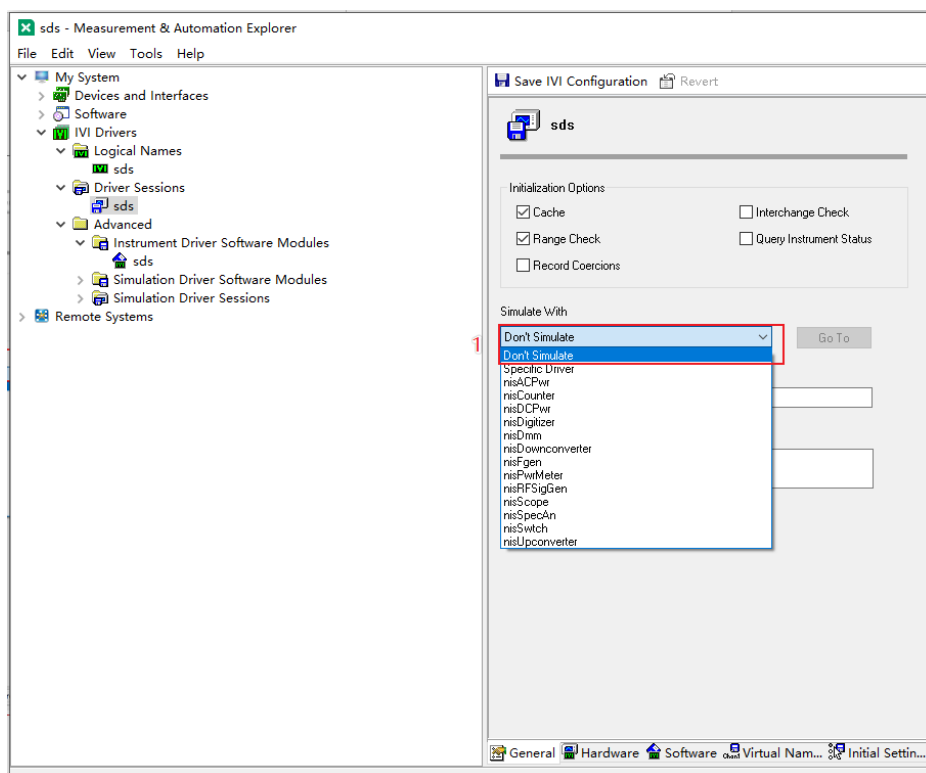
- a. On the **【Equipment and Interface】** tab, find the equipment to be tested;



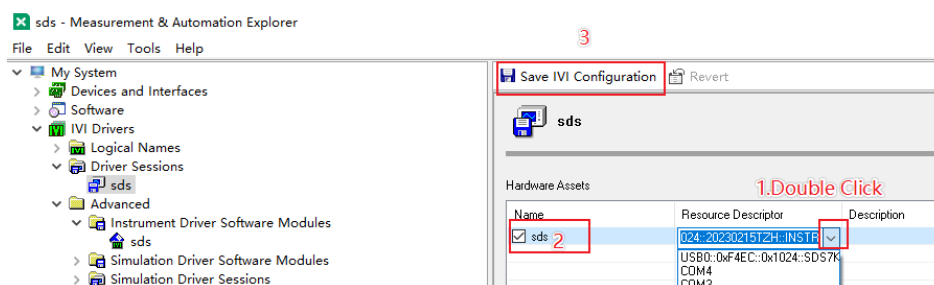
- b. Then create a new logical name in the **【IVI Driver】** tab, such as: sds; And point to the corresponding Driver Session, and then click **GO TO** to go to the corresponding Session;



- c. Set simulation options on the **【General】** tab, and select Don't Simulate



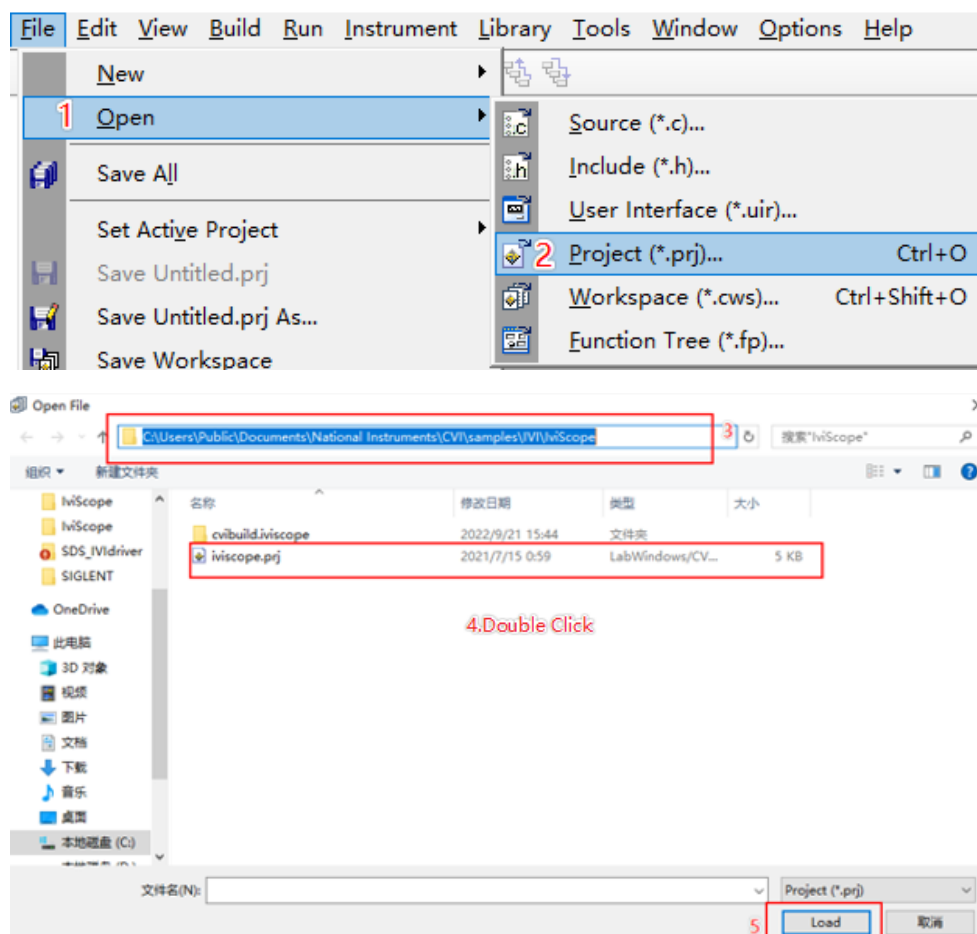
- d. On the **【Hardware】** tab, add a hardware resource and select the correct resource address (Name is optional) ,and then save the configuration.



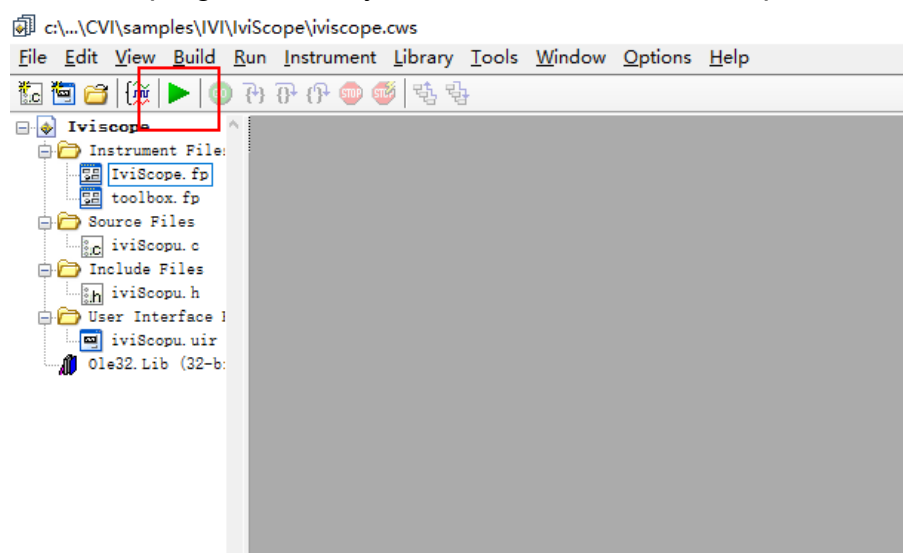
**Step2:** Use LabWindow/CVI to open the instance that comes with running IVI;

- a. Open Instance Project:

C:\Users\Public\Documents\National\Instruments\CVI\samples\IVI\IviScope;

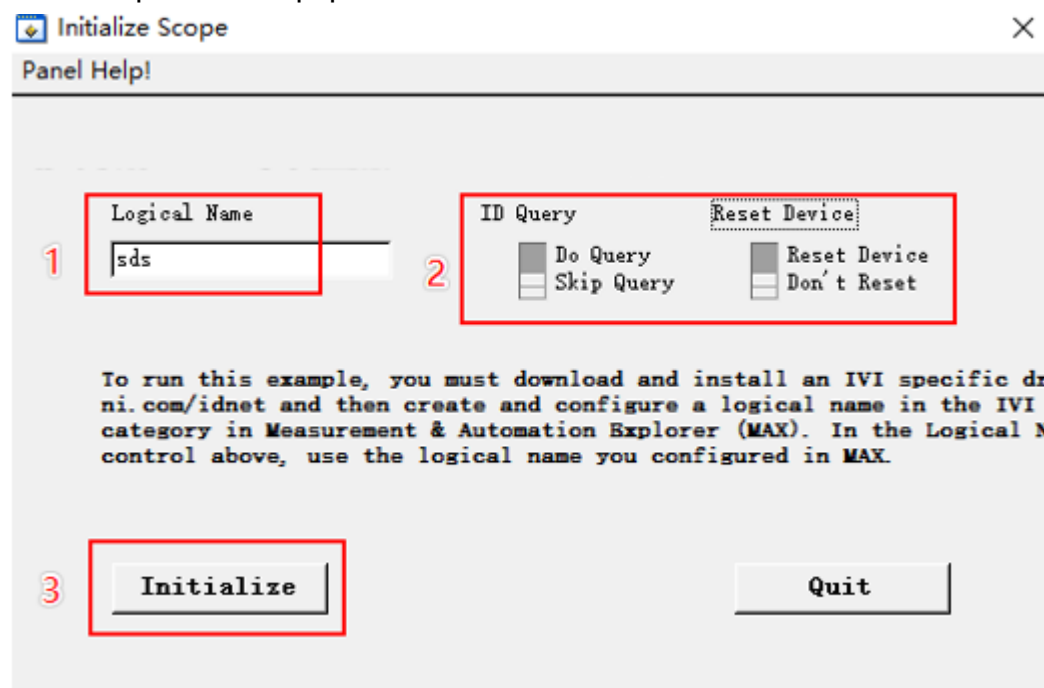


- b. Run the program directly and enter the initialization panel immediately:

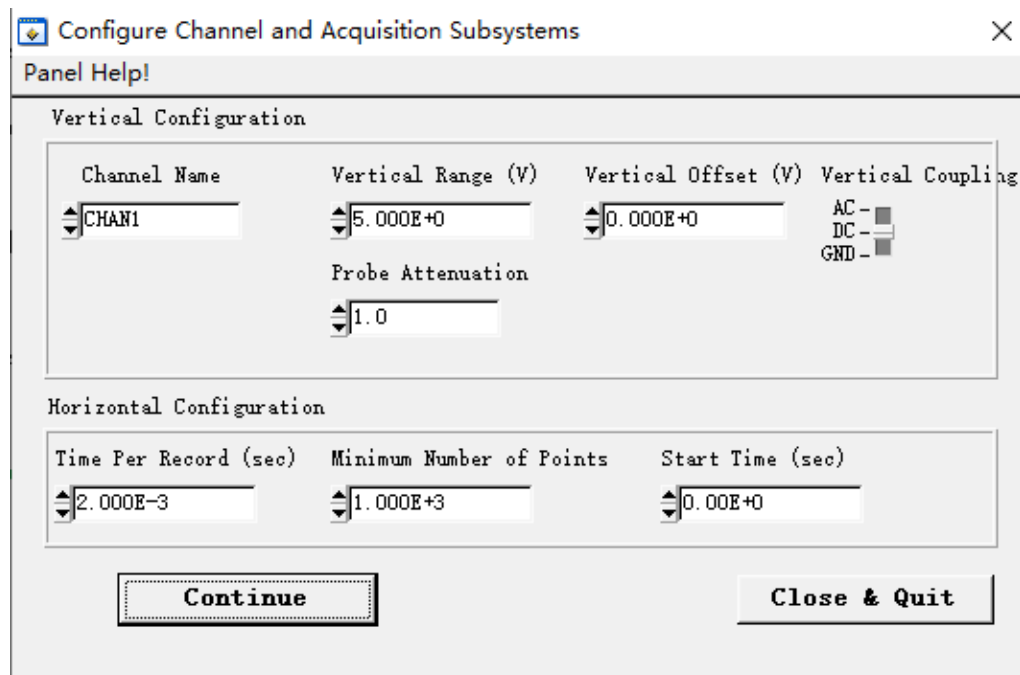


- c. In the initialization panel, fill in the logical name of the device that has been added in Step1, and set the attributes as required, and click **【Initialize】** to

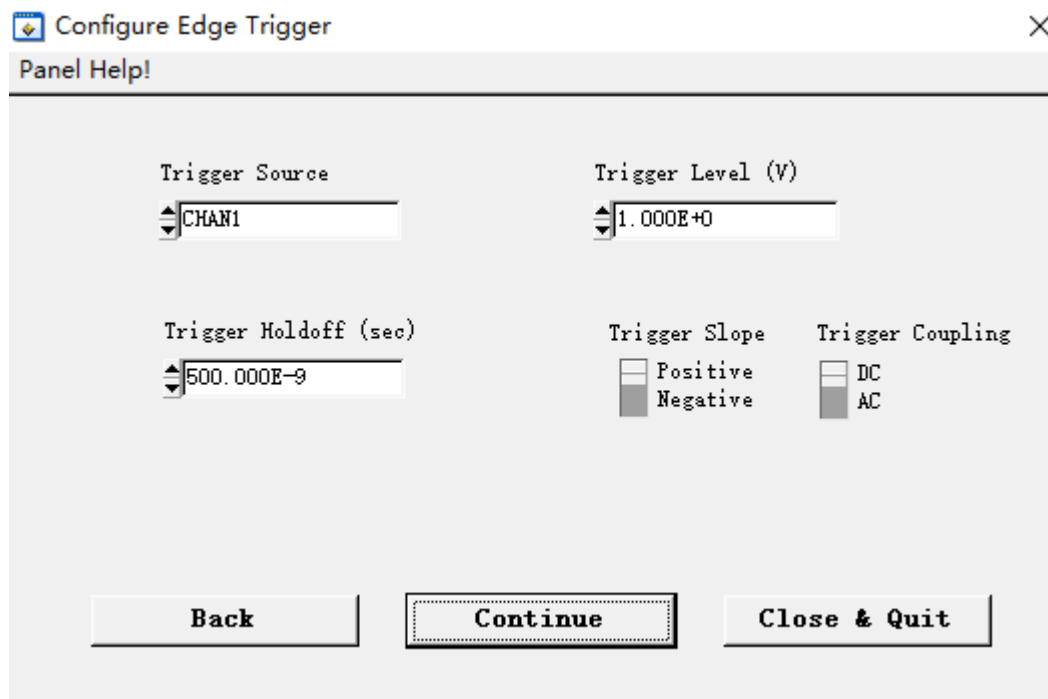
complete the equipment connection.



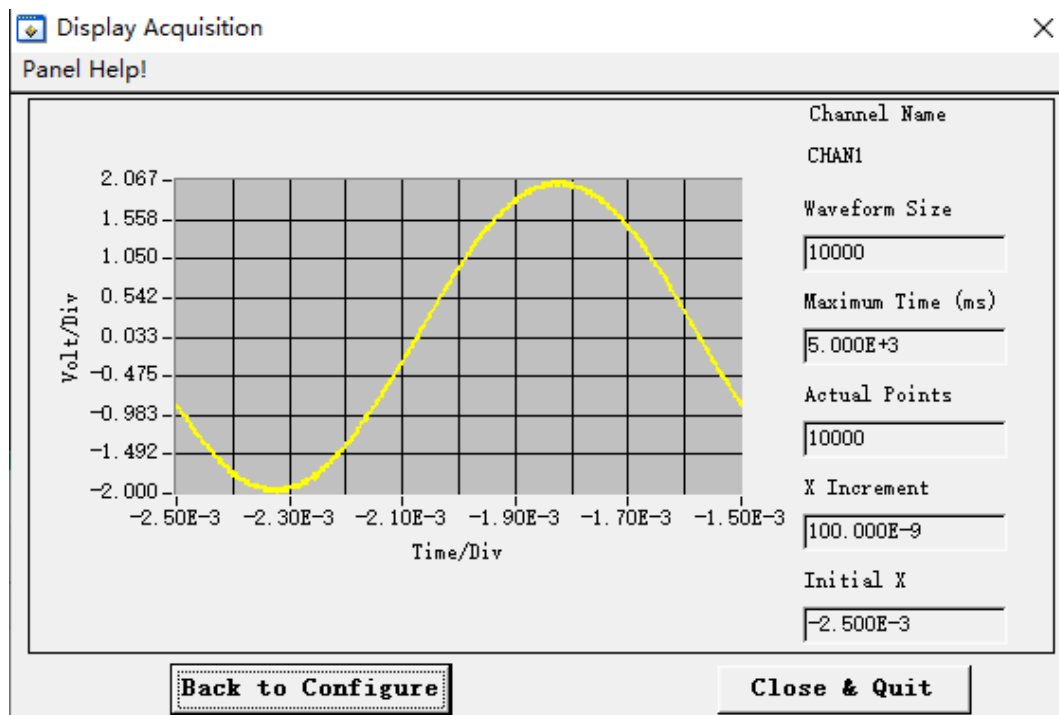
- d. Then enter the settings of the channel and acquisition system. All parameters must meet the requirements. See the attribute descriptions in the <SDS IVI-C Programming Guide> for details;



- e. Click **【Continue】** to enter the edge trigger setting:



- f. Click **【Continue】** to enter the waveform acquisition display page:





# SDS Series

## Digital Oscilloscope

### About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

#### Headquarters:

SIGLENT Technologies Co., Ltd  
Add: Bldg No.4 & No.5, Antongda Industrial  
Zone, 3rd Liuxian Road, Bao'an District,  
Shenzhen, 518101, China  
Tel: + 86 755 3688 7876  
Fax: + 86 755 3359 1582  
Email: [sales@siglent.com](mailto:sales@siglent.com)  
Website: [int.siglent.com](http://int.siglent.com)

#### USA:

SIGLENT Technologies America, Inc  
6557 Cochran Rd Solon, Ohio 44139  
Tel: 440-398-5800  
Toll Free: 877-515-5551  
Fax: 440-399-1211  
Email: [info@siglent.com](mailto:info@siglent.com)  
Website: [www.siglentna.com](http://www.siglentna.com)

#### Europe:

SIGLENT Technologies Germany GmbH  
Add: Staetzlinger Str. 70  
86165 Augsburg, Germany  
Tel: +49(0)-821-666 0 111 0  
Fax: +49(0)-821-666 0 111 22  
Email: [info-eu@siglent.com](mailto:info-eu@siglent.com)  
Website: [www.siglenteu.com](http://www.siglenteu.com)

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