

# Digital Oscilloscopes

## IVI-C Programming Guide

E01A



## 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.

## Models Supported

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

Series	Release Version Supporting IVI-C Driver
SDS2000X Plus	1.3.5R3

## Software Requirement

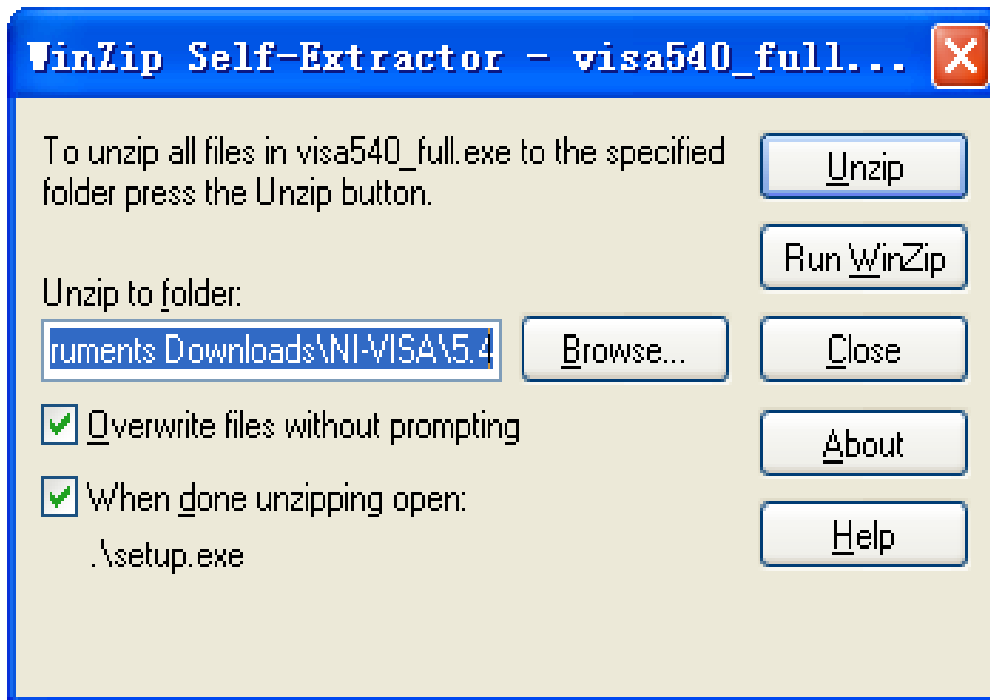
This chapter describes how to configure the IVI driver to control the instrument. If you want to use the IVI Driver, you must install NI-VISA, the IVI Compliance Package, and a C language development system that supports the IVI driver library.

## 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 5.4 full version from <http://www.ni.com/download/ni-visa-5.4/4230/en/>.

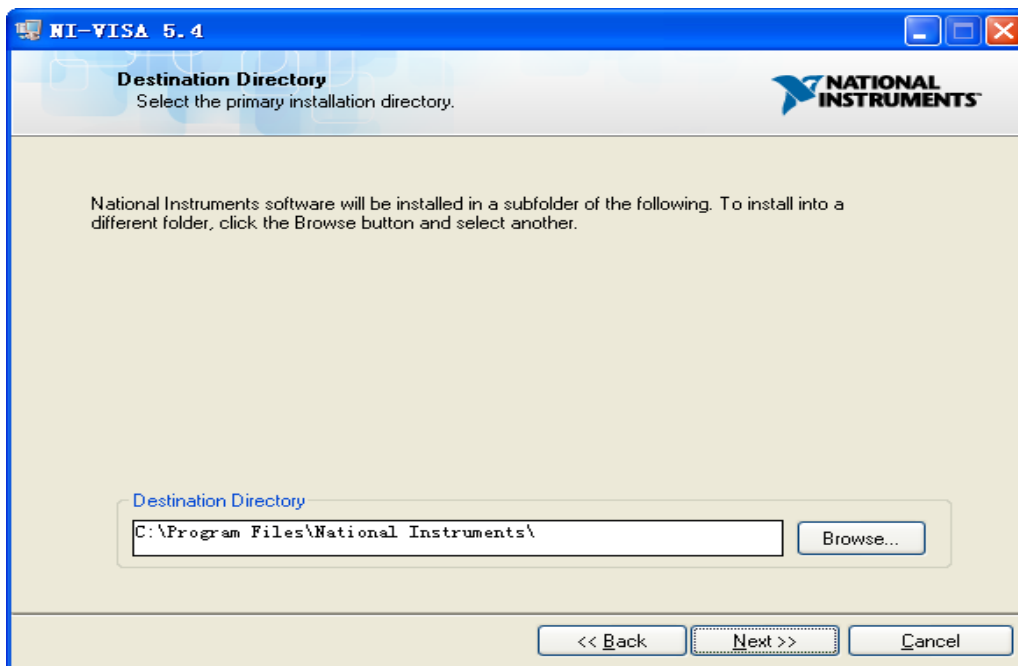
- a. Double click the NIVISA 5.4 full.exe, a dialog will be shown as below:



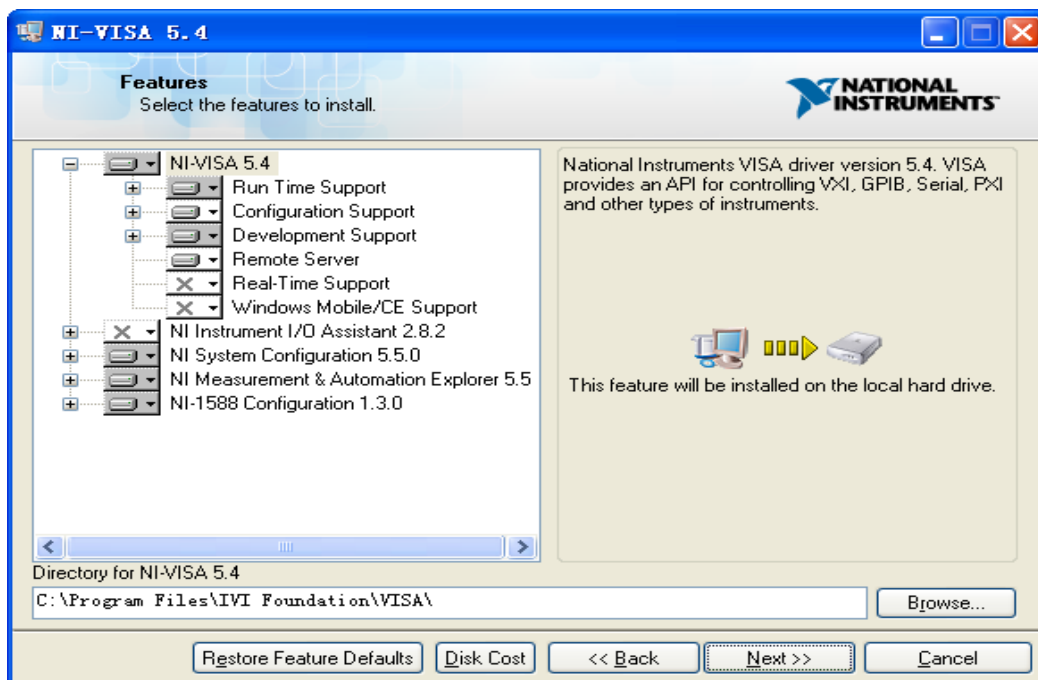
- b. Click Unzip, the installation process will automatically launch after unzipping files. If your computer needs to install .NET Framework 4, it may auto start.



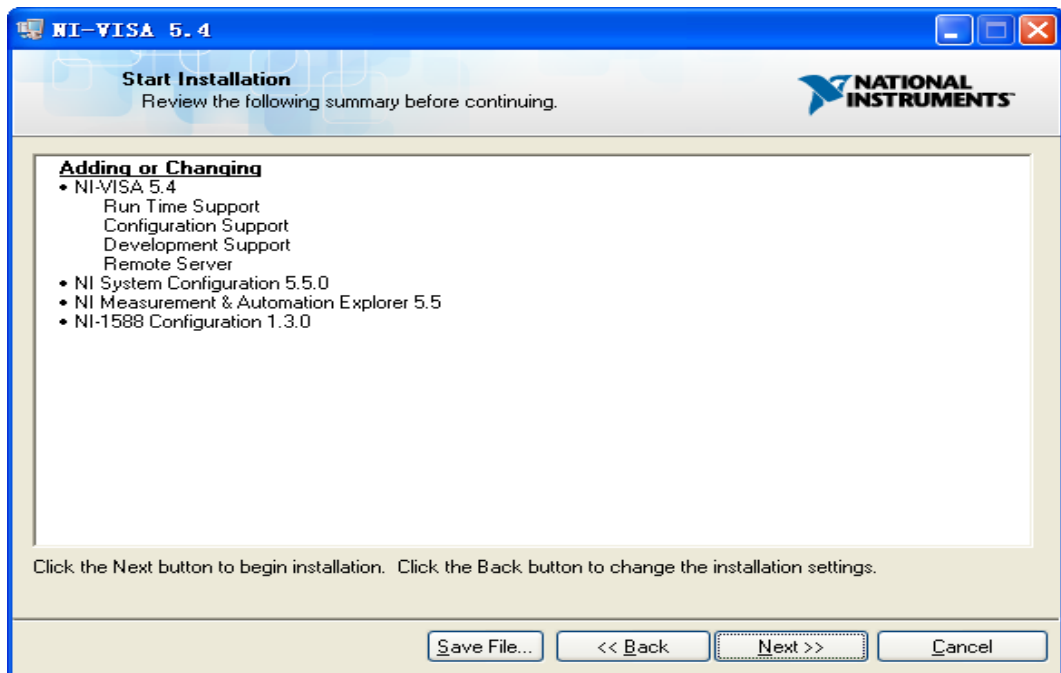
- c. The NI-VISA installing dialog is shown above. Click Next to start the installation process.



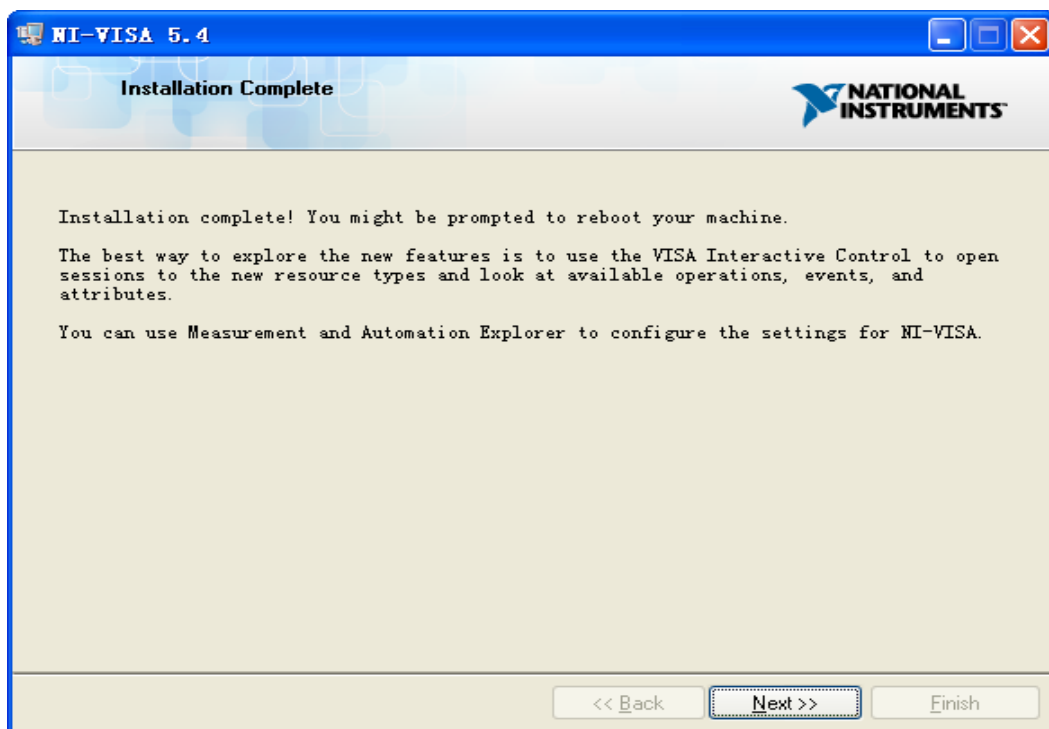
- d. Set the install path. The default path is “C:\Program Files\National Instruments\”.  
You can change it. Click Next.



- 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.



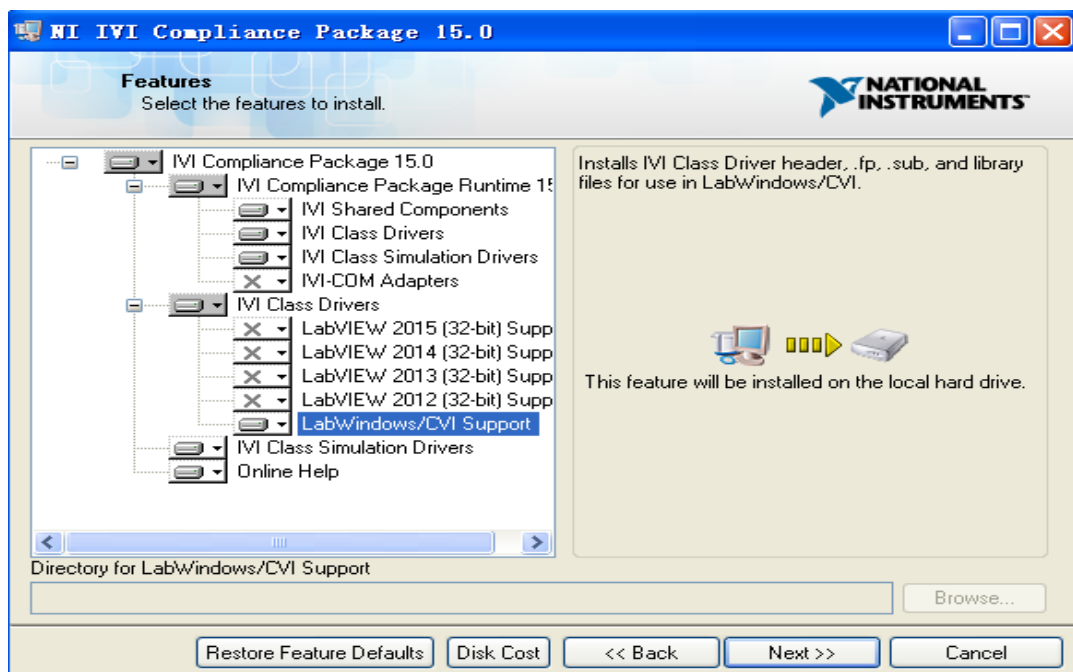
- g. Wait until the installation is completed, and then reboot your PC.

## Install the IVI Compliance Package

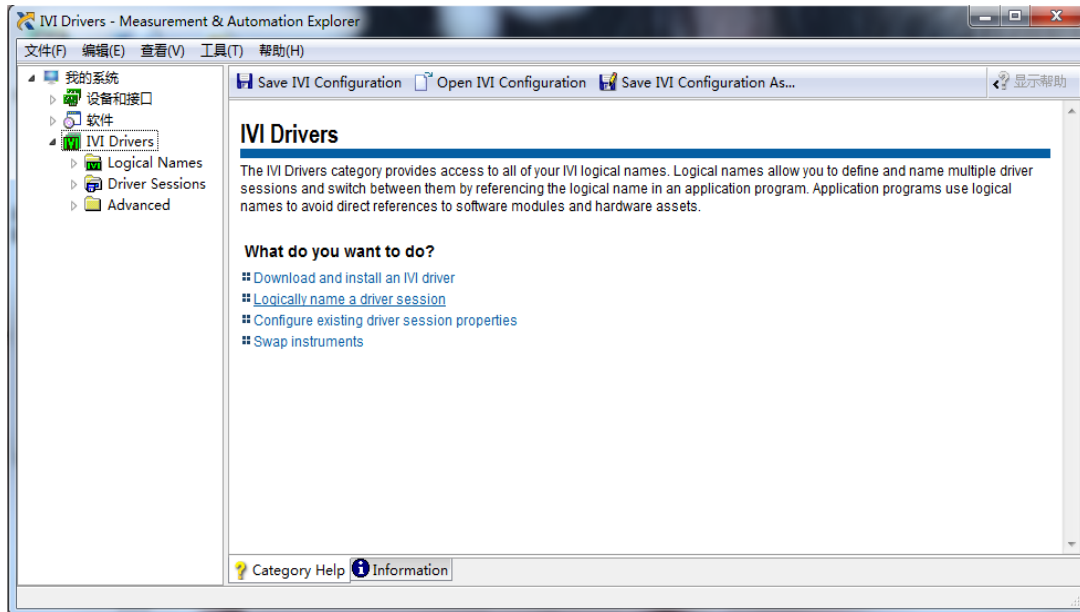
The IVI Compliance Package contains the IVI class drivers and supported libraries for developing and leveraging IVI-based applications.

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 files: sds.dll file, sds.h file and sds.lib file.

File	Description
sds.dll	A dynamic link library file, including variables, functions, and data interfaces for various attributes.
sds.lib	A static data connection library file, including variables, functions, and data interfaces for various attributes.
sds.h	A header file, including declarations of variables, functions, and data interfaces.

Depending on your requirements, you can include the sds.h when programming the Siglent oscilloscope with the IVI driver, and load the sds.dll and sds.lib library files into your own project.

You will find multiple examples that show you how to use these files at the end of this document. You can implicitly call sds.lib, or explicitly call sds.dll as well.

## 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 attributId, 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,"CHAN1",SDS_ATTR_VERTICAL_COUPLING,SDS_VAL_AC);
```

where,

**session**: The instrument handle.

**“CHAN1”**: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_VERTICAL\_COUPLING** attribute is corresponding to that specific channel.

**SDS\_VAL\_AC**: This sets the coupling mode to AC.

- `sds_SetAttributeViReal64` (ViSession vi, ViConstString channelName, ViAttr attributId, 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,"CHAN1",SDS_ATTR_PROBE_ATTENUATION,100);
```

where,

**session:** Instrument Handle.

“**CHAN1**”: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_PROBE\_ATTENUATION** attribute is corresponding to this specific channel.

**100:** Set the probe attenuation to x100.

- `sds_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributId, 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,"CHAN1",SDS_ATTR_CHANNEL_LABEL_TEXT,"  
Channel1");
```

where,

**session:** The instrument handle.

“**CHAN1**”: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_CHANNEL\_LABEL\_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 attributId, 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,"CHAN1",SDS_ATTR_CHANNEL_ENABLED,VI_FALSE);
```

where,

**session:** The instrument handle.

**“CHAN1”:** 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 attributId, 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,"CHAN1",SDS_ATTR_PROBE_ATTENUATION,&value64);
```

where,

**session:** The instrument handle.

**“CHAN1”:** 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 attributId, 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,"CHAN1",SDS_ATTR_VERTICAL_COUPLING,&value32);
```

where,

**session:** The instrument handle.

**“CHAN1”:** 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 attributId, 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,"CHAN1",SDS_ATTR_CHANNEL_ENABLED,&boolean);
```

where,

**session:** The instrument handle.

“**CHAN1**”: 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 attributId, 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,"CHAN1",SDS_ATTR_CHANNEL_LABEL_TEXT,buffersize,str);
```

where,

**session**: The instrument handle.

“**CHAN1**”: A constant string that represents the analog channel 1 and shows that this **SDS\_ATTR\_CHANNEL\_LABEL\_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_PROBE_SENSE_VALUE
	SDS_ATTR_CHANNEL_LABEL_TEXT
Acquisition Subsystem	SDS_ATTR_ACQUISITION_TYPE
	SDS_ATTR_HORZ_RECORD_LENGT
	SDS_ATTR_HORZ_SAMPLE_RATE
	SDS_ATTR_HORZ_TIME_PER_RECORD
	SDS_ATTR_ACQUISITION_START_TIME
	SDS_ATTR_INTERPOLATION
	SDS_ATTR_NUM_AVERAGES (Not Supported)
	SDS_ATTR_NUM_ENVELOPES (Not Supported)
	SDS_ATTR_SAMPLE_MODE (Not Supported)
Trigger Subsystem	SDS_ATTR_TRIGGER_TYPE
	SDS_ATTR_TRIGGER_HOLDOFF
	SDS_ATTR_TRIGGER_COUPLING
	SDS_ATTR_TRIGGER_SLOPE
	SDS_ATTR_TRIGGER_SOURCE
	SDS_ATTR_TRIGGER_LEVEL
	SDS_ATTR_TV_TRIGGER_EVENT (Not Supported)
	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_GLITCH_WIDTH (Not Supported)
	SDS_ATTR_WIDTH_CONDITION
	SDS_ATTR_WIDTH_HIGH_THRESHOLD
SDS_ATTR_WIDTH_LOW_THRESHOLD	
SDS_ATTR_WIDTH_POLARITY	



	SDS_ATTR_TRIGGER_MODIFIER
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_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_SIMPLE_SOURCE
	SDS_ATTR_MEASURE_ADVANCED_STATISTICS_RESET

## 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\_PROBE\_SENSE\_VALUE
- ◆ SDS\_ATTR\_CHANNEL\_LABEL\_TEXT

## 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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	(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
<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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	(49.5,50.5) means the impedance is 50Ω (999999.5,1000000.5) means the impedance is 1MΩ
<b>Related Attribute</b>	SDS_ATTR_MAX_INPUT_FREQUENCY
<b>High Level Functions</b>	sds_ConfigureChanCharacteristics

## SDS\_ATTR\_VERTICAL\_COUPLING

<b>Description</b>	This attribute specifies channel coupling.
<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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	SDS_VAL_AC SDS_VAL_DC SDS_VAL_GND
<b>Related Attribute</b>	SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_VERTICAL_RANGE SDS_ATTR_CHANNEL_ENABLED SDS_ATTR_PROBE_ATTENUATION
<b>High Level Functions</b>	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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	SDS_VAL_PROBE_SENSE_ON SDS_VAL_PROBE_SENSE_1 SDS_VAL_PROBE_SENSE_10 SDS_VAL_PROBE_SENSE_100
<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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	<p>When the channel scale is between <math>[5e-4 \cdot \text{probe}, 1e-1 \cdot \text{probe}]</math>, the range of value is <math>[-2 \cdot \text{probe}, 2 \cdot \text{probe}]</math>.</p> <p>When the channel scale is between <math>(1e-1 \cdot \text{probe}, 1 \cdot \text{probe}]</math>, the range of value is <math>[-20 \cdot \text{probe}, 20 \cdot \text{probe}]</math>.</p> <p>When the channel scale is between <math>(1 \cdot \text{probe}, 10 \cdot \text{probe}]</math>, the range of value is <math>[-200 \cdot \text{probe}, 200 \cdot \text{probe}]</math>.</p> <p><b>Note:</b> Probe is the value of channel attenuation.</p>
<b>Related Attribute</b>	SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_CHANNEL_ENABLED SDS_ATTR_VERTICAL_COUPLING SDS_ATTR_PROBE_ATTENUATION
<b>High Level Functions</b>	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 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 one of the following analog inputs: CHAN1, CHAN2, CHAN3 or CHAN4. <b>attributId</b> is SDS_ATTR_VERTICAL_RANGE 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>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.</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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	VI_TRUE means to turn on the channel VI_FALSE means to turn off the channel
<b>Related Attribute</b>	SDS_ATTR_VERTICAL_OFFSET SDS_ATTR_VERTICAL_RANGE SDS_ATTR_VERTICAL_COUPLING SDS_ATTR_PROBE_ATTENUATION
<b>High Level Functions</b>	sds_ConfigureChannel

## SDS\_ATTR\_PROBE\_SENSE\_VALUE

<b>Description</b>	This attribute specifies channel probe attenuation to 1X.
<b>Data Type</b>	ViReal64
<b>Access</b>	R/O
<b>Common Control Functions</b>	sds_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViReal64 *value)  <b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is one of the following analog inputs: CHAN1, CHAN2, CHAN3 or CHAN4. <b>attributeld</b> is SDS_ATTR_PROBE_SENSE_VALUE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b> .
<b>Value Range</b>	None
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## 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: CHAN1, CHAN2, CHAN3 or CHAN4. <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>
<b>Value Range</b>	The limit of the label text is 20 bytes
<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\_NUM\_AVERAGES (Not Supported)
- ◆ SDS\_ATTR\_NUM\_ENVELOPES (Not Supported)
- ◆ SDS\_ATTR\_SAMPLE\_MODE (Not Supported)

## SDS\_ATTR\_ACQUISITION\_TYPE

<b>Description</b>	This attribute specifies the acquisition 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 NULL. <b>attributeld</b> is SDS_ATTR_ACQUISITION_TYPE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_NORMAL SDS_VAL_PEAK_DETECT
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureAcquisitionType

## SDS\_ATTR\_HORZ\_RECORD\_LEN

<b>Description</b>	This attribute gets the length of the waveform record.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/O
<b>Common Control Functions</b>	<code>sds_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeld, ViInt32 *value)</code>  <b>Note:</b> <code>vi</code> is the instrument handle. <code>channelName</code> is NULL. <code>attributeld</code> is SDS_ATTR_HORZ_RECORD_LEN macro. <code>value</code> is used to store or set the value of function represented by <code>attributeld</code> .
<b>Value Range</b>	None
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## SDS\_ATTR\_HORZ\_SAMPLE\_RATE

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

## 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 NULL.

**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 attributId, ViReal64 *value);</p> <p>sds_SetAttributeViReal64(ViSession vi, ViConstString channelName, ViAttr attributId, ViReal64 value);</p> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is NULL. <b>attributId</b> is SDS_ATTR_ACQUISITION_START_TIME macro. <b>value</b> is used to store or set the value of function represented by <b>attributId</b>.</p>
<b>Value Range</b>	The value range is [-5000div*timebase, 5*timebase].
<b>Related Attribute</b>	SDS_ATTR_HORZ_TIME_PER_RECORD
<b>High Level Functions</b>	sds_ConfigureAcquisitionRecord

## SDS\_ATTR\_INTERPOLATION

<b>Description</b>	This attribute specifies the way of interpolation.
<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 NULL. <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>
<b>Value Range</b>	SDS_VAL_SINE_X SDS_VAL_LINEAR
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureInterpolation

## 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\_COUPLING
- ◆ SDS\_ATTR\_TRIGGER\_SLOPE
- ◆ SDS\_ATTR\_TRIGGER\_SOURCE
- ◆ SDS\_ATTR\_TRIGGER\_LEVEL
- ◆ SDS\_ATTR\_TV\_TRIGGER\_EVENT (Not Supported)
- ◆ 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\_GLITCH\_WIDTH (Not Supported)
- ◆ SDS\_ATTR\_WIDTH\_CONDITION
- ◆ SDS\_ATTR\_WIDTH\_HIGH\_THRESHOLD
- ◆ SDS\_ATTR\_WIDTH\_LOW\_THRESHOLD
- ◆ SDS\_ATTR\_WIDTH\_POLARITY
- ◆ SDS\_ATTR\_TRIGGER\_MODIFIER

## 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> <p><b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is NULL. <b>attributeld</b> is SDS_ATTR_TRIGGER_TYPE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_EDGE_TRIGGER SDS_VAL_WIDTH_TRIGGER SDS_VAL_RUNT_TRIGGER SDS_VAL_GLITCH_TRIGGER SDS_VAL_TV_TRIGGER SDS_VAL_PATTERN_TRIGGER SDS_VAL_WINDOW_TRIGGER SDS_VAL_INTERVAL_TRIGGER SDS_VAL_DROPOUT_TRIGGER SDS_VAL_SLOPE_TRIGGER
<b>Related Attribute</b>	SDS_ATTR_TRIGGER_HOLDOFF SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_TRIGGER_SLOPE SDS_ATTR_GLITCH_CONDITION SDS_ATTR_GLITCH_POLARITY SDS_ATTR_GLITCH_WIDTH (Not Supported) SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY
<b>High Level Functions</b>	sds_ConfigureTrigger

sds\_ConfigureWidthTriggerSource  
sds\_ConfigureGlitchTriggerSource  
sds\_ConfigureEdgeTriggerSource

## 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 NULL. <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>	[8.00e-09, 3.00e+01]
<b>Related Attribute</b>	<p><b>Note:</b> Only when the SDS_ATTR_TRIGGER_TYPE is EDGE, SDS_ATTR_TRIGGER_HOLDOFF can be set.</p> SDS_ATTR_TRIGGER_TYPE
<b>High Level Functions</b>	sds_ConfigureTrigger

## SDS\_ATTR\_TRIGGER\_COUPLING

<b>Description</b>	This attribute specifies the coupling mode of the edge 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 NULL. <b>attributeld</b> is SDS_ATTR_TRIGGER_COUPLING 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>SDS_VAL_AC_TRIGGER SDS_VAL_DC_TRIGGER SDS_VAL_HF_REJECT SDS_VAL_LF_REJECT</p> <p><b>Note:</b> Only when the SDS_ATTR_TRIGGER_TYPE is EDGE, the SDS_ATTR_TRIGGER_COUPLING can be set.</p>
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureTriggerCoupling



## SDS\_ATTR\_TRIGGER\_SLOPE

<b>Description</b>	This attribute specifies the slope of the edge 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 NULL. <b>attributeld</b> is SDS_ATTR_TRIGGER_SLOPE 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>SDS_VAL_POSITIVE SDS_VAL_NEGATIVE SDS_VAL_ALTERNATE</p> <p><b>Note:</b> Only when the SDS_ATTR_TRIGGER_TYPE is EDGE, the SDS_ATTR_TRIGGER_SLOPE can be set.</p>
<b>Related Attribute</b>	<p>SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL</p>
<b>High Level Functions</b>	sds_ConfigureEdgeTriggerSource

## 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>	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 NULL.

**attributeld** is SDS\_ATTR\_TRIGGER\_SOURCE 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**.

### Value Range

The source can be set to: {Cn|Dm|EX|EX5|LINE}

n can be set from 1 to 4

m can be set from 0 to 15

### Example:

If you want to set the source to C1, enter "C1".

If you want to set the source to D0, enter "D0".

### Note:

Only when the SDS\_ATTR\_TRIGGER\_TYPE is EDGE, RUNT, GLITCH, WIDTH or TV trigger, the SDS\_ATTR\_TRIGGER\_SOURCE can be set as {Cn|Dm|EX|EX5|LINE}.

### Related Attribute

SDS\_ATTR\_TRIGGER\_LEVEL

SDS\_ATTR\_TRIGGER\_TYPE

SDS\_ATTR\_TRIGGER\_SLOPE

SDS\_ATTR\_GLITCH\_CONDITION

SDS\_ATTR\_GLITCH\_POLARITY

SDS\_ATTR\_GLITCH\_WIDTH (Not Supported)

SDS\_ATTR\_TV\_TRIGGER\_LINE\_NUMBER

SDS\_ATTR\_TV\_TRIGGER\_SIGNAL\_FORMAT

SDS\_ATTR\_TV\_TRIGGER\_EVENT (Not Supported)  
SDS\_ATTR\_RUNT\_LOW\_THRESHOLD  
SDS\_ATTR\_RUNT\_POLARITY  
SDS\_ATTR\_RUNT\_HIGH\_THRESHOLD  
SDS\_ATTR\_WIDTH\_CONDITION  
SDS\_ATTR\_WIDTH\_HIGH\_THRESHOLD  
SDS\_ATTR\_WIDTH\_LOW\_THRESHOLD  
SDS\_ATTR\_WIDTH\_POLARITY

### High Level Functions

sds\_ConfigureEdgeTriggerSource  
sds\_ConfigureRuntTriggerSource  
sds\_ConfigureGlitchTriggerSource  
sds\_ConfigureWidthTriggerSource  
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 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 NULL. <b>attributId</b> is SDS_ATTR_TRIGGER_LEVEL 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>[-4.1*vertical_scale-vertical_offset, 4.1*vertical_scale-vertical_offset]</p> <p><b>Note:</b> Only when the SDS_ATTR_TRIGGER_TYPE is EDGE, RUNT, GLITCH, WIDTH or TV trigger type, the SDS_ATTR_TRIGGER_LEVEL can be set.</p>
<b>Related Attribute</b>	<p>SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_SLOPE SDS_ATTR_TRIGGER_TYPE SDS_ATTR_GLITCH_CONDITION SDS_ATTR_GLITCH_POLARITY SDS_ATTR_GLITCH_WIDTH (Not Supported) SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY</p>
<b>High Level Functions</b>	<p>sds_ConfigureTrigger sds_ConfigureWidthTriggerSource sds_ConfigureGlitchTriggerSource sds_ConfigureEdgeTriggerSource</p>

## 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 NULL. <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>	[1,625]
<b>Related Attribute</b>	SDS_ATTR_TV_TRIGGER_EVENT (Not Supported) SDS_ATTR_TV_TRIGGER_SIGNAL_FORMAT SDS_ATTR_TRIGGER_SOURCE
<b>High Level Functions</b>	sds_ConfigureTVTriggerLineNumber sds_ConfigureTVTriggerLineNumber

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

<b>Description</b>	This attribute specifies the video standard 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 NULL. <b>attributeld</b> is SDS_ATTR_TV_TRIGGER_SIGNAL_FORMAT macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_NTSC SDS_VAL_PAL SDS_VAL_720P50 SDS_VAL_720P60 SDS_VAL_1080P50 SDS_VAL_1080P60 SDS_VAL_1080I50 SDS_VAL_1080I60 SDS_VAL_CUSTOM
<b>Related Attribute</b>	SDS_ATTR_TV_TRIGGER_EVENT (Not Supported) SDS_ATTR_TV_TRIGGER_LINE_NUMBER SDS_ATTR_TRIGGER_SOURCE
<b>High Level Functions</b>	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 NULL. <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>	[-10,10]
<b>Related Attribute</b>	SDS_ATTR_RUNT_LOW_THRESHOLD SDS_ATTR_RUNT_POLARITY SDS_ATTR_TRIGGER_SOURCE
<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 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 NULL. <b>attributeld</b> is SDS_ATTR_RUNT_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>	[-10,10]
<b>Related Attribute</b>	SDS_ATTR_RUNT_HIGH_THRESHOLD SDS_ATTR_RUNT_POLARITY SDS_ATTR_TRIGGER_SOURCE
<b>High Level Functions</b>	sds_ConfigureRuntTriggerSource



## SDS\_ATTR\_RUNT\_POLARITY

<b>Description</b>	This attribute specifies the polarity of the runt 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 NULL. <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>
<b>Value Range</b>	SDS_VAL_RUNT_POSITIVE SDS_VAL_RUNT_NEGATIVE SDS_VAL_RUNT_EITHER
<b>Related Attribute</b>	SDS_ATTR_RUNT_HIGH_THRESHOLD SDS_ATTR_RUNT_LOW_THRESHOLD SDS_ATTR_TRIGGER_SOURCE
<b>High Level Functions</b>	sds_ConfigureRuntTriggerSource

## SDS\_ATTR\_GLITCH\_CONDITION

<b>Description</b>	This attribute specifies the limit range type of the pulse 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 NULL. <b>attributeld</b> is SDS_ATTR_GLITCH_CONDITION macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_GLITCH_LESS_THAN SDS_VAL_GLITCH_GREATER_THAN
<b>Related to Channel</b>	SDS_ATTR_GLITCH_CONDITION SDS_ATTR_GLITCH_POLARITY SDS_ATTR_GLITCH_WIDTH (Not Supported) SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL
<b>High Level Functions</b>	sds_ConfigureGlitchTriggerSource

## SDS\_ATTR\_GLITCH\_POLARITY

<b>Description</b>	This attribute specifies the polarity of the pulse 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 NULL. <b>attributeld</b> is SDS_ATTR_GLITCH_POLARITY macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_GLITCH_POSITIVE SDS_VAL_GLITCH_NEGATIVE
<b>Related to Channel</b>	SDS_ATTR_GLITCH_CONDITION SDS_ATTR_GLITCH_POLARITY SDS_ATTR_GLITCH_WIDTH (Not Supported) SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL
<b>High Level Functions</b>	sds_ConfigureGlitchTriggerSource

## SDS\_ATTR\_WIDTH\_CONDITION

<b>Description</b>	This attribute specifies the limit range type of the pulse 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 NULL. <b>attributeld</b> is SDS_ATTR_WIDTH_CONDITION macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_WIDTH_WITHIN SDS_VAL_WIDTH_OUTSIDE
<b>Related to Channel</b>	SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource

## SDS\_ATTR\_WIDTH\_HIGH\_THRESHOLD

<b>Description</b>	This attribute specifies the upper limit of the pulse width.
<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 NULL. <b>attributeld</b> is SDS_ATTR_WIDTH_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>	[3.0e-9,20]
<b>Related to Channel</b>	SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource

## SDS\_ATTR\_WIDTH\_LOW\_THRESHOLD

<b>Description</b>	This attribute specifies the lower limit of the pulse width.
<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 NULL. <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>	[2.0e-9,20]
<b>Related to Channel</b>	SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource

## SDS\_ATTR\_WIDTH\_POLARITY

<b>Description</b>	This attribute specifies the polarity of the pulse 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 NULL. <b>attributeld</b> is SDS_ATTR_WIDTH_POLARITY macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_WIDTH_POSITIVE SDS_VAL_WIDTH_NEGATIVE
<b>Related to Channel</b>	SDS_ATTR_TRIGGER_TYPE SDS_ATTR_TRIGGER_SOURCE SDS_ATTR_TRIGGER_LEVEL SDS_ATTR_WIDTH_CONDITION SDS_ATTR_WIDTH_HIGH_THRESHOLD SDS_ATTR_WIDTH_LOW_THRESHOLD SDS_ATTR_WIDTH_POLARITY
<b>High Level Functions</b>	sds_ConfigureWidthTriggerSource

## SDS\_ATTR\_INITIATE\_CONTINUOUS

<b>Description</b>	This attribute specifies the acquisition state.
<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 NULL. <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>
<b>Value Range</b>	VI_TRUE means to set the oscilloscope to Stop VI_FALSE means to set the oscilloscope to Run
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureInitiateContinuous



## SDS\_ATTR\_TRIGGER\_MODIFIER

<b>Description</b>	This attribute specifies the trigger 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 NULL. <b>attributeld</b> is SDS_ATTR_TRIGGER_MODIFIER macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_NO_TRIGGER_MOD SDS_VAL_AUTO SDS_VAL_SINGLE
<b>Related Attribute</b>	None
<b>High Level Functions</b>	sds_ConfigureTriggerModifier

## 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\_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\_SIMPLE\_SOURCE
- ◆ SDS\_ATTR\_MEASURE\_ADVANCED\_STATISTICS\_RESET

## 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 NULL. <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>	VI_TRUE means measurement is on VI_FALSE means measurement is off
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_MODE

<b>Description</b>	This attribute specifies the mode of measurement.
<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 NULL. <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>
<b>Value Range</b>	SDS_VAL_MEAS_MODE_SIMPLE SDS_VAL_MEAS_MODE_ADVANCED
<b>Related Attribute</b>	None
<b>High Level Functions</b>	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 NULL. <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>	VI_TRUE means enable the measurement gate VI_FALSE means to disable the measurement gate
<b>Related Attribute</b>	None
<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 NULL. <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]. The value cannot exceed SDS_ATTR_MEASURE_GATE_GB.</p>
<b>Related Attribute</b>	None
<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 NULL. <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>	[-5*timebase, 5*timebase].
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## SDS\_ATTR\_MEASURE\_ADVANCED\_STYLE

<b>Description</b>	This attribute specifies the display mode of the advanced measurement.
<b>Data Type</b>	ViInt32
<b>Access</b>	R/W
<b>High Level Functions</b>	None
<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 NULL. <b>attributeld</b> is SDS_ATTR_MEASURE_ADVANCED_STYLE macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b>.</p>
<b>Value Range</b>	SDS_VAL_MEAS_ADV_STYLE_M1 SDS_VAL_MEAS_ADV_STYLE_M2
<b>Related Attribute</b>	None
<b>High Level Functions</b>	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 NULL. <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>	None
<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 NULL. <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>	None
<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 NULL. <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>	None
<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 NULL. <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>	None
<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 NULL. <b>attributeld</b> is SDS_ATTR_MEASURE_SIMPLE_SOURCE 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 source can be set to: {Cx Dn Zx ZDn F1 F2 REFA REFB REFC REFD }. x can be set from 1 to 4 n can be set from 0 to 15</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". If you want to set the source to C1 in the Zoom window, enter "Z1". If you want to set the source to D0 in the Zoom window, enter "ZD0".</p>
<b>Related Attribute</b>	None
<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>	W/O
<b>Common Control Functions</b>	sds_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeld, ViBoolean value)  <b>Note:</b> <b>vi</b> is the instrument handle. <b>channelName</b> is NULL. <b>attributeld</b> is SDS_ATTR_MEASURE_ADVANCED_STATISTICS_RESET macro. <b>value</b> is used to store or set the value of function represented by <b>attributeld</b> .
<b>Value Range</b>	VI_TRUE means to restart measurement statistics
<b>Related Attribute</b>	None
<b>High Level Functions</b>	None

## 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::0xEE38::0123456789::INSTR", VI_TRUE, VI_FALSE, "Simulate=0,RangeCheck=0,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\_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	The name of the channel from which you want to obtain waveform data
waveformSize	The size of the data you want to get
waveform[]	Channel waveform data storage location
*actualPoints	The actual number of channel waveform data points
*initialX	Current time delay
*xIncrement:	Current time base
<b>Example :</b> sds_FetchWaveform(session,"CHAN1",256,waveform,&actualPoints,&initialX,&xIncrement);	

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

This function sets the acquisition mode.

Parameter	Description
vi	Instrument handle
acquisitionType	The acquisition mode



**Example :**

```
sds_ConfigureAcquisitionType (session,SDS_VAL_NORMAL);
```

- **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	Current time base
minimumRecordLength	Not Supported. Can be set to any value.
acqStartTime	Current time delay
<b>Example :</b> sds_ConfigureAcquisitionRecord (session,1e-6, 0,0) ;	

- **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, SDS_VAL_SINE_X);	

- **sds\_ConfigureInitiateContinuous (ViSession vi, ViBoolean continuous)**

This function configures the continuous acquisition.

Parameter	Description
vi	Instrument handle
continuous	The state of acquisition
<b>Example :</b> sds_ConfigureInitiateContinuous (session, VI_TRUE);	

- **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> sds_ConfigureChannel(session,"CHAN1",1.0,0.0,SDS_VAL_AC,SDS_VAL_PROBE_SENSE_1,VI_TRUE);	

- **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> sds_ConfigureChanCharacteristics (session,"CHAN1", 5e+1, 2e+7);	

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

This function configures the common triggering attributes.

Description	Description
vi	Instrument handle
triggerType	The Trigger type
holdoff	Holdoff time
<b>Example :</b> sds_ConfigureTrigger (session,SDS_VAL_EDGE_TRIGGER, 8e-6);	

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

This function configures the trigger coupling.

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

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

This function configures the trigger modifier.

Description	Description
vi	Instrument handle
modifier	The trigger mode
<b>Example :</b>	
sds_ConfigureTriggerModifier (session, SDS_VAL_NO_TRIGGER_MOD);	

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

This function configures the edge triggering.

Description	Description
vi	Instrument handle
source	The source of the trigger
level	The trigger level
slope	The slope
<b>Example :</b>	
sds_ConfigureEdgeTriggerSource (session, SDS_VAL_CHAN1, 1e+0, SDS_VAL_POSITIVE);	

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

This function configures the TV triggering.

Description	Description
vi	Instrument handle
source	The source of the trigger
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, SDS_VAL_CHAN1, SDS_VAL_NTSC, SDS_VAL_TV_EVENT_FIELD1, SDS_VAL_TV_POSITIVE);	

➤ **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\_ConfigureRuntTriggerSource (ViSession vi, ViConstString source, ViReal64 runtLowThreshold, ViReal64 runtHighThreshold, ViInt32 runtPolarity)**

This function configures the runt triggering.

Description	Description
vi	Instrument handle
source	The source of the trigger
runtLowThreshold	The lower trigger level
runtHighThreshold	The upper trigger level
runtPolarity	The polarity
<b>Example :</b> sds_ConfigureRuntTriggerSource (session, SDS_VAL_CHAN1, -1e+0, 1e+0, SDS_VAL_RUNT_POSITIVE);	

- **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	The source of the trigger
level	The trigger level
glitchWidth	Not supported. Can be set to any value
glitchPolarity	The polarity
glitchCondition	The limit range type
<b>Example :</b> <pre>sds_ConfigureGlitchTriggerSource(session, SDS_VAL_CHAN1,1e+0,1.5e+0,SDS_VAL_GLITCH_POSITIVE, SDS_VAL_GLITCH_LESS_THAN);</pre>	

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

This function configures the Pulse width triggering.

Description	Description
vi	Instrument handle
source	The source of the trigger
level	The trigger level
widthLowThreshold	The lower value of the pulse trigger limit

widthHighThreshold	The upper value of the pulse trigger limit
widthPolarity	The polarity
widthCondition	The limit range type of the pulse trigger
<p><b>Example :</b></p> <pre>sds_ConfigureWidthTriggerSource(session, SDS_VAL_CHAN1, 1e+0, 3.8e-1, 1.2e+0, SDS_VAL_WIDTH_NEGATIVE, SDS_VAL_WIDTH_OUTSIDE);</pre>	

## IVI-C Driver Programming Example

There are two ways to use the IVI driver at present. One is to use the explicit link library, and the other is to use the implicit link library.

The example is running in an environment where NI VISA 5.4, LabWindow/CVI9.0, and IVI Compliance Package 15.0 are installed.

### Implicit call sds.lib

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

#define BUFFER_SIZE 512L
#pragma comment(lib,"sds.lib") // Call the sds.lib link library

static ViSession session;
static ViStatus status;

void main()
{
    ViChar    str[BUFFER_SIZE];
    //Connect the instrument
    status = sds_InitWithOptions("USB0::0xF4EC::0xEE38::0123456789::INSTR",
VI_TRUE, VI_FALSE, "Simulate=0,RangeCheck=0,QueryInstrStatus=0,Cache=0",
&session);
    //Configure settings for channel 1
    sds_ConfigureChannel(session,"CHAN1",1.0,0.0,0,1.0,VI_TRUE);
    //Open measurement
    sds_SetAttributeViBoolean(session,VI_NULL,SDS_ATTR_MEASURE_ENABLED,VI_
TRUE);
    //Query simple measurement source
    sds_GetAttributeViString(session,VI_NULL,SDS_ATTR_MEASURE_SIMPLE_SOURC
E,BUFFER_SIZE,str);
    printf("SDS_ATTR_MEASURE_SIMPLE_SOURCE = %s\n",str);
    system("cmd /C pause");
}
```



## Explicit call sds.dll

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <Windows.h>
#include "sds.h" //Call header
#define BUFFER_SIZE 512L
static ViSession session;
static ViStatus status;

typedef ViStatus _VI_FUNC (*sdsInit)(ViRsrc resourceName,ViBoolean
IDQuery,ViBoolean resetDevice,ViConstString optionString,ViSession *newVi);
typedef ViStatus _VI_FUNC (*setAttrBool)(ViSession vi, ViConstString channelName,
ViAttr attribute, ViBoolean value);
typedef ViStatus _VI_FUNC (*getAttrString)(ViSession vi, ViConstString channelName,
ViAttr attribute, ViInt32 bufSize, ViChar value[]);
typedef ViStatus _VI_FUNC (*sdsConfig) (ViSession vi,ViConstString channel,ViReal64
range,ViReal64 offset, ViInt32 coupling,ViReal64 probeAttenuation,ViBoolean enabled);

void main()
{
    HINSTANCE hDLL = LoadLibrary("sds.dll"); // Call the sds.dll link library
    if (hDLL != NULL)
    {
        sdsInit sds_InitWithOptions =
(sdsInit)GetProcAddress(hDLL,"sds_InitWithOptions");
        setAttrBool
sds_SetAttributeViBoolean=(setAttrBool)GetProcAddress(hDLL,"sds_SetAttributeViBoole
an");
        getAttrString
sds_GetAttributeViString=(getAttrString)GetProcAddress(hDLL,"sds_GetAttributeViString
");
        sdsConfig
sds_ConfigureChannel=(sdsConfig)GetProcAddress(hDLL,"sds_ConfigureChannel");
        ViChar    str[BUFFER_SIZE];
        //Connect the instrument
```

```

    status =
sds_InitWithOptions("USB0::0xF4EC::0xEE38::0123456789::INSTR",VI_TRUE,
VI_FALSE, "Simulate=0,RangeCheck=0,QueryInstrStatus=0,Cache=0",&session);
    //Configure settings for channel 1
    sds_ConfigureChannel(session,"CHAN1",1.0,0.0,0,1.0,VI_TRUE);
    // Open measurement
    sds_SetAttributeViBoolean(session,VI_NULL,SDS_ATTR_MEASURE_ENABLE
D,VI_TRUE);
    //Query simple measurement source
    sds_GetAttributeViString(session,VI_NULL,SDS_ATTR_MEASURE_SIMPLE_S
OURCE,BUFFER_SIZE,str);
    printf("SDS_ATTR_MEASURE_SIMPLE_SOURCE = %s\n",str);
}
system("cmd /C pause");
}

```

## 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, function/arbitrary waveform generators, digital multimeters, DC power supplies, spectrum analyzers, isolated handheld oscilloscopes and other general purpose test instrumentation. Since its first oscilloscope, the ADS7000 series, 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.

#### Headquarter:

SIGLENT TECHNOLOGIES CO., LTD.  
Add: Blog No.4 & No.5, Antongda Industrial Zone, 3rd Liuxian Road, Bao'an District, Shenzhen, 518101, China.  
Tel: + 86 755 3661 5186  
Fax: + 86 755 3359 1582  
Email: sales@siglent.com;  
Website: <http://www.siglent.com/ens/>

#### 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  
Website: [www.siglentamerica.com](http://www.siglentamerica.com)

#### Europe:

SIGLENT TECHNOLOGIES EUROPE GmbH  
ADD: Liebigstrasse 2-20, Gebaeude 14,  
22113 Hamburg Germany  
Tel: +49(0)-819-95946  
Fax: +49(0)-819-95947  
Email: info-eu@siglent.com  
Website: [www.siglenteu.com](http://www.siglenteu.com)

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