Function Generator

IVI-C Programming Guide

E01A

Aug, 2022

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.

Models Supported

The series of SIGLENT Function Generator supporting this IVI-C driver is shown below.

Series	Release Version Supporting IVI-C Driver
SDG1000X	1.01.01.21R1 and higher
SDG2000X	2.01.01.23R5 and higher
SDG6000X	6.01.01.36 and higher
SDG7000A	1.1.1.26 and higher

Software Requirement

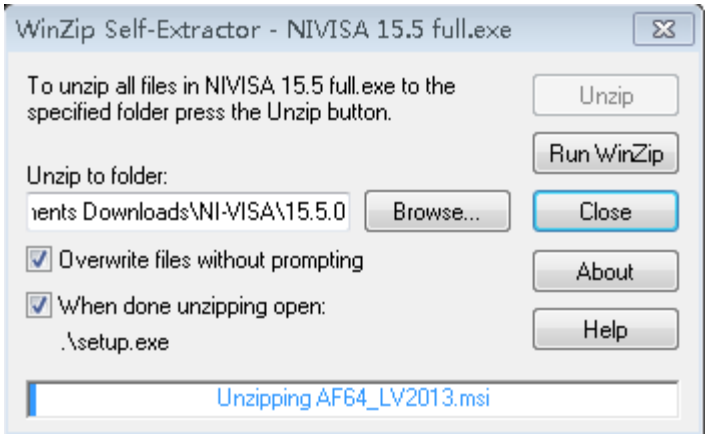
This chapter describes how to configure the IVI driver to control the instrument. If you want to use the IVI Driver, you must install NI-VISA, the IVI Compliance Package, and a C language development system that supports the IVI driver library.

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.*

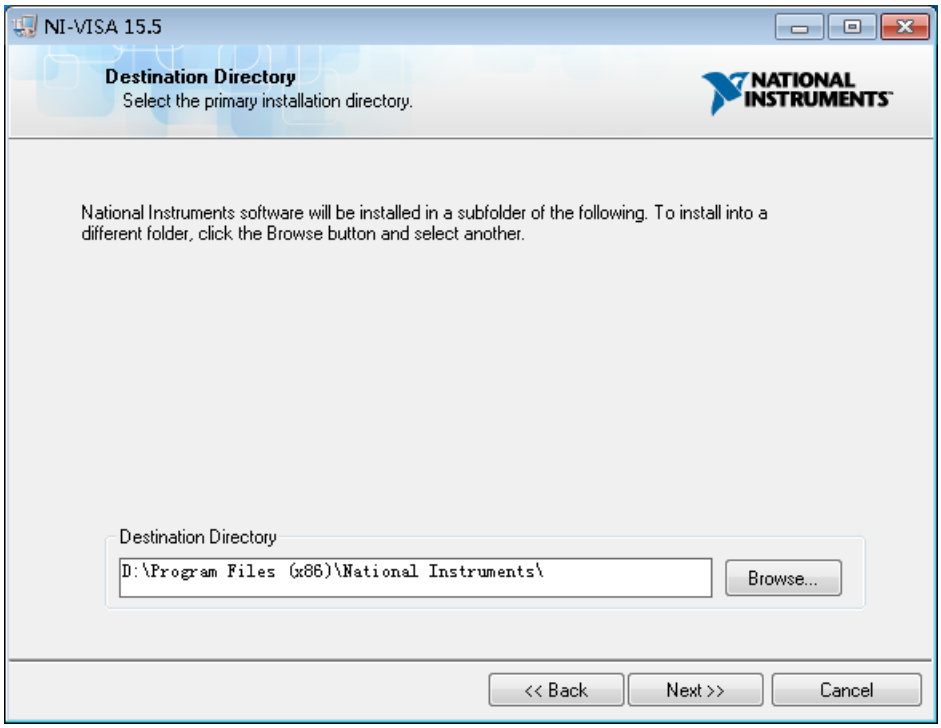
a. Double click the NIVISA 15.5 full.exe, a dialog will be shown as below:



b. Click Unzip, the installation process will automatically launch after unzipping files.

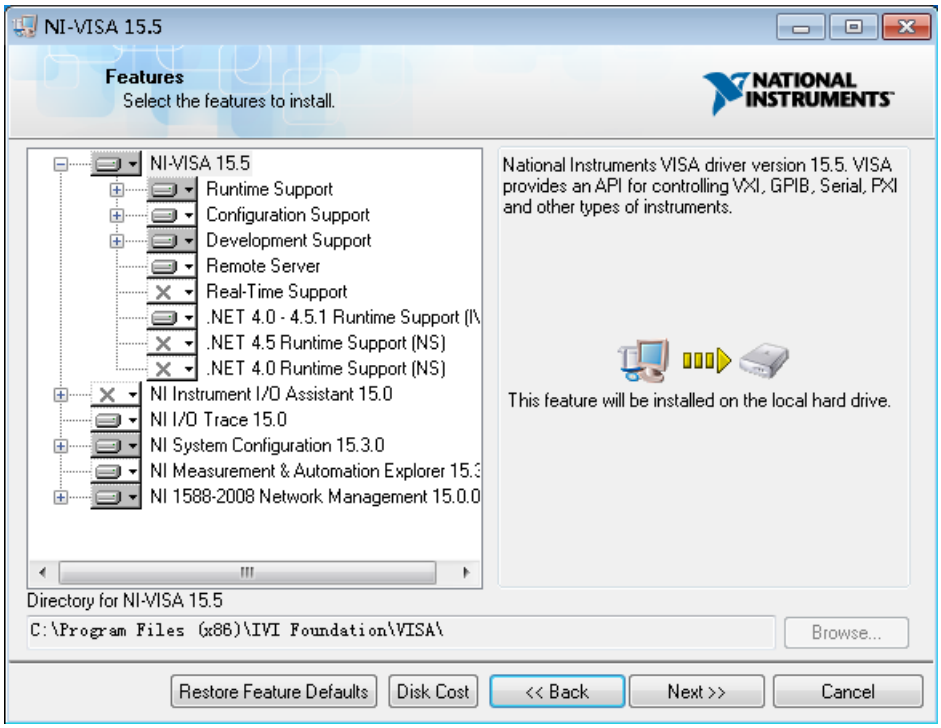
If your computer needs to install .NET Framework 4, it may auto start.

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

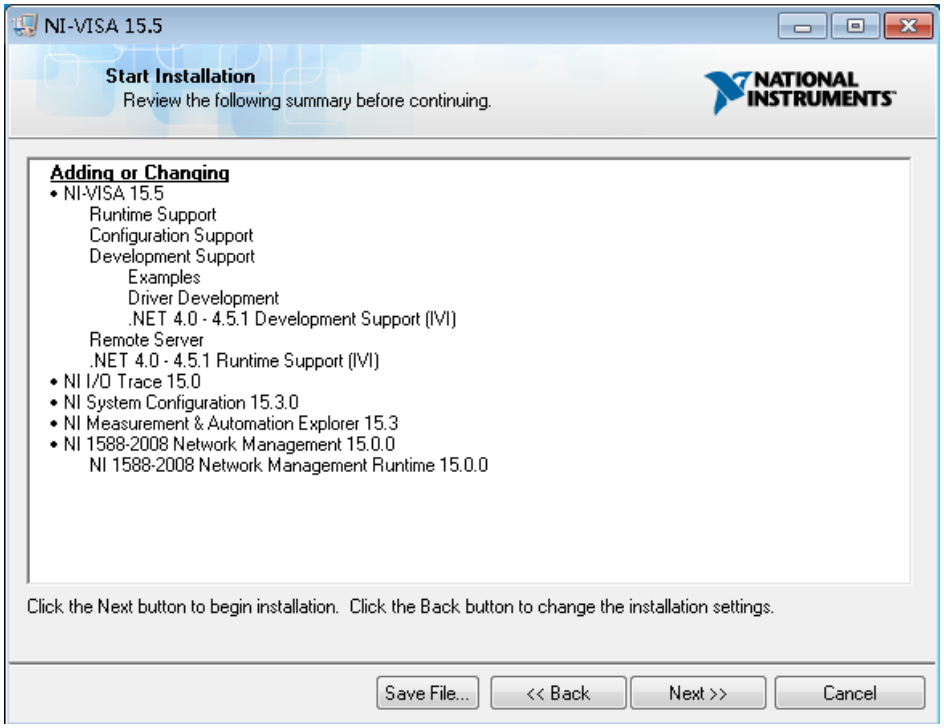


d. Set the install path. The default path is “C:\Program Files\National Instruments\”.

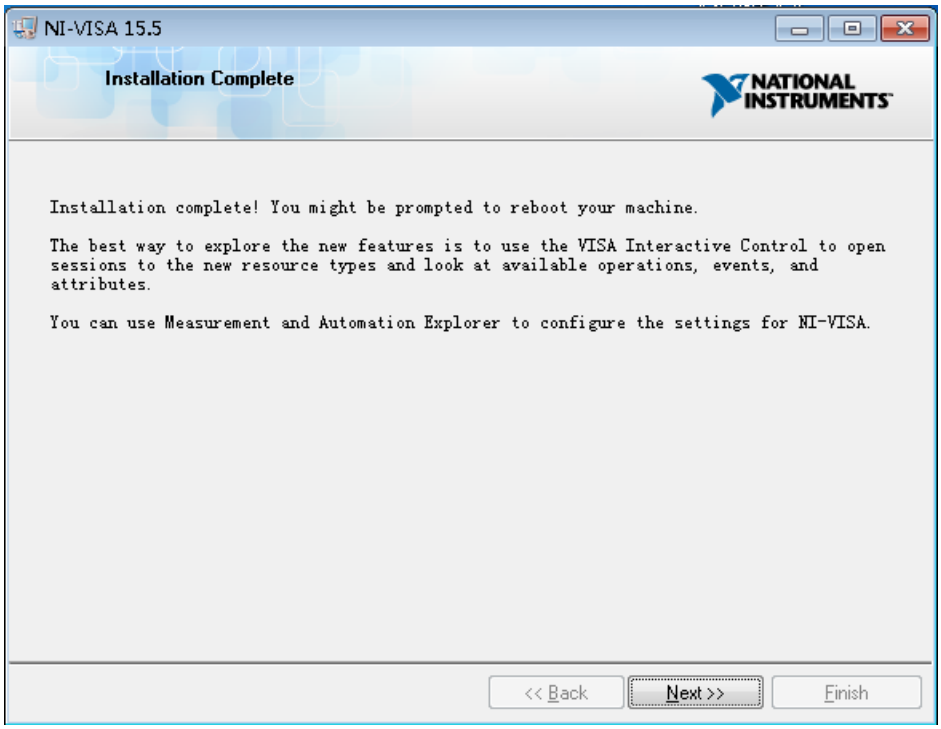
You can change it. Click Next.



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

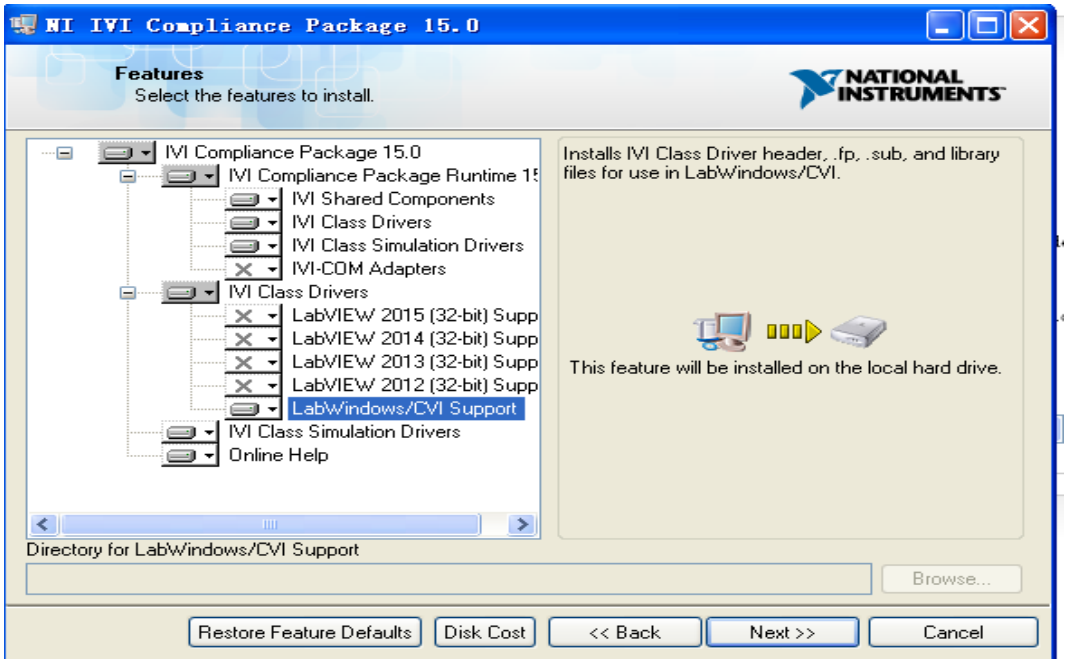
The IVI Compliance Package contains the IVI class drivers and supported libraries for developing and leveraging IVI-based applications.

You can get the IVI Compliance Package from

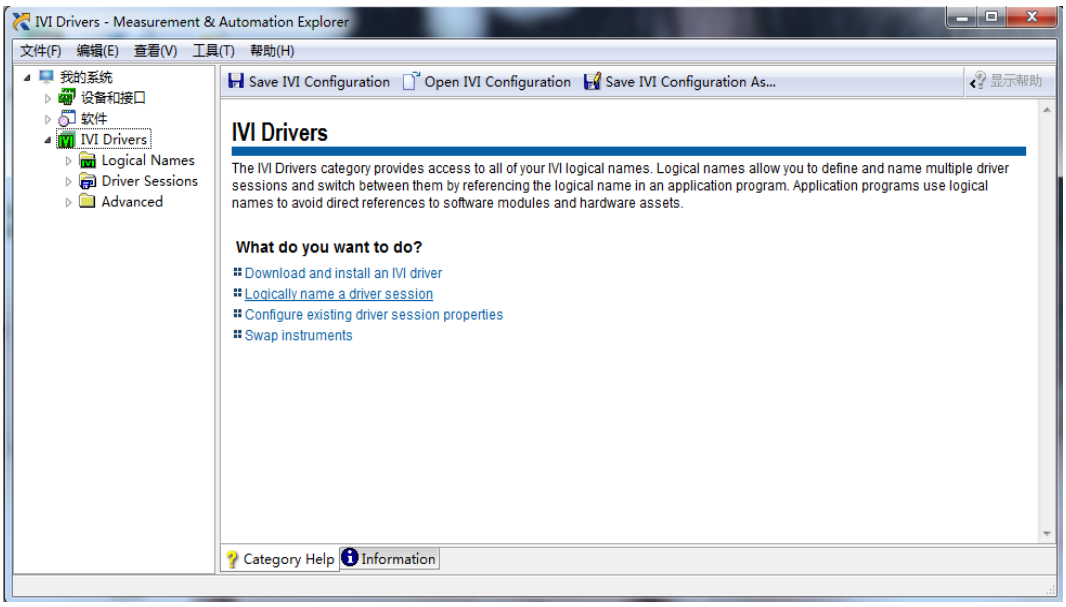
https://www.ni.com/zh-cn/support/downloads/drivers/download.ivi-compliance-package.html#329444

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.



SDG IVI-C Driver Package List

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

File	Description
sdg.dll/sdg_64.dll	A dynamic link library file, including variables, functions, and data interfaces for various attributes.
sdg.lib/sdg_64.lib	An import library file, including the symbolic name and optional identification number of each exported function in the sdg.dll file.
sdg.h	A header file, including declarations of variables, functions, and data interfaces.

You include the sdg.h when programming the Siglent Function generator with the IVI driver, and load the sdg.dll dynamic file or sdg.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 sdg_SetAttribute or sdg_GetAttribute functions.

SetAttribute Function Group

- sdg_SetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeId, ViInt32 value)

  Example: When you want to set the burst count, you can call the SetAttribute function to change the burst count.

  sdg_SetAttributeViInt32 (vi, channelName, SDG_ATTR_OPERATION_MODE, SDG_VAL_OPERATE_BURST);

  where,

  vi: The instrument handle.

  channelName: A constant string that represents the channelName and shows that this **SDG_ATTR_OPERATION_MODE** attribute is corresponding to that specific mode.

  SDG_VAL_OPERATE_BURST: Set the value to mode.

- sdg_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeId, ViReal64 value)

  Example: When you want to set the rate at which the function generator's internal trigger source generates trigger signals, you can call SetAttribute or GetAttribute function to change or obtain the rate.

  sdg_SetAttributeViReal64(vi, VI_NULL, SDG_ATTR_INTERNAL_TRIGGER_RATE, rate);

  where,

vi: Instrument Handle.

VI_NULL: A constant string that represents the rate at which the function generator's internal trigger source generates trigger signals and shows that this **SDG_ATTR_INTERNAL_TRIGGER_RATE** attribute is corresponding to this specific rate.

rate: Set the value to rate.

- sdg_SetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeId, ViConstString value)

Example: When you want to get the string that describes the physical instrument ; from the configuration file, you can call SetAttribute function to get the string that describes the physical instrument.

sdg_SetAttributeViString(vi,"",IVI_ATTR_IO_RESOURCE_DESCRIPTOR,0, newResourceName);

where,

vi: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_ATTR_CHANNEL_LABLE_TEXT** attribute is corresponding to this specific channel.

newResourceName: Get the string that describes the physical instrument.

- sdg_SetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeId, 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.

sdg_SetAttributeViBoolean(session,"CHAN1",SDG_ATTR_CHANNEL_ENABLED,

VI_FALSE);

where,

session: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_ATTR_CHANNEL_ENABLED** attribute is corresponding to this channel.

VI_FALSE: This means turning channel 1 off.

GetAttribute Function Group

- sdg_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeId, 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.

sdg_GetAttributeViReal64(session,"CHAN1",SDG_ATTR_PROBE_ATTENUATION, &value64);

where,

session: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_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.

- sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName, ViAttr attributeId, 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.

sdg_GetAttributeViInt32(session,"CHAN1",SDG_ATTR_VERTICAL_COUPLING, &value32);

where,

session: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_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.

- sdg_GetAttributeViBoolean (ViSession vi, ViConstString channelName, ViAttr attributeId, 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.

sdg_GetAttributeViBoolean(session,"CHAN1",SDG_ATTR_CHANNEL_ENABLED, &boolean);

where,

session: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_ATTR_CHANNEL_ENABLED** attribute is corresponding to this specific channel.

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

- sdg_GetAttributeViString (ViSession vi, ViConstString channelName, ViAttr attributeId, 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.

sdg_GetAttributeViString(session,"CHAN1",SDG_ATTR_CHANNEL_LABLE_TEXT, buffersize,str);

where,

session: The instrument handle.

"CHAN1": A constant string that represents the analog channel 1 and shows that this **SDG_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
Basic Operation	SDG_ATTR_MACHINE_MODEL
	SDG_ATTR_OPERATION_MODE
	SDG_ATTR_OUTPUT_MODE
	SDG_ATTR_OUTPUT_COUNT
	SDG_ATTR_REF_CLOCK_SOURCE
	SDG_ATTR_OUTPUT_ENABLED
	SDG_ATTR_OUTPUT_IMPEDANCE
Standard Function Output	SDG_ATTR_FUNC_WAVEFORM
	SDG_ATTR_FUNC_AMPLITUDE
	SDG_ATTR_FUNC_DC_OFFSET
	SDG_ATTR_FUNC_FREQUENCY
	SDG_ATTR_FUNC_START_PHASE
	SDG_ATTR_FUNC_DUTY_CYCLE_HIGH
	SDG_ATTR_FUNC_RAMP_SYMMETRY
	SDG_ATTR_FUNC_WIDTH
	SDG_ATTR_FUNC_DELAY
	SDG_ATTR_FUNC_PULSE_RISE
	SDG_ATTR_FUNC_PULSE_FALL
	SDG_ATTR_FUNC_NOISE_BW_ENABLED
	SDG_ATTR_FUNC_NOISE_BW_VALUE
	SDG_ATTR_FUNC_NOISE_MEAN
	SDG_ATTR_FUNC_NOISE_STDEV
Arbitrary Waveform Output	SDG_ATTR_ARB_GAIN
	SDG_ATTR_ARB_OFFSET
	SDG_ATTR_ARB_SAMPLE_RATE
	SDG_ATTR_ARB_WAVEFORM_HANDLE
	SDG_ATTR_ARB_FREQUENCY
	SDG_ATTR_ARB_MODE
Harmonic	SDG_ATTR_HARMONIC_ENABLED

	SDG_ATTR_HARMONIC_ORDER
	SDG_ATTR_HARMONIC_AMPL
	SDG_ATTR_HARMONIC_PHASE
	SDG_ATTR_HARMONIC_TYPE
Bursting	SDG_ATTR_BURST_NCYCLES_ENABLED
	SDG_ATTR_BURST_GATED_ENABLED
	SDG_ATTR_BURST_INFINITY_ENABLED
	SDG_ATTR_BURST_GATE_POLARITY
	SDG_ATTR_BURST_INTERNAL_PERIOD
	SDG_ATTR_BURST_PHASE
	SDG_ATTR_BURST_TDELAY
	SDG_ATTR_BURST_NCYCLE
	SDG_ATTR_BURST_TRIGGER_SOURCE
	SDG_ATTR_BURST_TRIGGER_TRIGOUT
	SDG_ATTR_BURST_COUNT
Sweep	SDG_ATTR_SWEEP_STATE
	SDG_ATTR_SWEEP_TIME
	SDG_ATTR_SWEEP_TRIGGER_SOURCE
	SDG_ATTR_SWEEP_TRIGGER_TRIGOUT
	SDG_ATTR_SWEEP_TYPE
	SDG_ATTR_SWEEP_DIRECTION
	SDG_ATTR_SWEEP_FREQUENCY_CENTER
	SDG_ATTR_SWEEP_FREQUENCY_SPAN
	SDG_ATTR_SWEEP_FREQUENCY_START
	SDG_ATTR_SWEEP_FREQUENCY_STOP
	SDG_ATTR_SWEEP_FREQUENCY_STARTTIME
	SDG_ATTR_SWEEP_FREQUENCY_ENDTIME
	SDG_ATTR_SWEEP_FREQUENCY_BACKTIME
IQ	SDG_ATTR_IQ_FREQUENCY_CENTER
	SDG_ATTR_IQ_SAMPLE_RATE
	SDG_ATTR_IQ_SYMBOL_RATE
	SDG_ATTR_IQ_AMPLITUDE
	SDG_ATTR_IQ_TRIGGER_SOURCE
	SDG_ATTR_IQ_ADJ_GAIN
	SDG_ATTR_IQ_ADJ_I_OFFSET
	SDG_ATTR_IQ_ADJ_Q_OFFSET

	SDG_ATTR_IQ_ADJ_Q_SKEW
	SDG_ATTR_IQ_WAVE_BUILT_IN
	SDG_ATTR_IQ_WAVE_USER
PRBS	SDG_ATTR_PRBS_BITRATE
	SDG_ATTR_PRBS_AMPLITUDE
	SDG_ATTR_PRBS_OFFSET
	SDG_ATTR_PRBS_LENGTH
	SDG_ATTR_PRBS_EDGE
	SDG_ATTR_PRBS_DIFFSTATE
	SDG_ATTR_PRBS_LOGIC_STATE
Modulation	SDG_ATTR_MOD_TYPE
	SDG_ATTR_MOD_STATE
	SDG_ATTR_AM_ENABLED
	SDG_ATTR_AM_SOURCE
	SDG_ATTR_AM_INTERNAL_DEPTH
	SDG_ATTR_AM_INTERNAL_WAVEFORM
	SDG_ATTR_AM_INTERNAL_FREQUENCY
	SDG_ATTR_FM_ENABLED
	SDG_ATTR_FM_SOURCE
	SDG_ATTR_FM_INTERNAL_DEVIATION
	SDG_ATTR_FM_INTERNAL_WAVEFORM
	SDG_ATTR_FM_INTERNAL_FREQUENCY
	SDG_ATTR_PM_ENABLED
	SDG_ATTR_PM_SOURCE
	SDG_ATTR_PM _DEVIATION
	SDG_ATTR_PM_INTERNAL_WAVEFORM
	SDG_ATTR_PM_INTERNAL_FREQUENCY
	SDG_ATTR_ASK_ENABLED
	SDG_ATTR_ASK_SOURCE
	SDG_ATTR_ASK_KEY_FREQ
	SDG_ATTR_FSK_ENABLED
	SDG_ATTR_FSK_SOURCE
	SDG_ATTR_FSK_HOP_FREQ
	SDG_ATTR_FSK_KEY_FREQ
	SDG_ATTR_PSK_ENABLED
	SDG_ATTR_PSK_SOURCE

	SDG_ATTR_PSK_POLARITY
	SDG_ATTR_PSK_KEY_FREQ
	SDG_ATTR_PWM_ENABLED
	SDG_ATTR_PWM_SOURCE
	SDG_ATTR_PWM_DEVIATION_WIDTH
	SDG_ATTR_PWM_INTERNAL_WAVEFORM
	SDG_ATTR_PWM_INTERNAL_FREQUENCY
	SDG_ATTR_DSB_SC_ENABLED
	SDG_ATTR_DSB_SC_SOURCE
	SDG_ATTR_DSB_SC_INTERNAL_WAVEFORM
	SDG_ATTR_DSB_SC_INTERNAL_FREQUENCY
	SDG_ATTR_DSB_AM_ENABLED
	SDG_ATTR_DSB_AM_SOURCE
	SDG_ATTR_DSB_AM_INTERNAL_WAVEFORM
	SDG_ATTR_DSB_AM_INTERNAL_FREQUENCY

Basic Operation

Attributes that control the basic features of the function generator. The basic group has the following attributes:

- **SDG_ATTR_MACHINE_MODEL**
- **SDG_ATTR_OPERATION_MODE**
- **SDG_ATTR_OUTPUT_MODE**
- **SDG_ATTR_OUTPUT_COUNT**
- **SDG_ATTR_REF_CLOCK_SOURCET**
- **SDG_ATTR_OUTPUT_ENABLED**
- **SDG_ATTR_OUTPUT_IMPEDANCE**

SDG_ATTR_MACHINE_MODEL

Description

This attribute is used to store the specific machine model.

Data type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViReal64 (ViSession vi, ViConstString channelName, ViAttr attributeId, ViInt32 *value)

Notes:

vi is the instrument handle.

channelName is one of the following analog inputs: SDG1012X,SDG1032X,SDG1062X,SDG2042X, SDG2082X,SDG6022X,SDG6032X,SDG6052X, SDG6052X,SDG7102A,SDG7052A,SDG7032A.
attributeId is SDG_ATTR_MACHINE_MODEL macro.
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SDG1012X	SDG_VAL_MACHINE_MODEL_ SDG1012X	0
SDG1032X	SDG_VAL_MACHINE_MODEL_ SDG1032X	1
SDG1062X	SDG_VAL_MACHINE_MODEL_ SDG1062X	2
SDG2042X	SDG_VAL_MACHINE_MODEL_ SDG2042X	3
SDG2082X	SDG_VAL_MACHINE_MODEL_ SDG2082X	4
SDG2122X	SDG_VAL_MACHINE_MODEL_ SDG2122X	5
SDG6022X	SDG_VAL_MACHINE_MODEL_ SDG6022X	6
SDG6032X	SDG_VAL_MACHINE_MODEL_ SDG6032X	7

SDG6052X	SDG_VAL_MACHINE_MODEL_ SDG6052X	8
SDG7102A	SDG_VAL_MACHINE_MODEL_ SDG7102A	9
SDG7052A	SDG_VAL_MACHINE_MODEL_ SDG7052A	10
SDG7032A	SDG_VAL_MACHINE_MODEL_ SDG7032A	11

Related Attribute NULL

High Level Functions NULL

SDG_ATTR_OPERATION_MODE

Description

This channel-based attribute determines how the function generator produces waveforms.

Data type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
channelName is one of the following analog inputs: CHAN1, CHAN2.
attributeId is SDG_ATTR_OPERATION_MODE macro.
value is used to store or set the value of function represented by **attributeId.**

Value Range

Type	Discrete Value	Value
CONT	SDG_VAL _OPERATE_CONTINUOUS	0
BURST	SDG_VAL _OPERATE_BURST	1

Related Attribute

NULL

High Level Functions

sdg_ConfigureOperationMode
sdg_ConfigureBurstCount
sdg_ConfigureBurstStartPhase

SDG_ATTR_OUTPUT_MODE

Description

This attribute determines the type of waveform generated by the function generator.

Data type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
channelName is one of the following analog inputs: NULL.
attributeId is SDG_ATTR_OUTPUT_MODE macro.
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
FUNC	SDG_VAL_OUTPUT_FUNC	0
ARB	SDG_VAL_OUTPUT_ARB	1

Related Attribute

SDG_ATTR_ARB_MODE

High Level Functions

sdg_VerifyOutputMode
sdg_ConfigureArbWaveform
sdg_ConfigureOutputMode
sdg_ConfigureRampWaveformSpec
sdg_ConfigureStandardWaveform

SDG_ATTR_OUTPUT_COUNT

Description	Returns the number of available output channels.
Data type	ViInt32
Access	R
Common Control Functions	sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 *value) **Notes:** **vi** is the instrument handle. channelName is one of the following analog inputs: CHAN1, CHAN2. **attributeId** is SDG_ATTR_OUTPUT_COUNT macro. **value** is used to store or set the value of function represented by **attributeId.**
Value Range	NULL.
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_REF_CLOCK_SOURCE

Description

Specifies the reference clock source. The function generator derives frequencies and sample rates that it uses to generate waveforms from the source you specify.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is NULL.
attributeId is SDG_ATTR_REF_CLOCK_SOURCE macro.
value is used to store or set the value of function represented by **attributeId.**

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_REF_CLOCK_INTERNAL	0
EXT	SDG_VAL_REF_CLOCK_EXTERNAL	1
10MOUT,ON	SDG_VAL_REF_CLOCK_10MON	2
10MOUT,OFF	SDG_VAL_REF_CLOCK_10MOFF	3

Notes:
When the SDG_ATTR_MACHINE_MODEL is SDG7000A&SDG6000X, all types are satisfied, otherwise only "INT" and "EXT" are included

Related Attribute

NULL

High Level Functions

sdg_ConfigureRefClockSource

SDG_ATTR_OUTPUT_ENABLED

Description	This channel-based attribute specifies whether the signal the function generator produces appears at the output connector.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_OUTPUT_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means Output is on VI_FALSE means Output is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureOutputEnabled

SDG_ATTR_OUTPUT_IMPEDANCE

Description	This channel-based attribute specifies the function generator's output impedance at the output connector.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_OUTPUT_IMPEDANCE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	Its value must be between 50 and 1000000. 1000000 indicates that the function generator is connected to a high impedance load.
Related Attribute	NULL
High Level Functions	sdg_ConfigureOutputImpedance

Standard Function Output

Attributes for generating standard function waveform output. You use this group of attributes when you set the SDG_ATTR_OUTPUT_MODE attribute to SDG_VAL_OUTPUT_FUNC. You can use the sdg_ConfigureStandardWaveform function to set all these attributes except SDG_ATTR_FUNC_DUTY_CYCLE_HIGH. The Standard Function group has the following attributes:

- **SDG_ATTR_FUNC_WAVEFORM**
- **SDG_ATTR_FUNC_AMPLITUDE**
- **SDG_ATTR_FUNC_DC_OFFSET**
- **SDG_ATTR_FUNC_FREQUENCY**
- **SDG_ATTR_FUNC_START_PHASE**
- **SDG_ATTR_FUNC_DUTY_CYCLE_HIGH**
- **SDG_ATTR_FUNC_RAMP_SYMMETRY**
- **SDG_ATTR_FUNC_WIDTH**
- **SDG_ATTR_FUNC_DELAY**
- **SDG_ATTR_FUNC_PULSE_RISE**
- **SDG_ATTR_FUNC_PULSE_FALL**
- **SDG_ATTR_FUNC_NOISE_BW_ENABLED**
- **SDG_ATTR_FUNC_NOISE_BW_VALUE**
- **SDG_ATTR_FUNC_NOISE_MEAN**
- **SDG_ATTR_FUNC_NOISE_STDEV**

SDG_ATTR_FUNC_WAVEFORM

Description

This channel-based attribute specifies which standard waveform the function generator produces.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_FUNC_WAVEFORM macro.
value is used to store or set the value of function represented by **attributeId.**

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_WFM_SINE	1
SQUARE	SDG_VAL_WFM_SQUARE	2
RAMP	SDG_VAL_WFM_RAMP	3
RAMP	SDG_VAL_WFM_RAMP_UP	4
RAMP	SDG_VAL_WFM_RAMP_DOWN	5
PULSE	SDG_VAL_WFM_PULSE	1001
NOISE	SDG_VAL_WFM_NOISE	1002
DC	SDG_VAL_WFM_DC	6
PRBS	SDG_VAL_WFM_PRBS	7
IQ	SDG_VAL_WFM_IQ	8

Related Attribute

SDG_ATTR_FUNC_AMPLITUDE
SDG_ATTR_FUNC_FREQUENCY
SDG_ATTR_FUNC_START_PHSAE

High Level Functions

sdg_ConfigureSquareWaveformSpec
sdg_ConfigureRampWaveformSpec

SDG_ATTR_FUNC_AMPLITUDE

Description	This channel-based attribute specifies the amplitude of the standard waveform the function generator produces. This value is the amplitude at the output terminal.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_AMPLITUDE macro. **value** is used to store the value of function returned by **attributeId**.
Value Range	The value range is [2mV,24V] **Notes:** Only SDG7000A maximum amplitude is 24V, other models are 20V
Related Attribute	SDG_ATTR_FUNC_FREQUENCY SDG_ATTR_FUNC_WAVEFORM SDG_ATTR_FUNC_START_PHSAE
High Level Functions	sdg_ConfigureStandardWaveform

SDG_ATTR_FUNC_DC_OFFSET

Description	This channel-based attribute specifies the DC offset of the standard waveform the function generator produces. This value is the offset at the output terminal. The units are volts (V).
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_AMPLITUDE macro. **value** is used to store the value of function returned by **attributeId**.
Value Range	The value range is [-12V,12V] **Notes:** Only SDG7000A maximum offset is ±12V, other models are ±10V
Related Attribute	SDG_ATTR_FUNC_WAVEFORM
High Level Functions	sdg_ConfigureStandardWaveform

SDG_ATTR_FUNC_FREQUENCY

Description	This channel-based attribute specifies the frequency of the standard waveform the function generator produces. The units are hertz (Hz).
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_FREQUENCY macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1uHZ,1GHZ] **Notes:** SDG1000X range is [1uHZ,60M] SDG2000X range is [1uHZ,120M] SDG6000X range is [1uHZ,500M] SDG7000A range is [1uHZ,1G]
Related Attribute	SDG_ATTR_FUNC_AMPLITUDE SDG_ATTR_FUNC_WAVEFORM SDG_ATTR_FUNC_START_PHSAE
High Level Functions	sdg_ConfigureAcquisitionRecord

SDG_ATTR_FUNC_START_PHASE

Description	This channel-based attribute specifies the horizontal offset of the standard waveform the function generator produces.You specify this attribute in degrees of one waveform cycle.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_START_PHSAE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-360°, 360°]
Related Attribute	SDG_ATTR_FUNC_AMPLITUDE SDG_ATTR_FUNC_FREQUENCY SDG_ATTR_FUNC_WAVEFORM
High Level Functions	sdg_ConfigureStandardWaveform

SDG_ATTR_FUNC_DUTY_CYCLE_HIGH

Description	This channel-based attribute specifies the length of time the output voltage level remains high in a square waveform.You specify this attribute as a percentage of one waveform cycle.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_DUTY_CYCLE_HIGH macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0.01%, 99.9%].
Related Attribute	SDG_ATTR_FUNC_WAVEFORM
High Level Functions	sdg_ConfigureSquareWaveformSpec

SDG_ATTR_FUNC_RAMP_SYMMETRY

Description	This channel-based property specifies the symmetry of the output triangle wave. It can be set only when WVTP is a triangle wave, the unit is "%".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_RAMP_SYMMETRY macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0%,100%]
Related Attribute	SDG_ATTR_FUNC_WAVEFORM
High Level Functions	sdg_ConfigureRampWaveformSpec

SDG_ATTR_FUNC_WIDTH

Description	This attribute sets the pulse width of the pulse waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_WIDTH macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1ns,1Ms]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_FUNC_DELAY

Description	This property sets the delay of the pulse waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_DELAY macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-1us,1us]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_FUNC_PULSE_RISE

Description	This attribute sets the rise time of the pulse waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_PULSE_RISE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [500ps,75s] **Notes:** SDG1000X range is [16.8ns, 22.4s] SDG2000X range is [8.4ns, 22.4s] SDG6000X range is [1ns, 75s] SDG7000A range is [500ps, 75s]
Related Attribute	SDG_ATTR_FUNC_PULSE_FALL
High Level Functions	NULL

SDG_ATTR_FUNC_PULSE_FALL

Description	This attribute sets the fall time of the pulse waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_PULSE_FALL macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1ns,75s] **Notes:** SDG1000X range is [16.8ns, 22.4s] SDG2000X range is [8.4ns, 22.4s] SDG6000X range is [1ns, 75s] SDG7000A range is [1ns, 75s]
Related Attribute	SDG_ATTR_FUNC_PULSE_FALL
High Level Functions	NULL

SDG_ATTR_FUNC_NOISE_BW_ENABLED

Description	This attribute sets the bandwidth limit switch for noise
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_NOISE_BW_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means BW limit is on VI_FALSE means BW limit is off
Related Attribute	SDG_ATTR_FUNC_NOISE_BW_VALUE SDG_ATTR_FUNC_NOISE_STDEV SDG_ATTR_FUNC_NOISE_MEAN
High Level Functions	sdg_ConfigureNosie

SDG_ATTR_FUNC_NOISE_BW_VALUE

Description	This attribute sets the bandwidth of the noise.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_NOISE_BW_VALUE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,1GHZ] **Note:** SDG1000X not involved SDG2000X range is [20MHZ,120MHZ] SDG6000X range is [1mHZ,500MHZ] SDG7000A range is [10mHZ,1GHZ]
Related Attribute	SDG_ATTR_FUNC_NOISE_BW_ENABLED SDG_ATTR_FUNC_NOISE_STDEV SDG_ATTR_FUNC_NOISE_MEAN
High Level Functions	sdg_ConfigureNosie

SDG_ATTR_FUNC_NOISE_MEAN

Description	This attribute sets the mean value of the noise.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_NOISE_MEAN macro. **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [-12, 12]V **Note:** SDG1000X range is [-9.99, 9.99]V SDG2000X range is [-9.983,9.983]V SDG6000X range is [-9.984,9.984]V SDG7000A range is [-12,12]V
Related Attribute	SDG_ATTR_FUNC_NOISE_BW_ENABLED SDG_ATTR_FUNC_NOISE_BW_VALUE SDG_ATTR_FUNC_NOISE_STDEV
High Level Functions	sdg_ConfigureNosie

SDG_ATTR_FUNC_NOISE_STDEV

Description	This attribute sets the standard deviation of the noise.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FUNC_NOISE_STDEV macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0V, 1.983V] **Note:** SDG1000X range is [2mV, 1.983V] SDG2000X range is [2mV, 1.150V] SDG6000X range is [2mV, 1.084V] SDG7000A range is [0V, 1.338V]
Related Attribute	SDG_ATTR_FUNC_NOISE_BW_ENABLED SDG_ATTR_FUNC_NOISE_BW_VALUE SDG_ATTR_FUNC_NOISE_MEAN
High Level Functions	sdg_ConfigureNosie

Arbitrary Waveform Output

Attributes for generating arbitrary waveform output.You use this group of attributes when you set the SDG_ATTR_OUTPUT_MODE attribute to SDG_VAL_OUTPUT_ARB.The Arbitrary Waveform group has the following attributes:

- **SDG_ATTR_ARB_GAIN**
- **SDG_ATTR_ARB_OFFSET**
- **SDG_ATTR_ARB_SAMPLE_RATE**
- **SDG_ATTR_ ARB_FREQUENCY**
- **SDG_ATTR_ARB_MODE**

SDG_ATTR_ARB_GAIN

Description	This channel-based attribute specifies the factor by which the function generator scales the arbitrary waveform data.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ARB_GAIN macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mV,24V] **Notes:** SDG1000X range is [2mV,20V] SDG2000X range is [2mV,20V] SDG6000X range is [2mV,20V] SDG7000A range is [1mV,24V]
Related Attribute	SDG_ATTR_ARB_WAVEFORM_HANDLE SDG_ATTR_ARB_OFFSET
High Level Functions	sdg_ConfigureArbWaveform

SDG_ATTR_ARB_OFFSET

Description	This channel-based attribute specifies the value the function generator adds to the arbitrary waveform data.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ARB_OFFSET macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-12V,12V] **Notes:** SDG1000X range is [-9.998V,9.998V] SDG2000X range is [-9.999V,9.999V] SDG6000X range is [-9.999V,9.999V] SDG7000A range is [-12V,12V]
Related Attribute	SDG_ATTR_ARB_GAIN SDG_ATTR_ARB_WAVEFORM_HANDLE
High Level Functions	sdg_ConfigureArbWaveform

SDG_ATTR_ARB_SAMPLE_RATE

Description	Specifies the rate at which the function generator outputs the points in arbitrary waveforms. The units are samples per second.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** vi is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ARB_SAMPLE_RATE macro. **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1uSa/s,2.5GSa/s] **Notes:** SDG1000X range is [1uSa/s,30MSa/s] SDG2000X range is [1uSa/s,75MSa/s] SDG6000X range is [1uSa/s,300MSa/s] SDG7000A range is [10mSa/s, 2.5GSa/s]
Related Attribute	NULL
High Level Functions	sdg_ConfigureSampleRate

SDG_ATTR_ARB_FREQUENCY

Description	This channel-based attribute specifies the rate at which the function generator produces an entire arbitrary waveform. The units are waveforms per second.
Data type	ViReal64
Access	R/W
Common control functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ARB_FREQUENCY macro. **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1uHZ,100MHZ] **Notes:** SDG1000X range is [1uHZ,6MHZ] SDG2000X range is [1uHZ,20MHZ] SDG6000X range is [1uHZ,50MHZ] SDG7000A range is [1uHZ,100MHZ]
Related Attribute	NULL
High Level Functions	sdg_ConfigureArbFrequency

SDG_ATTR_ARB_MODE

Description

This attribute sets the ARB waveform output mode: AWG (TrueArb)/AFG (DDS).

Data type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString channelName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32 (ViSession vi, ViConstString channelName,ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
channelName is one of the following analog inputs: CHAN1, CHAN2.
attributeId is SDG_ATTR_ARB_MODE macro.
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
AFG	SDG_VAL_ARB_AFG	0
AWG	SDG_VAL_ARB_AWG	1
DDS	SDG_VAL_ARB_DDS	2
TRAB	SDG_VAL_ARB_TRAB	3

Related Attribute

NULL

High Level Functions

NULL

Harmonic

Attributes for configuring the harmonic mode. The harmonic mode group has the following attributes:

- **SDG_ATTR_HARMONIC_ENABLED**
- **SDG_ATTR_HARMONIC_ORDER**
- **SDG_ATTR_HARMONIC_AMPL**
- **SDG_ATTR_HARMONIC_PHASE**
- **SDG_ATTR_HARMONIC_TYPE**

SDG_ATTR_HARMONIC_ENABLED

Description	This channel-based attribute enable or disable the harmonic mode.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_HARMONIC_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value range	VI_TRUE means harmonic is on VI_FALSE means harmonic is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_HARMONIC_ORDER

Description	This channel-based attribute specifies the harmonic source.
Data Type	ViInt32
Access	R/W
Common Control Functions	sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value) sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_HARMONIC_ORDER macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The Value range is [2,16] **Notes:** SDG1000X range is [2,16] SDG2000X range is [2,10] SDG6000X range is [2,16] SDG7000A range is [2,16]
Related Attribute	SDG_ATTR_HARMONIC_TYPE SDG_ATTR_HARMONIC_PHASE SDG_ATTR_HARMONIC_AMPL
High Level Functions	NULL

SDG_ATTR_HARMONIC_AMPL

Description	This channel-based attribute specifies the amplitude of the specified order of harmonic.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_HARMONIC_AMPL macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [2mV, 24V]. **Notes:** Only SDG7000A maximum amplitude is 24V, other models are 20V
Related Attribute	SDG_ATTR_HARMONIC_TYPE SDG_ATTR_HARMONIC_PHASE SDG_ATTR_HARMONIC_ORDER
High Level Functions	NULL

SDG_ATTR_HARMONIC_PHASE

Description	This channel-based attribute specifies the phase of the specified order of harmonic.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_HARMONIC_PHASE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0°, 360°].
Related Attribute	SDG_ATTR_HARMONIC_TYPE SDG_ATTR_HARMONIC_AMPL SDG_ATTR_HARMONIC_ORDER
High Level Functions	NULL

SDG_ATTR_HARMONIC_TYPE

Description

This channel-based attribute specifies the harmonic type to EVEN, ODD, ALL or USER.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_HARMONIC_TYPE macro.
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
EVEN	SDG_VAL_HARMONIC_TYPE_EVEN	0
ODD	SDG_VAL_HARMONIC_TYPE_ODD	1
ALL	SDG_VAL_HARMONIC_TYPE_ALL	2

Related Attribute

SDG_ATTR_HARMONIC_PHASE
SDG_ATTR_HARMONIC_AMPL
SDG_ATTR_HARMONIC_ORDER

High Level Functions

NULL

Bursting

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

- **SDG_ATTR_BURST_NCYCLES_ENABLED**
- **SDG_ATTR_BURST_GATED_ENABLED**
- **SDG_ATTR_BURST_INFINITY_ENABLED**
- **SDG_ATTR_BURST_GATE_POLARITY**
- **SDG_ATTR_BURST_INTERNAL_PERIOD**
- **SDG_ATTR_BURST_PHASE**
- **SDG_ATTR_BURST_TDELAY**
- **SDG_ATTR_BURST_NCYCLE**
- **SDG_ATTR_BURST_TRIGGER_SOURCE**
- **SDG_ATTR_BURST_TRIGGER_TRIGOUT**
- **SDG_ATTR_BURST_COUNT**

SDG_ATTR_BURST_NCYCLES_ENABLED

Description	This channel-based attribute specifies whether the function generator is configured to N cycles burst mode.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_NCYCLES_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means Ncycles is on VI_FALSE means Ncycles is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureBurstNcycEnabled

SDG_ATTR_BURST_GATED_ENABLED

Description	This channel-based attribute specifies whether the function generator is configured to gated burst mode.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_GATED_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means Gated is on VI_FALSE means Gated is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureBurstGateEnabled

SDG_ATTR_BURST_INFINITY_ENABLED

Description	This channel-based attribute specifies whether the function generator is configured to infinite burst mode.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_INFINITY_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means Infinity is on VI_FALSE means Infinity is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_BURST_GATE_POLARITY

Description

Specify it's high level or low level from the rear panel [Mod/FSK/Trig] that triggers the function generator to produce pulse train.This attribute is effective only when the burst mode is gated.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_BURST_GATE_POLARITY macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
POS	SDG_VAL_BURST_GATE_POLARITY _ POSITIVE	0
NEG	SDG_VAL_BURST_GATE_POLARITY _ NEGATIVE	1

Related Attribute

NULL

High Level Functions

NULL

SDG_ATTR_BURST_INTERNAL_PERIOD

Description	Specify the peroid of the burst pulse train which means the time interval between two adjacent N-cycles pulse train.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_INTERNAL_PERIOD macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	NULL
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_BURST_PHASE

Description	Specify the start phase of the pulse train, whose unit is degree.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_PHASE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0°,360°]
Related Attribute	SDG_ATTR_BURST_TDELAY SDG_ATTR_BURST_COUNT
High Level Functions	sdg_ConfigureBurstStartPhase

SDG_ATTR_BURST_TDELAY

Description	Specify the time interval between the function generator just received a triggering and it starts to produce pulse train.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_TDELAY macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0s,100s]
Related Attribute	SDG_ATTR_BURST_PHASE SDG_ATTR_BURST_COUNT
High Level Functions	NULL

SDG_ATTR_BURST_NCYCLE

Description	Set the number of BURST signal N cycles
Data Type	ViInt32
Access	R/W
Common Control Functions	sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value) sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_NCYCLE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The range is [1,1M]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_BURST_TRIGGER_SOURCE

Description

Specify the trigger source of the function generator, whose value can be internal, external or manual (software).

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_BURST_TRIGGER_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_INTERNAL_TRIGGER	0
EXT	SDG_VAL_EXTERNAL	1
MAN	SDG_VAL_MANUAL	2

Related Attribute

SDG_ATTR_BURST_TRIGGER_TRIGOUT
SDG_ATTR_BURST_TRIGGER_SLOPE

High Level Functions

NULL

SDG_ATTR_BURST_TRIGGER_TRIGOUT

Description

Specify the edge type of the Trigger output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_BURST_TRIGGER_TRIGOUT macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
OFF	SDG_VAL_BURST_TRIGGER_TRIGOUT_OFF	0
RISE	SDG_VAL_BURST_TRIGGER_TRIGOUT_POSITIVE	1
FALL	SDG_VAL_BURST_TRIGGER_TRIGOUT_NEGATIVE	2

Related Attribute

SDG_ATTR_BURST_TRIGGER_SOURCE
SDG_ATTR_BURST_TRIGGER_SLOPE

High Level Functions

sdg_ConfigureBurstTrigOut

SDG_ATTR_BURST_COUNT

Description	This channel-based attribute specifies the number of cycles that the function generator produces when it is in the burst operation mode and receives a trigger.
Data Type	ViInt32
Access	R/W
Common Control Functions	sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value) sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_BURST_COUNT macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1,1M]
Related Attribute	SDG_ATTR_BURST_PHASE SDG_ATTR_BURST_TDELAY
High Level Functions	sdg_ConfigureBurstCount

Sweep

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

- **SDG_ATTR_SWEEP_STATE**
- **SDG_ATTR_SWEEP_TIME**
- **SDG_ATTR_SWEEP_TRIGGER_SOURCE**
- **SDG_ATTR_SWEEP_TRIGGER_TRIGOUT**
- **SDG_ATTR_SWEEP_TYPE**
- **SDG_ATTR_SWEEP_DIRECTION**
- **SDG_ATTR_SWEEP_FREQUENCY_CENTER**
- **SDG_ATTR_SWEEP_FREQUENCY_SPAN**
- **SDG_ATTR_SWEEP_FREQUENCY_START**
- **SDG_ATTR_SWEEP_FREQUENCY_STOP**
- **SDG_ATTR_SWEEP_FREQUENCY_STARTTIME**
- **SDG_ATTR_SWEEP_FREQUENCY_ENDTIME**
- **SDG_ATTR_SWEEP_FREQUENCY_BACKTIME**

SDG_ATTR_SWEEP_STATE

Description	Enable or disable the sweep function.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_STATE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means Sweep is on VI_FALSE means Sweep is off
Related Attribute	SDG_ATTR_SWEEP_TIME SDG_ATTR_SWEEP_TYPE SDG_ATTR_SWEEP_DIRECTION
High Level Functions	NULL

SDG_ATTR_SWEEP_TIME

Description	Set the sweep time and the default unit is "s".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_TIME macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1ms,1000s] **Notes:** Only SDG7000A maximum time is 1000s, other models are 500s
Related Attribute	SDG_ATTR_SWEEP_TYPE SDG_ATTR_SWEEP_STATE SDG_ATTR_SWEEP_DIRECTION
High Level Functions	NULL

SDG_ATTR_SWEEP_TRIGGER_SOURCE

Description

Set the trigger source of the sweep to INTernal,EXTernal or MANual.Query the trigger source.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_SWEEP_TRIGGER_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_SWEEP_TRIGGER_SOURCE_INTERNAL	0
EXT	SDG_VAL_SWEEP_TRIGGER_SOURCE_EXTERNAL	1
MAN	SDG_VAL_SWEEP_TRIGGER_SOURCE_MANUAL	2

Related Attribute

NULL

High Level Functions

sdg_ConfigureSweepTriggerSource

SDG_ATTR_SWEEP_TRIGGER_TRIGOUT

Description	Set the edge type of the sweep trigger output to rising (POSitive) or falling (NEGative) edge or disable the trigger output signal (OFF).
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_TRIGGER_TRIGOUT macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	NULL
Related Attribute	NULL
High Level Functions	sdg_ConfigureSweepTriggerOut

SDG_ATTR_SWEEP_TYPE

Description

Set the type of the sweep to Log or Linear.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_SWEEP_TYPE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
LINE	SDG_VAL_SWEEP_TYPE_LINER	0
LOG	SDG_VAL_SWEEP_TYPE_LOG	1
STEP	SDG_VAL_SWEEP_TYPE_STEP	2

Notes:
Only SDG7000A supports STEP.

Related Attribute

SDG_ATTR_SWEEP_TIME
SDG_ATTR_SWEEP_STATE
SDG_ATTR_SWEEP_DIRECTION

High Level Functions

NULL

SDG_ATTR_SWEEP_DIRECTION

Description

Set the direction of the sweep to Up,Down or Up_and_Down.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_SWEEP_DIRECTION macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
UP	SDG_VAL_SWEEP_DIRECTION _UP	0
DOWN	SDG_VAL_SWEEP_DIRECTION _DOWN	1
UP_DOWN	SDG_VAL_SWEEP_DIRECTION _UP_DOWN	2

Notes:
SDG6000X&SDG7000A can set SDG_VAL_SWEEP_DIRECTION_UP_DOWN in linear mode.

Related Attribute

SDG_ATTR_SWEEP_TIME
SDG_ATTR_SWEEP_TYPE
SDG_ATTR_SWEEP_STATE

High Level Functions

sdg_ConfigureSweepDirection

SDG_ATTR_SWEEP_FREQUENCY_CENTER

Description	Set the center frequency of the sweep and the default unit is "Hz".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_FREQUENCY_CENTER macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1uHZ,1GHZ] **Notes:** SDG1000X range is [1uHZ, 50MHZ] SDG2000X range is [1uHZ,120MHZ] SDG6000X range is [1uHZ, 500MHZ] SDG7000A range is [1uHZ,1GHZ]
Related Attribute	SDG_ATTR_SWEEP_FREQUENCY_SPAN SDG_ATTR_SWEEP_FREQUENCY_START SDG_ATTR_SWEEP_FREQUENCY_STOP
High Level Functions	NULL

SDG_ATTR_SWEEP_FREQUENCY_SPAN

Description	Set the frequency span of the sweep and the default unit is "Hz".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_FREQUENCY_SPAN macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0HZ,1GHZ] **Notes:** SDG1000X range is [0HZ, 50MHZ] SDG2000X range is [0HZ,120MHZ] SDG6000X range is [0HZ, 500MHZ] SDG7000A range is [0HZ,1GHZ]
Related Attribute	SDG_ATTR_SWEEP_FREQUENCY_START SDG_ATTR_SWEEP_FREQUENCY_STOP SDG_ATTR_SWEEP_FREQUENCY_CENTER
High Level Functions	NULL

SDG_ATTR_SWEEP_FREQUENCY_START

Description	Set the start frequency of the sweep and the default unit is "Hz".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_FREQUENCY _START macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1uHZ,1GHZ] **Notes:** SDG1000X range is [1uHZ, 50MHZ] SDG2000X range is [1uHZ,120MHZ] SDG6000X range is [1uHZ, 500MHZ] SDG7000A range is [1uHZ,1GHZ]
Related Attribute	SDG_ATTR_SWEEP_FREQUENCY_SPAN SDG_ATTR_SWEEP_FREQUENCY_STOP SDG_ATTR_SWEEP_FREQUENCY_CENTER
High Level Functions	sdg_ConfigureSweepFrequencyStart

SDG_ATTR_SWEEP_FREQUENCY_STOP

Description	Set the end frequency of the sweep and the default unit is "Hz".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_FREQUENCY_STOP macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1uHZ,1GHZ] **Notes:** SDG1000X range is [1uHZ, 50MHZ] SDG2000X range is [1uHZ,120MHZ] SDG6000X range is [1uHZ, 500MHZ] SDG7000A range is [1uHZ,1GHZ]
Related Attribute	SDG_ATTR_SWEEP_FREQUENCY_SPAN SDG_ATTR_SWEEP_FREQUENCY_START SDG_ATTR_SWEEP_FREQUENCY_CENTER
High Level Functions	sdg_ConfigureSweepFrequencyStop

SDG_ATTR_SWEEP_STARTTIME

Description	This attribute sets the start hold time of the sweep,Only SDG7KA supports.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_STARTTIME macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0,300] s **Notes:** Only Support SDG7000A
Related Attribute	SDG_ATTR_SWEEP_ENDTIME SDG_ATTR_SWEEP_BACKTIME SDG_ATTR_SWEEP_TIME
High Level Functions	NULL

SDG_ATTR_SWEEP_ENDTIME

Description	This attribute sets the end hold time of the sweep,Only SDG7KA supports.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_ENDTIME macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0,300] s **Notes:** Only Support SDG7000A
Related Attribute	SDG_ATTR_SWEEP_STARTTIME SDG_ATTR_SWEEP_BACKTIME SDG_ATTR_SWEEP_TIME
High Level Functions	NULL

SDG_ATTR_SWEEP_BACKTIME

Description	This attribute sets the backtime of the sweep,Only SDG7KA supports.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_SWEEP_BACKTIME macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0,300] s **Notes:** Only Support SDG7000A
Related Attribute	SDG_ATTR_SWEEP_STARTTIME SDG_ATTR_SWEEP_ENDTIME SDG_ATTR_SWEEP_TIME
High Level Functions	NULL

IQ

The I/Q vector signal group properties are used to set or read I/Q vector signal related parameters. The I/Q vector signal group has the following attributes:

- **SDG_ATTR_IQ_FREQUENCY_CENTER**
- **SDG_ATTR_IQ_SAMPLE_RATE**
- **SDG_ATTR_IQ_SYMBOL_RATE**
- **SDG_ATTR_IQ_AMPLITUDE**
- **SDG_ATTR_IQ_TRIGGER_SOURCE**
- **SDG_ATTR_IQ_ADJ_GAIN**
- **SDG_ATTR_IQ_ADJ_I_OFFSET**
- **SDG_ATTR_IQ_ADJ_Q_OFFSET**
- **SDG_ATTR_IQ_ADJ_Q_SKEW**
- **SDG_ATTR_IQ_WAVE_BUILT_IN**
- **SDG_ATTR_IQ_WAVE_USER**

SDG_ATTR_IQ_FREQUENCY_CENTER

Description	Set the center frequency of the IQ and the default unit is "Hz".
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_FREQUENCY_CENTER macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1HZ,1GHZ] **Notes:** SDG6000X range is [1HZ,500MHZ] SDG7000A range is [1HZ,1GHZ] Other models are not involved
Related Attribute	NULL
High Level Functions	sdg_ConfigureIqFrequencyCenter

SDG_ATTR_IQ_SAMPLE_RATE

Description	Specifies the rate at which the function generator outputs the points in IQ waveforms.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_SAMPLE_RATE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1KHZ,1.25GHZ] **Notes:** SDG6000X range is [1KHZ,300MHZ] SDG7000A range is [1KHZ,1.25GHZ]
Related Attribute	SDG_ATTR_IQ_SYMBOL_RATE
High Level Functions	sdg_ConfigureIqSampleRate

SDG_ATTR_IQ_SYMBOL_RATE

Description	Specifies the rate at which the function generator outputs oversampled points in the IQ waveform. This parameter is limited by the oversampling factor
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_SYMBOL_RATE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [250Sa/s,312.5MSa/s] **Notes:** SDG6000X range is [250Sa/s,75MSa/s] SDG7000A range is [250Sa/s,312.5MSa/s]
Related Attribute	SDG_ATTR_IQ_SAMPLE_RATE
High Level Functions	sdg_ConfigureIqSymbolRate

SDG_ATTR_IQ_AMPLITUDE

Description	This attribute specifies the amplitude of the IQ.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_AMPLITUDE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0mVrms,939mVrms] **Notes:** SDG6000X range is [0mVrms, 225.8mVrms] SDG7000A range is [0mVrms, 939mVrms]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_IQ_TRIGGER_SOURCE

Description

This attribute specifies the trigger source.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_IQ_TRIGGER_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_IQ_TRIGGER_SOURCE _INTERNAL	0
EXT	SDG_VAL_IQ_TRIGGER_SOURCE _EXTERNAL	1
MAN	SDG_VAL_IQ_TRIGGER_SOURCE _MANUAL	2

Related Attribute

NULL

High Level Functions

sdg_ConfigureIqTriggerSource

SDG_ATTR_IQ_ADJ_GAIN

Description	This attribute is used for amplitude gain balance, which adjusts the amplitude difference between the two I/Q channels.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_ADJ_GAIN macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-4dB,4 dB]
Related Attribute	NULL
High Level Functions	sdg_ConfigureIqAdjGain

SDG_ATTR_IQ_ADJ_I_OFFSET

Description	This attribute is used to adjust the offset of the I channel. Combined with the Q-channel DC bias adjustment to compensate for the bias imbalance of the I/Q channels
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_ADJ_J_OFFSET macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-0.25V,0.25V]
Related Attribute	SDG_ATTR_IQ_ADJ_Q_OFFSET SDG_ATTR_IQ_ADJ_Q_SKEW
High Level Functions	sdg_ConfigureIqAdjIOffest

SDG_ATTR_IQ_ADJ_Q_OFFSET

Description	This attribute is used to adjust the offset of the I channel. Combined with the I-channel DC bias adjustment to compensate for the bias imbalance of the I/Q channels
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_ADJ_Q_OFFSET macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-0.25V,0.25V]
Related Attribute	SDG_ATTR_IQ_ADJ_I_OFFSET SDG_ATTR_IQ_ADJ_Q_SKEW
High Level Functions	sdg_ConfigureIqAdjQOffest

SDG_ATTR_IQ_ADJ_Q_SKEW

Description	This attribute is used for the phase angle adjustment of the Q channel to compensate for the phase imbalance between the I/Q channels
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_ADJ_Q_SKEW macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-10°,10°]
Related Attribute	SDG_ATTR_IQ_ADJ_I_OFFSET SDG_ATTR_IQ_ADJ_Q_OFFSET
High Level Functions	sdg_ConfigureIqAdjSkew

SDG_ATTR_IQ_WAVE_BUILT_IN

Description

This attribute is used to select the I/Q waveform from the built-in waveform list.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_IQ_WAVE_BUILT_IN macro
value is used to store or set the value of function represented by **attributeId.**

Value Range

Type	Discrete Value	Value
2ASK	SDG_VAL_IQ_WAVE_BUILT_IN_2ASK	0
4ASK	SDG_VAL_IQ_WAVE_BUILT_IN_4ASK	1
8ASK	SDG_VAL_IQ_WAVE_BUILT_IN_8ASK	2
BPSK	SDG_VAL_IQ_WAVE_BUILT_IN_BPSK	3
QPSK	SDG_VAL_IQ_WAVE_BUILT_IN_QPSK	4
8PSK	SDG_VAL_IQ_WAVE_BUILT_IN_8PSK	5
DBPSK	SDG_VAL_IQ_WAVE_BUILT_IN_DBPSK	6
DQPSK	SDG_VAL_IQ_WAVE_BUILT_IN_DQPSK	7
D8PSK	SDG_VAL_IQ_WAVE_BUILT_IN_D8PSK	8
8QAM	SDG_VAL_IQ_WAVE_BUILT_IN_8QAM	9
16QAM	SDG_VAL_IQ_WAVE_BUILT_IN_16QAM	10
32QAM	SDG_VAL_IQ_WAVE_BUILT_IN_32QAM	11
64QAM	SDG_VAL_IQ_WAVE_BUILT_IN_64QAM	12
128QAM	SDG_VAL_IQ_WAVE_BUILT_IN_128QAM	13
256QAM	SDG_VAL_IQ_WAVE_BUILT_IN_256QAM	14

Related Attribute

SDG_ATTR_IQ_WAVE_USER

High Level Functions

sdg_ConfigureIqWaveBuiltIn

SDG_ATTR_IQ_WAVE_USER

Description	This attribute is used to select the I/Q waveform among the user-stored waveforms.
Data Type	ViString
Access	R/W
Common Control Functions	sdg_SetAttributeViString(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViConstString value) sdg_GetAttributeViString(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 bufSize, ViChar value[]) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_IQ_WAVE_USER macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	NULL
Related Attribute	SDG_ATTR_IQ_WAVE_BUILT_IN
High Level Functions	sdg_ConfigureIqWaveUser

PRBS

The PRBS group properties are used to set or read PRBS related parameters(SDG6000X/SDG7KA models support PRBS). The PRBS group has the following attributes:

- **SDG_ATTR_PRBS_BITRATE**
- **SDG_ATTR_PRBS_AMPLITUDE**
- **SDG_ATTR_PRBS_OFFSET**
- **SDG_ATTR_PRBS_LENGTH**
- **SDG_ATTR_PRBS_EDGE**
- **SDG_ATTR_PRBS_DIFFSTATE**
- **SDG_ATTR_PRBS_LOGIC_STATE**

SDG_ATTR_PRBS_BITRATE

Description	This attribute is used to set the bit rate/symbol period of PRBS.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_BITRATE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1ubps,312.5Mbps] **Notes:** SDG6000X range is [1ubps, 300Mbps] SDG7000A range is [1ubps,312.5Mbps] Other models are not involved.
Related Attribute	SDG_ATTR_PRBS_AMPLITUDE SDG_ATTR_PRBS_OFFSET
High Level Functions	sdg_ConfigurePrbsBitRate

SDG_ATTR_PRBS_AMPLITUDE

Description	This attribute specifies the amplitude of the PRBS.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_AMPLITUDE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [2mV,24V] **Notes:** SDG6000X range is [2mV,20V] SDG7000A range is [2mV,24V]
Related Attribute	SDG_ATTR_PRBS_OFFSET SDG_ATTR_PRBS_BITRATE
High Level Functions	sdg_ConfigurePrbsAmplitude

SDG_ATTR_PRBS_OFFSET

Description	This attribute specifies the offset of the PRBS
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_OFFSET macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [-12V,12V] **Notes:** SDG6000X range is [-9.99V,9.99V] SDG7000A range is [-12V,12V]
Related Attribute	NULL
High Level Functions	sdg_ConfigurePrbsOffest

SDG_ATTR_PRBS_LENGTH

Description	This attribute specifies the length of the PRBS. The settable range is PRBS-3 ~ 32. Its length =$2^{length} - 1$
Data Type	ViInt32
Access	R/W
Common Control Functions	sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value) sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_LENGTH macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [3,32]
Related Attribute	NULL
High Level Functions	sdg_ConfigurePrbsLength

SDG_ATTR_PRBS_EDGE

Description	This attribute specifies the edge rise/fall time of PRBS.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_EDGE macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0.5ns,1us] **Notes:** SDG6000X range is [1ns,1us] SDG7000A range is [0.5ns,1us]
Related Attribute	NULL
High Level Functions	sdg_ConfigurePrbsEdge

SDG_ATTR_PRBS_DIFFSTATE

Description	This attritude specifies the differential output switch mode of the PRBS.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PRBS_DIFFSTATE macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	NULL
Related Attribute	NULL
High Level Functions	sdg_ConfigurePrbsDifferentialState

SDG_ATTR_PRBS_LOGIC_STATE

Description

This attribute is used to set the logic level of PRBS.

Data Type

ViInt32

Access

W

Common Control Functions

sdg _SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PRBS_LOGIC_STATE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
TTL_COMS	SDG_VAL_PRBS_TTL_CMOS	0
LVTTL_LVCOMS	SDG_VAL_PRBS_LVTTL_LVCMOS	1
ECL	SDG_VAL_PRBS_ECL	2
LVPECL	SDG_VAL_PRBS_LVPECL	3
LVDS	SDG_VAL_PRBS_LVDS	4
CUSTOM	SDG_VAL_PRBS_CUSTOM	5

Related Attribute

NULL

High Level Functions

sdg_ConfigurePrbsLogicLevel

MOD

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

- **SDG_ATTR_MOD_TYPE**
- **SDG_ATTR_MOD_STATE**
- **SDG_ATTR_AM_ENABLED**
- **SDG_ATTR_AM_SOURCE**
- **SDG_ATTR_AM_INTERNAL_DEPTH**
- **SDG_ATTR_AM_INTERNAL_WAVEFORM**
- **SDG_ATTR_AM_INTERNAL_FREQUENCY**
- **SDG_ATTR_FM_ENABLED**
- **SDG_ATTR_FM_SOURCE**
- **SDG_ATTR_FM_INTERNAL_DEVIATION**
- **SDG_ATTR_FM_INTERNAL_WAVEFORM**
- **SDG_ATTR_FM_INTERNAL_FREQUENCY**
- **SDG_ATTR_PM_ENABLED**
- **SDG_ATTR_PM_SOURCE**
- **SDG_ATTR_PM _DEVIATION**
- **SDG_ATTR_PM_INTERNAL_WAVEFORM**
- **SDG_ATTR_PM_INTERNAL_FREQUENCY**
- **SDG_ATTR_ASK_ENABLED**
- **SDG_ATTR_ASK_SOURCE**
- **SDG_ATTR_ASK_KEY_FREQ**
- **SDG_ATTR_FSK_ENABLED**
- **SDG_ATTR_FSK_SOURCE**
- **SDG_ATTR_FSK_HOP_FREQ**
- **SDG_ATTR_FSK_KEY_FREQ**
- **SDG_ATTR_PSK_ENABLED**

- **SDG_ATTR_PSK_SOURCE**
- **SDG_ATTR_PSK_POLARITY**
- **SDG_ATTR_PSK_PHASE**
- **SDG_ATTR_PSK_KEY_FREQ**
- **SDG_ATTR_PWM_ENABLED**
- **SDG_ATTR_PWM_SOURCE**
- **SDG_ATTR_PWM_DEVIATION_WIDTH**
- **SDG_ATTR_PWM_INTERNAL_WAVEFORM**
- **SDG_ATTR_PWM_INTERNAL_FREQUENCY**
- **SDG_ATTR_DSB_SC_ENABLED**
- **SDG_ATTR_DSB_SC_SOURCE**
- **SDG_ATTR_DSB_SC_INTERNAL_FREQUENCY**
- **SDG_ATTR_DSB_SC_INTERNAL_WAVEFORM**
- **SDG_ATTR_DSB_AM_ENABLED**
- **SDG_ATTR_DSB_AM_SOURCE**
- **SDG_ATTR_DSB_AM_INTERNAL_FREQUENCY**
- **SDG_ATTR_DSB_AM_INTERNAL_WAVEFORM**

SDG_ATTR_MOD_TYPE

Description

Select the modulation mode.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_MOD_TYPE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
AM	SDG_VAL_MOD_TYPE_AM	0
FM	SDG_VAL_MOD_TYPE_FM	1
PM	SDG_VAL_MOD_TYPE_PM	2
ASK	SDG_VAL_MOD_TYPE_ASK	3
FSK	SDG_VAL_MOD_TYPE_FSK	4
PSK	SDG_VAL_MOD_TYPE_PSK	5
PWM	SDG_VAL_MOD_TYPE_PWM	6
DSBSC	SDG_VAL_MOD_TYPE_DSBSC	7
DSBAM	SDG_VAL_MOD_TYPE_DSBAM	8

Notes:
Different models support different modulation types

Related Attribute

NULL

High Level Functions

NULL

SDG_ATTR_MOD_STATE

Description	Enable or disable the modulation function.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **RepCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **AttributeId** is SDG_ATTR_MOD_STATE macro. **Value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means MOD is on VI_FALSE means MOD is off
Related Attribute	SDG_ATTR_MOD_TYPE
High Level Functions	NULL

SDG_ATTR_AM_ENABLED

Description	This channel-based attribute specifies whether the function generator applies amplitude modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **RepCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **AttributeId** is SDG_ATTR_AM_ENABLED macro. **Value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means AM is on VI_FALSE means AM is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureAMEnabled

SDG_ATTR_AM_SOURCE

Description

This channel-based attribute specifies the signal that the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
RepCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
AttributeId is SDG_ATTR_AM_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_AM_INTERNAL	0
EXT	SDG_VAL_AM_EXTERNAL	1
CH1	SDG_VAL_AM_CH1	2
CH2	SDG_VAL_AM_CH2	3

Related Attribute

NULL

High Level Functions

sdg_ConfigureAMSource

SDG_ATTR_AM_INTERNAL_DEPTH

Description	Specifies the extent of modulation the function generator applies to the carrier signal.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_AM_INTERNAL_DEPTH macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0%,120%]
Related Attribute	SDG_ATTR_AM_INTERNAL_FREQUENCY SDG_ATTR_AM_INTERNAL_WAVEFORM
High Level Functions	sdg_ConfigureAMInternal

SDG_ATTR_AM_INTERNAL_WAVEFORM

Description

This attribute turns on or off the measurement gate.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_AM_INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_AM_INTERNAL_SINE	0
SQUARE	SDG_VAL_AM_INTERNAL_SQUARE	1
TRIANGLE	SDG_VAL_AM_INTERNAL_TRIANGLE	2
UPRAMP	SDG_VAL_AM_INTERNAL_RAMP_UP	3
DNRAMP	SDG_VAL_AM_INTERNAL_RAMP_DOWN	4
NOISE	SDG_VAL_AM_INTERNAL_NOISE	5
ARB	SDG_VAL_AM_INTERNAL_ARB	6

Related Attribute

SDG_ATTR_AM_INTERNAL_DEPTH
SDG_ATTR_AM_INTERNAL_FREQUENCY

High Level Functions

sdg_ConfigureAMInternal

SDG_ATTR_AM_INTERNAL_FREQUENCY

Description	Specifies the frequency of the standard waveform that the function generator uses to modulate the output signal.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_AM_INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,20KHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_AM_INTERNAL_DEPTH SDG_ATTR_AM_INTERNAL_WAVEFORM
High Level Functions	sdg_ConfigureAMInternal

SDG_ATTR_FM_ENABLED

Description	Specifies whether the function generator applies frequency modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FM_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means FM is on VI_FALSE means FM is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureFMEnabled

SDG_ATTR_FM_SOURCE

Description

Specifies the signal the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_FM_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_FM_INTERNAL	0
EXT	SDG_VAL_FM_EXTERNAL	1
CH1	SDG_VAL_FM_CH1	2
CH2	SDG_VAL_FM_CH2	3

Related Attribute

NULL

High Level Functions

sdg_ConfigureFMSource

SDG_ATTR_FM_INTERNAL_DEVIATION

Description	Specifies the maximum frequency deviation the modulating waveform applies to the carrier waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FM_INTERNAL_DEVIATION macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1uHZ,500MHZ] **Notes:** The max deciation is 0.5*BW(BW stands for maximum output frequency)
Related Attribute	SDG_ATTR_FM_INTERNAL_WAVEFORM SDG_ATTR_FM_INTERNAL_FREQUENCY
High Level Functions	sdg_ConfigureFMInternal

SDG_ATTR_FM_INTERNAL_WAVEFORM

Description

Specifies the standard waveform type that the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_FM_INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_FM_INTERNAL_SINE	0
SQUARE	SDG_VAL_FM_INTERNAL_SQUARE	1
TRIANGLE	SDG_VAL_FM_INTERNAL_TRIANGLE	2
UPRAMP	SDG_VAL_FM_INTERNAL_RAMP_UP	3
DNRAMP	SDG_VAL_FM_INTERNAL_RAMP_DOWN	4
NOISE	SDG_VAL_FM_INTERNAL_NOISE	5
ARB	SDG_VAL_FM_INTERNAL_ARB	6

Notes:
Only SDG7000A can modulate noise

Related Attribute

SDG_ATTR_FM_INTERNAL_DEVIATION
SDG_ATTR_FM_INTERNAL_FREQUENCY

High Level Functions

sdg_ConfigureFMInterna

SDG_ATTR_FM_INTERNAL_FREQUENCY

Description	Specifies the frequency of the standard waveform that the function generator uses to modulate the output signal.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FM_INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,20KHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_FM_INTERNAL_DEVIATION SDG_ATTR_FM_INTERNAL_WAVEFORM
High Level Functions	sdg_ConfigureFMInternal

SDG_ATTR_PM_ENABLED

Description	Specifies whether the function generator applies phase modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PM_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means PM is on VI_FALSE means PM is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_PM_SOURCE

Description

Specifies the signal the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PM_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_PM_INTERNAL	0
EXT	SDG_VAL_PM_EXTERNAL	1
CH1	SDG_VAL_PM_CH1	2
CH2	SDG_VAL_PM_CH2	3

Related Attribute

NULL

High Level Functions

NULL

SDG_ATTR_PM_DEVIATION

Description	Specifies the maximum frequency deviation the modulating waveform applies to the carrier waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PM_DEVIATION macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [0°,360°]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_PM_INTERNAL_WAVEFORM

Description

Specifies the standard waveform type that the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PM_INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_PM_INTERNAL_SINE	0
SQUARE	SDG_VAL_PM_INTERNAL_SQUARE	1
TRIANGLE	SDG_VAL_PM_INTERNAL_TRIANGLE	2
UPRAMP	SDG_VAL_PM_INTERNAL_RAMP	3
DNRAMP	SDG_VAL_PM_INTERNAL_NRAMP	4
NOISE	SDG_VAL_PM_INTERNAL_NOISE	5
ARB	SDG_VAL_PM_INTERNAL_ARB	6

Related Attribute

NULL

High Level Functions

NULL

SDG_ATTR_PM_INTERNAL_FREQUENCY

Description	Specifies the frequency of the standard waveform that the function generator uses to modulate the output signal
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PM_INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId.**
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,20KHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_ASK_ENABLED

Description	Specifies whether the function generator applies amplitude shift keying modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ASK_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means ASK is on VI_FALSE means ASKis off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_ASK_SOURCE

Description

Specifies the signal the function generator uses to modulate the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_ASK_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_ASK_INTERNAL	0
EXT	SDG_VAL_ASK_EXTERNAL	1

Related Attribute

SDG_ATTR_ASK_AMPLITUDE
SDG_ATTR_ASK_INTERNAL_RATE

High Level Functions

NULL

SDG_ATTR_ASK_KEY_FREQ

Description	Set the ASK(amplitude shift keying) rate.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ASK_KEY_FREQ macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,50KHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_ASK_AMPLITUDE SDG_ATTR_ASK_SOURCE
High Level Functions	NULL

SDG_ATTR_FSK_ENABLED

Description	This channel-based attribute specifies whether the function generator applies frequency shift keying modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FSK_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means FSK is on VI_FALSE means FSK is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_FSK_SOURCE

Description

This channel-based attribute specifies whether the function generator applies frequency shift keying modulation to the output signal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_FSK_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_FSK_INTERNAL	0
EXT	SDG_VAL_FSK_EXTERNAL	1

Related Attribute

SDG_ATTR_FSK_FREQUENCY
SDG_ATTR_FSK_ INTERNAL_RATE

High Level Functions

NULL

SDG_ATTR_FSK_HOP_FREQ

Description	Set the FSK(Frequency Shift Keying) hop frequency.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FSK_HOP_FREQ macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1uHZ,1GHZ] **Notes:** The max deciation is BW(BW stands for maximum output frequency)
Related Attribute	SDG_ATTR_FSK_SOURCE SDG_ATTR_FSK_ KEY_FREQ
High Level Functions	NULL

SDG_ATTR_FSK_KEY_FREQ

Description	Set the FSK(Frequency Shift Keying) rate.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_FSK_KEY_FREQ macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,50KHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_FSK_HOP_FREQ SDG_ATTR_FSK_SOURCE
High Level Functions	NULL

SDG_ATTR_PSK_ENABLED

Description	This channel-based attribute specifies whether the function generator applies phase shift keying modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PSK_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means PSK is on VI_FALSE means PSK is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_PSK_SOURCE

Description

This channel-based attribute set the PSK modulation source to INTernal or EXTernal.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PSK_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_PSK_INTERNAL	0
EXT	SDG_VAL_PSK_EXTERNAL	1

Related Attribute

SDG_ATTR_PSK_INTERNAL_RATE
SDG_ATTR_PSK_PHASE
SDG_ATTR_PSK_POLARITY

High Level Functions

NULL

SDG_ATTR_PSK_POLARITY

Description

Select the positive or negative polarity of the modulating waveform to control the phase output.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PSK_POLARITY macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
POS	SDG_VAL_PSK_POLARITY_POSITIVE	0
NEG	SDG_VAL_PSK_POLARITY_NEGATIVE	1

Related Attribute

SDG_ATTR_PSK_INTERNAL_RATE
SDG_ATTR_PSK_PHASE
SDG_ATTR_PSK_SOURCE

High Level Functions

NULL

SDG_ATTR_PSK_KEY_FREQ

Description	Set the PSK(Phase Shift Keying) rate.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PSK_KEY_FREQ macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X does not support SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_PSK_PHASE SDG_ATTR_PSK_POLARITY SDG_ATTR_PSK_SOURCE
High Level Functions	NULL

SDG_ATTR_PWM_ENABLED

Description	This channel-based attribute specifies whether the function generator applies pulse width modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PWM_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means PWM is on VI_FALSE means PWM is off
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_PWM_SOURCE

Description

This channel-based attribute set the PWM modulation source to internal or external.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PWM_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_PWM_INTERNAL	0
EXT	SDG_VAL_PWM_EXTERNAL	1
CH1	SDG_VAL_PWM_CH1	2
CH2	SDG_VAL_PWM_CH2	3

Related Attribute

NULL

High Level Functions

NULL

SDG_ATTR_PWM_DEVIATION_WIDTH

Description	Set the pulse width deviation of PWM.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PWM_DEVIATION_WIDTH macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [0s,500s] **Notes:** The pulse width deviation is related to the pulse width of the carrier pulse
Related Attribute	NULL
High Level Functions	NULL

SDG_ATTR_PWM_INTERNAL_WAVEFORM

Description

Select the PWM modulating waveform.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_PWM_INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_PWM_INTERNAL_SINE	0
SQUARE	SDG_VAL_PWM_INTERNAL_SQUARE	1
TRIANGLE	SDG_VAL_PWM_INTERNAL_TRIANGLE	2
UPRAMP	SDG_VAL_PWM_INTERNAL_RAMP	3
DNRAMP	SDG_VAL_PWM_INTERNAL_NRAMP	4
NOISE	SDG_VAL_PWM_INTERNAL_NOISE	5
ARB	SDG_VAL_PWM_INTERNAL_ARB	6

Related Attribute

SDG_ATTR_PWM_INTERNAL_FREQUENCY

High Level Functions

NULL

SDG_ATTR_PWM_INTERNAL_FREQUENCY

Description	Set the frequency of the PWM modulating waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_PWM_INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** SDG1000X range is [1mHZ,20kHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A range is [1mHZ, 2MHZ]
Related Attribute	SDG_ATTR_PWM_INTERNAL_WAVEFORM
High Level Functions	NULL

SDG_ATTR_DSB_SC_ENABLED

Description	This channel based attribute specifies whether the function generator applies double sideband modulation with suppressed carriers to the output signal
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_DSB_SC_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means DSB_SC is on VI_FALSE means DSB_SC is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureDSBEnabled

SDG_ATTR_DSB_SC_SOURCE

Description

This channel-based attribute set the DSB_SC modulation source to internal , external or channel.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_DSB_SC_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_DSB_SC_INTERNAL	0
EXT	SDG_VAL_DSB_SC_EXTERNAL	1
CH1	SDG_VAL_DSB_SC_CH1	2
CH2	SDG_VAL_DSB_SC_CH2	3

Related Attribute

NULL

High Level Functions

sdg_ConfigureDSBSource

SDG_ATTR_DSB_SC_INTERNAL_FREQUENCY

Description	Set the frequency of the DSB_SC modulating waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_DSB_SC_INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,2MHZ] **Notes:** Only SDG7000A supports
Related Attribute	SDG_ATTR_DSB_SC_INTERNAL_WAVEFORM
High Level Functions	sdg_ConfigureDSBInternal

SDG_ATTR_DSB_SC_INTERNAL_WAVEFORM

Description

Select the DSB_SC modulating waveform.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_DSB_SC_INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_DSB_SC_INTERNAL _SINE	0
SQUARE	SDG_VAL_DSB_SC_INTERNAL _SQUARE	1
TRIANGLE	SDG_VAL_DSB_SC_INTERNAL _TRIANGLE	2
UPRAMP	SDG_VAL_DSB_SC_INTERNAL _RAMP_UP	3
DNRAMP	SDG_VAL_DSB_SC_INTERNAL _RAMP_DOWN	4
NOISE	SDG_VAL_ DSB_SC INTERNAL_NOISE	5
ARB	SDG_VAL_ DSB_SC INTERNAL_ARB	6

Related Attribute

SDG_ATTR_DSB_SC_INTERNAL_FREQUENCY

High Level Functions

sdg_ConfigureDSBInternal

SDG_ATTR_DSB_AM_ENABLED

Description	This channel-based attribute specifies whether the function generator applies double sideband amplitude modulation to the output signal.
Data Type	ViBoolean
Access	R/W
Common Control Functions	sdg_SetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean value) sdg_GetAttributeViBoolean(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViBoolean *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_DSB_AM_ENABLED macro. **value** is used to store or set the value of function represented by **attributeId**.
Value Range	VI_TRUE means DSB_AM is on VI_FALSE means DSB_AM is off
Related Attribute	NULL
High Level Functions	sdg_ConfigureDSBEnabled

SDG_ATTR_DSB_AM_SOURCE

Description

This channel-based attribute set the DSB_AM modulation source to internal , external or channel.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_DSB_AM_SOURCE macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
INT	SDG_VAL_DSB_AM_INTERNAL	0
EXT	SDG_VAL_DSB_AM _EXTERNAL	1
CH1	SDG_VAL_DSB_AM _CH1	2
CH2	SDG_VAL_DSB_AM _CH2	3

Related Attribute

NULL

High Level Functions

sdg_ConfigureDSBSource

SDG_ATTR_DSB_AM_INTERNAL_FREQUENCY

Description	Set the frequency of the DSB_AM modulating waveform.
Data Type	ViReal64
Access	R/W
Common Control Functions	sdg_SetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 value) sdg_GetAttributeViReal64(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViReal64 *value) **Notes:** **vi** is the instrument handle. **repCapName** is channelName(one of the following analog inputs: CHAN1, CHAN2). **attributeId** is SDG_ATTR_ DSB_AM _INTERNAL_FREQUENCY macro **value** is used to store or set the value of function represented by **attributeId**.
Value Range	The value range is [1mHZ,1MHZ] **Notes:** SDG1000X range is [1mHZ,20kHZ] SDG2000X range is [1mHZ,1MHZ] SDG6000X range is [1mHZ,1MHZ] SDG7000A not supports.
Related Attribute	SDG_ATTR_PWM_INTERNAL_WAVEFORM
High Level Functions	sdg_ConfigureDSBInternal

SDG_ATTR_DSB_AM_INTERNAL_WAVEFORM

Description

Select the DSB_AM modulating waveform.

Data Type

ViInt32

Access

R/W

Common Control Functions

sdg_SetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 value)

sdg_GetAttributeViInt32(ViSession vi, ViConstString repCapName, ViAttr attributeId, ViInt32 *value)

Notes:
vi is the instrument handle.
repCapName is channelName(one of the following analog inputs: CHAN1, CHAN2).
attributeId is SDG_ATTR_DSB_AM _INTERNAL_WAVEFORM macro
value is used to store or set the value of function represented by **attributeId**.

Value Range

Type	Discrete Value	Value
SINE	SDG_VAL_DSB_AM_INTERNAL_SINE	0
SQUARE	SDG_VAL_DSB_AM_INTERNAL_SQUARE	1
TRIANGLE	SDG_VAL_DSB_AM_INTERNAL_TRIANGLE	2
UPRAMP	SDG_VAL_DSB_AM_INTERNAL_RAMP_UP	3
DNRAMP	SDG_VAL_DSB_AM_INTERNAL_RAMP_DOWN	4
NOISE	SDG_VAL_DSB_AM_INTERNAL_NOISE	5
ARB	SDG_VAL_DSB_AM_INTERNAL_ARB	6

Related Attribute

SDG_ATTR_DSB_AM_INTERNAL_FREQUENCY

High Level Functions

sdg_ConfigureDSBInternal

High Level Functions

Some high level functions are available to set multiple attributes.

- **sdg_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
Example: sdg_InitWithOptions("USB0::0xF4EC::0x1013::0123456789::INSTR", VI_TRUE, VI_FALSE, "Simulate=0,RangeCheck=1,QueryInstrStatus=0,Cache=0", &session);	

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 sdg_InitWithOptions() before using it, and input the parameters we suggested except argument resourceName.

- **sdg_close (ViSession vi)**

  This function closes the instrument.

Parameter	Description
vi	Instrument handle
Example: sdg_close(vi);	

Notes: This function must unlock the session before calling Ivi_Dispose.

- **sdg_ConfigureOperationMode (ViSession vi, ViConstString channelName, ViInt32 outputMode)**

This function configures the operation mode of the function generator.The operation mode determines how the function generator produces waveforms.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
outputMode	operation mode of the function generator
Example: ConfigureOperationMode(vi,"1",0)	

- **sdg_ConfigureOutputEnabled (ViSession vi, ViConstString channelName, ViBoolean enabled)**

his function configures whether the signal the function generator produces appears at the channel's output connector.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn output function on / off
Example: sdg_ConfigureOutputEnabled(vi,"1",0)	

- **sdg_ConfigureOutputImpedance (ViSession vi, ViConstString channelName, ViReal64 impedance)**

This function configures the output impedance for the channel you specify.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
impedance	Output impedance
Example: sdg_ConfigureOutputImpedance (vi,"1",50);	

- **sdg_ConfigureOutputMode (ViSession vi, ViInt32 outputMode)**

This function configures the output mode of the function generator.The output mode determines the kind of waveform the function generator produces.

Parameter	Description
vi	Instrument handle
outputMode	output mode of the function generator
Example: sdg_ConfigureOutputMode (vi,0);	

- **sdg_ConfigureRefClockSource (ViSession vi, ViInt32 refClockSource)**

This function configures the function generator's reference clock source.The function generator uses the reference clock to derive frequencies and sample rates for signal generation.

Parameter	Description
vi	Instrument handle
refClockSource	Ref Clock Source
Example : sdg_ConfigureRefClockSource (vi, 2);	

- **sdg _ConfigureStandardWaveform (ViSession vi, ViConstString channelName, ViInt32 waveform, ViReal64 amplitude, ViReal64 dcOffset, ViReal64 frequency, ViReal64 startPhase)**

This function sets the Standard Waveform.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
waveform	Output waveform type
amplitude	Output waveform amplitude
dcOffset	Output waveform dcOffset
frequency	Output waveform frequency
startPhase	the horizontal offset of the standard waveform the function generator produces.
Example: sdg_ConfigureStandardWaveform(vi, "1", SDG_VAL_WFM_SINE, 20, 0, 1000, 0)	

- **sdg_ConfigureSquareWaveformSpec(ViSession vi, ViConstString channelName, ViReal64 dutyCycle)**

This function configures the Square Duty Cycle and Square Period of waveform.Period is paired with Frequency in ConfigureStandardWaveform and whichever one is executed last overrides the other.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
dutyCycle	The length of time the output voltage level remains high in a square waveform
Example: sdg_ConfigureSquareWaveformSpec (vi," 1",50);	

- **sdg _ConfigureRampWaveformSpec(ViSession vi, ViConstString channelName, ViReal64 symmetry)**

This function configures the Ramp Symmetry of the function generator that affect ramp waveform generation.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
symmetry	the Ramp Symmetry
Example: sdg_ConfigureChanCharacteristics (vi,"1", 50);	

- **sdg _ConfigureArbWaveform (ViSession vi, ViConstString channelName, ViInt32 handle, ViReal64 gain, ViReal64 offset)**

This function configures the attributes of the functiongenerator that affect arbitrary waveform generation.These attributes are the arbitrary waveform handle, gain, and offset.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
handle	attribute identifies which arbitrary waveform the function generator produces
gain	similar to amplitude
offset	the value the function generator adds to the arbitrary

	waveform data
Example: sdg_ConfigureArbWaveform (vi, "2", 10100, 3, 4);	

- **sdg _ConfigureSampleRate(ViSession vi, ViConstString channelName, ViReal64 sampleRate)**

This function is used to set the sampling rate of ARB waveform under AFG/DDS model.

Parameter	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
sampleRate	Sampling rate setting in AFG/DDS mode
Example: sdg_ConfigureSampleRate (vi,"1", 500);	

- **sdg_CreateArbWaveform(ViSession vi, ViInt32 size, ViReal64 data[], ViInt32 *handle)**

This function creates an arbitrary waveform and returns a handle that identifies that waveform. You use the handles this functionreturns to specify what waveform to generate with the sdg_ConfigureArbWaveform function. You also use the handles this function returns to specify a sequence of arbitrary waveforms with the sdg_CreateArbSequence function.Use sdg_ConfigChannel function to specify a target channel for 2-channel instrument.

Description	Description
vi	Instrument handle
size	Size of waveform
data[]	Data of waveform
*handle	a handle that identifies that waveform
Example: sdg_CreateArbWaveform(vi, 1e+3,1e+3, SDG_VAL_WFM_SINE);	

- **sdg_ConfigureArbFrequency (ViSession Vi, ViConstString ChannelName, ViReal64 Frequency)**

This function configures the arbitrary waveform frequency, which is the rate at which the function generator produces one cycle of an arbitrary waveform.

Description	Description
vi	Instrument handle
ChannelName	ChannelName: 1 or 2
Frequency	set frequency value
Example: sdg_ConfigureArbFrequency (vi, "1", 1e+3)	

- **sdg_ConfigureHarmonicEnabled (ViSession vi, ViConstString channelName, ViBoolean enabled)**

Turn harmonic function on/off.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Enabled	Trun on/off harmonic:VI_TRUE or VI_FALSE
Example: sdg_ConfigureHarmonicEnabled (vi, “1”,VI_TRUE);	

- **sdg_SendSoftwareTrigger (ViSession vi)**

This function can make the user send a software trigger to cause signal output to occur

Description	Description
vi	Instrument handle
Example: sdg_SendSoftwareTrigger (vi);	

- **sdg _ConfigureBurstCount (ViSession vi, ViConstString channelName, ViInt32 count)**

This function configures the burst count. The driver uses this value to set the Burst Count attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
count	the number of cycles
Example: sdg_ConfigureBurstCount(vi,"1",3)	

- **sdg_ConfigureBurstGateEnabled (ViSession vi, ViConstString channelName, ViBoolean enabled)**

This function configures the Burst-GATE switch.The driver uses this value to set the Burst-GATE Enabled attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn on the Burst-GATE
Example: sdg_ConfigureBurstGateEnabled (vi,"1",0);	

- **sdg_ConfigureBurstNcycEnabled (ViSession vi, ViConstString channelName, ViBoolean enabled)**

This function configures the Burst-NCYC switch.The driver uses this value to set the Burst-NCYC Enabled attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn on the Burst-NCYC
Example: sdg_ConfigureBurstNcycEnabled (vi,"1",0);	

- **sdg_ConfigureBurstStartPhase (ViSession vi, ViConstString channelName, ViReal64 phase)**

This function configures the burst start phase. The driver uses this value to set the Burst Start phase attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
phase	the burst start phase
Example: sdg_ConfigureBurstStartPhase (vi,"1",45);	

- **sdg_ConfigureBurstTrigOut (ViSession vi, ViConstString channelName, ViInt32 trigoutmod)**

This function configures mod of the burst trigger out.The driver uses this value to set the Burst Trigger Out attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
trigoutmod	Mod of the burst trigger out
Example: sdg_ConfigureBurstGateEnabled (vi,"1",1);	

- **sdg_ConfigureAMEnabled (ViSession vi, ViConstString channelName, ViBoolean enabled);**

This function configures the am switch.The driver uses this value to set the AM Enabled attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn on the AM
Example: sdg_ConfigureAMEnabled (vi,"1",0);	

- **sdg_ConfigureAMInternal (ViSession vi, ViReal64 Depth, ViInt32 Waveform, ViReal64 Frequency)**

This function configures the am internal.The driver uses this value to configure the AM Internal attribute.

Description	Description
vi	Instrument handle
Depth	the extent of modulation
Waveform	standard waveform type
Frequency	frequency of the standard waveform
Example: sdg_ConfigureAMInternal(vi, 90, 2, 10)	

- **sdg_ConfigureAMSource (ViSession vi, ViConstString channelName, ViInt32 Source)**

This function configures trigger source of the Am .The driver uses this value to set the Am Trigger Source attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Source	trigger source
Example: sdg_ConfigureAMSource (vi,"1",0);	

- **sdg_ConfigureFMEnabled(ViSession vi,ViConstString channelName,ViBoolean enabled)**

This function configures the FM switch.The driver uses this value to set the FM Enabled attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn on the FM
Example: sdg_ConfigureFMEnabled (vi,"1",0);	

- **sdg_ConfigureFMInternal (ViSession vi, ViReal64 Dev, ViInt32 Waveform, ViReal64 Frequency)**

This function configures the fm internal.The driver uses this value to configure the FM Internal attribute

Description	Description
vi	Instrument handle
Dev	maximum frequency deviation the modulating waveform
Waveform	standard waveform type
Frequency	frequency of the standard waveform
Example: sdg_ConfigureFMInternal(vi, 10, 2, 10);	

- **sdg_ConfigureFMSource (ViSession vi, ViConstString channelName, ViInt32 Source)**

This function sets the source selection for FM modulation

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Source	Trigger source
Example: sdg_ConfigureFMSource(vi,"2",0);	

- **sdg_ConfigureDSBEnabled(ViSession vi,ViConstStringchannelName,ViBoolean enabled)**

This function configures the DSB switch.The driver uses this value to set the DSB Enabled attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
enabled	Turn on the DSB_AM or DSB_SC
Example: sdg_ConfigureFMEnabled (vi,"1",0);	

- **sdg_ConfigureDSBInternal (ViSession vi, ViConstString channelName, ViInt32 Waveform, ViReal64 Frequency)**

This function configures the DSB internal.The driver uses this value to configure the DSB Internal attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Waveform	standard waveform type
Frequency	frequency of the standard waveform
Example: sdg_ConfigureDSBInternal(vi, "1", 2, 10);	

- **sdg_ConfigureDSBSource (ViSession vi, ViConstString channelName, ViInt32 Source)**

This function sets the source selection for DSB modulation

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Source	Trigger source
Example: sdg_ConfigureDSBSource(vi,"2",0);	

- **sdg_ConfigureSweepState (ViSession vi, ViConstString channelName, ViBoolean state)**

This function configures state of sweep.The driver uses this value to set the Sweep State attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
state	The state of Sweep
Example: sdg_ConfigureSweepState(vi,"1",1);	

- **sdg_ConfigureSweepTime (ViSession vi, ViConstString channelName, ViReal64 time)**

This function configures time of sweep.The driver uses this value to set the Sweep Time attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
time	time of sweep
Example: sdg_ConfigureSweepTime(vi,"1",3);	

- **sdg_ConfigureSweepFrequencyStart (ViSession vi, ViConstString channelName, ViReal64 freqstart)**

This function configures start frequency of sweep.The driver uses this value to set the Sweep Start Frequency attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Freqstart	Sweep start frequency
Example: sdg_ConfigureSweepFrequencyStart(vi,"1",600);	

- **sdg_ConfigureSweepFrequencyStop (ViSession vi, ViConstString channelName, ViReal64 freqstop)**

This function configures stop frequency of sweep.The driver uses this value to set the Sweep Stop Frequency attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
Freqstop	Sweep stop frequency
Example: sdg_ConfigureSweepFrequencyStop(vi,"1",2000);	

- **sdg_ConfigureSweepTriggerSource (ViSession vi, ViConstString channelName, ViInt32 trigsrc)**

This function configures trigger source of sweep.The driver uses this value to set the Sweep Trigger Source attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
trigsrc	Trigger Source
Example: sdg_ConfigureSweepTriggerSource(vi,"1",0);	

- **sdg_ConfigureSweepTriggerOut (ViSession vi, ViConstString channelName, ViBoolean state)**

This function configures trigger out of sweep.The driver uses this value to set the Sweep Trigger Out attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
state	edge type of the sweep trigger output
Example: sdg_ConfigureSweepTriggerOut(vi,"1",1);	

- **sdg_ConfigureSweepType (ViSession vi, ViConstString channelName, ViInt32 type)**

This function configures the type of sweep.The driver uses this value to set the Sweep Type attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
type	type of the sweep
Example: sdg_ConfigureSweepType(vi,"1",0);	

- **sdg_ConfigureSweepDirection (ViSession vi, ViConstString channelName, ViInt32 dir))**

This function configures the direction of sweep.The driver uses this value to set the Sweep Direction attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
dir	the direction of the sweep
Example: sdg_ConfigureSweepDirection(vi,"1",2);	

- **sdg_ConfigureIqFrequencyCenter (ViSession vi, ViReal64 freqcenter)**

This function configures the center frequency of IQ.The driver uses this value to set the IQ Center Frequency attribute.

Description	Description
vi	Instrument handle
frequency	the center frequency of IQ
Example: sdg_ConfigureIqFrequencyCenter(vi,34000000);	

- **sdg_ConfigureIqSampleRate (ViSession vi, ViReal64 samplerate)**

This function configures the sample rate of IQ.The driver uses this value to set the IQ Sample Rate attribute

Description	Description
vi	Instrument handle
samplerate	the sample rate of IQ
Example: sdg_ConfigureIqSampleRate(vi,600000);	

- **sdg_ConfigureIqSymbolRate (ViSession vi, ViReal64 symbolrate)**

This function configures the symbol rate of IQ.The driver uses this value to set the IQ Symbol Rate attribute.

Description	Description
vi	Instrument handle
symbolrate	the symbol rate of IQ
Example: sdg_ConfigureIqSymbolRate(vi,400000);	

- **sdg_ConfigureIqAmplitude (ViSession vi, ViReal64 amplitude)**

This function configures the amplitude of IQ.The driver uses this value to set the IQ Amplitude attribute

Description	Description
vi	Instrument handle
amplitude	the amplitude of IQ
Example: sdg_ConfigureIqAmplitude(vi,0.15)	

- **sdg_ConfigureIqTriggerSource (ViSession vi, ViInt32 trigsrc)**

This function configures the trigger source of IQ.The driver uses this value to set the IQ Trigger Source attribute.

Description	Description
vi	Instrument handle
trigsrc	trigger source
Example: sdg_ConfigureIqTriggerSource(vi,0);	

- **sdg_ConfigureIqAdjGain (ViSession vi, ViReal64 gain)**

This function configures the gain of adjustment of IQ.The driver uses this value to set the IQ Gain attribute

Description	Description
vi	Instrument handle
gain	the gain of adjustment of IQ
Example: sdg_ConfigureIqAdjGain(vi,1);	

- **sdg_ConfigureIqAdjIOffest (ViSession vi, ViReal64 offest)**

This function configures the I-offest of adjustment of IQ.The driver uses this value to set the IQ I-offset attribute.

Description	Description
vi	Instrument handle
offset	I-offest of adjustment
Example: sdg_ConfigureIqAdjIOffest(vi,1);	

- **sdg_ConfigureIqAdjQOffest (ViSession vi, ViReal64 offest)**

This function configures the Q-offest of adjustment of IQ.The driver uses this value to set the IQ Q-offset attribute.

Description	Description
vi	Instrument handle
offset	Q-offest of adjustment
Example: sdg_ConfigureIqAdjQOffest(vi,1);	

- **sdg_ConfigureIqAdjSkew (ViSession vi, ViReal64 angle)**

This function configures the skew of adjustment of IQ.The driver uses this value to set the IQ Skew attribute

Description	Description
vi	Instrument handle
angle	skew of adjustment
Example: sdg_ConfigureIqAdjSkew(vi,1);	

- **sdg_ConfigureIqWaveBuiltIn (ViSession vi, ViInt32 wave)**

This function configures the wave in the system-stored of IQ.The driver uses this value to set the IQ Bulit-in Wave attribute.

Description	Description
vi	Instrument handle
wave	the wave in the system-stored of IQ
Example: sdg_ConfigureIqWaveBuiltIn(vi,0)	

- **sdg_ConfigureIqWaveUser (ViSession vi, ViString wavename)**

This function configures the user's wave of IQ. The driver uses this value to set the IQ User's Wave attribute

Description	Description
vi	Instrument handle
wavename	The name of waveform file
Example: sdg_ConfigureIqWaveUser(vi,xxx); //xxx is file name	

- **sdg_ConfigurePrbsBitRate (ViSession vi, ViConstString channelName , ViReal64 bitrate)**

This function configures the bit rate of PRBS.The driver uses this value to set the PRBS Bit Rate attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
bitrate	the bit rate attribute of PRBS
Example: sdg_ConfigurePrbsBitRate(vi,"1",1000);	

- **sdg_ConfigurePrbsAmplitude (ViSession vi, ViConstString channelName , ViReal64 amp)**

This function configures the amplitude of PRBS.The driver uses this value to set the PRBS Amplitude attribute

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
amp	the amplitude attribute of PRBS
Example: sdg_ConfigurePrbsAmplitude(vi,"1",5);	

- **sdg_ConfigurePrbsOffest (ViSession vi, ViConstString channelName , ViReal64 offest)**

This function configures the offest of PRBS.The driver uses this value to set the PRBS Offest attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
offset	the offset attribute of PRBS
Example: sdg_ConfigurePrbsOffest(vi,"1",1);	

- **sdg_ConfigurePrbsLength (ViSession vi, ViConstString channelName , ViInt32 length)**

This function configures the length of PRBS.The driver uses this value to set the PRBS Length attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
length	the length attribute of PRBS
Example: sdg_ConfigurePrbsLength(vi,"1",3);	

- **sdg_ConfigurePrbsEdge (ViSession vi, ViConstString channelName , ViReal64 edge)**

This function configures the edge of PRBS.The driver uses this value to set the PRBS Edge attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
edge	Edge attribute
Example: sdg_ConfigurePrbsEdge(vi,"1",0.000000001);	

- **sdg_ConfigurePrbsDifferentialState (ViSession vi, ViConstString channelName , ViBoolean state)**

This function configures the differential state of PRBS.The driver uses this value to set the PRBS Differential State attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
state	differential state
Example: sdg_ConfigurePrbsDifferentialState(vi,"1",0);	

- **sdg_ConfigurePrbsLogicLevel (ViSession vi, ViConstString channelName , ViInt32 level)**

This function configures the logic level of PRBS. The driver uses this value to set the PRBS Logic Level attribute.

Description	Description
vi	Instrument handle
channelName	ChannelName: 1 or 2
level	the logic level of PRBS
Example: sdg_ConfigurePrbsLogicLevel (vi,”1”,0);	

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

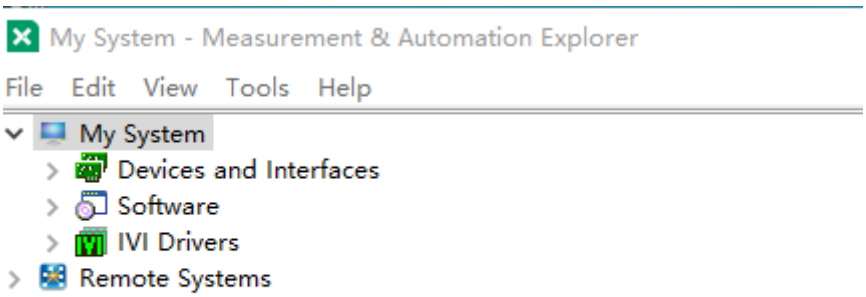
```
#include <Windows.h>
#include <stdio.h>
#include <userint.h>
#include <utility.h>
#include <string.h>
#include <stdlib.h>
#include "sdg.h"
#include "sdg_scpi.h"

#define    SDG_EXAMPLE_INSTR_RES_ADDR
"USB0::0xF4EC::0x1101::SDG6XFCX6R0349::INSTR"
//TCPIP0::10.11.13.138::inst0::INSTR
USB0::0xF4EC::0x1101::SDG6XFCX6R0349::INSTR
#define    SDG_EXAMPLE_INIT_OPTION
"Simulate=0,RangeCheck=0,QueryInstrStatus=0,Cache=1"


#define BUFFER_SIZE 512L
#pragma comment(lib,"sdg.lib")

static ViSession vi;
static ViStatus status;
```

```
void main()
{
    status = sdg_InitWithOptions(SDG_EXAMPLE_INSTR_RES_ADDR, VI_TRUE, VI_FALSE,
SDG_EXAMPLE_INIT_OPTION, &vi);

    sdg_ConfigureRefClockSource (vi,3);
    sdg_ConfigureOutputEnabled(vi,"2",VI_TRUE);

    sdg_SetAttributeViBoolean(vi,"2",SDG_ATTR_PWM_ENABLED,VI_TRUE);
    sdg_SetAttributeViInt32 (vi, "2",SDG_ATTR_PWM_SOURCE, 0);
    sdg_SetAttributeViInt32 (vi, "2",SDG_ATTR_PWM_INTERNAL_WAVEFORM, 4);
    sdg_SetAttributeViReal64(vi, "2",SDG_ATTR_PWM_DEVIATION_WIDTH, 100);
    sdg_SetAttributeViReal64(vi, "2",SDG_ATTR_PWM_INTERNAL_FREQUENCY, 1E+6);

    system("cmd /C pause");
}
```

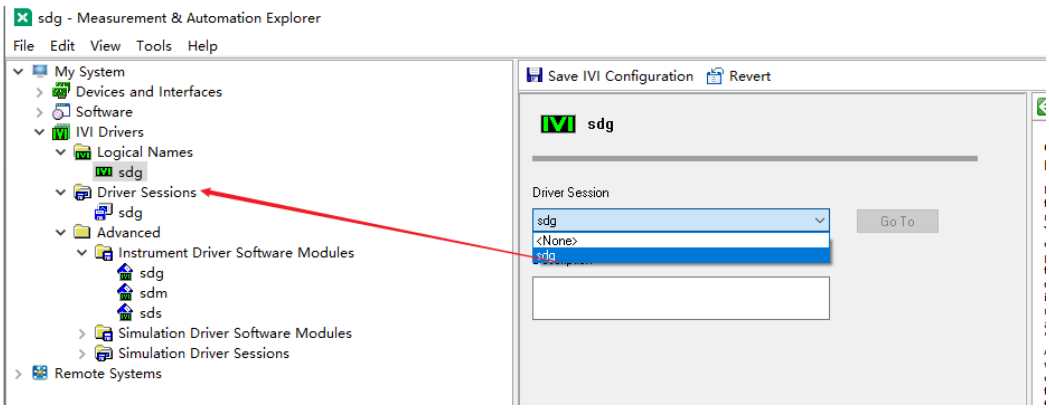
IVI Example Engineering Application

Step1: Use NI MAX to modify the IVI configuration file

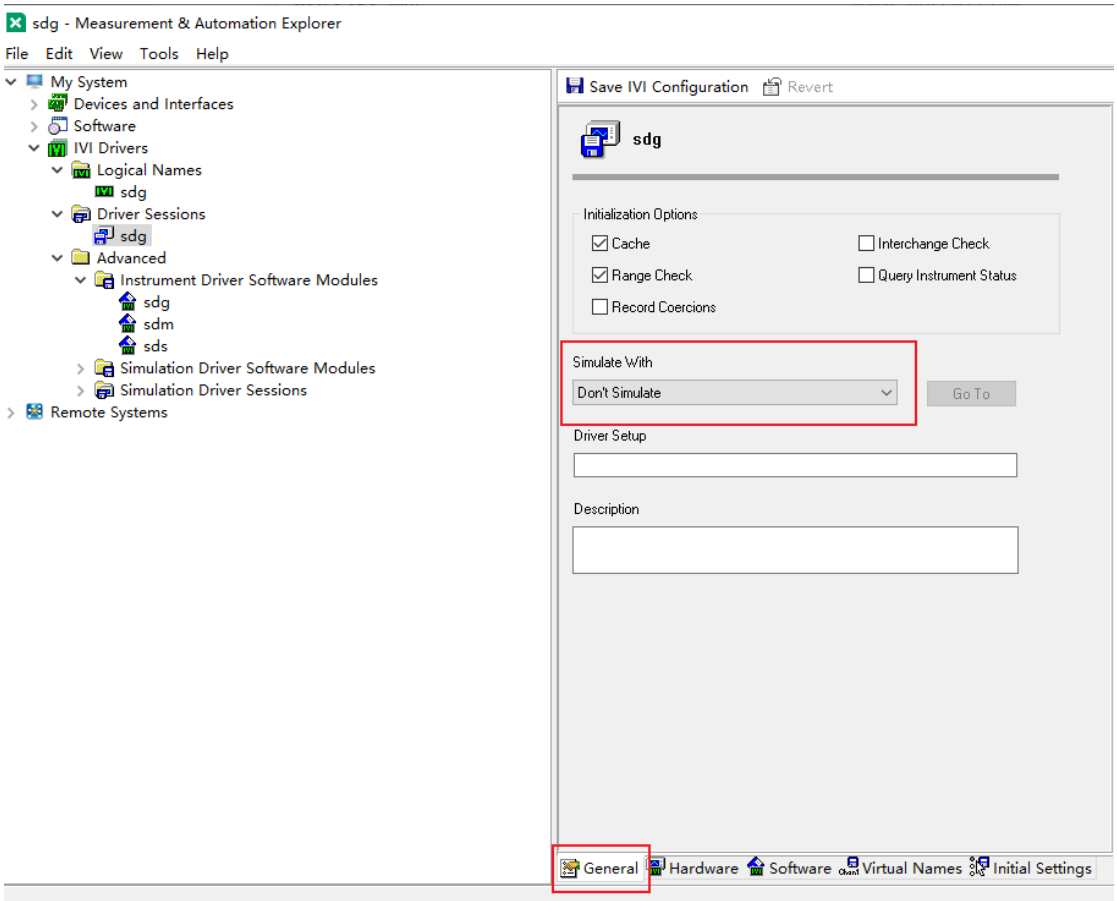
a. On the [Equipment and Interface] tab, find the equipment to be tested;



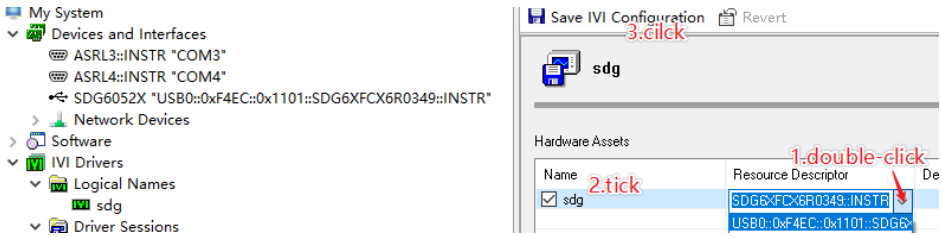
b. Then create a new logical name in the [IVI Driver] tab, such as sdg; And point to the corresponding Driver Session, and then click GO TO to go to the corresponding Session;



c. Set simulation options on the [General] tab, and select Don't Simulate



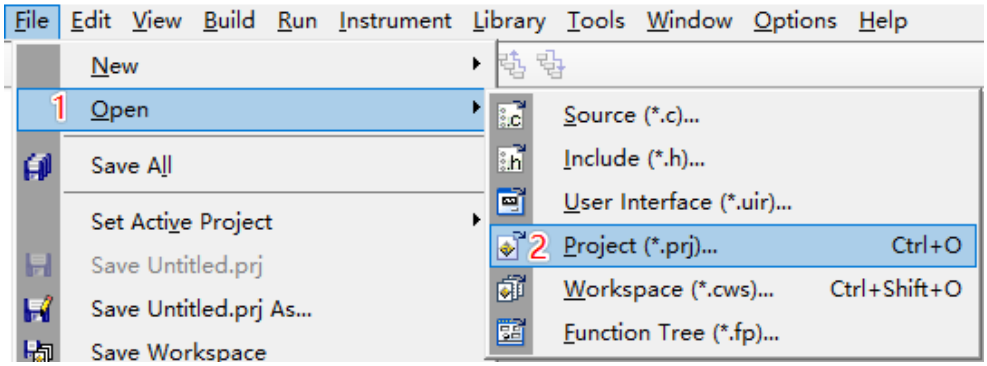
d. On the [Hardware] tab, add a hardware resource and select the correct resource address (Name is optional) ,and then save the configuration.

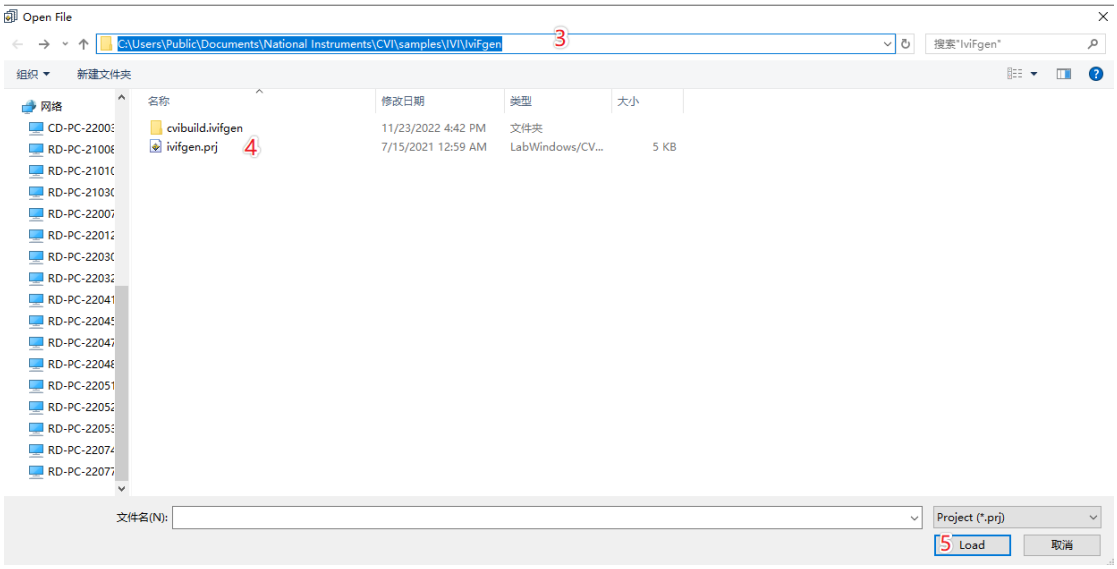


Step2: Use LabWindow/CVI to open the instance that comes with running IVI;

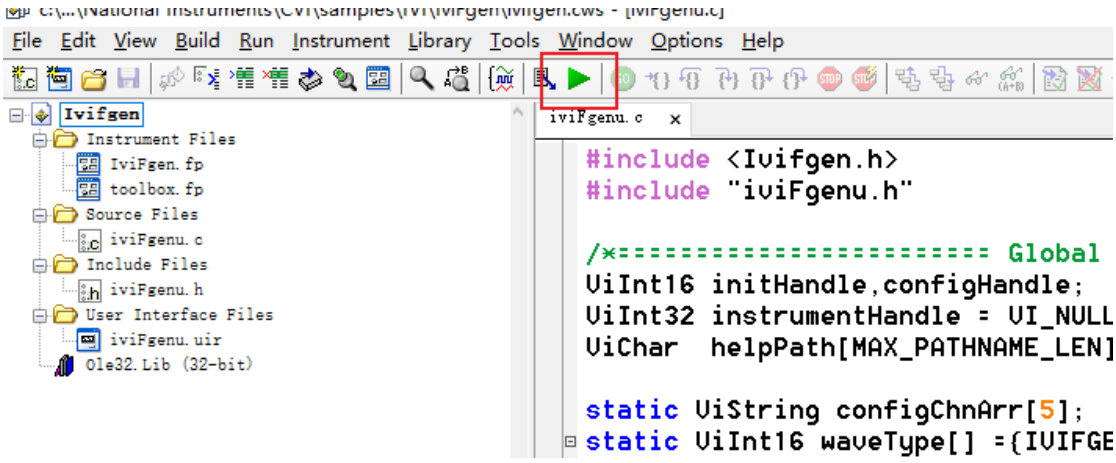
a. Open Instance Project:

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

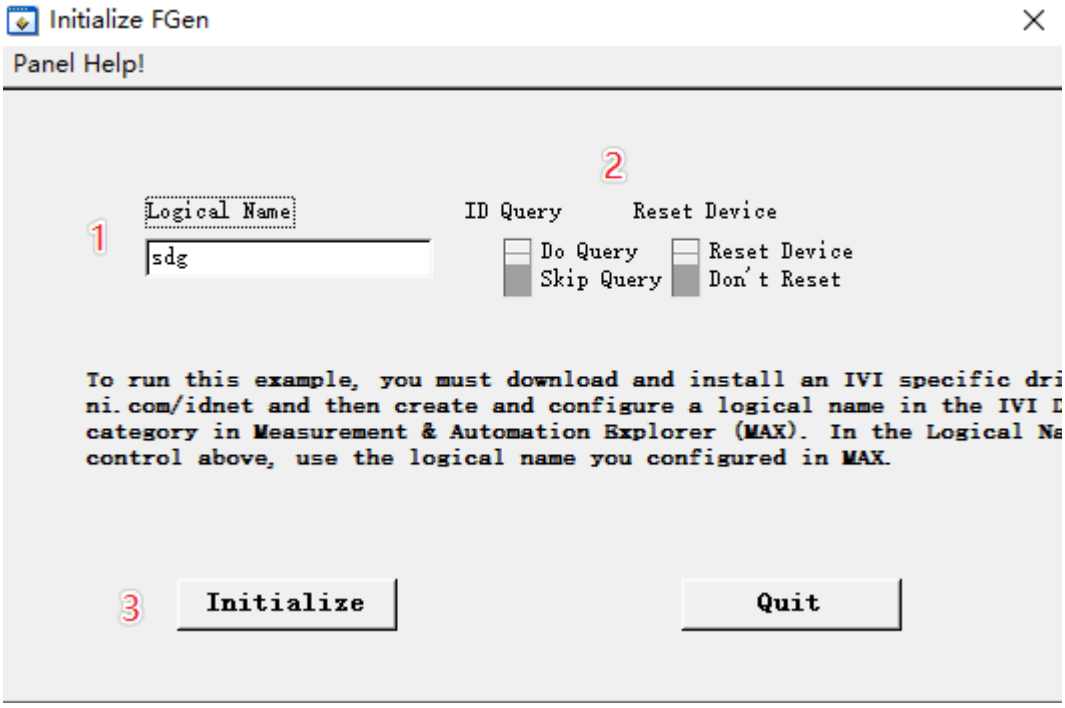




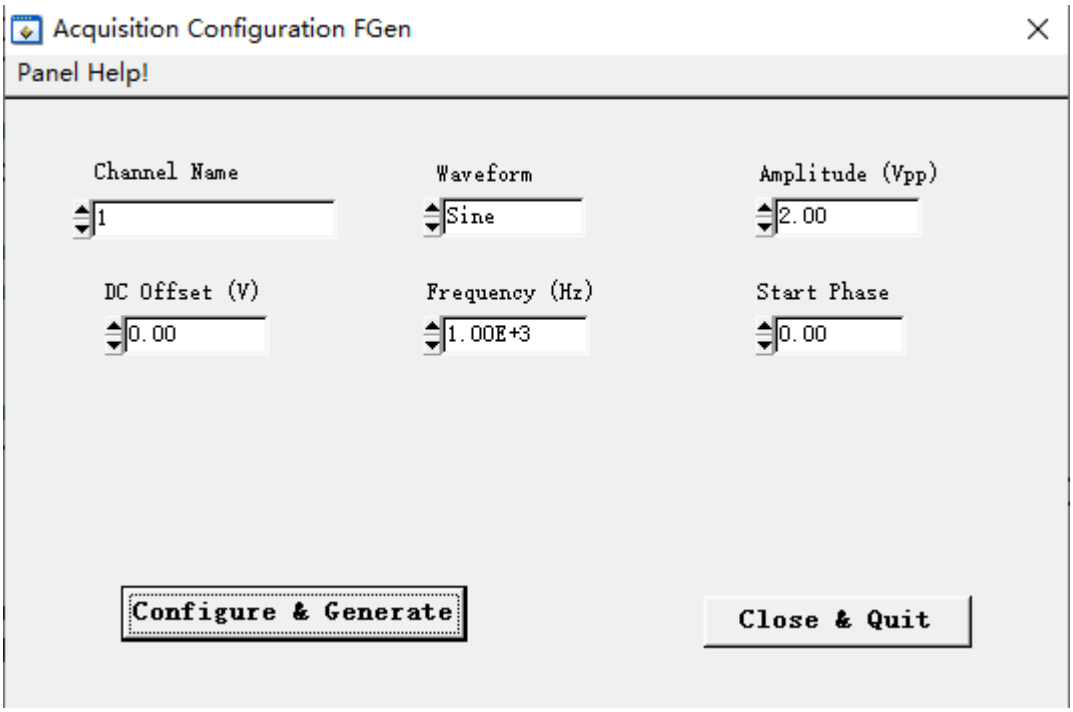
b. Run the program directly and enter the initialization panel immediately:



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 channel settings. Each parameter must meet the requirements. See the description of each attribute in the <SDG IVI-C Programming Guide> for details.


Acquisition Configuration FGen
Panel Help!
Channel Name
1
Waveform
Sine
Amplitude (Vpp)
2.00
DC Offset (V)
0.00
Frequency (Hz)
1.00E+3
Start Phase
0.00
Configure & Generate
Close & Quit

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

Website: int.siglent.com

North America:

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@siglentna.com

Website: 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

Website: www.siglenteu.com

Follow us on
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