
NI Modular Instruments Python API Documentation

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CHAPTER 1

Intro

nimi-python is a collection of Python modules that provide an interface to the underlying NI driver. Currently, the following drivers are supported:

- NI-DCPower (Python module: nidcpower)
- NI-DMM (Python module: nidmm)
- NI-FGEN (Python module: nifgen)
- NI-SCOPE (Python module: niscscope)
- NI-SWITCH (Python module: niswitch)
- NI-ModInst (Python module: nimodinst)

nimi-python supports all the Operating Systems supported by the underlying driver.

nimi-python supports Python 2.7, 3.4 and later using CPython or PyPy.

CHAPTER 2

Installation

Driver specific installation instructions can be found on Read The Docs:

- [nidcpower](#)
- [nidmm](#)
- [nifgen](#)
- [niscopes](#)
- [niswitch](#)
- [nimodinst](#)

CHAPTER 3

Contributing

We welcome contributions! You can clone the project repository, build it, and install it by [following these instructions](#).

CHAPTER 4

Support / Feedback

The packages included in **nimi-python** package are supported by NI. For support, open a request through the NI support portal at ni.com.

To report a bug or submit a feature request, please use the [GitHub issues page](#).

5.1 Information to Include When Asking for Help

Please include **all** of the following information when opening an issue:

- Detailed steps on how to reproduce the problem and full traceback, if applicable. Code samples are encouraged!
- The python version used:

```
$ python -c "import sys; print(sys.version)"
```

- The module (i.e. **nidmm**) and its version:

```
$ python -m pip list
```

- The version of the driver used (i.e. **NI-DMM 17.1**). Follow [this KB article](#) to determine the version you have installed.
- The operating system, version, and bitness. For example 64-bit Windows 7.

CHAPTER 6

Documentation

Documentation is available [here](#).

6.1 Additional Documentation

Refer to your driver documentation for device-specific information and detailed API documentation.

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7.1 nidcpower module

7.1.1 Installation

As a prerequisite to using the **nidcpower** module, you must install the NI-DCPower runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The **nimi-python** modules (i.e. for **NI-DCPower**) can be installed with **pip**:

```
$ python -m pip install nidcpower~=0.8.0
```

Or **easy_install** from **setuptools**:

```
$ python -m easy_install nidcpower
```

7.1.2 Usage

The following is a basic example of using the **nidcpower** module to open a session to a Source Meter Unit and measure voltage and current.

```
import nidcpower
# Configure the session.

with nidcpower.Session('dev1') as session:
    session.measure_record_length = 20
    session.measure_record_length_is_finite = True
    session.measure_when = nidcpower.MeasureWhen.AUTOMATICALLY_AFTER_SOURCE_COMPLETE
    session.voltage_level = 5.0
```

```

session.commit()
print('Effective measurement rate: {0} S/s'.format(session.measure_record_delta_
↪time / 1))

samples_acquired = 0
print(' #      Voltage      Current      In Compliance')
row_format = '{0:3d}:   {1:8.6f}   {2:8.6f}   {3}'
with session.initiate():
    while samples_acquired < 20:
        measurements = session.fetch_multiple(count=session.fetch_backlog)
        samples_acquired += len(measurements)
        for i in range(len(measurements)):
            print(row_format.format(i, measurements[i].voltage, measurements[i].
↪current, measurements[i].in_compliance))

```

Additional examples for NI-DCPower are located in `src/nidcpower/examples/` directory.

7.1.3 API Reference

nidcpower.Session

class nidcpower.Session

An NI-DCPower session to a National Instruments Programmable Power Supply or Source Measure Unit.

Properties

Property	Datatype
<code>active_advanced_sequence</code>	str
<code>active_advanced_sequence_step</code>	int
<code>aperture_time</code>	float
<code>aperture_time_units</code>	<i>ApertureTimeUnits</i>
<code>auto_zero</code>	<i>AutoZero</i>
<code>auxiliary_power_source_available</code>	bool
<code>cache</code>	bool
<code>channel_count</code>	int
<code>compliance_limit_symmetry</code>	<i>ComplianceLimitSymmetry</i>
<code>current_compensation_frequency</code>	float
<code>current_gain_bandwidth</code>	float
<code>current_level</code>	float
<code>current_level_autorange</code>	bool
<code>current_level_range</code>	float
<code>current_limit</code>	float
<code>current_limit_autorange</code>	bool
<code>current_limit_high</code>	float
<code>current_limit_low</code>	float
<code>current_limit_range</code>	float
<code>current_pole_zero_ratio</code>	float
<code>dc_noise_rejection</code>	<i>DCNoiseRejection</i>
<code>digital_edge_measure_trigger_edge</code>	<i>DigitalEdge</i>
<code>digital_edge_measure_trigger_input_terminal</code>	str
<code>digital_edge_pulse_trigger_edge</code>	<i>DigitalEdge</i>

Continued on next page

Table 7.1 – continued from previous page

Property	Datatype
<code>digital_edge_pulse_trigger_input_terminal</code>	str
<code>digital_edge_sequence_advance_trigger_edge</code>	<i>DigitalEdge</i>
<code>digital_edge_sequence_advance_trigger_input_terminal</code>	str
<code>digital_edge_source_trigger_edge</code>	<i>DigitalEdge</i>
<code>digital_edge_source_trigger_input_terminal</code>	str
<code>digital_edge_start_trigger_edge</code>	<i>DigitalEdge</i>
<code>digital_edge_start_trigger_input_terminal</code>	str
<code>driver_setup</code>	str
<code>exported_measure_trigger_output_terminal</code>	str
<code>exported_pulse_trigger_output_terminal</code>	str
<code>exported_sequence_advance_trigger_output_terminal</code>	str
<code>exported_source_trigger_output_terminal</code>	str
<code>exported_start_trigger_output_terminal</code>	str
<code>fetch_backlog</code>	int
<code>group_capabilities</code>	str
<code>instrument_firmware_revision</code>	str
<code>instrument_manufacturer</code>	str
<code>instrument_model</code>	str
<code>interchange_check</code>	bool
<code>interlock_input_open</code>	bool
<code>io_resource_descriptor</code>	str
<code>logical_name</code>	str
<code>measure_buffer_size</code>	int
<code>measure_complete_event_delay</code>	float in seconds or datetime.timedelta
<code>measure_complete_event_output_terminal</code>	str
<code>measure_complete_event_pulse_polarity</code>	<i>Polarity</i>
<code>measure_complete_event_pulse_width</code>	float
<code>measure_record_delta_time</code>	float in seconds or datetime.timedelta
<code>measure_record_length</code>	int
<code>measure_record_length_is_finite</code>	bool
<code>measure_trigger_type</code>	<i>TriggerType</i>
<code>measure_when</code>	<i>MeasureWhen</i>
<code>output_capacitance</code>	<i>OutputCapacitance</i>
<code>output_connected</code>	bool
<code>output_enabled</code>	bool
<code>output_function</code>	<i>OutputFunction</i>
<code>output_resistance</code>	float
<code>overranging_enabled</code>	bool
<code>ovp_enabled</code>	bool
<code>ovp_limit</code>	float
<code>power_line_frequency</code>	float
<code>power_source</code>	<i>PowerSource</i>
<code>power_source_in_use</code>	<i>PowerSourceInUse</i>
<code>pulse_bias_current_level</code>	float
<code>pulse_bias_current_limit</code>	float
<code>pulse_bias_current_limit_high</code>	float
<code>pulse_bias_current_limit_low</code>	float
<code>pulse_bias_delay</code>	float
<code>pulse_bias_voltage_level</code>	float

Continued on next page

Table 7.1 – continued from previous page

Property	Datatype
<code>pulse_bias_voltage_limit</code>	float
<code>pulse_bias_voltage_limit_high</code>	float
<code>pulse_bias_voltage_limit_low</code>	float
<code>pulse_complete_event_output_terminal</code>	str
<code>pulse_complete_event_pulse_polarity</code>	<i>Polarity</i>
<code>pulse_complete_event_pulse_width</code>	float
<code>pulse_current_level</code>	float
<code>pulse_current_level_range</code>	float
<code>pulse_current_limit</code>	float
<code>pulse_current_limit_high</code>	float
<code>pulse_current_limit_low</code>	float
<code>pulse_current_limit_range</code>	float
<code>pulse_off_time</code>	float in seconds or datetime.timedelta
<code>pulse_on_time</code>	float in seconds or datetime.timedelta
<code>pulse_trigger_type</code>	<i>TriggerType</i>
<code>pulse_voltage_level</code>	float
<code>pulse_voltage_level_range</code>	float
<code>pulse_voltage_limit</code>	float
<code>pulse_voltage_limit_high</code>	float
<code>pulse_voltage_limit_low</code>	float
<code>pulse_voltage_limit_range</code>	float
<code>query_instrument_status</code>	bool
<code>range_check</code>	bool
<code>ready_for_pulse_trigger_event_output_terminal</code>	str
<code>ready_for_pulse_trigger_event_pulse_polarity</code>	<i>Polarity</i>
<code>ready_for_pulse_trigger_event_pulse_width</code>	float
<code>record_coercions</code>	bool
<code>reset_average_before_measurement</code>	bool
<code>samples_to_average</code>	int
<code>self_calibration_persistence</code>	<i>SelfCalibrationPersistence</i>
<code>sense</code>	<i>Sense</i>
<code>sequence_advance_trigger_type</code>	<i>TriggerType</i>
<code>sequence_engine_done_event_output_terminal</code>	str
<code>sequence_engine_done_event_pulse_polarity</code>	<i>Polarity</i>
<code>sequence_engine_done_event_pulse_width</code>	float
<code>sequence_iteration_complete_event_output_terminal</code>	str
<code>sequence_iteration_complete_event_pulse_polarity</code>	<i>Polarity</i>
<code>sequence_iteration_complete_event_pulse_width</code>	float
<code>sequence_loop_count</code>	int
<code>sequence_loop_count_is_finite</code>	bool
<code>simulate</code>	bool
<code>source_complete_event_output_terminal</code>	str
<code>source_complete_event_pulse_polarity</code>	<i>Polarity</i>
<code>source_complete_event_pulse_width</code>	float
<code>source_delay</code>	float in seconds or datetime.timedelta
<code>source_mode</code>	<i>SourceMode</i>
<code>source_trigger_type</code>	<i>TriggerType</i>
<code>specific_driver_class_spec_major_version</code>	int
<code>specific_driver_class_spec_minor_version</code>	int

Continued on next page

Table 7.1 – continued from previous page

Property	Datatype
<i>specific_driver_description</i>	str
<i>specific_driver_prefix</i>	str
<i>specific_driver_revision</i>	str
<i>specific_driver_vendor</i>	str
<i>start_trigger_type</i>	<i>TriggerType</i>
<i>supported_instrument_models</i>	str
<i>transient_response</i>	<i>TransientResponse</i>
<i>voltage_compensation_frequency</i>	float
<i>voltage_gain_bandwidth</i>	float
<i>voltage_level</i>	float
<i>voltage_level_autorange</i>	bool
<i>voltage_level_range</i>	float
<i>voltage_limit</i>	float
<i>voltage_limit_autorange</i>	bool
<i>voltage_limit_high</i>	float
<i>voltage_limit_low</i>	float
<i>voltage_limit_range</i>	float
<i>voltage_pole_zero_ratio</i>	float

Public methods

Method name
<i>abort()</i>
<i>commit()</i>
<i>configure_aperture_time()</i>
<i>configure_digital_edge_measure_trigger()</i>
<i>configure_digital_edge_pulse_trigger()</i>
<i>configure_digital_edge_sequence_advance_trigger()</i>
<i>configure_digital_edge_source_trigger()</i>
<i>configure_digital_edge_start_trigger()</i>
<i>disable()</i>
<i>export_signal()</i>
<i>fetch_multiple()</i>
<i>get_channel_name()</i>
<i>get_ext_cal_last_date_and_time()</i>
<i>get_ext_cal_last_temp()</i>
<i>get_ext_cal_recommended_interval()</i>
<i>get_self_cal_last_date_and_time()</i>
<i>get_self_cal_last_temp()</i>
<i>measure()</i>
<i>measure_multiple()</i>
<i>query_in_compliance()</i>
<i>query_max_current_limit()</i>
<i>query_max_voltage_level()</i>
<i>query_min_current_limit()</i>
<i>query_output_state()</i>
<i>read_current_temperature()</i>
<i>reset()</i>
<i>reset_device()</i>

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Table 7.2 – continued from previous page

Method name
<code>reset_with_defaults()</code>
<code>self_cal()</code>
<code>self_test()</code>
<code>send_software_edge_trigger()</code>
<code>set_sequence()</code>
<code>wait_for_event()</code>

nidcpower.Session methods

`nidcpower.Session.abort()`

Transitions the NI-DCPower session from the Running state to the Committed state. If a sequence is running, it is stopped. Any configuration methods called after this method are not applied until the `nidcpower.Session._initiate()` method is called. If power output is enabled when you call the `nidcpower.Session.abort()` method, the output channels remain in their current state and continue providing power.

Use the `nidcpower.Session.ConfigureOutputEnabled()` method to disable power output on a per channel basis. Use the `nidcpower.Session.reset()` method to disable output on all channels.

Refer to the [Programming States](#) topic in the *NI DC Power Supplies and SMUs Help* for information about the specific NI-DCPower software states.

Related Topics:

[Programming States](#)

Note: One or more of the referenced methods are not in the Python API for this driver.

`nidcpower.Session.commit()`

Applies previously configured settings to the device. Calling this method moves the NI-DCPower session from the Uncommitted state into the Committed state. After calling this method, modifying any property reverts the NI-DCPower session to the Uncommitted state. Use the `nidcpower.Session._initiate()` method to transition to the Running state. Refer to the [Programming States](#) topic in the *NI DC Power Supplies and SMUs Help* for details about the specific NI-DCPower software states.

Related Topics:

[Programming States](#)

`nidcpower.Session.configure_aperture_time(aperture_time, units=nidcpower.ApertureTimeUnits.SECONDS)`

Configures the aperture time on the specified channel(s).

The supported values depend on the **units**. Refer to the *Aperture Time* topic for your device in the *NI DC Power Supplies and SMUs Help* for more information. In general, devices support discrete **apertureTime** values, and if you configure **apertureTime** to some unsupported value, NI-DCPower coerces it up to the next supported value.

Refer to the *Measurement Configuration and Timing* or *DC Noise Rejection* topic for your device in the *NI DC Power Supplies and SMUs Help* for more information about how to configure your measurements.

Related Topics:

[Aperture Time](#)

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].configure_aperture_time(aperture_time, units=nidcpower.
↪ApertureTimeUnits.SECONDS)
```

Parameters

- **aperture_time** (*float*) – Specifies the aperture time. Refer to the *Aperture Time* topic for your device in the *NI DC Power Supplies and SMUs Help* for more information.
- **units** (*nidcpower.ApertureTimeUnits*) – Specifies the units for **apertureTime**.
Defined Values:

<i>SECONDS</i> (1028)	Specifies seconds.
<i>POWER_LINE_CYCLES</i> (1029)	Specifies Power Line Cycles.

`nidcpower.Session.configure_digital_edge_measure_trigger` (*input_terminal*,
edge=nidcpower.DigitalEdge.RISING)
Configures the Measure trigger for digital edge triggering.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **input_terminal** (*str*) – Specifies the input terminal for the digital edge Measure trigger.

You can specify any valid input terminal for this method. Valid terminals are listed in MAX under the **Device Routes** tab. For PXIe-4162/4163, refer to the Signal Routing topic for the device to determine which routes are available. This information is not available on a Device Routes tab in MAX.

Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

- **edge** (*nidcpower.DigitalEdge*) – Specifies whether to configure the Measure trigger to assert on the rising or falling edge. **Defined Values:**

<i>RISING</i> (1016)	Asserts the trigger on the rising edge of the digital signal.
<i>FALLING</i> (1017)	Asserts the trigger on the falling edge of the digital signal.

```
nidcpower.Session.configure_digital_edge_pulse_trigger(input_terminal,
                                                         edge=nidcpower.DigitalEdge.RISING)
```

Configures the Pulse trigger for digital edge triggering.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **input_terminal** (*str*) – Specifies the input terminal for the digital edge Pulse trigger.
You can specify any valid input terminal for this method. Valid terminals are listed in MAX under the **Device Routes** tab.

Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.
- **edge** (*nidcpower.DigitalEdge*) – Specifies whether to configure the Pulse trigger to assert on the rising or falling edge. **Defined Values:**

<i>RISING</i> (1016)	Asserts the trigger on the rising edge of the digital signal.
<i>FALLING</i> (1017)	Asserts the trigger on the falling edge of the digital signal.

```
nidcpower.Session.configure_digital_edge_sequence_advance_trigger(input_terminal,
                                                                    edge=nidcpower.DigitalEdge.RISING)
```

Configures the Sequence Advance trigger for digital edge triggering.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **input_terminal** (*str*) – Specifies the input terminal for the digital edge Sequence Advance trigger.
You can specify any valid input terminal for this method. Valid terminals are listed in MAX under the **Device Routes** tab. For PXIe-4162/4163, refer to the Signal Routing topic for the device to determine which routes are available. This information is not available on a Device Routes tab in MAX.

Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.
- **edge** (*nidcpower.DigitalEdge*) – Specifies whether to configure the Sequence Advance trigger to assert on the rising or falling edge. **Defined Values:**

<i>RISING</i> (1016)	Asserts the trigger on the rising edge of the digital signal.
<i>FALLING</i> (1017)	Asserts the trigger on the falling edge of the digital signal.


```
nidcpower.Session.configure_digital_edge_source_trigger(input_terminal,
                                                         edge=nidcpower.DigitalEdge.RISING)
```

Configures the Source trigger for digital edge triggering.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **input_terminal** (*str*) – Specifies the input terminal for the digital edge Source trigger.
You can specify any valid input terminal for this method. Valid terminals are listed in MAX under the **Device Routes** tab. For PXIe-4162/4163, refer to the Signal Routing topic for the device to determine which routes are available. This information is not available on a Device Routes tab in MAX.

Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.
- **edge** (*nidcpower.DigitalEdge*) – Specifies whether to configure the Source trigger to assert on the rising or falling edge. **Defined Values:**

<i>RISING</i> (1016)	Asserts the trigger on the rising edge of the digital signal.
<i>FALLING</i> (1017)	Asserts the trigger on the falling edge of the digital signal.

```
nidcpower.Session.configure_digital_edge_start_trigger(input_terminal,
                                                         edge=nidcpower.DigitalEdge.RISING)
```

Configures the Start trigger for digital edge triggering.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **input_terminal** (*str*) – Specifies the input terminal for the digital edge Start trigger.
You can specify any valid input terminal for this method. Valid terminals are listed in MAX under the **Device Routes** tab. For PXIe-4162/4163, refer to the Signal Routing topic for the device to determine which routes are available. This information is not available on a Device Routes tab in MAX.

Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.
- **edge** (*nidcpower.DigitalEdge*) – Specifies whether to configure the Start trigger to assert on the rising or falling edge. **Defined Values:**

<i>RISING</i> (1016)	Asserts the trigger on the rising edge of the digital signal.
<i>FALLING</i> (1017)	Asserts the trigger on the falling edge of the digital signal.

`nidcpower.Session.disable()`

This method performs the same actions as the `nidcpower.Session.reset()` method, except that this method also immediately sets the `nidcpower.Session.output_enabled` property to False.

This method opens the output relay on devices that have an output relay.

`nidcpower.Session.export_signal(signal, output_terminal, signal_identifier="")`

Routes signals (triggers and events) to the output terminal you specify. The route is created when the session is `nidcpower.Session.commit()`.

Related Topics:

[Triggers](#)

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **signal** (`nidcpower.ExportSignal`) – Specifies which trigger or event to export.
Defined Values:

<code>SOURCE_COMPLETE_EVENT</code> (1030)	Exports the Source Complete event.
<code>MEASURE_COMPLETE_EVENT</code> (1031)	Exports the Measure Complete event.
<code>SEQUENCE_ITERATION_COMPLETE_EVENT</code> (1032)	Exports the Sequence Iteration Complete event.
<code>SEQUENCE_ENGINE_DONE_EVENT</code> (1033)	Exports the Sequence Engine Done event.
<code>PULSE_COMPLETE_EVENT</code> (1051)	Exports the Pulse Complete event.
<code>READY_FOR_PULSE_TRIGGER_EVENT</code> (1052)	Exports the Ready Pulse Trigger event.
<code>START_TRIGGER</code> (1034)	Exports the Start trigger.
<code>SOURCE_TRIGGER</code> (1035)	Exports the Source trigger.
<code>MEASURE_TRIGGER</code> (1036)	Exports the Measure trigger.
<code>SEQUENCE_ADVANCE_TRIGGER</code> (1037)	Exports the Sequence Advance trigger.
<code>PULSE_TRIGGER</code> (1053)	Exports the Pulse trigger.

- **output_terminal** (`str`) – Specifies where to export the selected signal. **Relative Terminals:**

""	Do not export signal
"PXI_Trig0"	PXI trigger line 0
"PXI_Trig1"	PXI trigger line 1
"PXI_Trig2"	PXI trigger line 2
"PXI_Trig3"	PXI trigger line 3
"PXI_Trig4"	PXI trigger line 4
"PXI_Trig5"	PXI trigger line 5
"PXI_Trig6"	PXI trigger line 6
"PXI_Trig7"	PXI trigger line 7

- **signal_identifier** (`str`) – Reserved for future use. Pass in an empty string for this parameter.

`nidcpower.Session.fetch_multiple(count, timeout=datetime.timedelta(seconds=1.0))`

Returns a list of named tuples (Measurement) that were previously taken and are stored in the NI-DCPower buffer. This method should not be used when the `nidcpower.Session.measure_when` property is set to `ON_DEMAND`. You must first call `nidcpower.Session._initiate()` before calling this method.

Fields in Measurement:

- **voltage** (float)
- **current** (float)
- **in_compliance** (bool)

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].fetch_multiple(count, timeout=datetime.
↳timedelta(seconds=1.0))
```

Parameters

- **count** (*int*) – Specifies the number of measurements to fetch.
- **timeout** (*float in seconds or datetime.timedelta*) – Specifies the maximum time allowed for this method to complete. If the method does not complete within this time interval, NI-DCPower returns an error.

Note: When setting the timeout interval, ensure you take into account any triggers so that the timeout interval is long enough for your application.

Return type list of Measurement

Returns

List of named tuples with fields:

- **voltage** (float)
- **current** (float)
- **in_compliance** (bool)

`nidcpower.Session.get_channel_name(index)`

Retrieves the output **channelName** that corresponds to the requested **index**. Use the `nidcpower.Session.channel_count` property to determine the upper bound of valid values for **index**.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].get_channel_name(index)
```

Parameters `index (int)` – Specifies which output channel name to return. The index values begin at 1.

`nidcpower.Session.get_ext_cal_last_date_and_time()`

Returns the date and time of the last successful calibration.

Return type `datetime.datetime`

Returns Indicates date and time of the last calibration.

`nidcpower.Session.get_ext_cal_last_temp()`

Returns the onboard **temperature** of the device, in degrees Celsius, during the last successful external calibration.

Return type `float`

Returns Returns the onboard **temperature** of the device, in degrees Celsius, during the last successful external calibration.

`nidcpower.Session.get_ext_cal_recommended_interval()`

Returns the recommended maximum interval, in **months**, between external calibrations.

Return type `datetime.timedelta`

Returns Specifies the recommended maximum interval, in **months**, between external calibrations.

`nidcpower.Session.get_self_cal_last_date_and_time()`

Returns the date and time of the oldest successful self-calibration from among the channels in the session.

Note: This method is not supported on all devices.

Return type `datetime.datetime`

Returns Returns the date and time the device was last calibrated.

`nidcpower.Session.get_self_cal_last_temp()`

Returns the onboard temperature of the device, in degrees Celsius, during the oldest successful self-calibration from among the channels in the session.

For example, if you have a session using channels 1 and 2, and you perform a self-calibration on channel 1 with a device temperature of 25 degrees Celsius at 2:00, and a self-calibration was performed on channel 2 at 27 degrees Celsius at 3:00 on the same day, this method returns 25 for the **temperature** parameter.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Return type `float`

Returns Returns the onboard **temperature** of the device, in degrees Celsius, during the oldest successful calibration.

`nidcpower.Session.measure(measurement_type)`

Returns the measured value of either the voltage or current on the specified output channel. Each call to this method blocks other method calls until the hardware returns the **measurement**. To measure multiple output channels, use the `nidcpower.Session.measure_multiple()` method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].measure(measurement_type)
```

Parameters `measurement_type` (`nidcpower.MeasurementTypes`) – Specifies whether a voltage or current value is measured. **Defined Values:**

<code>VOLTAGE</code> (1)	The device measures voltage.
<code>CURRENT</code> (0)	The device measures current.

Return type `float`

Returns Returns the value of the measurement, either in volts for voltage or amps for current.

`nidcpower.Session.measure_multiple()`

Returns a list of named tuples (`Measurement`) containing the measured voltage and current values on the specified output channel(s). Each call to this method blocks other method calls until the measurements are returned from the device. The order of the measurements returned in the array corresponds to the order on the specified output channel(s).

Fields in `Measurement`:

- **voltage** (`float`)
- **current** (`float`)
- **in_compliance** (`bool`) - Always `None`

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].measure_multiple()
```

Return type `list of Measurement`

Returns

List of named tuples with fields:

- **voltage** (float)
- **current** (float)
- **in_compliance** (bool) - Always None

`nidcpower.Session.query_in_compliance()`

Queries the specified output device to determine if it is operating at the **compliance** limit.

The compliance limit is the current limit when the output method is set to **DC_VOLTAGE**. If the output is operating at the compliance limit, the output reaches the current limit before the desired voltage level. Refer to the `nidcpower.Session.ConfigureOutputFunction()` method and the `nidcpower.Session.ConfigureCurrentLimit()` method for more information about output method and current limit, respectively.

The compliance limit is the voltage limit when the output method is set to **DC_CURRENT**. If the output is operating at the compliance limit, the output reaches the voltage limit before the desired current level. Refer to the `nidcpower.Session.ConfigureOutputFunction()` method and the `nidcpower.Session.ConfigureVoltageLimit()` method for more information about output method and voltage limit, respectively.

Related Topics:

[Compliance](#)

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].query_in_compliance()
```

Return type **bool**

Returns Returns whether the device output channel is in compliance.

`nidcpower.Session.query_max_current_limit(voltage_level)`

Queries the maximum current limit on an output channel if the output channel is set to the specified **voltageLevel**.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].query_max_current_limit(voltage_level)
```

Parameters **voltage_level** (*float*) – Specifies the voltage level to use when calculating the **maxCurrentLimit**.

Return type **float**

Returns Returns the maximum current limit that can be set with the specified **voltageLevel**.

`nidcpower.Session.query_max_voltage_level(current_limit)`

Queries the maximum voltage level on an output channel if the output channel is set to the specified **currentLimit**.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].query_max_voltage_level(current_limit)
```

Parameters **current_limit** (*float*) – Specifies the current limit to use when calculating the **maxVoltageLevel**.

Return type *float*

Returns Returns the maximum voltage level that can be set on an output channel with the specified **currentLimit**.

`nidcpower.Session.query_min_current_limit(voltage_level)`

Queries the minimum current limit on an output channel if the output channel is set to the specified **voltageLevel**.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].query_min_current_limit(voltage_level)
```

Parameters **voltage_level** (*float*) – Specifies the voltage level to use when calculating the **minCurrentLimit**.

Return type *float*

Returns Returns the minimum current limit that can be set on an output channel with the specified **voltageLevel**.

`nidcpower.Session.query_output_state(output_state)`

Queries the specified output channel to determine if the output channel is currently in the state specified by **outputState**.

Related Topics:

[Compliance](#)

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].query_output_state(output_state)
```

Parameters `output_state` (*nidcpower.OutputStates*) – Specifies the output state of the output channel that is being queried. **Defined Values:**

<i>VOLTAGE</i> (0)	The device maintains a constant voltage by adjusting the current.
<i>CURRENT</i> (1)	The device maintains a constant current by adjusting the voltage.

Return type `bool`

Returns Returns whether the device output channel is in the specified output state.

```
nidcpower.Session.read_current_temperature()
```

Returns the current onboard **temperature**, in degrees Celsius, of the device.

Return type `float`

Returns Returns the onboard **temperature**, in degrees Celsius, of the device.

```
nidcpower.Session.reset()
```

Resets the device to a known state. This method disables power generation, resets session properties to their default values, commits the session properties, and leaves the session in the Uncommitted state. Refer to the [Programming States](#) topic for more information about NI-DCPower software states.

```
nidcpower.Session.reset_device()
```

Resets the device to a known state. The method disables power generation, resets session properties to their default values, clears errors such as overtemperature and unexpected loss of auxiliary power, commits the session properties, and leaves the session in the Uncommitted state. This method also performs a hard reset on the device and driver software. This method has the same functionality as using `reset` in Measurement & Automation Explorer. Refer to the [Programming States](#) topic for more information about NI-DCPower software states.

This will also open the output relay on devices that have an output relay.

```
nidcpower.Session.reset_with_defaults()
```

Resets the device to a known state. This method disables power generation, resets session properties to their default values, commits the session properties, and leaves the session in the [Running](#) state. In addition to exhibiting the behavior of the `nidcpower.Session.reset()` method, this method can assign user-defined default values for configurable properties from the IVI configuration.

```
nidcpower.Session.self_cal()
```

Performs a self-calibration upon the specified channel(s).

This method disables the output, performs several internal calculations, and updates calibration values. The updated calibration values are written to the device hardware if the `nidcpower.Session.self_calibration_persistence` property is set to `WRITE_TO_EEPROM`. Refer to the `nidcpower.Session.self_calibration_persistence` property topic for more information about the settings for this property.

When calling `nidcpower.Session.self_cal()` with the PXIe-4162/4163, specify all channels of your PXIe-4162/4163 with the `channelName` input. You cannot self-calibrate a subset of PXIe-4162/4163 channels.

Refer to the [Self-Calibration](#) topic for more information about this method.

Related Topics:

[Self-Calibration](#)

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].self_cal()
```

`nidcpower.Session.self_test()`

Performs the device self-test routine and returns the test result(s). Calling this method implicitly calls the `nidcpower.Session.reset()` method.

When calling `nidcpower.Session.self_test()` with the PXIe-4162/4163, specify all channels of your PXIe-4162/4163 with the channels input of `nidcpower.Session.__init__()`. You cannot self test a subset of PXIe-4162/4163 channels.

Raises `SelfTestError` on self test failure. Properties on exception object:

- code - failure code from driver
- message - status message from driver

Self-Test Code	Description
0	Self test passed.
1	Self test failed.

`nidcpower.Session.send_software_edge_trigger(trigger=nidcpower.SendSoftwareEdgeTriggerType.START)`

Asserts the specified trigger. This method can override an external edge trigger.

Related Topics:

[Triggers](#)

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters `trigger` (`nidcpower.SendSoftwareEdgeTriggerType`) – Specifies which trigger to assert. **Defined Values:**

<code>START_TRIGGER</code> (1034)	Asserts the Start trigger.
<code>SOURCE_TRIGGER</code> (1035)	Asserts the Source trigger.
<code>MEASURE_TRIGGER</code> (1036)	Asserts the Measure trigger.
<code>SEQUENCE_ADVANCE_TRIGGER</code> (1037)	Asserts the Sequence Advance trigger.
<code>PULSE_TRIGGER</code> (1053)	Asserts the Pulse trigger.

`nidcpower.Session.set_sequence(values, source_delays)`

Configures a series of voltage or current outputs and corresponding source delays. The source mode must be set to [Sequence](#) for this method to take effect.

Refer to the [Configuring the Source Unit](#) topic in the *NI DC Power Supplies and SMUs Help* for more information about how to configure your device.

Use this method in the Uncommitted or Committed programming states. Refer to the [Programming States](#) topic in the *NI DC Power Supplies and SMUs Help* for more information about NI-DCPower programming states.

Note: This method is not supported on all devices. Refer to [Supported Methods by Device](#) for more information about supported devices.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nidcpower.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nidcpower.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].set_sequence(values, source_delays)
```

Parameters

- **values** (*list of float*) – Specifies the series of voltage levels or current levels, depending on the configured [output method](#). **Valid values:** The valid values for this parameter are defined by the voltage level range or current level range.
- **source_delays** (*list of float*) – Specifies the source delay that follows the configuration of each value in the sequence. **Valid Values:** The valid values are between 0 and 167 seconds.

`nidcpower.Session.wait_for_event(event_id, timeout=datetime.timedelta(seconds=10.0))`

Waits until the device has generated the specified event.

The session monitors whether each type of event has occurred at least once since the last time this method or the `nidcpower.Session._initiate()` method were called. If an event has only been generated once and you call this method successively, the method times out. Individual events must be generated between separate calls of this method.

Note: Refer to [Supported Methods by Device](#) for more information about supported devices.

Parameters

- **event_id** (*nidcpower.Event*) – Specifies which event to wait for. **Defined Values:**

<code>SOURCE_COMPLETE_EVENT</code> (1030)	Waits for the Source Complete event.
<code>MEASURE_COMPLETE_EVENT</code> (1031)	Waits for the Measure Complete event.
<code>SEQUENCE_ITERATION_COMPLETE_EVENT</code> (1032)	Waits for the Sequence Iteration Complete event.
<code>SEQUENCE_ENGINE_DONE_EVENT</code> (1033)	Waits for the Sequence Engine Done event.
<code>PULSE_COMPLETE_EVENT</code> (1051)	Waits for the Pulse Complete event.
<code>READY_FOR_PULSE_TRIGGER_EVENT</code> (1052)	Waits for the Ready for Pulse Trigger event.

- **timeout** (*float in seconds or `datetime.timedelta`*) – Specifies the maximum time allowed for this method to complete, in seconds. If the method does not complete within this time interval, NI-DCPower returns an error.

Note: When setting the timeout interval, ensure you take into account any triggers so that the timeout interval is long enough for your application.

nidcpower.Session properties

nidcpower.Session.active_advanced_sequence

Specifies the advanced sequence to configure or generate.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `active_advanced_sequence.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `active_advanced_sequence.Session` instance, and calling set/get value on the result.:

```
session['0,1'].active_advanced_sequence = var
var = session['0,1'].active_advanced_sequence
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Active Advanced Sequence**
 - C Attribute: **NIDCPOWER_ATTR_ACTIVE_ADVANCED_SEQUENCE**
-

nidcpower.Session.active_advanced_sequence_step

Specifies the advanced sequence step to configure.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `active_advanced_sequence_step.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `active_advanced_sequence_step.Session` instance, and calling set/get value on the result.:

```
session['0,1'].active_advanced_sequence_step = var  
var = session['0,1'].active_advanced_sequence_step
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Active Advanced Sequence Step**
 - C Attribute: **NIDCPOWER_ATTR_ACTIVE_ADVANCED_SEQUENCE_STEP**
-

`nidcpower.Session.aperture_time`

Specifies the measurement aperture time for the channel configuration. Aperture time is specified in the units set by the `nidcpower.Session.aperture_time_units` property. for information about supported devices. Refer to the Aperture Time topic in the NI DC Power Supplies and SMUs Help for more information about how to configure your measurements and for information about valid values. Default Value: 0.01666666 seconds

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `aperture_time.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `aperture_time.Session` instance, and calling set/get value on the result.:

```
session['0,1'].aperture_time = var  
var = session['0,1'].aperture_time
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Aperture Time**
 - C Attribute: **NIDCPOWER_ATTR_APERTURE_TIME**
-

nidcpower.Session.aperture_time_units

Specifies the units of the `nidcpower.Session.aperture_time` property for the channel configuration. for information about supported devices. Refer to the Aperture Time topic in the NI DC Power Supplies and SMUs Help for more information about how to configure your measurements and for information about valid values. Default Value: `SECONDS`

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `aperture_time_units.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `aperture_time_units.Session` instance, and calling set/get value on the result.:

```
session['0,1'].aperture_time_units = var
var = session['0,1'].aperture_time_units
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ApertureTimeUnits</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Aperture Time Units**
- C Attribute: **NIDCPower_ATTR_APERTURE_TIME_UNITS**

nidcpower.Session.auto_zero

Specifies the auto-zero method to use on the device. Refer to the NI PXI-4132 Measurement Configuration and Timing and Auto Zero topics for more information about how to configure your measurements. Default Value: The default value for the NI PXI-4132 is `ON`. The default value for all other devices is `OFF`, which is the only supported value for these devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `auto_zero.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `auto_zero.Session` instance, and calling set/get value on the result.:

```
session['0,1'].auto_zero = var
var = session['0,1'].auto_zero
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.AutoZero
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Auto Zero**
 - C Attribute: **NIDCPOWER_ATTR_AUTO_ZERO**
-

`nidcpower.Session.auxiliary_power_source_available`

Indicates whether an auxiliary power source is connected to the device. A value of False may indicate that the auxiliary input fuse has blown. Refer to the Detecting Internal/Auxiliary Power topic in the NI DC Power Supplies and SMUs Help for more information about internal and auxiliary power. power source to generate power. Use the `nidcpower.Session.power_source_in_use` property to retrieve this information.

Note: This property does not necessarily indicate if the device is using the auxiliary

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Advanced:Auxiliary Power Source Available**
 - C Attribute: **NIDCPOWER_ATTR_AUXILIARY_POWER_SOURCE_AVAILABLE**
-

`nidcpower.Session.cache`

Specifies whether to cache the value of properties. When caching is enabled, NI-DCPower records the current power supply settings and avoids sending redundant commands to the device. Enabling caching can significantly increase execution speed. NI-DCPower might always cache or never cache particular properties regardless of the setting of this property. Use the `nidcpower.Session.__init__()` method to override this value. Default Value: True

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Cache**
 - C Attribute: **NIDCPOWER_ATTR_CACHE**
-

`nidcpower.Session.channel_count`

Indicates the number of channels that NI-DCPower supports for the instrument that was chosen when the current session was opened. For channel-based properties, the IVI engine maintains a separate cache value for each channel.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Channel Count**
 - C Attribute: **NIDCPOWER_ATTR_CHANNEL_COUNT**
-

`nidcpower.Session.compliance_limit_symmetry`

Specifies whether compliance limits for current generation and voltage generation for the device are applied symmetrically about 0 V and 0 A or asymmetrically with respect to 0 V and 0 A. When set to **Symmetric**, voltage limits and current limits are set using a single property with a positive value. The resulting range is bounded by this positive value and its opposite. When set to **Asymmetric**, you must separately set a limit high and a limit low using distinct properties. For asymmetric limits, the range bounded by the limit high and limit low must include zero. **Default Value:** Symmetric **Related Topics:** [Compliance Ranges](#) [Changing Ranges](#) [Overranging](#)

Note: Refer to [Supported Properties by Device](#) for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `compliance_limit_symmetry.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `compliance_limit_symmetry.Session` instance, and calling set/get value on the result.:

```
session['0,1'].compliance_limit_symmetry = var
var = session['0,1'].compliance_limit_symmetry
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ComplianceLimitSymmetry
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Compliance Limit Symmetry**
 - C Attribute: **NIDCPOWER_ATTR_COMPLIANCE_LIMIT_SYMMETRY**
-

`nidcpower.Session.current_compensation_frequency`

The frequency at which a pole-zero pair is added to the system when the channel is in Constant Current mode. for information about supported devices. Default Value: Determined by the value of the *NORMAL* setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_compensation_frequency.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_compensation_frequency.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_compensation_frequency = var
var = session['0,1'].current_compensation_frequency
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Current:Compensation Frequency**
 - C Attribute: **NIDCPOWER_ATTR_CURRENT_COMPENSATION_FREQUENCY**
-

`nidcpower.Session.current_gain_bandwidth`

The frequency at which the unloaded loop gain extrapolates to 0 dB in the absence of additional poles and zeroes. This property takes effect when the channel is in Constant Current mode. for information about supported devices. Default Value: Determined by the value of the *NORMAL* setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_gain_bandwidth.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_gain_bandwidth.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_gain_bandwidth = var
var = session['0,1'].current_gain_bandwidth
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Current:Gain Bandwidth**
 - C Attribute: **NIDCPOWER_ATTR_CURRENT_GAIN_BANDWIDTH**
-

`nidcpower.Session.current_level`

Specifies the current level, in amps, that the device attempts to generate on the specified channel(s). This property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_CURRENT`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. Valid Values: The valid values for this property are defined by the values to which the `nidcpower.Session.current_level_range` property is set.

Note: The channel must be enabled for the specified current level to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_level = var
var = session['0,1'].current_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Current Level**
 - C Attribute: **NIDCPOWER_ATTR_CURRENT_LEVEL**
-

`nidcpower.Session.current_level_autorange`

Specifies whether NI-DCPower automatically selects the current level range based on the desired current level for the specified channels. If you set this property to *ON*, NI-DCPower ignores any changes you make to the `nidcpower.Session.current_level_range` property. If you change the `nidcpower.Session.current_level_autorange` property from *ON* to *OFF*, NI-DCPower retains the last value the `nidcpower.Session.current_level_range` property was set to (or the default value if the property was never set) and uses that value as the current level range. Query the `nidcpower.Session.current_level_range` property by using the `nidcpower.Session._get_attribute_vi_int32()` method for information about which range NI-DCPower automatically selects. The `nidcpower.Session.current_level_autorange` property is applicable only if the `nidcpower.Session.output_function` property is set to *DC_CURRENT*. Default Value: *OFF*

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_level_autorange.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_level_autorange.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_level_autorange = var
var = session['0,1'].current_level_autorange
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Current Level Autorange**
 - C Attribute: **NIDCPOWER_ATTR_CURRENT_LEVEL_AUTORANGE**
-

`nidcpower.Session.current_level_range`

Specifies the current level range, in amps, for the specified channel(s). The range defines the valid value to which the current level can be set. Use the `nidcpower.Session.current_level_autorange`

property to enable automatic selection of the current level range. The `nidcpower.Session.current_level_range` property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_CURRENT`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. For valid ranges, refer to the Ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: The channel must be enabled for the specified current level range to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_level_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_level_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_level_range = var
var = session['0,1'].current_level_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Current Level Range**
 - C Attribute: **NIDCPower_ATTR_CURRENT_LEVEL_RANGE**
-

`nidcpower.Session.current_limit`

Specifies the current limit, in amps, that the output cannot exceed when generating the desired voltage level on the specified channel(s). This property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_VOLTAGE` and the `nidcpower.Session.compliance_limit_symmetry` property is set to `NIDCPower_VAL_SYMMETRIC`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. Valid Values: The valid values for this property are defined by the values to which `nidcpower.Session.current_limit_range` property is set.

Note: The channel must be enabled for the specified current limit to take effect. Refer to the

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a

subset of repeated capabilities using the Python index notation on an `current_limit.Session` instance, and calling `set/get` value on the result.:

```
session['0,1'].current_limit = var
var = session['0,1'].current_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Current Limit**
- C Attribute: **NIDCPOWER_ATTR_CURRENT_LIMIT**

`nidcpower.Session.current_limit_autorange`

Specifies whether NI-DCPower automatically selects the current limit range based on the desired current limit for the specified channel(s). If you set this property to *ON*, NI-DCPower ignores any changes you make to the `nidcpower.Session.current_limit_range` property. If you change this property from *ON* to *OFF*, NI-DCPower retains the last value the `nidcpower.Session.current_limit_range` property was set to (or the default value if the property was never set) and uses that value as the current limit range. Query the `nidcpower.Session.current_limit_range` property by using the `nidcpower.Session._get_attribute_vi_int32()` method for information about which range NI-DCPower automatically selects. The `nidcpower.Session.current_limit_autorange` property is applicable only if the `nidcpower.Session.output_function` property is set to *DC_VOLTAGE*. Default Value: *OFF*

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_limit_autorange.Session` object, then the `set/get` will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_limit_autorange.Session` instance, and calling `set/get` value on the result.:

```
session['0,1'].current_limit_autorange = var
var = session['0,1'].current_limit_autorange
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Current Limit Autorange**

- C Attribute: **NIDCPOWER_ATTR_CURRENT_LIMIT_AUTORANGE**

`nidcpower.Session.current_limit_high`

Specifies the maximum current, in amps, that the output can produce when generating the desired voltage on the specified channel(s). This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **DC Voltage**. You must also specify a *Current Limit Low* `<p:py:meth:'nidcpower.Session.CurrentLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of *Current Limit Range* `<p:py:meth:'nidcpower.Session.CurrentLimitRange.html'>__`, *Current Limit Range* `<p:py:meth:'nidcpower.Session.CurrentLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_limit_high = var
var = session['0,1'].current_limit_high
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Current Limit High**
- C Attribute: **NIDCPOWER_ATTR_CURRENT_LIMIT_HIGH**

`nidcpower.Session.current_limit_low`

Specifies the minimum current, in amps, that the output can produce when generating the desired voltage on the specified channel(s). This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **DC Voltage**. You must also specify a *Current Limit High* `<p:py:meth:'nidcpower.Session.CurrentLimitHigh.html'>__` to complete the asymmetric range. **Valid**

Values: [-Current Limit Range <p:py:meth:'nidcpower.Session.CurrentLimitRange.html'>'__', -1% of Current Limit Range <p:py:meth:'nidcpower.Session.CurrentLimitRange.html'>'__'] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges](#) [Changing Ranges](#) [Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* <p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>'__' property is set to TRUE.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_limit_low.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_limit_low.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_limit_low = var
var = session['0,1'].current_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Current Limit Low**
- C Attribute: **NIDCPOWER_ATTR_CURRENT_LIMIT_LOW**

`nidcpower.Session.current_limit_range`

Specifies the current limit range, in amps, for the specified channel(s). The range defines the valid value to which the current limit can be set. Use the `nidcpower.Session.current_limit_autorange` property to enable automatic selection of the current limit range. The `nidcpower.Session.current_limit_range` property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_VOLTAGE`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. For valid ranges, refer to the [Ranges](#) topic for your device in the NI DC Power Supplies and SMUs Help.

Note: The channel must be enabled for the specified current limit to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_limit_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_limit_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_limit_range = var
var = session['0,1'].current_limit_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Current Limit Range**
- C Attribute: **NIDCPOWER_ATTR_CURRENT_LIMIT_RANGE**

`nidcpower.Session.current_pole_zero_ratio`

The ratio of the pole frequency to the zero frequency when the channel is in Constant Current mode. for information about supported devices. Default Value: Determined by the value of the [NORMAL](#) setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `current_pole_zero_ratio.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `current_pole_zero_ratio.Session` instance, and calling set/get value on the result.:

```
session['0,1'].current_pole_zero_ratio = var
var = session['0,1'].current_pole_zero_ratio
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Current:Pole-Zero Ratio**
- C Attribute: **NIDCPOWER_ATTR_CURRENT_POLE_ZERO_RATIO**

`nidcpower.Session.dc_noise_rejection`

Determines the relative weighting of samples in a measurement. Refer to the NI PXIe-4140/4141 DC Noise

Rejection, NI PXIe-4142/4143 DC Noise Rejection, or NI PXIe-4144/4145 DC Noise Rejection topic in the NI DC Power Supplies and SMUs Help for more information about noise rejection. for information about supported devices. Default Value: *NORMAL*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DCNoiseRejection
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Advanced:DC Noise Rejection**
 - C Attribute: **NIDCPOWER_ATTR_DC_NOISE_REJECTION**
-

`nidcpower.Session.digital_edge_measure_trigger_edge`

Specifies whether to configure the Measure trigger to assert on the rising or falling edge. `nidcpower.Session.source_trigger_type` property is set to *DIGITAL_EDGE*. for information about supported devices. Default Value: *RISING*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DigitalEdge
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Measure Trigger:Digital Edge:Edge**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_MEASURE_TRIGGER_EDGE**
-

`nidcpower.Session.digital_edge_measure_trigger_input_terminal`

Specifies the input terminal for the Measure trigger. This property is used only when the `nidcpower.Session.measure_trigger_type` property is set to *DIGITAL_EDGE*. for this property. You can specify any valid input terminal for this property. Valid terminals are listed in Measurement & Automation Explorer under the Device Routes tab. Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Measure Trigger:Digital Edge:Input Terminal**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_MEASURE_TRIGGER_INPUT_TERMINAL**
-

`nidcpower.Session.digital_edge_pulse_trigger_edge`

Specifies whether to configure the Pulse trigger to assert on the rising or falling edge. Default Value: *RISING*

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DigitalEdge
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Pulse Trigger:Digital Edge:Edge**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_PULSE_TRIGGER_EDGE**
-

`nidcpower.Session.digital_edge_pulse_trigger_input_terminal`

Specifies the input terminal for the Pulse trigger. This property is used only when the `nidcpower.Session.pulse_trigger_type` property is set to digital edge. You can specify any valid input terminal for this property. Valid terminals are listed in Measurement & Automation Explorer under the Device Routes tab. Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Pulse Trigger:Digital Edge:Input Terminal**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_PULSE_TRIGGER_INPUT_TERMINAL**
-

`nidcpower.Session.digital_edge_sequence_advance_trigger_edge`

Specifies whether to configure the Sequence Advance trigger to assert on the rising or falling edge. for information about supported devices. Default Value: *RISING*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DigitalEdge
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Sequence Advance Trigger:Digital Edge:Edge**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_SEQUENCE_ADVANCE_TRIGGER_EDGE**
-

`nidcpower.Session.digital_edge_sequence_advance_trigger_input_terminal`

Specifies the input terminal for the Sequence Advance trigger. Use this property only when the `nidcpower.Session.sequence_advance_trigger_type` property is set to *DIGITAL_EDGE*. the NI DC Power Supplies and SMUs Help for information about supported devices. You can specify any valid input terminal for this property. Valid terminals are listed in Measurement & Automation Explorer under the Device Routes tab. Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic in

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Sequence Advance Trigger:Digital Edge:Input Terminal**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_SEQUENCE_ADVANCE_TRIGGER_INPUT_TERMINAL**
-

`nidcpower.Session.digital_edge_source_trigger_edge`

Specifies whether to configure the Source trigger to assert on the rising or falling edge. for information about supported devices. Default Value: *RISING*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DigitalEdge
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Source Trigger:Digital Edge:Edge**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_SOURCE_TRIGGER_EDGE**
-

`nidcpower.Session.digital_edge_source_trigger_input_terminal`

Specifies the input terminal for the Source trigger. Use this property only when the `nidcpower.Session.source_trigger_type` property is set to *DIGITAL_EDGE*. for information about supported devices. You can specify any valid input terminal for this property. Valid terminals are listed in Measurement & Automation Explorer under the Device Routes tab. Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Source Trigger:Digital Edge:Input Terminal**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_SOURCE_TRIGGER_INPUT_TERMINAL**
-

`nidcpower.Session.digital_edge_start_trigger_edge`

Specifies whether to configure the Start trigger to assert on the rising or falling edge. for information about supported devices. Default Value: *RISING*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DigitalEdge
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start Trigger:Digital Edge:Edge**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_START_TRIGGER_EDGE**
-

`nidcpower.Session.digital_edge_start_trigger_input_terminal`

Specifies the input terminal for the Start trigger. Use this property only when the `nidcpower.Session.start_trigger_type` property is set to *DIGITAL_EDGE*. for information about supported devices. You can specify any valid input terminal for this property. Valid terminals are listed in Measurement & Automation Explorer under the Device Routes tab. Input terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. The input terminal can also be a terminal from another device. For example, you can set the input terminal on Dev1 to be /Dev2/SourceCompleteEvent.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start Trigger:Digital Edge:Input Terminal**
 - C Attribute: **NIDCPOWER_ATTR_DIGITAL_EDGE_START_TRIGGER_INPUT_TERMINAL**
-

`nidcpower.Session.driver_setup`

Indicates the Driver Setup string that you specified when initializing the driver. Some cases exist where you must specify the instrument driver options at initialization time. An example of this case is specifying a particular device model from among a family of devices that the driver supports. This property is useful when simulating a device. You can specify the driver-specific options through the DriverSetup keyword in the optionsString parameter in the `nidcpower.Session.__init__()` method or through the IVI Configuration Utility. You can specify driver-specific options through the DriverSetup keyword in the optionsString parameter in the `nidcpower.Session.__init__()` method. If you do not specify a Driver Setup string, this property returns an empty string.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Driver Setup**
 - C Attribute: **NIDCPOWER_ATTR_DRIVER_SETUP**
-

`nidcpower.Session.exported_measure_trigger_output_terminal`

Specifies the output terminal for exporting the Measure trigger. Refer to the Device Routes tab in Measurement & Automation Explorer for a list of the terminals available on your device. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, `/Dev1/PXI_Trig0`, or with the shortened terminal name, `PXI_Trig0`.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Measure Trigger:Export Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_EXPORTED_MEASURE_TRIGGER_OUTPUT_TERMINAL**
-

`nidcpower.Session.exported_pulse_trigger_output_terminal`

Specifies the output terminal for exporting the Pulse trigger. Refer to the Device Routes tab in Measurement & Automation Explorer for a list of the terminals available on your device. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Pulse Trigger:Export Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_EXPORTED_PULSE_TRIGGER_OUTPUT_TERMINAL**
-

`nidcpower.Session.exported_sequence_advance_trigger_output_terminal`

Specifies the output terminal for exporting the Sequence Advance trigger. Refer to the Device Routes tab in Measurement & Automation Explorer for a list of the terminals available on your device. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Sequence Advance Trigger:Export Output Terminal**
 - C Attribute: **NIDCPower_ATTR_EXPORTED_SEQUENCE_ADVANCE_TRIGGER_OUTPUT_TERMINAL**
-

`nidcpower.Session.exported_source_trigger_output_terminal`

Specifies the output terminal for exporting the Source trigger. Refer to the Device Routes tab in MAX for a list of the terminals available on your device. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Source Trigger:Export Output Terminal**
 - C Attribute: **NIDCPower_ATTR_EXPORTED_SOURCE_TRIGGER_OUTPUT_TERMINAL**
-

`nidcpower.Session.exported_start_trigger_output_terminal`

Specifies the output terminal for exporting the Start trigger. Refer to the Device Routes tab in Measurement & Automation Explorer (MAX) for a list of the terminals available on your device. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. for information about supported devices.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start Trigger:Export Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_EXPORTED_START_TRIGGER_OUTPUT_TERMINAL**
-

`nidcpower.Session.fetch_backlog`

Returns the number of measurements acquired that have not been fetched yet.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Fetch Backlog**
 - C Attribute: **NIDCPOWER_ATTR_FETCH_BACKLOG**
-

`nidcpower.Session.group_capabilities`

Contains a comma-separated list of class-extension groups that NI-DCPower implements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Class Group Capabilities**
 - C Attribute: **NIDCPOWER_ATTR_GROUP_CAPABILITIES**
-

`nidcpower.Session.instrument_firmware_revision`

Contains the firmware revision information for the device you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Firmware Revision**
 - C Attribute: **NIDCPOWER_ATTR_INSTRUMENT_FIRMWARE_REVISION**
-

`nidcpower.Session.instrument_manufacturer`

Contains the name of the manufacturer for the device you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Manufacturer**
 - C Attribute: **NIDCPOWER_ATTR_INSTRUMENT_MANUFACTURER**
-

`nidcpower.Session.instrument_model`

Contains the model number or name of the device that you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Model**
 - C Attribute: **NIDCPOWER_ATTR_INSTRUMENT_MODEL**
-

`nidcpower.Session.interchange_check`

Specifies whether to perform interchangeability checking and log interchangeability warnings when you call NI-DCPower methods. True specifies that interchangeability checking is enabled. Interchangeability warnings indicate that using your application with a different power supply might cause different behavior. Call

the `nidcpower.Session.GetNextInterchangeWarning()` method to retrieve interchange warnings. Call the `nidcpower.Session.GetNextInterchangeWarning()` method to clear the list of interchangeability warnings without reading them. Interchangeability checking examines the properties in a capability group only if you specify a value for at least one property within that group. Interchangeability warnings can occur when a property affects the behavior of the device and you have not set that property or when the property has been invalidated since you set it. Default Value: False

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Interchange Check**
 - C Attribute: **NIDCPower_ATTR_INTERCHANGE_CHECK**
-

`nidcpower.Session.interlock_input_open`

Indicates whether the safety interlock circuit is open. Refer to the Safety Interlock topic in the NI DC Power Supplies and SMUs Help for more information about the safety interlock circuit. about supported devices.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Advanced:Interlock Input Open**
 - C Attribute: **NIDCPower_ATTR_INTERLOCK_INPUT_OPEN**
-

`nidcpower.Session.io_resource_descriptor`

Indicates the resource descriptor NI-DCPower uses to identify the physical device. If you initialize NI-DCPower with a logical name, this property contains the resource descriptor that corresponds to the entry in the IVI Configuration utility. If you initialize NI-DCPower with the resource descriptor, this property contains that value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Resource Descriptor**
 - C Attribute: **NIDCPower_ATTR_IO_RESOURCE_DESCRIPTOR**
-

`nidcpower.Session.logical_name`

Contains the logical name you specified when opening the current IVI session. You can pass a logical name to the `nidcpower.Session.__init__()` method. The IVI Configuration utility must contain an entry for the logical name. The logical name entry refers to a method section in the IVI Configuration file. The method section specifies a physical device and initial user options.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Logical Name**
 - C Attribute: **NIDCPower_ATTR_LOGICAL_NAME**
-

`nidcpower.Session.measure_buffer_size`

Specifies the number of samples that the active channel measurement buffer can hold. The default value is the maximum number of samples that a device is capable of recording in one second. for information about supported devices. Valid Values: 1000 to 2147483647 Default Value: Varies by device. Refer to Supported Properties by Device topic in the NI DC Power Supplies and SMUs Help for more information about default values.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Advanced:Measure Buffer Size**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_BUFFER_SIZE**
-

`nidcpower.Session.measure_complete_event_delay`

Specifies the amount of time to delay the generation of the Measure Complete event, in seconds. for information about supported devices. Valid Values: 0 to 167 seconds Default Value: The NI PXI-4132 and NI PXIe-4140/4141/4142/4143/4144/4145/4154 supports values from 0 seconds to 167 seconds.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Measure Complete Event:Event Delay**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_COMPLETE_EVENT_DELAY**
-

`nidcpower.Session.measure_complete_event_output_terminal`

Specifies the output terminal for exporting the Measure Complete event. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Measure Complete Event:Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_COMPLETE_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.measure_complete_event_pulse_polarity`

Specifies the behavior of the Measure Complete event. for information about supported devices. Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Measure Complete Event:Pulse:Polarity**
 - C Attribute: **NIDCPower_ATTR_MEASURE_COMPLETE_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.measure_complete_event_pulse_width`

Specifies the width of the Measure Complete event, in seconds. The minimum event pulse width value for PXI devices is 150 ns, and the minimum event pulse width value for PXI Express devices is 250 ns. The maximum event pulse width value for all devices is 1.6 microseconds. for information about supported devices. Valid Values: 1.5e-7 to 1.6e-6 Default Value: The default value for PXI devices is 150 ns. The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Measure Complete Event:Pulse:Width**
 - C Attribute: **NIDCPower_ATTR_MEASURE_COMPLETE_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.measure_record_delta_time`

Queries the amount of time, in seconds, between between the start of two consecutive measurements in a measure record. Only query this property after the desired measurement settings are committed. for information about supported devices. two measurements and the rest would differ.

Note: This property is not available when Auto Zero is configured to Once because the amount of time between the first

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Measure Record Delta Time**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_RECORD_DELTA_TIME**
-

`nidcpower.Session.measure_record_length`

Specifies how many measurements compose a measure record. When this property is set to a value greater than 1, the `nidcpower.Session.measure_when` property must be set to `AUTOMATICALLY_AFTER_SOURCE_COMPLETE` or `ON_MEASURE_TRIGGER`, for information about supported devices. Valid Values: 1 to 16,777,216 Default Value: 1

Note: This property is not available in a session involving multiple channels.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Measure Record Length**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_RECORD_LENGTH**
-

`nidcpower.Session.measure_record_length_is_finite`

Specifies whether to take continuous measurements. Call the `nidcpower.Session.abort()` method to stop continuous measurements. When this property is set to False and the `nidcpower.Session.source_mode` property is set to `SINGLE_POINT`, the `nidcpower.Session.measure_when` property must be set to `AUTOMATICALLY_AFTER_SOURCE_COMPLETE` or `ON_MEASURE_TRIGGER`. When this property is set to False and the `nidcpower.Session.source_mode` property is set to `SEQUENCE`, the `nidcpower.Session.measure_when` property must be set to `ON_MEASURE_TRIGGER`, for information about supported devices. Default Value: True

Note: This property is not available in a session involving multiple channels.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Measure Record Length Is Finite**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_RECORD_LENGTH_IS_FINITE**
-

`nidcpower.Session.measure_trigger_type`

Specifies the behavior of the Measure trigger. for information about supported devices. Default Value: *DIGITAL_EDGE*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Measure Trigger:Trigger Type**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_TRIGGER_TYPE**
-

`nidcpower.Session.measure_when`

Specifies when the measure unit should acquire measurements. Unless this property is configured to *ON_MEASURE_TRIGGER*, the `nidcpower.Session.measure_trigger_type` property is ignored. Refer to the Acquiring Measurements topic in the NI DC Power Supplies and SMUs Help for more information about how to configure your measurements. Default Value: If the `nidcpower.Session.source_mode` property is set to *SINGLE_POINT*, the default value is *ON_DEMAND*. This value supports only the `nidcpower.Session.measure()` method and `nidcpower.Session.measure_multiple()` method. If the `nidcpower.Session.source_mode` property is set to *SEQUENCE*, the default value is *AUTOMATICALLY_AFTER_SOURCE_COMPLETE*. This value supports only the `nidcpower.Session.fetch_multiple()` method.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.MeasureWhen
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Advanced:Measure When**
 - C Attribute: **NIDCPOWER_ATTR_MEASURE_WHEN**
-

`nidcpower.Session.output_capacitance`

Specifies whether to use a low or high capacitance on the output for the specified channel(s). for information about supported devices. Refer to the NI PXI-4130 Output Capacitance Selection topic in the NI DC Power Supplies and SMUs Help for more information about capacitance.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `output_capacitance.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `output_capacitance.Session` instance, and calling set/get value on the result.:

```
session['0,1'].output_capacitance = var
var = session['0,1'].output_capacitance
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OutputCapacitance
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Output Capacitance**
 - C Attribute: **NIDCPOWER_ATTR_OUTPUT_CAPACITANCE**
-

`nidcpower.Session.output_connected`

Specifies whether the output relay is connected (closed) or disconnected (open). The `nidcpower.Session.output_enabled` property does not change based on this property; they are independent of each other. about supported devices. Set this property to False to disconnect the output terminal from the output. to the output terminal might discharge unless the relay is disconnected. Excessive connecting and disconnecting of the output can cause premature wear on the relay. Default Value: True

Note: Only disconnect the output when disconnecting is necessary for your application. For example, a battery connected

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `output_connected.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `output_connected.Session` instance, and calling set/get value on the result.:

```
session['0,1'].output_connected = var
var = session['0,1'].output_connected
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Output Connected**
 - C Attribute: **NIDCPOWER_ATTR_OUTPUT_CONNECTED**
-

`nidcpower.Session.output_enabled`

Specifies whether the output is enabled (True) or disabled (False). Depending on the value you specify for the `nidcpower.Session.output_function` property, you also must set the voltage level or current level in addition to enabling the output the `nidcpower.Session._initiate()` method. Refer to the Programming States topic in the NI DC Power Supplies and SMUs Help for more information about NI-DCPower programming states. Default Value: The default value is True if you use the `nidcpower.Session.__init__()` method to open the session. Otherwise the default value is False, including when you use a calibration session or the deprecated programming model.

Note: If the session is in the Committed or Uncommitted states, enabling the output does not take effect until you call

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `output_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `output_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].output_enabled = var
var = session['0,1'].output_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Output Enabled**
 - C Attribute: **NIDCPOWER_ATTR_OUTPUT_ENABLED**
-

`nidcpower.Session.output_function`

Configures the method to generate on the specified channel(s). When `DC_VOLTAGE` is selected, the device generates the desired voltage level on the output as long as the output current is below the current limit. You can use the following properties to configure the channel when `DC_VOLTAGE` is selected: `nidcpower.Session.voltage_level` `nidcpower.Session.current_limit` `nidcpower.Session.current_limit_high` `nidcpower.Session.current_limit_low` `nidcpower.Session.voltage_level_range` `nidcpower.Session.current_limit_range` When `DC_CURRENT` is selected, the device generates the desired current level on the output as long as the output voltage is below the voltage limit. You can use the following properties to configure the channel when `DC_CURRENT` is selected: `nidcpower.Session.current_level` `nidcpower.Session.voltage_limit` `nidcpower.Session.voltage_limit_high` `nidcpower.Session.voltage_limit_low` `nidcpower.Session.current_level_range` `nidcpower.Session.voltage_limit_range` Default Value: `DC_VOLTAGE`

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `output_function.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `output_function.Session` instance, and calling set/get value on the result.:

```
session['0,1'].output_function = var
var = session['0,1'].output_function
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.OutputFunction</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Output Function**
 - C Attribute: **NIDCPOWER_ATTR_OUTPUT_FUNCTION**
-

`nidcpower.Session.output_resistance`

Specifies the output resistance that the device attempts to generate for the specified channel(s). This property is

available only when you set the `nidcpower.Session.output_function` property on a support device. Refer to a supported device's topic about output resistance for more information about selecting an output resistance. about supported devices. Default Value: 0.0

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic for information

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `output_resistance.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `output_resistance.Session` instance, and calling set/get value on the result.:

```
session['0,1'].output_resistance = var
var = session['0,1'].output_resistance
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Output Resistance**
- C Attribute: **NIDCPOWER_ATTR_OUTPUT_RESISTANCE**

`nidcpower.Session.overranging_enabled`

Specifies whether NI-DCPower allows setting the voltage level, current level, voltage limit and current limit outside the device specification limits. True means that overranging is enabled. Refer to the Ranges topic in the NI DC Power Supplies and SMUs Help for more information about overranging. Default Value: False

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Overranging Enabled**
- C Attribute: **NIDCPOWER_ATTR_OVERRANGING_ENABLED**

`nidcpower.Session.ovp_enabled`

Enables (True) or disables (False) overvoltage protection (OVP). Refer to the Output Overvoltage Protection

topic in the NI DC Power Supplies and SMUs Help for more information about overvoltage protection. for information about supported devices. Default Value: False

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:OVP Enabled**
 - C Attribute: **NIDCPOWER_ATTR_OVP_ENABLED**
-

`nidcpower.Session.ovp_limit`

Determines the voltage limit, in volts, beyond which overvoltage protection (OVP) engages. for information about supported devices. Valid Values: 2 V to 210 V Default Value: 210 V

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:OVP Limit**
 - C Attribute: **NIDCPOWER_ATTR_OVP_LIMIT**
-

`nidcpower.Session.power_line_frequency`

Specifies the power line frequency for specified channel(s). NI-DCPower uses this value to select a time-base for setting the `nidcpower.Session.aperture_time` property in power line cycles (PLCs). in the NI DC Power Supplies and SMUs Help for information about supported devices. Default Value: NIDCPOWER_VAL_60_HERTZ

Note: This property is not supported by all devices. Refer to the Supported Properties by Device topic

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `power_line_frequency.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `power_line_frequency.Session` instance, and calling set/get value on the result.:

```
session['0,1'].power_line_frequency = var
var = session['0,1'].power_line_frequency
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Power Line Frequency**
 - C Attribute: **NIDCPOWER_ATTR_POWER_LINE_FREQUENCY**
-

`nidcpower.Session.power_source`

Specifies the power source to use. NI-DCPower switches the power source used by the device to the specified value. Default Value: `AUTOMATIC` is set to `AUTOMATIC`. However, if the session is in the Committed or Uncommitted state when you set this property, the power source selection only occurs after you call the `nidcpower.Session._initiate()` method.

Note: Automatic selection is not persistent and occurs only at the time this property

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.PowerSource</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Advanced:Power Source**
 - C Attribute: **NIDCPOWER_ATTR_POWER_SOURCE**
-

`nidcpower.Session.power_source_in_use`

Indicates whether the device is using the internal or auxiliary power source to generate power.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.PowerSourceInUse</code>
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Advanced:Power Source In Use**
 - C Attribute: **NIDCPOWER_ATTR_POWER_SOURCE_IN_USE**
-

`nidcpower.Session.pulse_bias_current_level`

Specifies the pulse bias current level, in amps, that the device attempts to generate on the specified channel(s) during the off phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_current_level_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_current_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_current_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_current_level = var
var = session['0,1'].pulse_bias_current_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Bias Current Level**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_CURRENT_LEVEL**
-

`nidcpower.Session.pulse_bias_current_limit`

Specifies the pulse bias current limit, in amps, that the output cannot exceed when generating the desired pulse bias voltage on the specified channel(s) during the off phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_current_limit_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_current_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_current_limit.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_current_limit = var
var = session['0,1'].pulse_bias_current_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Bias Current Limit**
- C Attribute: **NIDCPower_ATTR_PULSE_BIAS_CURRENT_LIMIT**

`nidcpower.Session.pulse_bias_current_limit_high`

Specifies the maximum current, in amps, that the output can produce when generating the desired pulse voltage on the specified channel(s) during the *off* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Voltage**. You must also specify a *Pulse Bias Current Limit Low* `<p:py:meth:'nidcpower.Session.PulseBiasCurrentLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of Pulse Current Limit Range `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`, *Pulse Current Limit Range* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to Supported Properties by Device for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_current_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_current_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_current_limit_high = var
var = session['0,1'].pulse_bias_current_limit_high
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Bias Current Limit High**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_CURRENT_LIMIT_HIGH**
-

`nidcpower.Session.pulse_bias_current_limit_low`

Specifies the minimum current, in amps, that the output can produce when generating the desired pulse voltage on the specified channel(s) during the *off* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Voltage**. You must also specify a *Pulse Bias Current Limit High* `<p:py:meth:'nidcpower.Session.PulseBiasCurrentLimitHigh.html'>__` to complete the asymmetric range. **Valid Values:** `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`, -1% of *Pulse Current Limit Range* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__` The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_current_limit_low.Session` object, then the set/get will use all repeated capabilities in the

session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_current_limit_low.Session` instance, and calling `set/get` value on the result.:

```
session['0,1'].pulse_bias_current_limit_low = var
var = session['0,1'].pulse_bias_current_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Bias Current Limit Low**
- C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_CURRENT_LIMIT_LOW**

`nidcpower.Session.pulse_bias_delay`

Determines when, in seconds, the device generates the Pulse Complete event after generating the off level of a pulse. Valid Values: 0 to 167 seconds Default Value: 16.67 milliseconds

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_delay.Session` object, then the `set/get` will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_delay.Session` instance, and calling `set/get` value on the result.:

```
session['0,1'].pulse_bias_delay = var
var = session['0,1'].pulse_bias_delay
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Pulse Bias Delay**
- C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_DELAY**

nidcpower.Session.pulse_bias_voltage_level

Specifies the pulse bias voltage level, in volts, that the device attempts to generate on the specified channel(s) during the off phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_voltage_level_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_voltage_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_voltage_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_voltage_level = var
var = session['0,1'].pulse_bias_voltage_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Bias Voltage Level**
 - C Attribute: **NIDCPower_ATTR_PULSE_BIAS_VOLTAGE_LEVEL**
-

nidcpower.Session.pulse_bias_voltage_limit

Specifies the pulse voltage limit, in volts, that the output cannot exceed when generating the desired current on the specified channel(s) during the off phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_voltage_limit_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_voltage_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_voltage_limit.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_voltage_limit = var
var = session['0,1'].pulse_bias_voltage_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Bias Voltage Limit**
- C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_VOLTAGE_LIMIT**

`nidcpower.Session.pulse_bias_voltage_limit_high`

Specifies the maximum voltage, in volts, that the output can produce when generating the desired pulse current on the specified channel(s) during the *off* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Current**. You must also specify a *Pulse Bias Voltage Limit Low* `<p:py:meth:'nidcpower.Session.PulseBiasVoltageLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`, *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_voltage_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_voltage_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_voltage_limit_high = var
var = session['0,1'].pulse_bias_voltage_limit_high
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Bias Voltage Limit High**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_VOLTAGE_LIMIT_HIGH**
-

`nidcpower.Session.pulse_bias_voltage_limit_low`

Specifies the minimum voltage, in volts, that the output can produce when generating the desired pulse current on the specified channel(s) during the *off* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Current**. You must also specify a *Pulse Bias Voltage Limit High* `<p:py:meth:'nidcpower.Session.PulseBiasVoltageLimitHigh.html'>__` to complete the asymmetric range. **Valid Values:** [*Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`, -1% of *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_bias_voltage_limit_low.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_bias_voltage_limit_low.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_bias_voltage_limit_low = var
var = session['0,1'].pulse_bias_voltage_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Bias Voltage Limit Low**
- C Attribute: **NIDCPOWER_ATTR_PULSE_BIAS_VOLTAGE_LIMIT_LOW**

`nidcpower.Session.pulse_complete_event_output_terminal`

Specifies the output terminal for exporting the Pulse Complete event. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0. Default Value: The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Pulse Complete Event:Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_COMPLETE_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.pulse_complete_event_pulse_polarity`

Specifies the behavior of the Pulse Complete event. Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Pulse Complete Event:Pulse:Polarity**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_COMPLETE_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.pulse_complete_event_pulse_width`

Specifies the width of the Pulse Complete event, in seconds. The minimum event pulse width value for PXI

Express devices is 250 ns. The maximum event pulse width value for PXI Express devices is 1.6 microseconds. Default Value: The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Pulse Complete Event:Pulse:Width**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_COMPLETE_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.pulse_current_level`

Specifies the pulse current level, in amps, that the device attempts to generate on the specified channel(s) during the on phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_current_level_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_level = var
var = session['0,1'].pulse_current_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Current Level**

- C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LEVEL**

`nidcpower.Session.pulse_current_level_range`

Specifies the pulse current level range, in amps, for the specified channel(s). The range defines the valid values to which you can set the pulse current level and pulse bias current level. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT`. For valid ranges, refer to the ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_level_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_level_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_level_range = var
var = session['0,1'].pulse_current_level_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Current Level Range**
- C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LEVEL_RANGE**

`nidcpower.Session.pulse_current_limit`

Specifies the pulse current limit, in amps, that the output cannot exceed when generating the desired pulse voltage on the specified channel(s) during the on phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE` and the `nidcpower.Session.compliance_limit_symmetry` property is set to `NIDCPOWER_VAL_SYMMETRIC`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_current_limit_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_limit.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_limit = var
var = session['0,1'].pulse_current_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Current Limit**
- C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LIMIT**

`nidcpower.Session.pulse_current_limit_high`

Specifies the maximum current, in amps, that the output can produce when generating the desired pulse voltage on the specified channel(s) during the *on* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Voltage**. You must also specify a *Pulse Current Limit Low* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of *Pulse Current Limit Range* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`, *Pulse Current Limit Range* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_limit_high = var
var = session['0,1'].pulse_current_limit_high
```


The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Current Limit High**
- C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LIMIT_HIGH**

`nidcpower.Session.pulse_current_limit_low`

Specifies the minimum current, in amps, that the output can produce when generating the desired pulse voltage on the specified channel(s) during the *on* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Voltage**. You must also specify a *Pulse Current Limit High* `<p:py:meth:'nidcpower.Session.PulseCurrentLimitHigh.html'>__` to complete the asymmetric range. **Valid Values:** [-Pulse Current Limit Range `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`, -1% of Pulse Current Limit Range `<p:py:meth:'nidcpower.Session.PulseCurrentLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_limit_low.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_limit_low.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_limit_low = var
var = session['0,1'].pulse_current_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Current Limit Low**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LIMIT_LOW**
-

`nidcpower.Session.pulse_current_limit_range`

Specifies the pulse current limit range, in amps, for the specified channel(s). The range defines the valid values to which you can set the pulse current limit and pulse bias current limit. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE`. For valid ranges, refer to the ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_current_limit_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_current_limit_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_current_limit_range = var
var = session['0,1'].pulse_current_limit_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Current Limit Range**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_CURRENT_LIMIT_RANGE**
-

`nidcpower.Session.pulse_off_time`

Determines the length, in seconds, of the off phase of a pulse. Valid Values: 10 microseconds to 167 seconds
Default Value: 34 milliseconds

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_off_time.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_off_time.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_off_time = var
var = session['0,1'].pulse_off_time
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Pulse Off Time**
- C Attribute: **NIDCPOWER_ATTR_PULSE_OFF_TIME**

`nidcpower.Session.pulse_on_time`

Determines the length, in seconds, of the on phase of a pulse. Valid Values: 10 microseconds to 167 seconds
Default Value: 34 milliseconds

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_on_time.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_on_time.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_on_time = var
var = session['0,1'].pulse_on_time
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Pulse On Time**
- C Attribute: **NIDCPOWER_ATTR_PULSE_ON_TIME**

`nidcpower.Session.pulse_trigger_type`

Specifies the behavior of the Pulse trigger. Default Value: *NONE*

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Pulse Trigger:Trigger Type**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_TRIGGER_TYPE**
-

`nidcpower.Session.pulse_voltage_level`

Specifies the pulse current limit, in amps, that the output cannot exceed when generating the desired pulse voltage on the specified channel(s) during the on phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_current_limit_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_level = var
var = session['0,1'].pulse_voltage_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Voltage Level**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LEVEL**
-

nidcpower.Session.pulse_voltage_level_range

Specifies the pulse voltage level range, in volts, for the specified channel(s). The range defines the valid values at which you can set the pulse voltage level and pulse bias voltage level. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_VOLTAGE`. For valid ranges, refer to the ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_level_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_level_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_level_range = var
var = session['0,1'].pulse_voltage_level_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Voltage:Pulse Voltage Level Range**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LEVEL_RANGE**
-

nidcpower.Session.pulse_voltage_limit

Specifies the pulse voltage limit, in volts, that the output cannot exceed when generating the desired pulse current on the specified channel(s) during the on phase of a pulse. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT` and the `nidcpower.Session.compliance_limit_symmetry` property is set to `NIDCPOWER_VAL_SYMMETRIC`. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.pulse_voltage_limit_range` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_limit.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_limit = var
var = session['0,1'].pulse_voltage_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Voltage Limit**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LIMIT**
-

`nidcpower.Session.pulse_voltage_limit_high`

Specifies the maximum voltage, in volts, that the output can produce when generating the desired pulse current on the specified channel(s) during the *on* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Current**. You must also specify a *Pulse Voltage Limit Low* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`, *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_limit_high = var
var = session['0,1'].pulse_voltage_limit_high
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Voltage Limit High**
- C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LIMIT_HIGH**

`nidcpower.Session.pulse_voltage_limit_low`

Specifies the minimum voltage, in volts, that the output can produce when generating the desired pulse current on the specified channel(s) during the *on* phase of a pulse. This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **Pulse Current**. You must also specify a *Pulse Voltage Limit High* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitHigh.html'>__` to complete the asymmetric range. **Valid Values:** [-*Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`, -1% of *Pulse Voltage Limit Range* `<p:py:meth:'nidcpower.Session.PulseVoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE or if the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to a pulsing method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_limit_low.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_limit_low.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_limit_low = var
var = session['0,1'].pulse_voltage_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Voltage Limit Low**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LIMIT_LOW**
-

`nidcpower.Session.pulse_voltage_limit_range`

Specifies the pulse voltage limit range, in volts, for the specified channel(s). The range defines the valid values to which you can set the pulse voltage limit and pulse bias voltage limit. This property is applicable only if the `nidcpower.Session.output_function` property is set to `PULSE_CURRENT`. For valid ranges, refer to the ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: The channel must be enabled for the specified current limit to take effect. Refer to the `nidcpower.Session.output_enabled` property for more information about enabling the output channel.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `pulse_voltage_limit_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `pulse_voltage_limit_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].pulse_voltage_limit_range = var
var = session['0,1'].pulse_voltage_limit_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Pulse Current:Pulse Voltage Limit Range**
 - C Attribute: **NIDCPOWER_ATTR_PULSE_VOLTAGE_LIMIT_RANGE**
-

`nidcpower.Session.query_instrument_status`

Specifies whether NI-DCPower queries the device status after each operation. Querying the device status is useful for debugging. After you validate your program, you can set this property to False to disable status checking and maximize performance. NI-DCPower ignores status checking for particular properties regardless of the setting of this property. Use the `nidcpower.Session.__init__()` method to override this value. Default Value: True

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Query Instrument Status**
 - C Attribute: **NIDCPOWER_ATTR_QUERY_INSTRUMENT_STATUS**
-

`nidcpower.Session.range_check`

Specifies whether to validate property values and method parameters. If this property is enabled, NI-DCPower validates the parameter values that you pass to NI-DCPower methods. Range checking parameters is useful for debugging. After you validate your program, you can set this property to False to disable range checking and maximize performance. Use the `nidcpower.Session.__init__()` method to override this value. Default Value: True

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Range Check**
 - C Attribute: **NIDCPOWER_ATTR_RANGE_CHECK**
-

`nidcpower.Session.ready_for_pulse_trigger_event_output_terminal`

Specifies the output terminal for exporting the Ready For Pulse Trigger event. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, `/Dev1/PXI_Trig0`, or with the shortened terminal name, `PXI_Trig0`.

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Pulse Trigger Event:Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_READY_FOR_PULSE_TRIGGER_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.ready_for_pulse_trigger_event_pulse_polarity`

Specifies the behavior of the Ready For Pulse Trigger event. Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Pulse Trigger Event:Pulse:Polarity**
 - C Attribute: **NIDCPOWER_ATTR_READY_FOR_PULSE_TRIGGER_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.ready_for_pulse_trigger_event_pulse_width`

Specifies the width of the Ready For Pulse Trigger event, in seconds. The minimum event pulse width value for PXI Express devices is 250 ns. The maximum event pulse width value for all devices is 1.6 microseconds. Default Value: The default value for PXI Express devices is 250 ns

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information about supported devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Pulse Trigger Event:Pulse:Width**
 - C Attribute: **NIDCPOWER_ATTR_READY_FOR_PULSE_TRIGGER_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.record_coercions`

Specifies whether the IVI engine records the value coercions it makes for ViInt32 and ViReal64 properties. Call the `nidcpower.Session.GetNextCoercionRecord()` method to read and delete the earliest coercion record from the list. Default Value: The default value is False. Use the `nidcpower.Session.__init__()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Record Value Coercions**
 - C Attribute: **NIDCPower_ATTR_RECORD_COERCIONS**
-

`nidcpower.Session.reset_average_before_measurement`

Specifies whether the measurement returned from any measurement call starts with a new measurement call (True) or returns a measurement that has already begun or completed(False). for information about supported devices. When you set the `nidcpower.Session.samples_to_average` property in the Running state, the output channel measurements might move out of synchronization. While NI-DCPower automatically synchronizes measurements upon the initialization of a session, you can force a synchronization in the running state before you run the `nidcpower.Session.measure_multiple()` method. To force a synchronization in the running state, set this property to True, and then run the `nidcpower.Session.measure_multiple()` method, specifying all channels in the channel name parameter. You can set the `nidcpower.Session.reset_average_before_measurement` property to False after the `nidcpower.Session.measure_multiple()` method completes. Default Value: True

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `reset_average_before_measurement.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `reset_average_before_measurement.Session` instance, and calling set/get value on the result.:

```
session['0,1'].reset_average_before_measurement = var
var = session['0,1'].reset_average_before_measurement
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Advanced:Reset Average Before Measurement**
 - C Attribute: **NIDCPOWER_ATTR_RESET_AVERAGE_BEFORE_MEASUREMENT**
-

`nidcpower.Session.samples_to_average`

Specifies the number of samples to average when you take a measurement. Increasing the number of samples to average decreases measurement noise but increases the time required to take a measurement. Refer to the NI PXI-4110, NI PXI-4130, NI PXI-4132, or NI PXIe-4154 Averaging topic for optional property settings to improve immunity to certain noise types, or refer to the NI PXIe-4140/4141 DC Noise Rejection, NI PXIe-4142/4143 DC Noise Rejection, or NI PXIe-4144/4145 DC Noise Rejection topic for information about improving noise immunity for those devices. Default Value: NI PXI-4110 or NI PXI-4130—10 NI PXI-4132—1 NI PXIe-4112—1 NI PXIe-4113—1 NI PXIe-4140/4141—1 NI PXIe-4142/4143—1 NI PXIe-4144/4145—1 NI PXIe-4154—500

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `samples_to_average.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `samples_to_average.Session` instance, and calling set/get value on the result.:

```
session['0,1'].samples_to_average = var
var = session['0,1'].samples_to_average
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Samples To Average**
 - C Attribute: **NIDCPOWER_ATTR_SAMPLES_TO_AVERAGE**
-

`nidcpower.Session.self_calibration_persistence`

Specifies whether the values calculated during self-calibration should be written to hardware to be used until the next self-calibration or only used until the `nidcpower.Session.reset_device()` method is called or the machine is powered down. This property affects the behavior of the `nidcpower.Session.self_cal()` method. When set to `KEEP_IN_MEMORY`, the values calculated by the `nidcpower.Session.self_cal()` method are used in the existing session, as well as in all further sessions until

you call the `nidcpower.Session.reset_device()` method or restart the machine. When you set this property to `WRITE_TO_EEPROM`, the values calculated by the `nidcpower.Session.self_cal()` method are written to hardware and used in the existing session and in all subsequent sessions until another call to the `nidcpower.Session.self_cal()` method is made. about supported devices. Default Value: `KEEP_IN_MEMORY`

Note: This property is not supported by all devices. Refer to Supported Properties by Device for information

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.SelfCalibrationPersistence</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Advanced:Self-Calibration Persistence**
 - C Attribute: **NIDCPower_ATTR_SELF_CALIBRATION_PERSISTENCE**
-

`nidcpower.Session.sense`

Selects either local or remote sensing of the output voltage for the specified channel(s). Refer to the Local and Remote Sense topic in the NI DC Power Supplies and SMUs Help for more information about sensing voltage on supported channels and about devices that support local and/or remote sensing. Default Value: The default value is `LOCAL` if the device supports local sense. Otherwise, the default and only supported value is `REMOTE`.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `sense.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `sense.Session` instance, and calling set/get value on the result.:

```
session['0,1'].sense = var
var = session['0,1'].sense
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.Sense</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Measurement:Sense**
 - C Attribute: **NIDCPower_ATTR_SENSE**
-

`nidcpower.Session.sequence_advance_trigger_type`

Specifies the behavior of the Sequence Advance trigger. for information about supported devices. Default Value: *NONE*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.TriggerType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Sequence Advance Trigger:Trigger Type**
 - C Attribute: **NIDCPower_ATTR_SEQUENCE_ADVANCE_TRIGGER_TYPE**
-

`nidcpower.Session.sequence_engine_done_event_output_terminal`

Specifies the output terminal for exporting the Sequence Engine Done Complete event. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Engine Done Event:Output Terminal**
 - C Attribute: **NIDCPower_ATTR_SEQUENCE_ENGINE_DONE_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.sequence_engine_done_event_pulse_polarity`

Specifies the behavior of the Sequence Engine Done event. for information about supported devices. Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Engine Done Event:Pulse:Polarity**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_ENGINE_DONE_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.sequence_engine_done_event_pulse_width`

Specifies the width of the Sequence Engine Done event, in seconds. The minimum event pulse width value for PXI devices is 150 ns, and the minimum event pulse width value for PXI Express devices is 250 ns. The maximum event pulse width value for all devices is 1.6 microseconds. for information about supported devices. Valid Values: 1.5e-7 to 1.6e-6 seconds Default Value: The default value for PXI devices is 150 ns. The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Engine Done Event:Pulse:Width**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_ENGINE_DONE_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.sequence_iteration_complete_event_output_terminal`

Specifies the output terminal for exporting the Sequence Iteration Complete event. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Iteration Complete Event:Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_ITERATION_COMPLETE_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.sequence_iteration_complete_event_pulse_polarity`

Specifies the behavior of the Sequence Iteration Complete event. for information about supported devices.
Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Iteration Complete Event:Pulse:Polarity**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_ITERATION_COMPLETE_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.sequence_iteration_complete_event_pulse_width`

Specifies the width of the Sequence Iteration Complete event, in seconds. The minimum event pulse width value for PXI devices is 150 ns, and the minimum event pulse width value for PXI Express devices is 250 ns. The maximum event pulse width value for all devices is 1.6 microseconds. the NI DC Power Supplies and SMUs Help for information about supported devices. Valid Values: 1.5e-7 to 1.6e-6 seconds Default Value: The default value for PXI devices is 150 ns. The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic in

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Sequence Iteration Complete Event:Pulse:Width**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_ITERATION_COMPLETE_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.sequence_loop_count`

Specifies the number of times a sequence is run after initiation. Refer to the Sequence Source Mode topic in the NI DC Power Supplies and SMUs Help for more information about the sequence loop count. for information about supported devices. When the `nidcpower.Session.sequence_loop_count_is_finite` property is set to False, the `nidcpower.Session.sequence_loop_count` property is ignored. Valid Range: 1 to 134217727 Default Value: 1

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Sequence Loop Count**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_LOOP_COUNT**
-

`nidcpower.Session.sequence_loop_count_is_finite`

Specifies whether a sequence should repeat indefinitely. Refer to the Sequence Source Mode topic in the NI DC Power Supplies and SMUs Help for more information about infinite sequencing. `nidcpower.Session.sequence_loop_count_is_finite` property is set to False, the `nidcpower.Session.sequence_loop_count` property is ignored. Default Value: True

Note: This property is not supported by all devices. When the

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Sequence Loop Count Is Finite**
 - C Attribute: **NIDCPOWER_ATTR_SEQUENCE_LOOP_COUNT_IS_FINITE**
-

`nidcpower.Session.simulate`

Specifies whether to simulate NI-DCPower I/O operations. True specifies that operation is simulated. Default Value: False

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Simulate**
 - C Attribute: **NIDCPOWER_ATTR_SIMULATE**
-

`nidcpower.Session.source_complete_event_output_terminal`

Specifies the output terminal for exporting the Source Complete event. for information about supported devices. Output terminals can be specified in one of two ways. If the device is named Dev1 and your terminal is PXI_Trig0, you can specify the terminal with the fully qualified terminal name, /Dev1/PXI_Trig0, or with the shortened terminal name, PXI_Trig0.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Source Complete Event:Output Terminal**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_COMPLETE_EVENT_OUTPUT_TERMINAL**
-

`nidcpower.Session.source_complete_event_pulse_polarity`

Specifies the behavior of the Source Complete event. for information about supported devices. Default Value: *HIGH*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Polarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Source Complete Event:Pulse:Polarity**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_COMPLETE_EVENT_PULSE_POLARITY**
-

`nidcpower.Session.source_complete_event_pulse_width`

Specifies the width of the Source Complete event, in seconds. for information about supported devices. The minimum event pulse width value for PXI devices is 150 ns, and the minimum event pulse width value for PXI Express devices is 250 ns. The maximum event pulse width value for all devices is 1.6 microseconds Valid Values: 1.5e-7 to 1.6e-6 seconds Default Value: The default value for PXI devices is 150 ns. The default value for PXI Express devices is 250 ns.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Source Complete Event:Pulse:Width**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_COMPLETE_EVENT_PULSE_WIDTH**
-

`nidcpower.Session.source_delay`

Determines when, in seconds, the device generates the Source Complete event, potentially starting a measurement if the `nidcpower.Session.measure_when` property is set to `AUTOMATICALLY_AFTER_SOURCE_COMPLETE`. Refer to the Single Point Source Mode and Sequence Source Mode topics for more information. Valid Values: 0 to 167 seconds Default Value: 0.01667 seconds

Note: Refer to Supported Properties by Device for information about supported devices.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `source_delay.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `source_delay.Session` instance, and calling set/get value on the result.:

```
session['0,1'].source_delay = var
var = session['0,1'].source_delay
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Advanced:Source Delay**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_DELAY**
-

`nidcpower.Session.source_mode`

Specifies whether to run a single output point or a sequence. Refer to the Single Point Source Mode and Sequence Source Mode topics in the NI DC Power Supplies and SMUs Help for more information about source modes. Default value: *SINGLE_POINT*

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.SourceMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Source Mode**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_MODE**
-

`nidcpower.Session.source_trigger_type`

Specifies the behavior of the Source trigger. for information about supported devices. Default Value: *NONE*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Source Trigger:Trigger Type**
 - C Attribute: **NIDCPOWER_ATTR_SOURCE_TRIGGER_TYPE**
-

`nidcpower.Session.specific_driver_class_spec_major_version`

Contains the major version number of the class specification with which NI-DCPower is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Major Version**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION**
-

`nidcpower.Session.specific_driver_class_spec_minor_version`

Contains the minor version number of the class specification with which NI-DCPower is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Minor Version**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION**
-

`nidcpower.Session.specific_driver_description`

Contains a brief description of the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Description**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_DESCRIPTION**
-

`nidcpower.Session.specific_driver_prefix`

Contains the prefix for NI-DCPower. The name of each user-callable method in NI-DCPower begins with this prefix.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Driver Prefix**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_PREFIX**
-

`nidcpower.Session.specific_driver_revision`

Contains additional version information about NI-DCPower.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Revision**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_REVISION**
-

`nidcpower.Session.specific_driver_vendor`

Contains the name of the vendor that supplies NI-DCPower.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Driver Vendor**
 - C Attribute: **NIDCPOWER_ATTR_SPECIFIC_DRIVER_VENDOR**
-

`nidcpower.Session.start_trigger_type`

Specifies the behavior of the Start trigger. for information about supported devices. Default Value: *NONE*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start Trigger:Trigger Type**
 - C Attribute: **NIDCPOWER_ATTR_START_TRIGGER_TYPE**
-

`nidcpower.Session.supported_instrument_models`

Contains a comma-separated (,) list of supported NI-DCPower device models.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Supported Instrument Models**
 - C Attribute: **NIDCPOWER_ATTR_SUPPORTED_INSTRUMENT_MODELS**
-

`nidcpower.Session.transient_response`

Specifies the transient response. Refer to the Transient Response topic in the NI DC Power Supplies and SMUs Help for more information about transient response. for information about supported devices. Default Value: *NORMAL*

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `transient_response.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `transient_response.Session` instance, and calling set/get value on the result.:

```
session['0,1'].transient_response = var
var = session['0,1'].transient_response
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TransientResponse
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Transient Response**
- C Attribute: **NIDCPOWER_ATTR_TRANSIENT_RESPONSE**

`nidcpower.Session.voltage_compensation_frequency`

The frequency at which a pole-zero pair is added to the system when the channel is in Constant Voltage mode. for information about supported devices. Default value: Determined by the value of the [NORMAL](#) setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_compensation_frequency.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_compensation_frequency.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_compensation_frequency = var
var = session['0,1'].voltage_compensation_frequency
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Voltage:Compensation Frequency**

- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_COMPENSATION_FREQUENCY**

`nidcpower.Session.voltage_gain_bandwidth`

The frequency at which the unloaded loop gain extrapolates to 0 dB in the absence of additional poles and zeroes. This property takes effect when the channel is in Constant Voltage mode. for information about supported devices. Default Value: Determined by the value of the *NORMAL* setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_gain_bandwidth.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_gain_bandwidth.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_gain_bandwidth = var
var = session['0,1'].voltage_gain_bandwidth
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Voltage:Gain Bandwidth**
- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_GAIN_BANDWIDTH**

`nidcpower.Session.voltage_level`

Specifies the voltage level, in volts, that the device attempts to generate on the specified channel(s). This property is applicable only if the `nidcpower.Session.output_function` property is set to *DC_VOLTAGE*. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. Valid Values: The valid values for this property are defined by the values you specify for the `nidcpower.Session.voltage_level_range` property.

Note: The channel must be enabled for the specified voltage level to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_level.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_level.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_level = var
var = session['0,1'].voltage_level
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Voltage Level**
 - C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LEVEL**
-

`nidcpower.Session.voltage_level_autorange`

Specifies whether NI-DCPower automatically selects the voltage level range based on the desired voltage level for the specified channel(s). If you set this property to *ON*, NI-DCPower ignores any changes you make to the `nidcpower.Session.voltage_level_range` property. If you change the `nidcpower.Session.voltage_level_autorange` property from *ON* to *OFF*, NI-DCPower retains the last value the `nidcpower.Session.voltage_level_range` property was set to (or the default value if the property was never set) and uses that value as the voltage level range. Query the `nidcpower.Session.voltage_level_range` property by using the `nidcpower.Session._get_attribute_vi_int32()` method for information about which range NI-DCPower automatically selects. The `nidcpower.Session.voltage_level_autorange` property is applicable only if the `nidcpower.Session.output_function` property is set to *DC_VOLTAGE*. Default Value: *OFF*

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_level_autorange.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_level_autorange.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_level_autorange = var
var = session['0,1'].voltage_level_autorange
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Voltage Level Autorange**
 - C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LEVEL_AUTORANGE**
-

`nidcpower.Session.voltage_level_range`

Specifies the voltage level range, in volts, for the specified channel(s). The range defines the valid values to which the voltage level can be set. Use the `nidcpower.Session.voltage_level_autorange` property to enable automatic selection of the voltage level range. The `nidcpower.Session.voltage_level_range` property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_VOLTAGE`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. For valid ranges, refer to the Ranges topic for your device in the NI DC Power Supplies and SMUs Help.

Note: The channel must be enabled for the specified voltage level range to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_level_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_level_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_level_range = var
var = session['0,1'].voltage_level_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Voltage:Voltage Level Range**
 - C Attribute: **NIDCPower_ATTR_VOLTAGE_LEVEL_RANGE**
-

`nidcpower.Session.voltage_limit`

Specifies the voltage limit, in volts, that the output cannot exceed when generating the desired current level on the specified channels. This property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_CURRENT` and the `nidcpower.Session.compliance_limit_symmetry` property is set to `NIDCPower_VAL_SYMMETRIC`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. Valid Values: The valid values for this property are defined by the values to which the `nidcpower.Session.voltage_limit_range` property is set.

Note: The channel must be enabled for the specified current level to take effect. Refer to the

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_limit.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_limit.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_limit = var
var = session['0,1'].voltage_limit
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Voltage Limit**
- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LIMIT**

`nidcpower.Session.voltage_limit_autorange`

Specifies whether NI-DCPower automatically selects the voltage limit range based on the desired voltage limit for the specified channel(s). If this property is set to *ON*, NI-DCPower ignores any changes you make to the `nidcpower.Session.voltage_limit_range` property. If you change the `nidcpower.Session.voltage_limit_autorange` property from *ON* to *OFF*, NI-DCPower retains the last value the `nidcpower.Session.voltage_limit_range` property was set to (or the default value if the property was never set) and uses that value as the voltage limit range. Query the `nidcpower.Session.voltage_limit_range` property by using the `nidcpower.Session._get_attribute_vi_int32()` method to find out which range NI-DCPower automatically selects. The `nidcpower.Session.voltage_limit_autorange` property is applicable only if the `nidcpower.Session.output_function` property is set to *DC_CURRENT*. Default Value: *OFF*

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_limit_autorange.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_limit_autorange.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_limit_autorange = var
var = session['0,1'].voltage_limit_autorange
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Voltage Limit Autorange**
 - C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LIMIT_AUTORANGE**
-

`nidcpower.Session.voltage_limit_high`

Specifies the maximum voltage, in volts, that the output can produce when generating the desired current on the specified channel(s). This property is applicable only if the *Compliance Limit Symmetry* `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **DC Current**. You must also specify a *Voltage Limit Low* `<p:py:meth:'nidcpower.Session.VoltageLimitLow.html'>__` to complete the asymmetric range. **Valid Values:** [1% of *Voltage Limit Range* `<p:py:meth:'nidcpower.Session.VoltageLimitRange.html'>__`, *Voltage Limit Range* `<p:py:meth:'nidcpower.Session.VoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_limit_high.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_limit_high.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_limit_high = var
var = session['0,1'].voltage_limit_high
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Voltage Limit High**
 - C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LIMIT_HIGH**
-

`nidcpower.Session.voltage_limit_low`

Specifies the minimum voltage, in volts, that the output can produce when generating the desired current on the specified channel(s). This property is applicable only if the *Compliance*

Limit Symmetry `<p:py:meth:'nidcpower.Session.ComplianceLimitSymmetry.html'>__` property is set to **Asymmetric** and the *Output Method* `<p:py:meth:'nidcpower.Session.OutputFunction.html'>__` property is set to **DC Current**. You must also specify a *Voltage Limit High* `<p:py:meth:'nidcpower.Session.VoltageLimitHigh.html'>__` to complete the asymmetric range. **Valid Values:** [-*Voltage Limit Range* `<p:py:meth:'nidcpower.Session.VoltageLimitRange.html'>__`, -1% of *Voltage Limit Range* `<p:py:meth:'nidcpower.Session.VoltageLimitRange.html'>__`] The range bounded by the limit high and limit low must include zero. **Default Value:** Refer to [Supported Properties by Device](#) for the default value by device. **Related Topics:** [Ranges Changing Ranges Overranging](#)

Note: The limit may be extended beyond the selected limit range if the *Overranging Enabled* `<p:py:meth:'nidcpower.Session.OverrangingEnabled.html'>__` property is set to TRUE.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_limit_low.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_limit_low.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_limit_low = var
var = session['0,1'].voltage_limit_low
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Voltage Limit Low**
- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LIMIT_LOW**

`nidcpower.Session.voltage_limit_range`

Specifies the voltage limit range, in volts, for the specified channel(s). The range defines the valid values to which the voltage limit can be set. Use the `nidcpower.Session.voltage_limit_autorange` property to enable automatic selection of the voltage limit range. The `nidcpower.Session.voltage_limit_range` property is applicable only if the `nidcpower.Session.output_function` property is set to `DC_CURRENT`. `nidcpower.Session.output_enabled` property for more information about enabling the output channel. For valid ranges, refer to the [Ranges](#) topic for your device in the NI DC Power Supplies and SMUs Help.

Note: The channel must be enabled for the specified voltage limit range to take effect. Refer to the

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_limit_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_limit_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_limit_range = var
var = session['0,1'].voltage_limit_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:DC Current:Voltage Limit Range**
- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_LIMIT_RANGE**

`nidcpower.Session.voltage_pole_zero_ratio`

The ratio of the pole frequency to the zero frequency when the channel is in Constant Voltage mode. for information about supported devices. Default value: Determined by the value of the *NORMAL* setting of the `nidcpower.Session.transient_response` property.

Note: This property is not supported by all devices. Refer to Supported Properties by Device topic

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `voltage_pole_zero_ratio.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `voltage_pole_zero_ratio.Session` instance, and calling set/get value on the result.:

```
session['0,1'].voltage_pole_zero_ratio = var
var = session['0,1'].voltage_pole_zero_ratio
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Source:Custom Transient Response:Voltage:Pole-Zero Ratio**

- C Attribute: **NIDCPOWER_ATTR_VOLTAGE_POLE_ZERO_RATIO**
-

Enums

Enums used in NI-DCPower

`nidcpower.ApertureTimeUnits`

`ApertureTimeUnits.SECONDS`

Specifies aperture time in seconds.

`ApertureTimeUnits.POWER_LINE_CYCLES`

Specifies aperture time in power line cycles (PLCs).

`nidcpower.AutoZero`

`AutoZero.OFF`

Disables auto zero.

`AutoZero.ON`

Makes zero conversions for every measurement.

`AutoZero.ONCE`

Makes zero conversions following the first measurement after initiating the device. The device uses these zero conversions for the preceding measurement and future measurements until the device is reinitiated.

`nidcpower.ComplianceLimitSymmetry`

`ComplianceLimitSymmetry.SYMMETRIC`

Compliance limits are specified symmetrically about 0.

`ComplianceLimitSymmetry.ASYMMETRIC`

Compliance limits can be specified asymmetrically with respect to 0.

`nidcpower.DCNoiseRejection`

`DCNoiseRejection.SECOND_ORDER`

Second-order rejection of DC noise.

`DCNoiseRejection.NORMAL`

Normal rejection of DC noise.

`nidcpower.DigitalEdge`

`DigitalEdge.RISING`

Asserts the trigger on the rising edge of the digital signal.

`DigitalEdge.FALLING`

Asserts the trigger on the falling edge of the digital signal.

`nidcpower.Event`

`Event.SOURCE_COMPLETE`

`Event.MEASURE_COMPLETE`

`Event.SOURCE_ITERATION_COMPLETE`

`Event.SOURCE_ENGINE_DONE`

`Event.PULSE_COMPLETE`

`Event.READY_FOR_PULSE_TRIGGER`

`nidcpower.ExportSignal`

`ExportSignal.SOURCE_COMPLETE_EVENT`

Exports the Source Complete event.

`ExportSignal.MEASURE_COMPLETE_EVENT`

Exports the Measure Complete event.

`ExportSignal.SOURCE_ITERATION_COMPLETE_EVENT`

Exports the Sequence Iteration Complete event.

`ExportSignal.SOURCE_ENGINE_DONE_EVENT`

Exports the Sequence Engine Done event.

`ExportSignal.PULSE_COMPLETE_EVENT`

Exports the Pulse Complete event.

`ExportSignal.READY_FOR_PULSE_TRIGGER_EVENT`

Exports the Ready Pulse Trigger event.

`ExportSignal.START_TRIGGER`

Exports the Start trigger.

`ExportSignal.SOURCE_TRIGGER`

Exports the Source trigger.

`ExportSignal.MEASURE_TRIGGER`

Exports the Measure trigger.

`ExportSignal.SOURCE_ADVANCE_TRIGGER`

Exports the Sequence Advance trigger.

`ExportSignal.PULSE_TRIGGER`

Exports the Pulse trigger.

`nidcpower.MeasureWhen`

`MeasureWhen.AUTOMATICALLY_AFTER_SOURCE_COMPLETE`

Acquires a measurement after each Source Complete event completes.

`MeasureWhen.ON_DEMAND`

Acquires a measurement when the `nidcpower.Session.measure()` method or `nidcpower.Session.measure_multiple()` method is called.

`MeasureWhen.ON_MEASURE_TRIGGER`

Acquires a measurement when a Measure trigger is received.

`nidcpower.MeasurementTypes`

`MeasurementTypes.CURRENT`

The device measures current.

`MeasurementTypes.VOLTAGE`

The device measures voltage.

`nidcpower.OutputCapacitance`

`OutputCapacitance.LOW`

Output Capacitance is low.

`OutputCapacitance.HIGH`

Output Capacitance is high.

`nidcpower.OutputFunction`

`OutputFunction.DC_VOLTAGE`

Sets the output method to DC voltage.

`OutputFunction.DC_CURRENT`

Sets the output method to DC current.

`OutputFunction.PULSE_VOLTAGE`

Sets the output method to pulse voltage.

`OutputFunction.PULSE_CURRENT`

Sets the output method to pulse current.

`nidcpower.OutputStates`

`OutputStates.VOLTAGE`

The device maintains a constant voltage by adjusting the current

`OutputStates.CURRENT`

The device maintains a constant current by adjusting the voltage.

`nidcpower.Polarity`

`Polarity.HIGH`

A high pulse occurs when the event is generated. The exported signal is low level both before and after the event is generated.

`Polarity.LOW`

A low pulse occurs when the event is generated. The exported signal is high level both before and after the event is generated.

`nidcpower.PowerSource`

`PowerSource.INTERNAL`

Uses the PXI chassis power source.

`PowerSource.AUXILIARY`

Uses the auxiliary power source connected to the device.

`PowerSource.AUTOMATIC`

Uses the auxiliary power source if it is available; otherwise uses the PXI chassis power source.

`nidcpower.PowerSourceInUse`

`PowerSourceInUse.INTERNAL`

Uses the PXI chassis power source.

`PowerSourceInUse.AUXILIARY`

Uses the auxiliary power source connected to the device. Only the NI PXI-4110, NI PXIe-4112, NI PXIe-4113, and NI PXI-4130 support this value. This is the only supported value for the NI PXIe-4112 and NI PXIe-4113.

`nidcpower.SelfCalibrationPersistence`

`SelfCalibrationPersistence.KEEP_IN_MEMORY`

Keep new self calibration values in memory only.

`SelfCalibrationPersistence.WRITE_TO_EEPROM`

Write new self calibration values to hardware.

`nidcpower.SendSoftwareEdgeTriggerType`

`SendSoftwareEdgeTriggerType.START`

`SendSoftwareEdgeTriggerType.SOURCE`

`SendSoftwareEdgeTriggerType.MEASURE`

`SendSoftwareEdgeTriggerType.SEQUENCE_ADVANCE`

`SendSoftwareEdgeTriggerType.PULSE`

`nidcpower.Sense`

`Sense.LOCAL`

Local sensing is selected.

`Sense.REMOTE`

Remote sensing is selected.

`nidcpower.SourceMode`

`SourceMode.SINGLE_POINT`

The source unit applies a single source configuration.

`SourceMode.SEQUENCE`

The source unit applies a list of voltage or current configurations sequentially.

`nidcpower.TransientResponse`

`TransientResponse.NORMAL`

The output responds to changes in load at a normal speed.

`TransientResponse.FAST`

The output responds to changes in load quickly.

`TransientResponse.SLOW`

The output responds to changes in load slowly.

`TransientResponse.CUSTOM`

The output responds to changes in load based on specified values.

`nidcpower.TriggerType`

`TriggerType.NONE`

No trigger is configured.

`TriggerType.DIGITAL_EDGE`

The data operation starts when a digital edge is detected.

`TriggerType.SOFTWARE_EDGE`

The data operation starts when a software trigger occurs.

Examples

nidcpower_measure_record.py

Listing 7.1: (nidcpower_measure_record.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import nidcpower
5  import sys
6
7
8  def example(resource_name, channels, options, voltage, length):
9      with nidcpower.Session(resource_name=resource_name, channels=channels,
10         ↪options=options) as session:
11
12         # Configure the session.
13         session.measure_record_length = length
14         session.measure_record_length_is_finite = True
15         session.measure_when = nidcpower.MeasureWhen.AUTOMATICALLY_AFTER_SOURCE_
16         ↪COMPLETE
17         session.voltage_level = voltage
18
19         session.commit()
20         print('Effective measurement rate: {0} S/s'.format(session.measure_record_
21         ↪delta_time / 1))
22
23         samples_acquired = 0
24         print(' #      Voltage      Current      In Compliance')
25         row_format = '{0:3d}:  {1:8.6f}  {2:8.6f}  {3}'
26         with session.initiate():
27             while samples_acquired < length:
28                 measurements = session.fetch_multiple(count=session.fetch_backlog)
29                 samples_acquired += len(measurements)
30                 for i in range(len(measurements)):
31                     print(row_format.format(i, measurements[i].voltage,
32                     ↪measurements[i].current, measurements[i].in_compliance))
33
34 def _main(argv):
35     parser = argparse.ArgumentParser(description='Outputs the specified voltage, then
36     ↪takes the specified number of voltage and current readings.', formatter_
37     ↪class=argparse.ArgumentDefaultsHelpFormatter)
38     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
39     ↪name of a National Instruments SMU')
40     parser.add_argument('-c', '--channels', default='0', help='Channel(s) to use')
41     parser.add_argument('-l', '--length', default='20', type=int, help='Measure
42     ↪record length')
43     parser.add_argument('-v', '--voltage', default=5.0, type=float, help='Voltage
44     ↪level (V)')

```

```

37     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
↪string')
38     args = parser.parse_args(argv)
39     example(args.resource_name, args.channels, args.option_string, args.voltage, args.
↪length)
40
41
42 def main():
43     _main(sys.argv[1:])
44
45
46 def test_example():
47     options = {'simulate': True, 'driver_setup': {'Model': '4162', 'BoardType': 'PXIe
↪', }, }
48     example('PXI1Slot2', '0', options, 5.0, 20)
49
50
51 def test_main():
52     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:4162; BoardType:PXIe
↪', ]
53     _main(cmd_line)
54
55
56 if __name__ == '__main__':
57     main()
58
59

```

nidcpower_source_delay_measure.py

Listing 7.2: (nidcpower_source_delay_measure.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import datetime
5  import nidcpower
6  import sys
7
8
9  def print_fetched_measurements(measurements):
10     print('          Voltage : {:.f} V'.format(measurements[0].voltage))
11     print('          Current: {:.f} A'.format(measurements[0].current))
12     print('          In compliance: {0}'.format(measurements[0].in_compliance))
13
14
15 def example(resource_name, channels, options, voltage1, voltage2, delay):
16     timeout = datetime.timedelta(seconds=(delay + 1.0))
17
18     with nidcpower.Session(resource_name=resource_name, channels=channels,
↪options=options) as session:
19
20         # Configure the session.
21         session.source_mode = nidcpower.SourceMode.SINGLE_POINT
22         session.output_function = nidcpower.OutputFunction.DC_VOLTAGE
23         session.current_limit = .06

```

```

24     session.voltage_level_range = 5.0
25     session.current_limit_range = .06
26     session.source_delay = datetime.timedelta(seconds=delay)
27     session.measure_when = nidcpower.MeasureWhen.AUTOMATICALLY_AFTER_SOURCE_
↪COMPLETE
28     session.voltage_level = voltage1
29
30     with session.initiate():
31         print('Voltage 1:')
32         print_fetched_measurements(session.fetch_multiple(count=1,
↪timeout=timeout))
33         session.voltage_level = voltage2 # on-the-fly set
34         print('Voltage 2:')
35         print_fetched_measurements(session.fetch_multiple(count=1,
↪timeout=timeout))
36         session.output_enabled = False
37
38
39 def _main(argv):
40     parser = argparse.ArgumentParser(description='Outputs voltage 1, waits for source_
↪delay, and then takes a measurement. Then orepeat with voltage 2.', formatter_
↪class=argparse.ArgumentDefaultsHelpFormatter)
41     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
↪name of a National Instruments SMU')
42     parser.add_argument('-c', '--channels', default='0', help='Channel(s) to use')
43     parser.add_argument('-v1', '--voltage1', default=1.0, type=float, help='Voltage_
↪level 1 (V)')
44     parser.add_argument('-v2', '--voltage2', default=2.0, type=float, help='Voltage_
↪level 2 (V)')
45     parser.add_argument('-d', '--delay', default=0.05, type=float, help='Source delay_
↪(s)')
46     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
↪string')
47     args = parser.parse_args(argv)
48     example(args.resource_name, args.channels, args.option_string, args.voltage1,
↪args.voltage2, args.delay)
49
50
51 def main():
52     _main(sys.argv[1:])
53
54
55 def test_main():
56     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:4162; BoardType:PXIe
↪', ]
57     _main(cmd_line)
58
59
60 def test_example():
61     options = {'simulate': True, 'driver_setup': {'Model': '4162', 'BoardType': 'PXIe
↪', }, }
62     example('PXI1Slot2', '0', options, 1.0, 2.0, 0.05)
63
64
65 if __name__ == '__main__':
66     main()
67
68

```

7.2 nidmm module

7.2.1 Installation

As a prerequisite to using the `nidmm` module, you must install the NI-DMM runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The `nimi-python` modules (i.e. for **NI-DMM**) can be installed with `pip`:

```
$ python -m pip install nidmm~=0.8.0
```

Or `easy_install` from `setuptools`:

```
$ python -m easy_install nidmm
```

7.2.2 Usage

The following is a basic example of using the `nidmm` module to open a session to a DMM and perform a 5.5 digits of resolution voltage measurement in the 10 V range.

```
import nidmm
with nidmm.Session("Dev1") as session:
    session.configureMeasurementDigits(nidmm.Function.DC_VOLTS, 10, 5.5)
    print("Measurement: " + str(session.read()))
```

Additional examples for NI-DMM are located in `src/nidmm/examples/` directory.

7.2.3 API Reference

`nidmm.Session`

class `nidmm.Session`

An NI-DMM session to a National Instruments Digital Multimeter

Properties

Property	Datatype
<code>ac_max_freq</code>	float
<code>ac_min_freq</code>	float
<code>adc_calibration</code>	<i>ADCCalibration</i>
<code>aperture_time</code>	float
<code>aperture_time_units</code>	<i>ApertureTimeUnits</i>
<code>auto_range_value</code>	float
<code>auto_zero</code>	<i>AutoZero</i>
<code>buffer_size</code>	int
<code>cable_comp_type</code>	<i>CableCompensationType</i>
<code>cache</code>	bool
<code>channel_count</code>	int
<code>current_source</code>	float
<code>dc_bias</code>	bool
<code>dc_noise_rejection</code>	<i>DCNoiseRejection</i>

Continued on next page

Table 7.3 – continued from previous page

Property	Datatype
<code>driver_setup</code>	str
<code>freq_voltage_autorange</code>	float
<code>freq_voltage_range</code>	float
<code>function</code>	<i>Function</i>
<code>group_capabilities</code>	str
<code>input_resistance</code>	float
<code>instrument_firmware_revision</code>	str
<code>instrument_manufacturer</code>	str
<code>instrument_model</code>	str
<code>instrument_product_id</code>	int
<code>interchange_check</code>	bool
<code>io_resource_descriptor</code>	str
<code>latency</code>	int
<code>lc_calculation_model</code>	<i>LCCalculationModel</i>
<code>lc_number_meas_to_average</code>	int
<code>logical_name</code>	str
<code>meas_complete_dest</code>	<i>MeasurementCompleteDest</i>
<code>meas_dest_slope</code>	<i>MeasurementDestinationSlope</i>
<code>number_of_averages</code>	int
<code>offset_comp_ohms</code>	bool
<code>open_cable_comp_conductance</code>	float
<code>open_cable_comp_susceptance</code>	float
<code>operation_mode</code>	<i>OperationMode</i>
<code>powerline_freq</code>	float
<code>range</code>	float
<code>range_check</code>	bool
<code>record_coercions</code>	bool
<code>resolution_absolute</code>	float
<code>resolution_digits</code>	float
<code>sample_count</code>	int
<code>sample_interval</code>	float in seconds or datetime.timedelta
<code>sample_trigger</code>	<i>SampleTrigger</i>
<code>sample_trigger_slope</code>	<i>SampleTrigSlope</i>
<code>serial_number</code>	str
<code>settle_time</code>	float in seconds or datetime.timedelta
<code>short_cable_comp_reactance</code>	float
<code>short_cable_comp_resistance</code>	float
<code>shunt_value</code>	float
<code>simulate</code>	bool
<code>specific_driver_class_spec_major_version</code>	int
<code>specific_driver_class_spec_minor_version</code>	int
<code>specific_driver_description</code>	str
<code>specific_driver_major_version</code>	int
<code>specific_driver_minor_version</code>	int
<code>specific_driver_revision</code>	str
<code>specific_driver_vendor</code>	str
<code>supported_instrument_models</code>	str
<code>temp_rtd_a</code>	float
<code>temp_rtd_b</code>	float

Continued on next page

Table 7.3 – continued from previous page

Property	Datatype
<code>temp_rtd_c</code>	float
<code>temp_rtd_res</code>	float
<code>temp_rtd_type</code>	<i>RTDType</i>
<code>temp_tc_fixed_ref_junc</code>	float
<code>temp_tc_ref_junc_type</code>	<i>ThermocoupleReferenceJunctionType</i>
<code>temp_tc_type</code>	<i>ThermocoupleType</i>
<code>temp_thermistor_a</code>	float
<code>temp_thermistor_b</code>	float
<code>temp_thermistor_c</code>	float
<code>temp_thermistor_type</code>	<i>ThermistorType</i>
<code>temp_transducer_type</code>	<i>TransducerType</i>
<code>trigger_count</code>	int
<code>trigger_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_slope</code>	<i>TriggerSlope</i>
<code>trigger_source</code>	<i>TriggerSource</i>
<code>waveform_coupling</code>	<i>WaveformCoupling</i>
<code>waveform_points</code>	int
<code>waveform_rate</code>	float

Public methods

Method name
<code>abort()</code>
<code>configure_ac_bandwidth()</code>
<code>configure_measurement_absolute()</code>
<code>configure_measurement_digits()</code>
<code>configure_multi_point()</code>
<code>configure_open_cable_comp_values()</code>
<code>configure_power_line_frequency()</code>
<code>configure_rtd_custom()</code>
<code>configure_rtd_type()</code>
<code>configure_short_cable_comp_values()</code>
<code>configure_thermistor_custom()</code>
<code>configure_thermocouple()</code>
<code>configure_trigger()</code>
<code>configure_waveform_acquisition()</code>
<code>disable()</code>
<code>fetch()</code>
<code>fetch_multi_point()</code>
<code>fetch_waveform()</code>
<code>fetch_waveform_into()</code>
<code>get_aperture_time_info()</code>
<code>get_auto_range_value()</code>
<code>get_cal_date_and_time()</code>
<code>get_dev_temp()</code>
<code>get_ext_cal_recommended_interval()</code>
<code>get_last_cal_temp()</code>
<code>get_measurement_period()</code>
<code>get_self_cal_supported()</code>

Continued on next page

Table 7.4 – continued from previous page

Method name
<code>perform_open_cable_comp()</code>
<code>perform_short_cable_comp()</code>
<code>read()</code>
<code>read_multi_point()</code>
<code>read_status()</code>
<code>read_waveform()</code>
<code>reset()</code>
<code>reset_with_defaults()</code>
<code>self_cal()</code>
<code>self_test()</code>
<code>send_software_trigger()</code>

nidmm.Session methods

`nidmm.Session.abort()`

Aborts a previously initiated measurement and returns the DMM to the Idle state.

`nidmm.Session.configure_ac_bandwidth(ac_minimum_frequency_hz, ac_maximum_frequency_hz)`

Configures the `nidmm.Session.ac_min_freq` and `nidmm.Session.ac_max_freq` properties, which the DMM uses for AC measurements.

Parameters

- **ac_minimum_frequency_hz** (*float*) – Specifies the minimum expected frequency component of the input signal in hertz. This parameter affects the DMM only when you set the `nidmm.Session.method` property to AC measurements. NI-DMM uses this parameter to calculate the proper aperture for the measurement. The driver sets the `nidmm.Session.ac_min_freq` property to this value. The valid range is 1 Hz–300 kHz for the NI 4080/4081/4082 and the NI 4070/4071/4072, 10 Hz–100 Hz for the NI 4065, and 20 Hz–25 kHz for the NI 4050 and NI 4060.
- **ac_maximum_frequency_hz** (*float*) – Specifies the maximum expected frequency component of the input signal in hertz within the device limits. This parameter is used only for error checking and verifies that the value of this parameter is less than the maximum frequency of the device.

This parameter affects the DMM only when you set the `nidmm.Session.method` property to AC measurements. The driver sets the `nidmm.Session.ac_max_freq` property to this value. The valid range is 1 Hz–300 kHz for the NI 4080/4081/4082 and the NI 4070/4071/4072, 10 Hz–100 Hz for the NI 4065, and 20 Hz–25 kHz for the NI 4050 and NI 4060.

`nidmm.Session.configure_measurement_absolute(measurement_function, range, resolution_absolute)`

Configures the common properties of the measurement. These properties include `nidmm.Session.method`, `nidmm.Session.range`, and `nidmm.Session.resolution_absolute`.

Parameters

- **measurement_function** (*nidmm.Function*) – Specifies the **measurement_function** used to acquire the measurement. The driver sets `nidmm.Session.method` to this value.
- **range** (*float*) – Specifies the **range** for the method specified in the **Measurement_Function** parameter. When frequency is specified in the **Measurement_Function**

parameter, you must supply the minimum frequency expected in the **range** parameter. For example, you must type in 100 Hz if you are measuring 101 Hz or higher. For all other methods, you must supply a **range** that exceeds the value that you are measuring. For example, you must type in 10 V if you are measuring 9 V. **range** values are coerced up to the closest input **range**. Refer to the [Devices Overview](#) for a list of valid ranges. The driver sets `nidmm.Session.range` to this value. The default is 0.02 V.

NIDMM_VAL_AUTO_RANGE_ON	1.0	NI-DMM performs an Auto Range before acquiring the measurement.
NIDMM_VAL_AUTO_RANGE_ONCE	2.0	NI-DMM sets the Range to the current <code>nidmm.Session.auto_range_value</code> and uses this range for all subsequent measurements until the measurement configuration is changed.
NIDMM_VAL_AUTO_RANGE_STORED	3.0	NI-DMM performs an Auto Range before acquiring the measurement. The <code>nidmm.Session.auto_range_value</code> is stored and used for all subsequent measurements until the measurement configuration is changed.

Note: The NI 4050, NI 4060, and NI 4065 only support Auto Range when the trigger and sample trigger are set to IMMEDIATE.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **resolution_absolute** (*float*) – Specifies the absolute resolution for the measurement. NI-DMM sets `nidmm.Session.resolution_absolute` to this value. This parameter is ignored when the **Range** parameter is set to NIDMM_VAL_AUTO_RANGE_ON (-1.0) or NIDMM_VAL_AUTO_RANGE_ONCE (-3.0). The default is 0.001 V.

Note: NI-DMM ignores this parameter for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use the `nidmm.Session.lc_number_meas_to_average` property.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

```
nidmm.Session.configure_measurement_digits(measurement_function, range, resolution_digits)
```

Configures the common properties of the measurement. These properties include `nidmm.Session.method`, `nidmm.Session.range`, and `nidmm.Session.resolution_digits`.

Parameters

- **measurement_function** (*nidmm.Function*) – Specifies the **measurement_function** used to acquire the measurement. The driver sets `nidmm.Session.method` to this value.
- **range** (*float*) – Specifies the range for the method specified in the **Measurement_Function** parameter. When frequency is specified in the **Measurement_Function** parameter, you must supply the minimum frequency expected in the **range** parameter. For example, you must type in 100 Hz if you are measuring 101 Hz or higher. For all other

methods, you must supply a range that exceeds the value that you are measuring. For example, you must type in 10 V if you are measuring 9 V. range values are coerced up to the closest input range. Refer to the [Devices Overview](#) for a list of valid ranges. The driver sets `nidmm.Session.range` to this value. The default is 0.02 V.

NIDMM_VAL_AUTO_RANGE_OFF	1.0	NI-DMM performs an Auto Range before acquiring the measurement.
NIDMM_VAL_AUTO_RANGE_ON	2.0	NI-DMM sets the Range to the current <code>nidmm.Session.auto_range_value</code> and uses this range for all subsequent measurements until the measurement configuration is changed.
NIDMM_VAL_AUTO_RANGE_ONCE	3.0	NI-DMM performs an Auto Range before acquiring the measurement. The <code>nidmm.Session.auto_range_value</code> is stored and used for all subsequent measurements until the measurement configuration is changed.

Note: The NI 4050, NI 4060, and NI 4065 only support Auto Range when the trigger and sample trigger are set to IMMEDIATE.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **resolution_digits** (*float*) – Specifies the resolution of the measurement in digits. The driver sets the [Devices Overview](#) for a list of valid ranges. The driver sets `nidmm.Session.resolution_digits` property to this value. This parameter is ignored when the **Range** parameter is set to NIDMM_VAL_AUTO_RANGE_ON (-1.0) or NIDMM_VAL_AUTO_RANGE_ONCE (-3.0). The default is 5½.

Note: NI-DMM ignores this parameter for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use the `nidmm.Session.lc_number_meas_to_average` property.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

```
nidmm.Session.configure_multi_point(trigger_count, sample_count, sample_trigger=nidmm.SampleTrigger.IMMEDIATE,
                                     sample_interval=datetime.timedelta(seconds=-1))
```

Configures the properties for multipoint measurements. These properties include `nidmm.Session.trigger_count`, `nidmm.Session.sample_count`, `nidmm.Session.sample_trigger`, and `nidmm.Session.sample_interval`.

For continuous acquisitions, set `nidmm.Session.trigger_count` or `nidmm.Session.sample_count` to zero. For more information, refer to [Multiple Point Acquisitions, Triggering, and Using Switches](#).

Parameters

- **trigger_count** (*int*) – Sets the number of triggers you want the DMM to receive before returning to the Idle state. The driver sets `nidmm.Session.trigger_count` to this value. The default value is 1.

- **sample_count** (*int*) – Sets the number of measurements the DMM makes in each measurement sequence initiated by a trigger. The driver sets `nidmm.Session.sample_count` to this value. The default value is 1.
- **sample_trigger** (*nidmm.SampleTrigger*) – Specifies the **sample_trigger** source you want to use. The driver sets `nidmm.Session.sample_trigger` to this value. The default is Immediate.

Note: To determine which values are supported by each device, refer to the [LabWindows/CVI Trigger Routing](#) section.

- **sample_interval** (*float in seconds or datetime.timedelta*) – Sets the amount of time in seconds the DMM waits between measurement cycles. The driver sets `nidmm.Session.sample_interval` to this value. Specify a sample interval to add settling time between measurement cycles or to decrease the measurement rate. **sample_interval** only applies when the **Sample_Trigger** is set to INTERVAL.

On the NI 4060, the **sample_interval** value is used as the settling time. When sample interval is set to 0, the DMM does not settle between measurement cycles. The NI 4065 and NI 4070/4071/4072 use the value specified in **sample_interval** as additional delay. The default value (-1) ensures that the DMM settles for a recommended time. This is the same as using an Immediate trigger.

Note: This property is not used on the NI 4080/4081/4082 and the NI 4050.

`nidmm.Session.configure_open_cable_comp_values` (*conductance, susceptance*)

For the NI 4082 and NI 4072 only, configures the `nidmm.Session.open_cable_comp_conductance` and `nidmm.Session.open_cable_comp_susceptance` properties.

Parameters

- **conductance** (*float*) – Specifies the open cable compensation **conductance**.
- **susceptance** (*float*) – Specifies the open cable compensation **susceptance**.

`nidmm.Session.configure_power_line_frequency` (*power_line_frequency_hz*)

Specifies the powerline frequency.

Parameters `power_line_frequency_hz` (*float*) – **Powerline Frequency** specifies the powerline frequency in hertz. NI-DMM sets the Powerline Frequency property to this value.

`nidmm.Session.configure_rtd_custom` (*rtd_a, rtd_b, rtd_c*)

Configures the A, B, and C parameters for a custom RTD.

Parameters

- **rtd_a** (*float*) – Specifies the Callendar-Van Dusen A coefficient for RTD scaling when RTD Type parameter is set to Custom in the `nidmm.Session.configure_rtd_type()` method. The default is 3.9083e-3 (Pt3851)
- **rtd_b** (*float*) – Specifies the Callendar-Van Dusen B coefficient for RTD scaling when RTD Type parameter is set to Custom in the `nidmm.Session.configure_rtd_type()` method. The default is -5.775e-7 (Pt3851).
- **rtd_c** (*float*) – Specifies the Callendar-Van Dusen C coefficient for RTD scaling when RTD Type parameter is set to Custom in the `nidmm.Session.configure_rtd_type()` method. The default is -4.183e-12 (Pt3851).

```
nidmm.Session.configure_rtd_type(rtd_type, rtd_resistance)
```

Configures the RTD Type and RTD Resistance parameters for an RTD.

Parameters

- **rtd_type** (*nidmm.RTDType*) – Specifies the type of RTD used to measure the temperature resistance. NI-DMM uses this value to set the RTD Type property. The default is *PT3851*.

Enum	Standards	Material	TCR (α)	Typical R_0 (Ω)	Notes	
Callendar-Van Dusen Coefficient						
<i>PT3851</i>	IEC-751 DIN 43760 BS 1904 ASTM-E1137 EN-60751	Platinum	.00385	100 Ω 1000 Ω	$A = 3.9083 \times 10^{-3}$ B = -5.775×10^{-7} C = -4.183×10^{-12}	Most common RTDs
<i>PT3750</i>	Low-cost vendor compliant RTD*	Platinum	.00375	50000 Ω	$A = 3.81 \times 10^{-3}$ B = -6.02×10^{-7} C = -6.0×10^{-12}	Low-cost RTD
<i>PT3916</i>	JISC 1604	Platinum	.00391	1600 Ω	$A = 3.9739 \times 10^{-3}$ B = -5.870×10^{-7} C = -4.4×10^{-12}	Used in primarily in Japan
<i>PT3920</i>	US Industrial Standard D-100 American	Platinum	.00392	2000 Ω	$A = 3.9787 \times 10^{-3}$ B = -5.8686×10^{-7} C = -4.167×10^{-12}	Low-cost RTD
<i>PT3911</i>	US Industrial Standard American	Platinum	.00391	1100 Ω	$A = 3.9692 \times 10^{-3}$ B = -5.8495×10^{-7} C = -4.233×10^{-12}	Low-cost RTD
<i>PT3928</i>	ITS-90	Platinum	.00392	2800 Ω	$A = 3.9888 \times 10^{-3}$ B = -5.915×10^{-7} C = -3.85×10^{-12}	The definition of temperature
*No standard. Check the TCR.						

- **rtd_resistance** (*float*) – Specifies the RTD resistance in ohms at 0 °C. NI-DMM uses this value to set the RTD Resistance property. The default is 100 (Ω).

```
nidmm.Session.configure_short_cable_comp_values(resistance, reactance)
```

For the NI 4082 and NI 4072 only, configures the *nidmm.Session.short_cable_comp_resistance* and *nidmm.Session.short_cable_comp_reactance* properties.

Parameters

- **resistance** (*float*) – Specifies the short cable compensation resistance.

- **reactance** (*float*) – Specifies the short cable compensation **reactance**.

`nidmm.Session.configure_thermistor_custom(thermistor_a, thermistor_b, thermistor_c)`
 Configures the A, B, and C parameters for a custom thermistor.

Parameters

- **thermistor_a** (*float*) – Specifies the Steinhart-Hart A coefficient for thermistor scaling when Thermistor Type is set to Custom in the `nidmm.Session.ConfigureThermistorType()` method. The default is 1.0295e-3 (44006).

Note: One or more of the referenced methods are not in the Python API for this driver.

- **thermistor_b** (*float*) – Specifies the Steinhart-Hart B coefficient for thermistor scaling when Thermistor Type is set to Custom in the `nidmm.Session.ConfigureThermistorType()` method. The default is 2.391e-4 (44006).

Note: One or more of the referenced methods are not in the Python API for this driver.

- **thermistor_c** (*float*) – Specifies the Steinhart-Hart C coefficient for thermistor scaling when Thermistor Type is set to Custom in the `nidmm.Session.ConfigureThermistorType()` method. The default is 1.568e-7 (44006).

Note: One or more of the referenced methods are not in the Python API for this driver.

`nidmm.Session.configure_thermocouple(thermocouple_type, reference_junction_type=nidmm.ThermocoupleReferenceJunctionType.FIXED)`
 Configures the thermocouple type and reference junction type for a chosen thermocouple.

Parameters

- **thermocouple_type** (*nidmm.ThermocoupleType*) – Specifies the type of thermocouple used to measure the temperature. NI-DMM uses this value to set the Thermocouple Type property. The default is *J*.

<i>B</i>	Thermocouple type B
<i>E</i>	Thermocouple type E
<i>J</i>	Thermocouple type J
<i>K</i>	Thermocouple type K
<i>N</i>	Thermocouple type N
<i>R</i>	Thermocouple type R
<i>S</i>	Thermocouple type S
<i>T</i>	Thermocouple type T

- **reference_junction_type** (*nidmm.ThermocoupleReferenceJunctionType*) – Specifies the type of reference junction to be used in the reference junction compensation of a thermocouple measurement. NI-DMM uses this value to set the Reference Junction Type property. The only supported value is `NIDMM_VAL_TEMP_REF_JUNC_FIXED`.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

```
nidmm.Session.configure_trigger(trigger_source, trigger_delay=datetime.timedelta(seconds=-1))
```

Configures the DMM **Trigger_Source** and **Trigger_Delay**. Refer to [Triggering](#) and [Using Switches](#) for more information.

Parameters

- **trigger_source** (*nidmm.TriggerSource*) – Specifies the **trigger_source** that initiates the acquisition. The driver sets *nidmm.Session.trigger_source* to this value. Software configures the DMM to wait until *nidmm.Session.send_software_trigger()* is called before triggering the DMM.

Note: To determine which values are supported by each device, refer to the [LabWindows/CVI Trigger Routing](#) section.

- **trigger_delay** (*float in seconds or datetime.timedelta*) – Specifies the time that the DMM waits after it has received a trigger before taking a measurement. The driver sets the *nidmm.Session.trigger_delay* property to this value. By default, **trigger_delay** is `NIDMM_VAL_AUTO_DELAY` (-1), which means the DMM waits an appropriate settling time before taking the measurement. On the NI 4060, if you set **trigger_delay** to 0, the DMM does not settle before taking the measurement. The NI 4065 and NI 4070/4071/4072 use the value specified in **trigger_delay** as additional settling time.

Note: When using the NI 4050, **Trigger_Delay** must be set to `NIDMM_VAL_AUTO_DELAY` (-1).

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

```
nidmm.Session.configure_waveform_acquisition(measurement_function, range, rate, waveform_points)
```

Configures the DMM for waveform acquisitions. This feature is supported on the NI 4080/4081/4082 and the NI 4070/4071/4072.

Parameters

- **measurement_function** (*nidmm.Function*) – Specifies the **measurement_function** used in a waveform acquisition. The driver sets *nidmm.Session.method* to this value.

WAVEFORM_VOLTAGE (default)	1003	Voltage Waveform
WAVEFORM_CURRENT	1004	Current Waveform

- **range** (*float*) – Specifies the expected maximum amplitude of the input signal and sets the **range** for the **Measurement_Function**. NI-DMM sets *nidmm.Session.range* to this value. **range** values are coerced up to the closest input **range**. The default is 10.0.

For valid ranges refer to the topics in [Devices](#).

Auto-ranging is not supported during waveform acquisitions.

- **rate** (*float*) – Specifies the **rate** of the acquisition in samples per second. NI-DMM sets *nidmm.Session.waveform_rate* to this value.

The valid **Range** is 10.0–1,800,000 S/s. **rate** values are coerced to the closest integer divisor of 1,800,000. The default value is 1,800,000.

- **waveform_points** (*int*) – Specifies the number of points to acquire before the waveform acquisition completes. NI-DMM sets `nidmm.Session.waveform_points` to this value.

To calculate the maximum and minimum number of waveform points that you can acquire in one acquisition, refer to the [Waveform Acquisition Measurement Cycle](#).

The default value is 500.

`nidmm.Session.disable()`

Places the instrument in a quiescent state where it has minimal or no impact on the system to which it is connected. If a measurement is in progress when this method is called, the measurement is aborted.

`nidmm.Session.fetch(maximum_time=datetime.timedelta(milliseconds=-1))`

Returns the value from a previously initiated measurement. You must call `nidmm.Session._initiate()` before calling this method.

Parameters `maximum_time` (*float in seconds or datetime.timedelta*) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the `NIDMM_ERROR_MAX_TIME_EXCEEDED` error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is `NIDMM_VAL_TIME_LIMIT_AUTO` (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type `float`

Returns The measured value returned from the DMM.

`nidmm.Session.fetch_multi_point(array_size, maximum_time=datetime.timedelta(milliseconds=-1))`

Returns an array of values from a previously initiated multipoint measurement. The number of measurements the DMM makes is determined by the values you specify for the **Trigger_Count** and **Sample_Count** parameters of `nidmm.Session.configure_multi_point()`. You must first call `nidmm.Session._initiate()` to initiate a measurement before calling this method.

Parameters

- **array_size** (*int*) – Specifies the number of measurements to acquire. The maximum number of measurements for a finite acquisition is the (**Trigger_Count** x **Sample_Count**) parameters in `nidmm.Session.configure_multi_point()`.

For continuous acquisitions, up to 100,000 points can be returned at once. The number of measurements can be a subset. The valid range is any positive `ViInt32`. The default value is 1.

- **maximum_time** (*float in seconds or datetime.timedelta*) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the `NIDMM_ERROR_MAX_TIME_EXCEEDED` error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is `NIDMM_VAL_TIME_LIMIT_AUTO` (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (reading_array, actual_number_of_points)

WHERE

reading_array (array.array("d")):

An array of measurement values.

Note: The size of the **Reading Array** must be at least the size that you specify for the **Array Size** parameter.

actual_number_of_points (int):

Indicates the number of measured values actually retrieved from the DMM.

`nidmm.Session.fetch_waveform(array_size, maximum_time=datetime.timedelta(milliseconds=-1))`

For the NI 4080/4081/4082 and the NI 4070/4071/4072, returns an array of values from a previously initiated waveform acquisition. You must call `nidmm.Session._initiate()` before calling this method.

Parameters

- **array_size** (*int*) – Specifies the number of waveform points to return. You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of `nidmm.Session.configure_waveform_acquisition()`. The default value is 1.
- **maximum_time** (*float in seconds or datetime.timedelta*) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the `NIDMM_ERROR_MAX_TIME_EXCEEDED` error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is `NIDMM_VAL_TIME_LIMIT_AUTO` (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (waveform_array, actual_number_of_points)

WHERE

waveform_array (array.array("d")):

Waveform Array is an array of measurement values stored in waveform data type.

actual_number_of_points (int):

Indicates the number of measured values actually retrieved from the DMM.

`nidmm.Session.fetch_waveform_into(array_size, maximum_time=datetime.timedelta(milliseconds=-1))`

For the NI 4080/4081/4082 and the NI 4070/4071/4072, returns an array of values from a previously initiated waveform acquisition. You must call `nidmm.Session._initiate()` before calling this method.

Parameters

- **waveform_array** (`numpy.array(dtype=numpy.float64)`) – **Waveform Array** is an array of measurement values stored in waveform data type.
- **maximum_time** (`float in seconds or datetime.timedelta`) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the `NIDMM_ERROR_MAX_TIME_EXCEEDED` error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is `NIDMM_VAL_TIME_LIMIT_AUTO` (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (waveform_array, actual_number_of_points)

WHERE

waveform_array (`numpy.array(dtype=numpy.float64)`):

Waveform Array is an array of measurement values stored in waveform data type.

actual_number_of_points (int):

Indicates the number of measured values actually retrieved from the DMM.

`nidmm.Session.get_aperture_time_info()`

Returns the DMM **Aperture_Time** and **Aperture_Time_Units**.

Return type

tuple (aperture_time, aperture_time_units)

WHERE

aperture_time (float):

Specifies the amount of time the DMM digitizes the input signal for a single measurement. This parameter does not include settling time. Returns the value of the `nidmm.Session.aperture_time` property. The units of this property depend on the value of the `nidmm.Session.aperture_time_units` property. On the NI 4070/4071/4072, the minimum aperture time is 8.89 μ s, and the maximum aperture time is 149 s. Any number of powerline cycles (PLCs) within the minimum and maximum ranges is allowed on the NI 4070/4071/4072. On the NI 4065 the minimum aperture time is 333 μ s, and the maximum aperture time is 78.2 s. If setting the number of averages directly, the total measurement time is aperture time X the number of averages, which must be less than 72.8 s. The aperture times allowed are 333 μ s, 667 μ s, or multiples of 1.11 ms—for example 1.11 ms, 2.22 ms, 3.33 ms, and so on. If you set an aperture time other than 333 μ s, 667 μ s, or multiples of 1.11 ms, the value will

be coerced up to the next supported aperture time. On the NI 4060, when the powerline frequency is 60, the PLCs allowed are 1 PLC, 6 PLC, 12 PLC, and 120 PLC. When the powerline frequency is 50, the PLCs allowed are 1 PLC, 5 PLC, 10 PLC, and 100 PLC.

`aperture_time_units` (`nidmm.ApertureTimeUnits`):

Indicates the units of aperture time as powerline cycles (PLCs) or seconds. Returns the value of the `nidmm.Session.aperture_time_units` property.

<code>SECONDS</code>	0	Seconds
<code>POWER_LINE_CYCLES</code>	1	Powerline Cycles

`nidmm.Session.get_auto_range_value()`

Returns the **Actual Range** that the DMM is using, even when Auto Range is off.

Return type `float`

Returns Indicates the **actual_range** the DMM is using. Returns the value of the `nidmm.Session.auto_range_value` property. The units of the returned value depend on the method.

`nidmm.Session.get_cal_date_and_time(cal_type)`

Returns the date and time of the last calibration performed.

Note: The NI 4050 and NI 4060 are not supported.

Parameters `cal_type` (`int`) – Specifies the type of calibration performed (external or self-calibration).

<code>NIDMM_VAL_INTERNAL_AREA</code> (default)	0	Self-Calibration
<code>NIDMM_VAL_EXTERNAL_AREA</code>	1	External Calibration

Note: The NI 4065 does not support self-calibration.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type `datetime.datetime`

Returns Indicates date and time of the last calibration.

`nidmm.Session.get_dev_temp(options='')`

Returns the current **Temperature** of the device.

Note: The NI 4050 and NI 4060 are not supported.

Parameters `options` (`str`) – Reserved.

Return type `float`

Returns Returns the current **temperature** of the device.

```
nidmm.Session.get_ext_cal_recommended_interval()
```

Returns the recommended interval between external recalibration in **Months**.

Note: The NI 4050 and NI 4060 are not supported.

Return type `datetime.timedelta`

Returns Returns the recommended number of **months** between external calibrations.

```
nidmm.Session.get_last_cal_temp(cal_type)
```

Returns the **Temperature** during the last calibration procedure.

Note: The NI 4050 and NI 4060 are not supported.

Parameters `cal_type` (*int*) – Specifies the type of calibration performed (external or self-calibration).

NIDMM_VAL_INTERNAL_AREA (default)	0	Self-Calibration
NIDMM_VAL_EXTERNAL_AREA	1	External Calibration

Note: The NI 4065 does not support self-calibration.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type `float`

Returns Returns the **temperature** during the last calibration.

```
nidmm.Session.get_measurement_period()
```

Returns the measurement **Period**, which is the amount of time it takes to complete one measurement with the current configuration. Use this method right before you begin acquiring data—after you have completely configured the measurement and after all configuration methods have been called.

Return type `float`

Returns

Returns the number of seconds it takes to make one measurement.

The first measurement in a multipoint acquisition requires additional settling time. This method does not include this additional time or any `nidmm.Session.trigger_delay` associated with the first measurement. Time required for internal measurements, such as `nidmm.Session.auto_zero`, is included.

```
nidmm.Session.get_self_cal_supported()
```

Returns a Boolean value that expresses whether or not the DMM that you are using can perform self-calibration.

Return type `bool`

Returns

Returns whether Self Cal is supported for the device specified by the given session.

True	1	The DMM that you are using can perform self-calibration.
False	0	The DMM that you are using cannot perform self-calibration.

`nidmm.Session.perform_open_cable_comp()`

For the NI 4082 and NI 4072 only, performs the open cable compensation measurements for the current capacitance/inductance range, and returns open cable compensation **Conductance** and **Susceptance** values. You can use the return values of this method as inputs to `nidmm.Session.configure_open_cable_comp_values()`.

This method returns an error if the value of the `nidmm.Session.method` property is not set to CAPACITANCE (1005) or INDUCTANCE (1006).

Return type

tuple (conductance, susceptance)

WHERE

conductance (float):

conductance is the measured value of open cable compensation **conductance**.

susceptance (float):

susceptance is the measured value of open cable compensation **susceptance**.

`nidmm.Session.perform_short_cable_comp()`

Performs the short cable compensation measurements for the current capacitance/inductance range, and returns short cable compensation **Resistance** and **Reactance** values. You can use the return values of this method as inputs to `nidmm.Session.configure_short_cable_comp_values()`.

This method returns an error if the value of the `nidmm.Session.method` property is not set to CAPACITANCE (1005) or INDUCTANCE (1006).

Return type

tuple (resistance, reactance)

WHERE

resistance (float):

resistance is the measured value of short cable compensation **resistance**.

reactance (float):

reactance is the measured value of short cable compensation **reactance**.

`nidmm.Session.read(maximum_time=datetime.timedelta(milliseconds=-1))`

Acquires a single measurement and returns the measured value.

Parameters `maximum_time` (*float in seconds or `datetime.timedelta`*) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is NIDMM_VAL_TIME_LIMIT_AUTO (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type `float`

Returns The measured value returned from the DMM.

`nidmm.Session.read_multi_point(array_size, maximum_time=datetime.timedelta(milliseconds=-1))`

Acquires multiple measurements and returns an array of measured values. The number of measurements the DMM makes is determined by the values you specify for the **Trigger_Count** and **Sample_Count** parameters in `nidmm.Session.configure_multi_point()`.

Parameters

- **array_size** (`int`) – Specifies the number of measurements to acquire. The maximum number of measurements for a finite acquisition is the (**Trigger_Count** x **Sample_Count**) parameters in `nidmm.Session.configure_multi_point()`.

For continuous acquisitions, up to 100,000 points can be returned at once. The number of measurements can be a subset. The valid range is any positive `ViInt32`. The default value is 1.

- **maximum_time** (`float in seconds or datetime.timedelta`) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the `NIDMM_ERROR_MAX_TIME_EXCEEDED` error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is `NIDMM_VAL_TIME_LIMIT_AUTO` (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (reading_array, actual_number_of_points)

WHERE

reading_array (array.array("d")):

An array of measurement values.

Note: The size of the **Reading_Array** must be at least the size that you specify for the **Array_Size** parameter.

actual_number_of_points (int):

Indicates the number of measured values actually retrieved from the DMM.

`nidmm.Session.read_status()`

Returns measurement backlog and acquisition status. Use this method to determine how many measurements are available before calling `nidmm.Session.fetch()`, `nidmm.Session.fetch_multi_point()`, or `nidmm.Session.fetch_waveform()`.

Note: The NI 4050 is not supported.

Return type

tuple (acquisition_backlog, acquisition_status)

WHERE

acquisition_backlog (int):

The number of measurements available to be read. If the backlog continues to increase, data is eventually overwritten, resulting in an error.

Note: On the NI 4060, the **Backlog** does not increase when autoranging. On the NI 4065, the **Backlog** does not increase when Range is set to AUTO RANGE ON (-1), or before the first point is fetched when Range is set to AUTO RANGE ONCE (-3). These behaviors are due to the autorange model of the devices.

acquisition_status (*nidmm.AcquisitionStatus*):

Indicates status of the acquisition. The following table shows the acquisition states:

0	Running
1	Finished with backlog
2	Finished with no backlog
3	Paused
4	No acquisition in progress

`nidmm.Session.read_waveform(array_size, maximum_time=datetime.timedelta(milliseconds=-1))`

For the NI 4080/4081/4082 and the NI 4070/4071/4072, acquires a waveform and returns data as an array of values or as a waveform data type. The number of elements in the **Waveform Array** is determined by the values you specify for the **Waveform Points** parameter in `nidmm.Session.configure_waveform_acquisition()`.

Parameters

- **array_size** (*int*) – Specifies the number of waveform points to return. You specify the total number of points that the DMM acquires in the **Waveform Points** parameter of `nidmm.Session.configure_waveform_acquisition()`. The default value is 1.
- **maximum_time** (*float in seconds or datetime.timedelta*) – Specifies the **maximum_time** allowed for this method to complete in milliseconds. If the method does not complete within this time interval, the method returns the NIDMM_ERROR_MAX_TIME_EXCEEDED error code. This may happen if an external trigger has not been received, or if the specified timeout is not long enough for the acquisition to complete.

The valid range is 0–86400000. The default value is NIDMM_VAL_TIME_LIMIT_AUTO (-1). The DMM calculates the timeout automatically.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (waveform_array, actual_number_of_points)

WHERE

waveform_array (array.array("d")):

An array of measurement values.

Note: The size of the **Waveform_Array** must be at least the size that you specify for the **Array_Size** parameter.

actual_number_of_points (int):

Indicates the number of measured values actually retrieved from the DMM.

`nidmm.Session.reset()`

Resets the instrument to a known state and sends initialization commands to the instrument. The initialization commands set instrument settings to the state necessary for the operation of the instrument driver.

`nidmm.Session.reset_with_defaults()`

Resets the instrument to a known state and sends initialization commands to the DMM. The initialization commands set the DMM settings to the state necessary for the operation of NI-DMM. All user-defined default values associated with a logical name are applied after setting the DMM.

`nidmm.Session.self_cal()`

For the NI 4080/4081/4082 and the NI 4070/4071/4072, executes the self-calibration routine to maintain measurement accuracy.

Note: This method calls `nidmm.Session.reset()`, and any configurations previous to the call will be lost. All properties will be set to their default values after the call returns.

`nidmm.Session.self_test()`

Performs a self-test on the DMM to ensure that the DMM is functioning properly. Self-test does not calibrate the DMM. Zero indicates success.

On the NI 4080/4082 and NI 4070/4072, the error code 1013 indicates that you should check the fuse and replace it, if necessary.

Raises *SelfTestError* on self test failure. Properties on exception object:

- code - failure code from driver
- message - status message from driver

Note: Self-test does not check the fuse on the NI 4065, NI 4071, and NI 4081. Hence, even if the fuse is blown on the device, self-test does not return error code 1013.

Note: This method calls `nidmm.Session.reset()`, and any configurations previous to the call will be lost. All properties will be set to their default values after the call returns.

`nidmm.Session.send_software_trigger()`

Sends a command to trigger the DMM. Call this method if you have configured either the `nidmm.Session.trigger_source` or `nidmm.Session.sample_trigger` properties. If the `nidmm.`

`Session.trigger_source` and/or `nidmm.Session.sample_trigger` properties are set to `NIDMM_VAL_EXTERNAL` or `NIDMM_VAL_TTLn`, you can use this method to override the trigger source that you configured and trigger the device. The NI 4050 and NI 4060 are not supported.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

nidmm.Session properties

`nidmm.Session.ac_max_freq`

Specifies the maximum frequency component of the input signal for AC measurements. This property is used only for error checking and verifies that the value of this parameter is less than the maximum frequency of the device. This property affects the DMM only when you set the `nidmm.Session.method` property to AC measurements. The valid range is 1 Hz-300 kHz for the NI 4070/4071/4072, 10 Hz-100 kHz for the NI 4065, and 20 Hz-25 kHz for the NI 4050 and NI 4060.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Max Frequency**
 - C Attribute: **NIDMM_ATTR_AC_MAX_FREQ**
-

`nidmm.Session.ac_min_freq`

Specifies the minimum frequency component of the input signal for AC measurements. This property affects the DMM only when you set the `nidmm.Session.method` property to AC measurements. The valid range is 1 Hz-300 kHz for the NI 4070/4071/4072, 10 Hz-100 kHz for the NI 4065, and 20 Hz-25 kHz for the NI 4050 and NI 4060.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Min Frequency**
 - C Attribute: **NIDMM_ATTR_AC_MIN_FREQ**
-

`nidmm.Session.adc_calibration`

For the NI 4070/4071/4072 only, specifies the ADC calibration mode.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ADCCalibration
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:ADC Calibration**
 - C Attribute: **NIDMM_ATTR_ADC_CALIBRATION**
-

`nidmm.Session.aperture_time`

Specifies the measurement aperture time for the current configuration. Aperture time is specified in units set by `nidmm.Session.aperture_time_units`. To override the default aperture, set this property to the desired aperture time after calling `nidmm.Session.ConfigureMeasurement()`. To return to the default, set this property to `NIDMM_VAL_APERTURE_TIME_AUTO` (-1). On the NI 4070/4071/4072, the minimum aperture time is 8.89 usec, and the maximum aperture time is 149 sec. Any number of powerline cycles (PLCs) within the minimum and maximum ranges is allowed on the NI 4070/4071/4072. On the NI 4065 the minimum aperture time is 333 μ s, and the maximum aperture time is 78.2 s. If setting the number of averages directly, the total measurement time is aperture time X the number of averages, which must be less than 72.8 s. The aperture times allowed are 333 μ s, 667 μ s, or multiples of 1.11 ms-for example 1.11 ms, 2.22 ms, 3.33 ms, and so on. If you set an aperture time other than 333 μ s, 667 μ s, or multiples of 1.11 ms, the value will be coerced up to the next supported aperture time. On the NI 4060, when the powerline frequency is 60 Hz, the PLCs allowed are 1 PLC, 6 PLC, 12 PLC, and 120 PLC. When the powerline frequency is 50 Hz, the PLCs allowed are 1 PLC, 5 PLC, 10 PLC, and 100 PLC.

Note: One or more of the referenced methods are not in the Python API for this driver.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Advanced:Aperture Time**
- C Attribute: **NIDMM_ATTR_APERTURE_TIME**

`nidmm.Session.aperture_time_units`

Specifies the units of aperture time for the current configuration. The NI 4060 does not support an aperture time set in seconds.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ApertureTimeUnits</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Advanced:Aperture Time Units**
 - C Attribute: **NIDMM_ATTR_APERTURE_TIME_UNITS**
-

`nidmm.Session.auto_range_value`

Specifies the value of the range. If auto ranging, shows the actual value of the active range. The value of this property is set during a read operation.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Auto Range Value**
 - C Attribute: **NIDMM_ATTR_AUTO_RANGE_VALUE**
-

`nidmm.Session.auto_zero`

Specifies the AutoZero mode. The NI 4050 is not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.AutoZero</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Auto Zero**

- C Attribute: **NIDMM_ATTR_AUTO_ZERO**

`nidmm.Session.buffer_size`

Size in samples of the internal data buffer. Maximum is 134,217,727 (0X7FFFFFFF) samples. When set to `NIDMM_VAL_BUFFER_SIZE_AUTO` (-1), NI-DMM chooses the buffer size.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Advanced:Buffer Size**
- C Attribute: **NIDMM_ATTR_BUFFER_SIZE**

`nidmm.Session.cable_comp_type`

For the NI 4072 only, the type of cable compensation that is applied to the current capacitance or inductance measurement for the current range. Changing the method or the range through this property or through `nidmm.Session.configure_measurement_digits()` resets the value of this property to the default value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.CableCompensationType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Cable Compensation Type**
- C Attribute: **NIDMM_ATTR_CABLE_COMP_TYPE**

`nidmm.Session.cache`

Specifies whether to cache the value of properties. When caching is enabled, the instrument driver keeps track of the current instrument settings and avoids sending redundant commands to the instrument. Thus, it significantly increases execution speed. The instrument driver can choose always to cache or to never cache particular properties regardless of the setting of this property. The default value is True (1). Use the `nidmm.Session.__init__()` method to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Cache**
 - C Attribute: **NIDMM_ATTR_CACHE**
-

`nidmm.Session.channel_count`

Indicates the number of channels that the specific instrument driver supports. For each property for which the `IVI_VAL_MULTI_CHANNEL` flag property is set, the IVI engine maintains a separate cache value for each channel.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Capabilities:Channel Count**
 - C Attribute: **NIDMM_ATTR_CHANNEL_COUNT**
-

`nidmm.Session.current_source`

Specifies the current source provided during diode measurements. The NI 4050 and NI 4060 are not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Current Source**
 - C Attribute: **NIDMM_ATTR_CURRENT_SOURCE**
-

`nidmm.Session.dc_bias`

For the NI 4072 only, controls the available DC bias for capacitance measurements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Advanced:DC Bias**
 - C Attribute: **NIDMM_ATTR_DC_BIAS**
-

`nidmm.Session.dc_noise_rejection`

Specifies the DC noise rejection mode. The NI 4050 and NI 4060 are not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DCNoiseRejection
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:DC Noise Rejection**
 - C Attribute: **NIDMM_ATTR_DC_NOISE_REJECTION**
-

`nidmm.Session.driver_setup`

This property indicates the Driver Setup string that the user specified when initializing the driver. Some cases exist where the end-user must specify instrument driver options at initialization time. An example of this is specifying a particular instrument model from among a family of instruments that the driver supports. This is useful when using simulation. The end-user can specify driver-specific options through the DriverSetup keyword in the optionsString parameter to the niDMM Init With Options.vi. If the user does not specify a Driver Setup string, this property returns an empty string.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Driver Setup**
 - C Attribute: **NIDMM_ATTR_DRIVER_SETUP**
-

`nidmm.Session.freq_voltage_autorange`

For the NI 4070/4071/4072 only, specifies the value of the frequency voltage range. If Auto Ranging, shows the actual value of the active frequency voltage range. If not Auto Ranging, the value of this property is the same as that of `nidmm.Session.freq_voltage_range`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Frequency Voltage Auto Range Value**
 - C Attribute: **NIDMM_ATTR_FREQ_VOLTAGE_AUTORANGE**
-

`nidmm.Session.freq_voltage_range`

Specifies the maximum amplitude of the input signal for frequency measurements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Frequency Voltage Range**
 - C Attribute: **NIDMM_ATTR_FREQ_VOLTAGE_RANGE**
-

`nidmm.Session.function`

Specifies the measurement method. Refer to the `nidmm.Session.method` topic in the NI Digital Multimeters Help for device-specific information. If you are setting this property directly, you must also set the `nidmm.Session.operation_mode` property, which controls whether the DMM takes standard single or multipoint measurements, or acquires a waveform. If you are programming properties directly, you must set the `nidmm.Session.operation_mode` property before setting other configuration properties. If the `nidmm.Session.operation_mode` property is set to `WAVEFORM`, the only valid method types are `WAVEFORM_VOLTAGE` and `WAVEFORM_CURRENT`. Set the `nidmm.Session.operation_mode` property to `IVIDMM` to set all other method values.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Function
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Function**
 - C Attribute: **NIDMM_ATTR_FUNCTION**
-

`nidmm.Session.group_capabilities`

A string containing the capabilities and extension groups supported by the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Capabilities:Group Capabilities**
 - C Attribute: **NIDMM_ATTR_GROUP_CAPABILITIES**
-

`nidmm.Session.input_resistance`

Specifies the input resistance of the instrument. The NI 4050 and NI 4060 are not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Input Resistance**
 - C Attribute: **NIDMM_ATTR_INPUT_RESISTANCE**
-

`nidmm.Session.instrument_firmware_revision`

A string containing the instrument firmware revision number.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Instrument Firmware Revision**
 - C Attribute: **NIDMM_ATTR_INSTRUMENT_FIRMWARE_REVISION**
-

`nidmm.Session.instrument_manufacturer`

A string containing the manufacturer of the instrument.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Instrument Manufacturer**
 - C Attribute: **NIDMM_ATTR_INSTRUMENT_MANUFACTURER**
-

`nidmm.Session.instrument_model`

A string containing the instrument model.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Instrument Model**
 - C Attribute: **NIDMM_ATTR_INSTRUMENT_MODEL**
-

`nidmm.Session.instrument_product_id`

The PCI product ID.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Instrument Product ID**
 - C Attribute: **NIDMM_ATTR_INSTRUMENT_PRODUCT_ID**
-

`nidmm.Session.interchange_check`

Specifies whether to perform interchangeability checking and log interchangeability warnings when you call niDMM methods. The default value is False. Interchangeability warnings indicate that using your application with a different instrument might cause different behavior. Call `nidmm.Session.GetNextInterchangeWarning()` to extract interchange warnings. Call `nidmm.Session.ClearInterchangeWarnings()` to clear the list of interchangeability warnings without reading them. Interchangeability checking examines the properties in a capability group only if you specify a value for at least one property within that group. Interchangeability warnings can occur when a property affects the behavior of the instrument and you have not set that property, or the property has been invalidated since you set it.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Interchange Check**
 - C Attribute: **NIDMM_ATTR_INTERCHANGE_CHECK**
-

`nidmm.Session.io_resource_descriptor`

A string containing the resource descriptor of the instrument.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:I/O Resource Descriptor**
 - C Attribute: **NIDMM_ATTR_IO_RESOURCE_DESCRIPTOR**
-

`nidmm.Session.latency`

Specifies the number of measurements transferred at a time from the instrument to an internal buffer. When set to `NIDMM_VAL_LATENCY_AUTO` (-1), NI-DMM chooses the transfer size.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Advanced:Latency**
 - C Attribute: **NIDMM_ATTR_LATENCY**
-

`nidmm.Session.lc_calculation_model`

For the NI 4072 only, specifies the type of algorithm that the measurement processing uses for capacitance and inductance measurements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.LCCalculationModel</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Advanced:Calculation Model**
 - C Attribute: **NIDMM_ATTR_LC_CALCULATION_MODEL**
-

`nidmm.Session.lc_number_meas_to_average`

For the NI 4072 only, specifies the number of LC measurements that are averaged to produce one reading.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Number of LC Measurements To Average**
 - C Attribute: **NIDMM_ATTR_LC_NUMBER_MEAS_TO_AVERAGE**
-

`nidmm.Session.logical_name`

A string containing the logical name of the instrument.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Logical Name**
 - C Attribute: **NIDMM_ATTR_LOGICAL_NAME**
-

`nidmm.Session.meas_complete_dest`

Specifies the destination of the measurement complete (MC) signal. The NI 4050 is not supported. To determine which values are supported by each device, refer to the LabWindows/CVI Trigger Routing section in the NI Digital Multimeters Help.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.MeasurementCompleteDest
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Trigger:Measurement Complete Dest**
 - C Attribute: **NIDMM_ATTR_MEAS_COMPLETE_DEST**
-

`nidmm.Session.meas_dest_slope`

Specifies the polarity of the generated measurement complete signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.MeasurementDestinationSlope
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Trigger:Measurement Destination Slope**
 - C Attribute: **NIDMM_ATTR_MEAS_DEST_SLOPE**
-

`nidmm.Session.number_of_averages`

Specifies the number of averages to perform in a measurement. For the NI 4070/4071/4072, applies only when the aperture time is not set to AUTO and Auto Zero is ON. The default is 1. The NI 4050 and NI 4060 are not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Advanced:Number Of Averages**
 - C Attribute: **NIDMM_ATTR_NUMBER_OF_AVERAGES**
-

`nidmm.Session.offset_comp_ohms`

For the NI 4070/4071/4072 only, enables or disables offset compensated ohms.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Offset Compensated Ohms**
 - C Attribute: **NIDMM_ATTR_OFFSET_COMP_OHMS**
-

`nidmm.Session.open_cable_comp_conductance`

For the NI 4072 only, specifies the active part (conductance) of the open cable compensation. The valid range is any real number greater than 0. The default value (-1.0) indicates that compensation has not taken place. Changing the method or the range through this property or through `nidmm.Session.configure_measurement_digits()` resets the value of this property to the default value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Open Cable Compensation Values:Conductance**
 - C Attribute: **NIDMM_ATTR_OPEN_CABLE_COMP_CONDUCTANCE**
-

`nidmm.Session.open_cable_comp_susceptance`

For the NI 4072 only, specifies the reactive part (susceptance) of the open cable compensation. The valid range is any real number greater than 0. The default value (-1.0) indicates that compensation has not taken place. Changing the method or the range through this property or through `nidmm.Session.configure_measurement_digits()` resets the value of this property to the default value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Open Cable Compensation Values:Susceptance**
 - C Attribute: **NIDMM_ATTR_OPEN_CABLE_COMP_SUSCEPTANCE**
-

`nidmm.Session.operation_mode`

Specifies how the NI 4065 and NI 4070/4071/4072 acquire data. When you call `nidmm.Session.configure_measurement_digits()`, NI-DMM sets this property to `IVIDMM`. When you call `nidmm.Session.configure_waveform_acquisition()`, NI-DMM sets this property to `WAVEFORM`. If you are programming properties directly, you must set this property before setting other configuration properties.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OperationMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Advanced:Operation Mode**

- C Attribute: **NIDMM_ATTR_OPERATION_MODE**
-

`nidmm.Session.powerline_freq`

Specifies the powerline frequency. The NI 4050 and NI 4060 use this value to select an aperture time to reject powerline noise by selecting the appropriate internal sample clock and filter. The NI 4065 and NI 4070/4071/4072 use this value to select a timebase for setting the `nidmm.Session.aperture_time` property in powerline cycles (PLCs). After configuring powerline frequency, set the `nidmm.Session.aperture_time_units` property to PLCs. When setting the `nidmm.Session.aperture_time` property, select the number of PLCs for the powerline frequency. For example, if powerline frequency = 50 Hz (or 20ms) and aperture time in PLCs = 5, then aperture time in Seconds = 20ms * 5 PLCs = 100 ms. Similarly, if powerline frequency = 60 Hz (or 16.667 ms) and aperture time in PLCs = 6, then aperture time in Seconds = 16.667 ms * 6 PLCs = 100 ms.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Powerline Frequency**
 - C Attribute: **NIDMM_ATTR_POWERLINE_FREQ**
-

`nidmm.Session.range`

Specifies the measurement range. Use positive values to represent the absolute value of the maximum expected measurement. The value is in units appropriate for the current value of the `nidmm.Session.method` property. For example, if `nidmm.Session.method` is set to `NIDMM_VAL_VOLTS`, the units are volts. The NI 4050 and NI 4060 only support Auto Range when the trigger and sample trigger is set to IMMEDIATE. `NIDMM_VAL_AUTO_RANGE_ON` -1.0 NI-DMM performs an Auto Range before acquiring the measurement. `NIDMM_VAL_AUTO_RANGE_OFF` -2.0 NI-DMM sets the Range to the current `nidmm.Session.auto_range_value` and uses this range for all subsequent measurements until the measurement configuration is changed. `NIDMM_VAL_AUTO_RANGE_ONCE` -3.0 NI-DMM performs an Auto Range before acquiring the next measurement. The `nidmm.Session.auto_range_value` is stored and used for all subsequent measurements until the measurement configuration is changed.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Range**
 - C Attribute: **NIDMM_ATTR_RANGE**
-

`nidmm.Session.range_check`

Specifies whether to validate property values and method parameters. If enabled, the instrument driver validates the parameter values passed to driver methods. Range checking parameters is very useful for debugging. After the user program is validated, this property can be set to False (0) to disable range checking and maximize performance. The default value is True (1). Use the `nidmm.Session.__init__()` method to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Range Check**
 - C Attribute: **NIDMM_ATTR_RANGE_CHECK**
-

`nidmm.Session.record_coercions`

Specifies whether the IVI engine keeps a list of the value coercions it makes for ViInt32 and ViReal64 properties. Call `nidmm.Session.GetNextCoercionRecord()` to extract and delete the oldest coercion record from the list. The default value is False (0). Use the `nidmm.Session.__init__()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Record Value Coercions**
 - C Attribute: **NIDMM_ATTR_RECORD_COERCIONS**
-

`nidmm.Session.resolution_absolute`

Specifies the measurement resolution in absolute units. Setting this property to higher values increases the measurement accuracy. Setting this property to lower values increases the measurement speed. NI-DMM ignores this property for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use the `nidmm.Session.lc_number_meas_to_average` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Absolute Resolution**
 - C Attribute: **NIDMM_ATTR_RESOLUTION_ABSOLUTE**
-

`nidmm.Session.resolution_digits`

Specifies the measurement resolution in digits. Setting this property to higher values increases the measurement accuracy. Setting this property to lower values increases the measurement speed. NI-DMM ignores this property for capacitance and inductance measurements on the NI 4072. To achieve better resolution for such measurements, use the `nidmm.Session.lc_number_meas_to_average` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Digits Resolution**
 - C Attribute: **NIDMM_ATTR_RESOLUTION_DIGITS**
-

`nidmm.Session.sample_count`

Specifies the number of measurements the DMM takes each time it receives a trigger in a multiple point acquisition.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Sample Count**
 - C Attribute: **NIDMM_ATTR_SAMPLE_COUNT**
-

`nidmm.Session.sample_interval`

Specifies the amount of time in seconds the DMM waits between measurement cycles. This property only applies when the `nidmm.Session.sample_trigger` property is set to INTERVAL. On the NI 4060, the value for this property is used as the settling time. When this property is set to 0, the NI 4060 does not settle between measurement cycles. The onboard timing resolution is 1 μ s on the NI 4060. The NI 4065 and NI 4070/4071/4072 use the value specified in this property as additional delay. On the NI 4065 and NI 4070/4071/4072, the onboard timing resolution is 34.72 ns and the valid range is 0-149 s. Only positive values are valid when setting the sample interval. The NI 4050 is not supported.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Sample Interval**
 - C Attribute: **NIDMM_ATTR_SAMPLE_INTERVAL**
-

`nidmm.Session.sample_trigger`

Specifies the sample trigger source. To determine which values are supported by each device, refer to the LabWindows/CVI Trigger Routing section in the NI Digital Multimeters Help.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.SampleTrigger
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Sample Trigger**
 - C Attribute: **NIDMM_ATTR_SAMPLE_TRIGGER**
-

`nidmm.Session.sample_trigger_slope`

Specifies the edge of the signal from the specified sample trigger source on which the DMM is triggered.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.SampleTrigSlope
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Sample Trig Slope**
 - C Attribute: **NIDMM_ATTR_SAMPLE_TRIGGER_SLOPE**
-

`nidmm.Session.serial_number`

A string containing the serial number of the instrument. This property corresponds to the serial number label that is attached to most products.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Instrument Serial Number**
 - C Attribute: **NIDMM_ATTR_SERIAL_NUMBER**
-

`nidmm.Session.settle_time`

Specifies the settling time in seconds. To override the default settling time, set this property. To return to the default, set this property to `NIDMM_VAL_SETTLE_TIME_AUTO` (-1). The NI 4050 and NI 4060 are not supported.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Advanced:Settle Time**

- C Attribute: `NIDMM_ATTR_SETTLE_TIME`
-

`nidmm.Session.short_cable_comp_reactance`

For the NI 4072 only, represents the reactive part (reactance) of the short cable compensation. The valid range is any real number greater than 0. The default value (-1) indicates that compensation has not taken place. Changing the method or the range through this property or through `nidmm.Session.configure_measurement_digits()` resets the value of this property to the default value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Short Cable Compensation Values:Reactance**
 - C Attribute: `NIDMM_ATTR_SHORT_CABLE_COMP_REACTANCE`
-

`nidmm.Session.short_cable_comp_resistance`

For the NI 4072 only, represents the active part (resistance) of the short cable compensation. The valid range is any real number greater than 0. The default value (-1) indicates that compensation has not taken place. Changing the method or the range through this property or through `nidmm.Session.configure_measurement_digits()` resets the value of this property to the default value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Capacitance and Inductance:Short Cable Compensation Values:Resistance**
 - C Attribute: `NIDMM_ATTR_SHORT_CABLE_COMP_RESISTANCE`
-

`nidmm.Session.shunt_value`

For the NI 4050 only, specifies the shunt resistance value. The NI 4050 requires an external shunt resistor for current measurements. This property should be set to the value of shunt resistor.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Shunt Value**
 - C Attribute: **NIDMM_ATTR_SHUNT_VALUE**
-

`nidmm.Session.simulate`

Specifies whether or not to simulate instrument driver I/O operations. If simulation is enabled, instrument driver methods perform range checking and call IVI Get and Set methods, but they do not perform instrument I/O. For output parameters that represent instrument data, the instrument driver methods return calculated values. The default value is False (0). Use the `nidmm.Session.__init__()` method to override this setting. Simulate can only be set within the `InitWithOptions` method. The property value cannot be changed outside of the method.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Simulate**
 - C Attribute: **NIDMM_ATTR_SIMULATE**
-

`nidmm.Session.specific_driver_class_spec_major_version`

The major version number of the class specification for the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Identification:Specific Driver Class Spec Major Version**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION**
-

`nidmm.Session.specific_driver_class_spec_minor_version`

The minor version number of the class specification for the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Identification:Specific Driver Class Spec Minor Version**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION**
-

`nidmm.Session.specific_driver_description`

A string containing a description of the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Identification:Specific Driver Description**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_DESCRIPTION**
-

`nidmm.Session.specific_driver_major_version`

Returns the major version number of this instrument driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Version Info:Specific Driver Major Version**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_MAJOR_VERSION**
-

`nidmm.Session.specific_driver_minor_version`

The minor version number of this instrument driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Version Info:Specific Driver Minor Version**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_MINOR_VERSION**
-

`nidmm.Session.specific_driver_revision`

A string that contains additional version information about this specific instrument driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Version Info:Specific Driver Revision**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_REVISION**
-

`nidmm.Session.specific_driver_vendor`

A string containing the vendor of the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Identification:Specific Driver Vendor**
 - C Attribute: **NIDMM_ATTR_SPECIFIC_DRIVER_VENDOR**
-

`nidmm.Session.supported_instrument_models`

A string containing the instrument models supported by the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Specific Driver Capabilities:Supported Instrument Models**
 - C Attribute: **NIDMM_ATTR_SUPPORTED_INSTRUMENT_MODELS**
-

`nidmm.Session.temp_rtd_a`

Specifies the Callendar-Van Dusen A coefficient for RTD scaling when the RTD Type property is set to Custom. The default value is 3.9083e-3 (Pt3851).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Resistance Temperature Detector:RTD A**
 - C Attribute: **NIDMM_ATTR_TEMP_RTD_A**
-

`nidmm.Session.temp_rtd_b`

Specifies the Callendar-Van Dusen B coefficient for RTD scaling when the RTD Type property is set to Custom. The default value is -5.775e-7(Pt3851).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Resistance Temperature Detector:RTD B**
 - C Attribute: **NIDMM_ATTR_TEMP_RTD_B**
-

`nidmm.Session.temp_rtd_c`

Specifies the Callendar-Van Dusen C coefficient for RTD scaling when the RTD Type property is set to Custom. The default value is -4.183e-12(Pt3851).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Resistance Temperature Detector:RTD C**
 - C Attribute: **NIDMM_ATTR_TEMP_RTD_C**
-

`nidmm.Session.temp_rtd_res`

Specifies the RTD resistance at 0 degrees Celsius. This applies to all supported RTDs, including custom RTDs. The default value is 100 (?).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Resistance Temperature Detector:RTD Resistance**
 - C Attribute: **NIDMM_ATTR_TEMP_RTD_RES**
-

`nidmm.Session.temp_rtd_type`

Specifies the type of RTD used to measure temperature. The default value is *PT3851*. Refer to the *nidmm.Session.temp_rtd_type* topic in the NI Digital Multimeters Help for additional information about defined values.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.RTDType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Resistance Temperature Detector:RTD Type**
 - C Attribute: **NIDMM_ATTR_TEMP_RTD_TYPE**
-

`nidmm.Session.temp_tc_fixed_ref_junc`

Specifies the reference junction temperature when a fixed reference junction is used to take a thermocouple measurement. The default value is 25.0 (°C).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermocouple:Fixed Reference Junction**
 - C Attribute: **NIDMM_ATTR_TEMP_TC_FIXED_REF_JUNC**
-

`nidmm.Session.temp_tc_ref_junc_type`

Specifies the type of reference junction to be used in the reference junction compensation of a thermocouple. The only supported value, `NIDMM_VAL_TEMP_REF_JUNC_FIXED`, is fixed.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ThermocoupleReferenceJunctionType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermocouple:Reference Junction Type**
 - C Attribute: **NIDMM_ATTR_TEMP_TC_REF_JUNC_TYPE**
-

`nidmm.Session.temp_tc_type`

Specifies the type of thermocouple used to measure the temperature. The default value is `J`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ThermocoupleType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermocouple:Thermocouple Type**
 - C Attribute: **NIDMM_ATTR_TEMP_TC_TYPE**
-

`nidmm.Session.temp_thermistor_a`

Specifies the Steinhart-Hart A coefficient for thermistor scaling when the Thermistor Type property is set to Custom. The default value is 0.0010295 (44006).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermistor:Thermistor A**
 - C Attribute: **NIDMM_ATTR_TEMP_THERMISTOR_A**
-

`nidmm.Session.temp_thermistor_b`

Specifies the Steinhart-Hart B coefficient for thermistor scaling when the Thermistor Type property is set to Custom. The default value is 0.0002391 (44006).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermistor:Thermistor B**
 - C Attribute: **NIDMM_ATTR_TEMP_THERMISTOR_B**
-

`nidmm.Session.temp_thermistor_c`

Specifies the Steinhart-Hart C coefficient for thermistor scaling when the Thermistor Type property is set to Custom. The default value is 1.568e-7 (44006).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermistor:Thermistor C**
 - C Attribute: **NIDMM_ATTR_TEMP_THERMISTOR_C**
-

`nidmm.Session.temp_thermistor_type`

Specifies the type of thermistor used to measure the temperature. The default value is `THERMISTOR_44006`. Refer to the `nidmm.Session.temp_thermistor_type` topic in the NI Digital Multimeters Help for additional information about defined values.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ThermistorType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Thermistor:Thermistor Type**
 - C Attribute: **NIDMM_ATTR_TEMP_THERMISTOR_TYPE**
-

`nidmm.Session.temp_transducer_type`

Specifies the type of device used to measure the temperature. The default value is `NIDMM_VAL_4_THERMOCOUPLE`.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TransducerType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Configuration:Measurement Options:Temperature:Transducer Type**
 - C Attribute: **NIDMM_ATTR_TEMP_TRANSducer_TYPE**
-

`nidmm.Session.trigger_count`

Specifies the number of triggers the DMM receives before returning to the Idle state. This property can be set to any positive ViInt32 value for the NI 4065 and NI 4070/4071/4072. The NI 4050 and NI 4060 support this property being set to 1. Refer to the Multiple Point Acquisitions section of the NI Digital Multimeters Help for more information.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Multi Point Acquisition:Trigger Count**
 - C Attribute: **NIDMM_ATTR_TRIGGER_COUNT**
-

`nidmm.Session.trigger_delay`

Specifies the time (in seconds) that the DMM waits after it has received a trigger before taking a measurement. The default value is AUTO DELAY (-1), which means that the DMM waits an appropriate settling time before taking the measurement. (-1) signifies that AUTO DELAY is on, and (-2) signifies that AUTO DELAY is off. The NI 4065 and NI 4070/4071/4072 use the value specified in this property as additional settling time. For the NI 4065 and NI 4070/4071/4072, the valid range for Trigger Delay is AUTO DELAY (-1) or 0.0-149.0 seconds and the onboard timing resolution is 34.72 ns. On the NI 4060, if this property is set to 0, the DMM does not settle before taking the measurement. On the NI 4060, the valid range for AUTO DELAY (-1) is 0.0-12.0 seconds and the onboard timing resolution is 100 ms. When using the NI 4050, this property must be set to AUTO DELAY (-1). Use positive values to set the trigger delay in seconds. Valid Range: NIDMM_VAL_AUTO_DELAY (-1.0), 0.0-12.0 seconds (NI 4060 only) Default Value: NIDMM_VAL_AUTO_DELAY

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Trigger:Trigger Delay**
 - C Attribute: **NIDMM_ATTR_TRIGGER_DELAY**
-

`nidmm.Session.trigger_slope`

Specifies the edge of the signal from the specified trigger source on which the DMM is triggered.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerSlope
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Trigger:Trigger Slope**
 - C Attribute: **NIDMM_ATTR_TRIGGER_SLOPE**
-

`nidmm.Session.trigger_source`

Specifies the trigger source. When `nidmm.Session._initiate()` is called, the DMM waits for the trigger specified with this property. After it receives the trigger, the DMM waits the length of time specified with the `nidmm.Session.trigger_delay` property. The DMM then takes a measurement. This property is not supported on the NI 4050. To determine which values are supported by each device, refer to the LabWindows/CVI Trigger Routing section in the NI Digital Multimeters Help.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerSource
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Trigger:Trigger Source**
 - C Attribute: **NIDMM_ATTR_TRIGGER_SOURCE**
-

`nidmm.Session.waveform_coupling`

For the NI 4070/4071/4072 only, specifies the coupling during a waveform acquisition.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.WaveformCoupling
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Waveform Acquisition:Waveform Coupling**
 - C Attribute: **NIDMM_ATTR_WAVEFORM_COUPLING**
-

`nidmm.Session.waveform_points`

For the NI 4070/4071/4072 only, specifies the number of points to acquire in a waveform acquisition.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Waveform Acquisition:Waveform Points**
 - C Attribute: **NIDMM_ATTR_WAVEFORM_POINTS**
-

`nidmm.Session.waveform_rate`

For the NI 4070/4071/4072 only, specifies the rate of the waveform acquisition in Samples per second (S/s). The valid Range is 10.0-1,800,000 S/s. Values are coerced to the closest integer divisor of 1,800,000. The default value is 1,800,000.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Waveform Acquisition:Waveform Rate**
 - C Attribute: **NIDMM_ATTR_WAVEFORM_RATE**
-

Enums

Enums used in NI-DMM

`nidmm.ADCCalibration`

`ADCCalibration.AUTO`

The DMM enables or disables ADC calibration for you.

`ADCCalibration.OFF`

The DMM does not compensate for changes to the gain.

`ADCCalibration.ON`

The DMM measures an internal reference to calculate the correct gain for the measurement.

`nidmm.AcquisitionStatus`

`AcquisitionStatus.RUNNING`

Running

`AcquisitionStatus.FINISHED_WITH_BACKLOG`

Finished with **Backlog**

`AcquisitionStatus.FINISHED_WITH_NO_BACKLOG`

Finished with no **Backlog**

`AcquisitionStatus.PAUSED`

Paused

`AcquisitionStatus.NO_ACQUISITION_IN_PROGRESS`

No acquisition in progress

`nidmm.ApertureTimeUnits`

`ApertureTimeUnits.SECONDS`

Seconds

`ApertureTimeUnits.POWER_LINE_CYCLES`

Powerline Cycles

`nidmm.AutoZero`

`AutoZero.AUTO`

The drivers chooses the AutoZero setting based on the configured method and resolution.

`AutoZero.OFF`

Disables AutoZero.

`AutoZero.ON`

The DMM internally disconnects the input signal following each measurement and takes a zero reading. It then subtracts the zero reading from the preceding reading.

`AutoZero.ONCE`

The DMM internally disconnects the input signal for the first measurement and takes a zero reading. It then subtracts the zero reading from the first reading and the following readings.

`nidmm.CableCompensationType`

`CableCompensationType.NONE`

No Cable Compensation

`CableCompensationType.OPEN`

Open Cable Compensation

`CableCompensationType.SHORT`

Short Cable Compensation

`CableCompensationType.OPEN_AND_SHORT`

Open and Short Cable Compensation

`nidmm.DCNoiseRejection`

`DCNoiseRejection.AUTO`

The driver chooses the DC noise rejection setting based on the configured method and resolution.

`DCNoiseRejection.NORMAL`

NI-DMM weighs all samples equally.

`DCNoiseRejection.SECOND_ORDER`

NI-DMM weighs the samples taken in the middle of the aperture time more than samples taken at the beginning and the end of the measurement using a triangular weighing method.

`DCNoiseRejection.HIGH_ORDER`

NI-DMM weighs the samples taken in the middle of the aperture time more than samples taken at the beginning and the end of the measurement using a bell-curve weighing method.

`nidmm.Function`

`Function.DC_VOLTS`

DC Voltage

`Function.AC_VOLTS`

AC Voltage

`Function.DC_CURRENT`

DC Current

`Function.AC_CURRENT`

AC Current

`Function.TWO_WIRE_RES`

2-Wire Resistance

`Function.FOUR_WIRE_RES`

4-Wire Resistance

`Function.FREQ`

Frequency

`Function.PERIOD`

Period

`Function.TEMPERATURE`

NI 4065, and NI 4070/4071/4072 supported.

`Function.AC_VOLTS_DC_COUPLED`

AC Voltage with DC Coupling

`Function.DIODE`

Diode

Function.**WAVEFORM_VOLTAGE**

Waveform voltage

Function.**WAVEFORM_CURRENT**

Waveform current

Function.**CAPACITANCE**

Capacitance

Function.**INDUCTANCE**

Inductance

nidmm.LCCalculationModel

LCCalculationModel.**AUTO**

NI-DMM chooses the algorithm based on method and range

LCCalculationModel.**SERIES**

NI-DMM uses the series impedance model to calculate capacitance and inductance

LCCalculationModel.**PARALLEL**

NI-DMM uses the parallel admittance model to calculate capacitance and inductance

nidmm.MeasurementCompleteDest

MeasurementCompleteDest.**NONE**

No Trigger

MeasurementCompleteDest.**EXTERNAL**

AUX I/O Connector

MeasurementCompleteDest.**PXI_TRIG0**

PXI Trigger Line 0

MeasurementCompleteDest.**PXI_TRIG1**

PXI Trigger Line 1

MeasurementCompleteDest.**PXI_TRIG2**

PXI Trigger Line 2

MeasurementCompleteDest.**PXI_TRIG3**

PXI Trigger Line 3

MeasurementCompleteDest.**PXI_TRIG4**

PXI Trigger Line 4

MeasurementCompleteDest.**PXI_TRIG5**

PXI Trigger Line 5

MeasurementCompleteDest.**PXI_TRIG6**

PXI Trigger Line 6

MeasurementCompleteDest.**PXI_TRIG7**

PXI Trigger Line 7

MeasurementCompleteDest.**LBR_TRIG0**

Internal Trigger Line of a PXI/SCXI Combination Chassis

nidmm.MeasurementDestinationSlope

MeasurementDestinationSlope.**POSITIVE**
Rising Edges

MeasurementDestinationSlope.**NEGATIVE**
Falling Edge

nidmm.**OperationMode**

OperationMode.**IVIDMM**
IviDmm Mode

OperationMode.**WAVEFORM**
Waveform acquisition mode

nidmm.**RTDType**

RTDType.**CUSTOM**
Performs Callendar-Van Dusen RTD scaling with the user-specified A, B, and C coefficients.

RTDType.**PT3750**
Performs scaling for a Pt 3750 RTD.

RTDType.**PT3851**
Performs scaling for a Pt 3851 RTD.

RTDType.**PT3911**
Performs scaling for a Pt 3911 RTD.

RTDType.**PT3916**
Performs scaling for a Pt 3916 RTD.

RTDType.**PT3920**
Performs scaling for a Pt 3920 RTD.

RTDType.**PT3928**
Performs scaling for a Pt 3928 RTD.

nidmm.**SampleTrigSlope**

SampleTrigSlope.**POSITIVE**
Rising Edges

SampleTrigSlope.**NEGATIVE**
Falling Edge

nidmm.**SampleTrigger**

SampleTrigger.**IMMEDIATE**
No Trigger

SampleTrigger.**EXTERNAL**
AUX I/O Connector Trigger Line 0

SampleTrigger.**SOFTWARE_TRIG**
Software Trigger

SampleTrigger.**INTERVAL**
Interval Trigger

`SampleTrigger.PXI_TRIG0`
 PXI Trigger Line 0
`SampleTrigger.PXI_TRIG1`
 PXI Trigger Line 1
`SampleTrigger.PXI_TRIG2`
 PXI Trigger Line 2
`SampleTrigger.PXI_TRIG3`
 PXI Trigger Line 3
`SampleTrigger.PXI_TRIG4`
 PXI Trigger Line 4
`SampleTrigger.PXI_TRIG5`
 PXI Trigger Line 5
`SampleTrigger.PXI_TRIG6`
 PXI Trigger Line 6
`SampleTrigger.PXI_TRIG7`
 PXI Trigger Line 7
`SampleTrigger.PXI_STAR`
 PXI Star Trigger Line
`SampleTrigger.AUX_TRIG1`
 AUX I/O Connector Trigger Line 1
`SampleTrigger.LBR_TRIG1`
 Internal Trigger Line of a PXI/SCXI Combination Chassis

`nidmm.ThermistorType`

`ThermistorType.CUSTOM`
 Custom
`ThermistorType.THERMISTOR_44004`
 44004
`ThermistorType.THERMISTOR_44006`
 44006
`ThermistorType.THERMISTOR_44007`
 44007

`nidmm.ThermocoupleReferenceJunctionType`

`ThermocoupleReferenceJunctionType.FIXED`
 Thermocouple reference junction is fixed at the user-specified temperature.

`nidmm.ThermocoupleType`

`ThermocoupleType.B`
 Thermocouple type B
`ThermocoupleType.E`
 Thermocouple type E

`ThermocoupleType.J`
Thermocouple type J

`ThermocoupleType.K`
Thermocouple type K

`ThermocoupleType.N`
Thermocouple type N

`ThermocoupleType.R`
Thermocouple type R

`ThermocoupleType.S`
Thermocouple type S

`ThermocoupleType.T`
Thermocouple type T

`nidmm.TransducerType`

`TransducerType.THERMOCOUPLE`
Thermocouple

`TransducerType.THERMISTOR`
Thermistor

`TransducerType.TWO_WIRE_RTD`
2-wire RTD

`TransducerType.FOUR_WIRE_RTD`
4-wire RTD

`nidmm.TriggerSlope`

`TriggerSlope.POSITIVE`
Rising Edgs

`TriggerSlope.NEGATIVE`
Falling Edge

`nidmm.TriggerSource`

`TriggerSource.IMMEDIATE`
No Trigger

`TriggerSource.EXTERNAL`
AUX I/O Connector Trigger Line 0

`TriggerSource.SOFTWARE_TRIG`
Software Trigger

`TriggerSource.PXI_TRIG0`
PXI Trigger Line 0

`TriggerSource.PXI_TRIG1`
PXI Trigger Line 1

`TriggerSource.PXI_TRIG2`
PXI Trigger Line 2

```

TriggerSource.PXI_TRIG3
    PXI Trigger Line 3

TriggerSource.PXI_TRIG4
    PXI Trigger Line 4

TriggerSource.PXI_TRIG5
    PXI Trigger Line 5

TriggerSource.PXI_TRIG6
    PXI Trigger Line 6

TriggerSource.PXI_TRIG7
    PXI Trigger Line 7

TriggerSource.PXI_STAR
    PXI Star Trigger Line

TriggerSource.AUX_TRIG1
    AUX I/O Connector Trigger Line 1

TriggerSource.LBR_TRIG1
    Internal Trigger Line of a PXI/SCXI Combination Chassis

```

`nidmm.WaveformCoupling`

```

WaveformCoupling.AC
    AC Coupled

```

```

WaveformCoupling.DC
    DC Coupled

```

Examples

`nidmm_fetch_waveform.py`

Listing 7.3: (`nidmm_fetch_waveform.py`)

```

1  #!/usr/bin/python
2
3  import argparse
4  import nidmm
5  import sys
6  import time
7
8
9  def example(resource_name, options, function, range, points, rate):
10     with nidmm.Session(resource_name=resource_name, options=options) as session:
11         session.configure_waveform_acquisition(measurement_function=nidmm.
12         ↪Function[function], range=range, rate=rate, waveform_points=points)
13         with session.initiate():
14             while True:
15                 time.sleep(0.1)
16                 backlog, acquisition_state = session.read_status()
17                 if acquisition_state == nidmm.AcquisitionStatus.FINISHED_WITH_NO_
18         ↪BACKLOG:
19                     break
20                 measurements = session.fetch_waveform(array_size=backlog)

```

```

19         print(measurements)
20
21
22     def _main(argv):
23         parser = argparse.ArgumentParser(description='Performs a waveform acquisition_
↳ using the NI-DMM API.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
24         parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
↳ name of a National Instruments Digital Multimeter.')
25         parser.add_argument('-f', '--function', default='WAVEFORM_VOLTAGE', choices=nidmm.
↳ Function.__members__.keys(), type=str.upper, help='Measurement function.')
26         parser.add_argument('-r', '--range', default=10, type=float, help='Measurement_
↳ range.')
27         parser.add_argument('-p', '--points', default=10, type=int, help='Specifies the_
↳ number of points to acquire before the waveform acquisition completes.')
28         parser.add_argument('-s', '--rate', default=1000, type=int, help='Specifies the_
↳ rate of the acquisition in samples per second.')
29         parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
↳ string')
30         args = parser.parse_args(argv)
31         example(args.resource_name, args.option_string, args.function, args.range, args.
↳ points, args.rate)
32
33
34     def main():
35         _main(sys.argv[1:])
36
37
38     def test_example():
39         options = {'simulate': True, 'driver_setup': {'Model': '4082', 'BoardType': 'PXIe
↳ ', }, }
40         example('PXI1Slot2', options, 'WAVEFORM_VOLTAGE', 10, 10, 1000)
41
42
43     def test_main():
44         cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:4082; BoardType:PXIe
↳ ', ]
45         _main(cmd_line)
46
47
48     if __name__ == '__main__':
49         main()
50
51

```

nidmm_measurement.py

Listing 7.4: (nidmm_measurement.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import nidmm
5  import sys
6
7
8  def example(resource_name, option_string, function, range, digits):

```



```

9     with nidmm.Session(resource_name=resource_name, options=option_string) as session:
10         session.configure_measurement_digits(measurement_function=nidmm.
↪Function[function], range=range, resolution_digits=digits)
11         print(session.read())
12
13
14 def _main(argv):
15     supported_functions = list(nidmm.Function.__members__.keys())
16     parser = argparse.ArgumentParser(description='Performs a single measurement using
↪the NI-DMM API.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
17     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
↪name of a National Instruments Digital Multimeter.')
18     parser.add_argument('-f', '--function', default=supported_functions[0],
↪choices=supported_functions, type=str.upper, help='Measurement function.')
19     parser.add_argument('-r', '--range', default=10, type=float, help='Measurement
↪range.')
20     parser.add_argument('-d', '--digits', default=6.5, type=float, help='Digits of
↪resolution for the measurement.')
21     parser.add_argument('-op', '--option-string', default='', type=str, help='Option
↪string')
22     args = parser.parse_args(argv)
23     example(args.resource_name, args.option_string, args.function, args.range, args.
↪digits)
24
25
26 def main():
27     _main(sys.argv[1:])
28
29
30 def test_example():
31     options = {'simulate': True, 'driver_setup': {'Model': '4082', 'BoardType': 'PXIe
↪', }, }
32     example('PXI1Slot2', options, 'DC_VOLTS', 10, 6.5)
33
34
35 def test_main():
36     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:4082; BoardType:PXIe
↪', ]
37     _main(cmd_line)
38
39
40 if __name__ == '__main__':
41     main()
42
43

```

nidmm_multi_point_measurement.py

Listing 7.5: (nidmm_multi_point_measurement.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import nidmm
5  import sys
6

```

```

7
8 def example(resource_name, options, function, range, digits, samples, triggers):
9     with nidmm.Session(resource_name=resource_name, options=options) as session:
10         session.configure_measurement_digits(measurement_function=nidmm.
↪Function[function], range=range, resolution_digits=digits)
11         session.configure_multi_point(trigger_count=triggers, sample_count=samples)
12         measurements = session.read_multi_point(array_size=samples)
13         print('Measurements: ', measurements)
14
15
16 def _main(argv):
17     parser = argparse.ArgumentParser(description='Performs a multipoint measurement_
↪using the NI-DMM API.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
18     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
↪name of a National Instruments Digital Multimeter.')
19     parser.add_argument('-f', '--function', default='DC_VOLTS', choices=nidmm.
↪Function.__members__.keys(), type=str.upper, help='Measurement function.')
20     parser.add_argument('-r', '--range', default=10, type=float, help='Measurement_
↪range.')
21     parser.add_argument('-d', '--digits', default=6.5, type=float, help='Digits of_
↪resolution for the measurement.')
22     parser.add_argument('-s', '--samples', default=10, type=int, help='The number of_
↪measurements the DMM makes.')
23     parser.add_argument('-t', '--triggers', default=1, type=int, help='Sets the_
↪number of triggers you want the DMM to receive before returning to the Idle state.')
24     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
↪string')
25     args = parser.parse_args(argv)
26     example(args.resource_name, args.option_string, args.function, args.range, args.
↪digits, args.samples, args.triggers)
27
28
29 def main():
30     _main(sys.argv[1:])
31
32
33 def test_example():
34     options = {'simulate': True, 'driver_setup': {'Model': '4082', 'BoardType': 'PXIe
↪', }, }
35     example('PXI1Slot2', options, 'DC_VOLTS', 10, 6.5, 10, 1)
36
37
38 def test_main():
39     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:4082; BoardType:PXIe
↪', ]
40     _main(cmd_line)
41
42
43 if __name__ == '__main__':
44     main()
45
46
47

```

7.3 nifgen module

7.3.1 Installation

As a prerequisite to using the nifgen module, you must install the NI-FGEN runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The nimi-python modules (i.e. for **NI-FGEN**) can be installed with `pip`:

```
$ python -m pip install nifgen~=0.8.0
```

Or `easy_install` from `setuptools`:

```
$ python -m easy_install nifgen
```

7.3.2 Usage

The following is a basic example of using the **nifgen** module to open a session to a Function Generator and generate a sine wave for 5 seconds.

```
import nifgen
import time
with nifgen.Session("Dev1") as session:
    session.output_mode = nifgen.OutputMode.FUNC
    session.configure_standard_waveform(waveform=nifgen.Waveform.SINE, amplitude=1.0,
    ↪ frequency=10000000, dc_offset=0.0, start_phase=0.0)
    with session.initiate():
        time.sleep(5)
```

Additional examples for NI-FGEN are located in `src/nifgen/examples/` directory.

7.3.3 API Reference

nifgen.Session

class `nifgen.Session`

An NI-FGEN session to a National Instruments Signal Generator.

Properties

Property	Datatype
<code>all_marker_events_latched_status</code>	int
<code>all_marker_events_live_status</code>	int
<code>analog_data_mask</code>	int
<code>analog_filter_enabled</code>	bool
<code>analog_path</code>	<i>AnalogPath</i>
<code>analog_static_value</code>	int
<code>arb_gain</code>	float
<code>arb_marker_position</code>	int
<code>arb_offset</code>	float
<code>arb_repeat_count</code>	int

Continued on next page

Table 7.5 – continued from previous page

Property	Datatype
<code>arb_sample_rate</code>	float
<code>arb_sequence_handle</code>	int
<code>arb_waveform_handle</code>	int
<code>aux_power_enabled</code>	bool
<code>bus_type</code>	<i>BusType</i>
<code>cache</code>	bool
<code>channel_delay</code>	float
<code>clock_mode</code>	<i>ClockMode</i>
<code>common_mode_offset</code>	float
<code>data_marker_events_count</code>	int
<code>data_marker_event_data_bit_number</code>	int
<code>data_marker_event_level_polarity</code>	<i>DataMarkerEventLevelPolarity</i>
<code>data_marker_event_output_terminal</code>	str
<code>data_transfer_block_size</code>	int
<code>data_transfer_maximum_bandwidth</code>	float
<code>data_transfer_maximum_in_flight_reads</code>	int
<code>data_transfer_preferred_packet_size</code>	int
<code>digital_data_mask</code>	int
<code>digital_edge_script_trigger_edge</code>	<i>ScriptTriggerDigitalEdgeEdge</i>
<code>digital_edge_script_trigger_source</code>	str
<code>digital_edge_start_trigger_edge</code>	<i>StartTriggerDigitalEdgeEdge</i>
<code>digital_edge_start_trigger_source</code>	str
<code>digital_filter_enabled</code>	bool
<code>digital_filter_interpolation_factor</code>	float
<code>digital_gain</code>	float
<code>digital_level_script_trigger_active_level</code>	<i>ScriptTriggerDigitalLevelActiveLevel</i>
<code>digital_level_script_trigger_source</code>	str
<code>digital_pattern_enabled</code>	bool
<code>digital_static_value</code>	int
<code>direct_dma_enabled</code>	bool
<code>direct_dma_window_address</code>	int
<code>direct_dma_window_size</code>	int
<code>done_event_delay</code>	float
<code>done_event_delay_units</code>	<i>DoneEventDelayUnits</i>
<code>done_event_latched_status</code>	bool
<code>done_event_level_active_level</code>	<i>DoneEventActiveLevel</i>
<code>done_event_output_behavior</code>	<i>DoneEventOutputBehavior</i>
<code>done_event_output_terminal</code>	str
<code>done_event_pulse_polarity</code>	<i>DoneEventPulsePolarity</i>
<code>done_event_pulse_width</code>	float
<code>done_event_pulse_width_units</code>	<i>DoneEventPulseWidthUnits</i>
<code>driver_setup</code>	str
<code>exported_onboard_reference_clock_output_terminal</code>	str
<code>exported_reference_clock_output_terminal</code>	str
<code>exported_sample_clock_divisor</code>	int
<code>exported_sample_clock_output_terminal</code>	str
<code>exported_sample_clock_timebase_divisor</code>	int
<code>exported_sample_clock_timebase_output_terminal</code>	str
<code>exported_script_trigger_output_terminal</code>	str

Continued on next page

Table 7.5 – continued from previous page

Property	Datatype
<code>exported_start_trigger_output_terminal</code>	str
<code>external_clock_delay_binary_value</code>	int
<code>external_sample_clock_multiplier</code>	float
<code>file_transfer_block_size</code>	int
<code>filter_correction_frequency</code>	float
<code>flatness_correction_enabled</code>	bool
<code>fpga_bitfile_path</code>	str
<code>freq_list_duration_quantum</code>	float
<code>freq_list_handle</code>	int
<code>func_amplitude</code>	float
<code>func_buffer_size</code>	int
<code>func_dc_offset</code>	float
<code>func_duty_cycle_high</code>	float
<code>func_frequency</code>	float
<code>func_max_buffer_size</code>	int
<code>func_start_phase</code>	float
<code>func_waveform</code>	<i>Waveform</i>
<code>gain_dac_value</code>	int
<code>group_capabilities</code>	str
<code>idle_behavior</code>	<i>IdleBehavior</i>
<code>idle_value</code>	int
<code>id_query_response</code>	str
<code>instrument_firmware_revision</code>	str
<code>instrument_manufacturer</code>	str
<code>instrument_model</code>	str
<code>interchange_check</code>	bool
<code>io_resource_descriptor</code>	str
<code>load_impedance</code>	float
<code>logical_name</code>	str
<code>major_version</code>	int
<code>marker_events_count</code>	int
<code>marker_event_delay</code>	float
<code>marker_event_delay_units</code>	<i>MarkerEventDelayUnits</i>
<code>marker_event_latched_status</code>	bool
<code>marker_event_live_status</code>	bool
<code>marker_event_output_behavior</code>	<i>MarkerEventOutputBehavior</i>
<code>marker_event_output_terminal</code>	str
<code>marker_event_pulse_polarity</code>	<i>MarkerEventPulsePolarity</i>
<code>marker_event_pulse_width</code>	float
<code>marker_event_pulse_width_units</code>	<i>MarkerEventPulseWidthUnits</i>
<code>marker_event_toggle_initial_state</code>	<i>MarkerEventToggleInitialState</i>
<code>max_freq_list_duration</code>	float
<code>max_freq_list_length</code>	int
<code>max_loop_count</code>	int
<code>max_num_freq_lists</code>	int
<code>max_num_sequences</code>	int
<code>max_num_waveforms</code>	int
<code>max_sequence_length</code>	int
<code>max_waveform_size</code>	int

Continued on next page

Table 7.5 – continued from previous page

Property	Datatype
<i>memory_size</i>	int
<i>minor_version</i>	int
<i>min_freq_list_duration</i>	float
<i>min_freq_list_length</i>	int
<i>min_sequence_length</i>	int
<i>min_waveform_size</i>	int
<i>module_revision</i>	str
<i>num_channels</i>	int
<i>offset_dac_value</i>	int
<i>oscillator_freq_dac_value</i>	int
<i>oscillator_phase_dac_value</i>	int
<i>osp_carrier_enabled</i>	bool
<i>osp_carrier_frequency</i>	float
<i>osp_carrier_phase_i</i>	float
<i>osp_carrier_phase_q</i>	float
<i>osp_cic_filter_enabled</i>	bool
<i>osp_cic_filter_gain</i>	float
<i>osp_cic_filter_interpolation</i>	float
<i>osp_compensate_for_filter_group_delay</i>	bool
<i>osp_data_processing_mode</i>	<i>DataProcessingMode</i>
<i>osp_enabled</i>	bool
<i>osp_fir_filter_enabled</i>	bool
<i>osp_fir_filter_flat_passband</i>	float
<i>osp_fir_filter_gaussian_bt</i>	float
<i>osp_fir_filter_interpolation</i>	float
<i>osp_fir_filter_raised_cosine_alpha</i>	float
<i>osp_fir_filter_root_raised_cosine_alpha</i>	float
<i>osp_fir_filter_type</i>	<i>FilterType</i>
<i>osp_frequency_shift</i>	float
<i>osp_mode</i>	<i>OSPMODE</i>
<i>osp_overflow_error_reporting</i>	<i>OSPOverflowErrorReporting</i>
<i>osp_overflow_status</i>	int
<i>osp_pre_filter_gain_i</i>	float
<i>osp_pre_filter_gain_q</i>	float
<i>osp_pre_filter_offset_i</i>	float
<i>osp_pre_filter_offset_q</i>	float
<i>output_enabled</i>	bool
<i>output_impedance</i>	float
<i>output_mode</i>	<i>OutputMode</i>
<i>p2p_endpoint_fullness_start_trigger_level</i>	int
<i>pci_dma_optimizations_enabled</i>	bool
<i>post_amplifier_attenuation</i>	float
<i>pre_amplifier_attenuation</i>	float
<i>range_check</i>	bool
<i>ready_for_start_event_level_active_level</i>	<i>ReadyForStartEventActiveLevel</i>
<i>ready_for_start_event_live_status</i>	bool
<i>ready_for_start_event_output_terminal</i>	str
<i>record_coercions</i>	bool
<i>reference_clock_source</i>	<i>ReferenceClockSource</i>

Continued on next page

Table 7.5 – continued from previous page

Property	Datatype
<code>ref_clock_frequency</code>	float
<code>sample_clock_absolute_delay</code>	float
<code>sample_clock_source</code>	<i>SampleClockSource</i>
<code>sample_clock_timebase_rate</code>	float
<code>sample_clock_timebase_source</code>	<i>SampleClockTimebaseSource</i>
<code>script_to_generate</code>	str
<code>script_triggers_count</code>	int
<code>script_trigger_type</code>	<i>ScriptTriggerType</i>
<code>serial_number</code>	str
<code>simulate</code>	bool
<code>specific_driver_class_spec_major_version</code>	int
<code>specific_driver_class_spec_minor_version</code>	int
<code>specific_driver_description</code>	str
<code>specific_driver_revision</code>	str
<code>specific_driver_vendor</code>	str
<code>started_event_delay</code>	float
<code>started_event_delay_units</code>	<i>StartedEventDelayUnits</i>
<code>started_event_latched_status</code>	bool
<code>started_event_level_active_level</code>	<i>StartedEventActiveLevel</i>
<code>started_event_output_behavior</code>	<i>StartedEventOutputBehavior</i>
<code>started_event_output_terminal</code>	str
<code>started_event_pulse_polarity</code>	<i>StartedEventPulsePolarity</i>
<code>started_event_pulse_width</code>	float
<code>started_event_pulse_width_units</code>	<i>StartedEventPulseWidthUnits</i>
<code>start_trigger_type</code>	<i>StartTriggerType</i>
<code>streaming_space_available_in_waveform</code>	int
<code>streaming_waveform_handle</code>	int
<code>streaming_waveform_name</code>	str
<code>streaming_write_timeout</code>	float in seconds or <code>datetime.timedelta</code>
<code>supported_instrument_models</code>	str
<code>synchronization</code>	<i>SynchronizationSource</i>
<code>sync_duty_cycle_high</code>	float
<code>sync_out_output_terminal</code>	str
<code>terminal_configuration</code>	<i>TerminalConfiguration</i>
<code>trigger_mode</code>	<i>TriggerMode</i>
<code>trigger_source</code>	<i>TriggerSource</i>
<code>video_waveform_type</code>	<i>VideoWaveformType</i>
<code>wait_behavior</code>	<i>WaitBehavior</i>
<code>wait_value</code>	int
<code>waveform_quantum</code>	int

Public methods

Method name
<code>abort()</code>
<code>allocate_named_waveform()</code>
<code>allocate_waveform()</code>
<code>clear_arb_memory()</code>
<code>clear_arb_sequence()</code>

Continued on next page

Table 7.6 – continued from previous page

Method name
<code>clear_arb_waveform()</code>
<code>clear_freq_list()</code>
<code>clear_user_standard_waveform()</code>
<code>commit()</code>
<code>configure_arb_sequence()</code>
<code>configure_arb_waveform()</code>
<code>configure_custom_fir_filter_coefficients()</code>
<code>configure_digital_edge_script_trigger()</code>
<code>configure_digital_edge_start_trigger()</code>
<code>configure_digital_level_script_trigger()</code>
<code>configure_freq_list()</code>
<code>configure_standard_waveform()</code>
<code>create_advanced_arb_sequence()</code>
<code>create_arb_sequence()</code>
<code>create_freq_list()</code>
<code>create_waveform_from_file_f64()</code>
<code>create_waveform_from_file_i16()</code>
<code>create_waveform_numpy()</code>
<code>define_user_standard_waveform()</code>
<code>delete_named_waveform()</code>
<code>delete_script()</code>
<code>disable()</code>
<code>export_signal()</code>
<code>get_ext_cal_last_date_and_time()</code>
<code>get_ext_cal_last_temp()</code>
<code>get_ext_cal_recommended_interval()</code>
<code>get_fir_filter_coefficients()</code>
<code>get_hardware_state()</code>
<code>get_self_cal_last_date_and_time()</code>
<code>get_self_cal_last_temp()</code>
<code>get_self_cal_supported()</code>
<code>is_done()</code>
<code>query_arb_seq_capabilities()</code>
<code>query_arb_wfm_capabilities()</code>
<code>query_freq_list_capabilities()</code>
<code>read_current_temperature()</code>
<code>reset()</code>
<code>reset_device()</code>
<code>reset_with_defaults()</code>
<code>self_cal()</code>
<code>self_test()</code>
<code>send_software_edge_trigger()</code>
<code>set_named_waveform_next_write_position()</code>
<code>set_waveform_next_write_position()</code>
<code>wait_until_done()</code>
<code>write_script()</code>
<code>write_waveform()</code>

nifgen.Session methods

`nifgen.Session.abort()`

Aborts any previously initiated signal generation. Call the `nifgen_InitiateGeneration` method to cause the signal generator to produce a signal again.

`nifgen.Session.allocate_named_waveform(waveform_name, waveform_size)`

Specifies the size of a named waveform up front so that it can be allocated in onboard memory before loading the associated data. Data can then be loaded in smaller blocks with the `niFgen Write (Binary16) Waveform` methods.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].allocate_named_waveform(waveform_name, waveform_size)
```

Parameters

- **waveform_name** (*str*) – Specifies the name to associate with the allocated waveform.
- **waveform_size** (*int*) – Specifies the size of the waveform to allocate in samples.

Default Value: “4096”

`nifgen.Session.allocate_waveform(waveform_size)`

Specifies the size of a waveform so that it can be allocated in onboard memory before loading the associated data. Data can then be loaded in smaller blocks with the `Write Binary 16 Waveform` methods.

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].allocate_waveform(waveform_size)
```

Parameters **waveform_size** (*int*) – Specifies, in samples, the size of the waveform to allocate.

Return type *int*

Returns The handle that identifies the new waveform. This handle is used later when referring to this waveform.

`nifgen.Session.clear_arb_memory()`

Removes all previously created arbitrary waveforms, sequences, and scripts from the signal generator memory and invalidates all waveform handles, sequence handles, and waveform names.

Note: The signal generator must not be in the Generating state when you call this method.

`nifgen.Session.clear_arb_sequence(sequence_handle)`

Removes a previously created arbitrary sequence from the signal generator memory and invalidates the sequence handle.

Note: The signal generator must not be in the Generating state when you call this method.

Parameters `sequence_handle` (*int*) – Specifies the handle of the arbitrary sequence that you want the signal generator to remove. You can create an arbitrary sequence using the `nifgen.CreateArbSequence` or `nifgen.CreateAdvancedArbSequence` method. These methods return a handle that you use to identify the sequence.

Defined Value:

`NIFGEN_VAL_ALL_SEQUENCES`—Remove all sequences from the signal generator

Default Value: None

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`nifgen.Session.clear_arb_waveform(waveform_handle)`

Removes a previously created arbitrary waveform from the signal generator memory and invalidates the waveform handle.

Note: The signal generator must not be in the Generating state when you call this method.

Parameters `waveform_handle` (*int*) – Specifies the handle of the arbitrary waveform that you want the signal generator to remove.

You can create multiple arbitrary waveforms using one of the following niFgen Create Waveform methods:

- `nifgen.Session.create_waveform()`
- `nifgen.Session.create_waveform()`
- `nifgen.Session.create_waveform_from_file_il6()`
- `nifgen.Session.create_waveform_from_file_f64()`
- `nifgen.Session.CreateWaveformFromFileHWS()`

Defined Value:

`NIFGEN_VAL_ALL_WAVEFORMS`—Remove all waveforms from the signal generator.

Default Value: None

Note: One or more of the referenced methods are not in the Python API for this driver.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`nifgen.Session.clear_freq_list(frequency_list_handle)`

Removes a previously created frequency list from the signal generator memory and invalidates the frequency list handle.

Note: The signal generator must not be in the Generating state when you call this method.

Parameters `frequency_list_handle` (*int*) – Specifies the handle of the frequency list you want the signal generator to remove. You create multiple frequency lists using `nifgen.Session.create_freq_list()`. `nifgen.Session.create_freq_list()` returns a handle that you use to identify each list. Specify a value of -1 to clear all frequency lists.

Defined Value

`NIFGEN_VAL_ALL_FLISTS`—Remove all frequency lists from the signal generator.

Default Value: None

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`nifgen.Session.clear_user_standard_waveform()`

Clears the user-defined waveform created by the `nifgen.DefineUserStandardWaveform` method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].clear_user_standard_waveform()
```

`nifgen.Session.commit()`

Causes a transition to the Committed state. This method verifies property values, reserves the device, and commits the property values to the device. If the property values are all valid, NI-FGEN sets the device hardware configuration to match the session configuration. This method does not support the NI 5401/5404/5411/5431 signal generators.

In the Committed state, you can load waveforms, scripts, and sequences into memory. If any properties are changed, NI-FGEN implicitly transitions back to the Idle state, where you can program all session properties before applying them to the device. This method has no effect if the device is already in the Committed or Generating state and returns a successful status value.

Calling this VI before the niFgen Initiate Generation VI is optional but has the following benefits:

- Routes are committed, so signals are exported or imported.
- Any Reference Clock and external clock circuits are phase-locked.
- A subsequent `nifgen.Session._initiate_generation()` method can run faster because the device is already configured.

`nifgen.Session.configure_arb_sequence(sequence_handle, gain, offset)`

Configures the signal generator properties that affect arbitrary sequence generation. Sets the `nifgen.Session.arb_sequence_handle`, `nifgen.Session.arb_gain`, and `nifgen.Session.arb_offset` properties.

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].configure_arb_sequence(sequence_handle, gain, offset)
```

Parameters

- **sequence_handle** (*int*) – Specifies the handle of the arbitrary sequence that you want the signal generator to produce. NI-FGEN sets the `nifgen.Session.arb_sequence_handle` property to this value. You can create an arbitrary sequence using the `nifgen.Session.create_arb_sequence()` or `nifgen.Session.create_advanced_arb_sequence()` method. These methods return a handle that you use to identify the sequence.

Default Value: None

- **gain** (*float*) – Specifies the factor by which the signal generator scales the arbitrary waveforms in the sequence. When you create an arbitrary waveform, you must first normalize the data points to a range of -1.00 to $+1.00$. You can use this parameter to scale the waveform to other ranges. The gain is applied before the offset is added.

For example, to configure the output signal to range from -2.00 to $+2.00$ V, set **gain** to 2.00.

Units: unitless

Default Value: None

- **offset** (*float*) – Specifies the value the signal generator adds to the arbitrary waveform data. When you create arbitrary waveforms, you must first normalize the data points to a range of -1.00 to $+1.00$ V. You can use this parameter to shift the range of the arbitrary waveform. NI-FGEN sets the `nifgen.Session.arb_offset` property to this value.

For example, to configure the output signal to range from 0.00 to 2.00 V instead of -1.00 to 1.00 V, set the offset to 1.00.

Units: volts

Default Value: None

`nifgen.Session.configure_arb_waveform(waveform_handle, gain, offset)`

Configures the properties of the signal generator that affect arbitrary waveform generation. Sets the `nifgen.Session.arb_waveform_handle`, `nifgen.Session.arb_gain`, and `nifgen.Session.arb_offset` properties.

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].configure_arb_waveform(waveform_handle, gain, offset)
```

Parameters

- **waveform_handle** (*int*) – Specifies the handle of the arbitrary waveform you want the signal generator to produce. NI-FGEN sets the `nifgen.Session.arb_waveform_handle` property to this value. You can create an arbitrary waveform using one of the following niFgen Create Waveform methods:

```
- nifgen.Session.create_waveform()
- nifgen.Session.create_waveform()
- nifgen.Session.create_waveform_from_file_i16()
- nifgen.Session.create_waveform_from_file_f64()
- nifgen.Session.CreateWaveformFromFileHWS()
```

These methods return a handle that you use to identify the waveform.

Default Value: None

Note: One or more of the referenced methods are not in the Python API for this driver.

- **gain** (*float*) – Specifies the factor by which the signal generator scales the arbitrary waveforms in the sequence. When you create an arbitrary waveform, you must first normalize the data points to a range of -1.00 to $+1.00$. You can use this parameter to scale the waveform to other ranges. The gain is applied before the offset is added.

For example, to configure the output signal to range from -2.00 to $+2.00$ V, set **gain** to 2.00.

Units: unitless

Default Value: None

- **offset** (*float*) – Specifies the value the signal generator adds to the arbitrary waveform data. When you create arbitrary waveforms, you must first normalize the data points to a range of -1.00 to $+1.00$ V. You can use this parameter to shift the range of the arbitrary waveform. NI-FGEN sets the `nifgen.Session.arb_offset` property to this value.

For example, to configure the output signal to range from 0.00 to 2.00 V instead of -1.00 to 1.00 V, set the offset to 1.00.

Units: volts

Default Value: None

`nifgen.Session.configure_custom_fir_filter_coefficients` (*coefficients_array*)

Sets the FIR filter coefficients used by the onboard signal processing block. The values are coerced to the closest settings achievable by the signal generator.

Refer to the *FIR Filter* topic for your device in the *NI Signal Generators Help* for more information about FIR filter coefficients. This method is supported only for the NI 5441.

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].configure_custom_fir_filter_coefficients(coefficients_
    ↪array)
```

Parameters `coefficients_array` (*list of float*) – Specifies the array of data the on-board signal processor uses for the FIR filter coefficients. For the NI 5441, provide a symmetric array of 95 coefficients to this parameter. The array must have at least as many elements as the value that you specify in the `numberOfCoefficients` parameter in this method. The coefficients should range between -1.00 and $+1.00$.

`nifgen.Session.configure_digital_edge_script_trigger` (*trigger_id*, *source*, *edge=nifgen.ScriptTriggerDigitalEdgeEdge.RISING*)
 Configures the specified Script Trigger for digital edge triggering.

Parameters

- **trigger_id** (*str*) – Specifies the Script Trigger used for triggering.

Defined Values

Default Value: “ScriptTrigger0”

”ScriptTrigger0”	Script Trigger 0
”ScriptTrigger1”	Script Trigger 1
”ScriptTrigger2”	Script Trigger 2
”ScriptTrigger3”	Script Trigger 3

- **source** (*str*) – Specifies which trigger source the signal generator uses.

Defined Values

Default Value: “PFI0”

"PFI0"	PFI 0
"PFI1"	PFI 1
"PFI2"	PFI 2
"PFI3"	PFI 3
"PFI4"	PFI 4
"PFI5"	PFI 5
"PFI6"	PFI 6
"PFI7"	PFI 7
"PXI_Trig0"	PXI trigger line 0 or RTSI line 0
"PXI_Trig1"	PXI trigger line 1 or RTSI line 1
"PXI_Trig2"	PXI trigger line 2 or RTSI line 2
"PXI_Trig3"	PXI trigger line 3 or RTSI line 3
"PXI_Trig4"	PXI trigger line 4 or RTSI line 4
"PXI_Trig5"	PXI trigger line 5 or RTSI line 5
"PXI_Trig6"	PXI trigger line 6 or RTSI line 6
"PXI_Trig7"	PXI trigger line 7 or RTSI line 7
"PXI_Star"	PXI star trigger line

- **edge** (*nifgen.ScriptTriggerDigitalEdgeEdge*) – Specifies the edge to detect.

****Defined Values****

****Default Value:**** *RISING*

<i>RISING</i>	Occurs when the signal transitions from low level to high level.
<i>FALLING</i>	Occurs when the signal transitions from high level to low level.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`nifgen.Session.configure_digital_edge_start_trigger` (*source*,
edge=nifgen.StartTriggerDigitalEdgeEdge.RISING)

Configures the Start Trigger for digital edge triggering.

Parameters

- **source** (*str*) – Specifies which trigger source the signal generator uses.

Defined Values

Default Value: "PFI0"

"PFI0"	PFI 0
"PFI1"	PFI 1
"PFI2"	PFI 2
"PFI3"	PFI 3
"PFI4"	PFI 4
"PFI5"	PFI 5
"PFI6"	PFI 6
"PFI7"	PFI 7
"PXI_Trig0"	PXI trigger line 0 or RTSI line 0
"PXI_Trig1"	PXI trigger line 1 or RTSI line 1
"PXI_Trig2"	PXI trigger line 2 or RTSI line 2
"PXI_Trig3"	PXI trigger line 3 or RTSI line 3
"PXI_Trig4"	PXI trigger line 4 or RTSI line 4
"PXI_Trig5"	PXI trigger line 5 or RTSI line 5
"PXI_Trig6"	PXI trigger line 6 or RTSI line 6
"PXI_Trig7"	PXI trigger line 7 or RTSI line 7
"PXI_Star"	PXI star trigger line

- **edge** (*nifgen.StartTriggerDigitalEdgeEdge*) – Specifies the edge to detect.

****Defined Values****

****Default Value:**** *RISING*

<i>RISING</i>	Occurs when the signal transitions from low level to high level.
<i>FALLING</i>	Occurs when the signal transitions from high level to low level.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

nifgen.Session.configure_digital_level_script_trigger (*trigger_id*, *source*, *trigger_when*)

Configures the specified Script Trigger for digital level triggering.

Parameters

- **trigger_id** (*str*) – Specifies the Script Trigger used for triggering.

Defined Values

Default Value: "ScriptTrigger0"

"ScriptTrigger0"	Script Trigger 0
"ScriptTrigger1"	Script Trigger 1
"ScriptTrigger2"	Script Trigger 2
"ScriptTrigger3"	Script Trigger 3

- **source** (*str*) – Specifies which trigger source the signal generator uses.

Defined Values

Default Value: "PFI0"

"PFI0"	PFI 0
"PFI1"	PFI 1
"PFI2"	PFI 2
"PFI3"	PFI 3
"PFI4"	PFI 4
"PFI5"	PFI 5
"PFI6"	PFI 6
"PFI7"	PFI 7
"PXI_Trig0"	PXI trigger line 0 or RTSI line 0
"PXI_Trig1"	PXI trigger line 1 or RTSI line 1
"PXI_Trig2"	PXI trigger line 2 or RTSI line 2
"PXI_Trig3"	PXI trigger line 3 or RTSI line 3
"PXI_Trig4"	PXI trigger line 4 or RTSI line 4
"PXI_Trig5"	PXI trigger line 5 or RTSI line 5
"PXI_Trig6"	PXI trigger line 6 or RTSI line 6
"PXI_Trig7"	PXI trigger line 7 or RTSI line 7
"PXI_Star"	PXI star trigger line

- **trigger_when** (*nifgen.TriggerWhen*) – Specifies whether the Script Trigger asserts on a high or low digital level.

Defined Values

Default Value: "HighLevel"

"HighLevel"	Script Trigger asserts on a high digital level.
"LowLevel"	Script Trigger asserts on a low digital level.

`nifgen.Session.configure_freq_list` (*frequency_list_handle*, *amplitude*, *dc_offset=0.0*, *start_phase=0.0*)

Configures the properties of the signal generator that affect frequency list generation (the *nifgen.Session.freq_list_handle*, *nifgen.Session.func_amplitude*, *nifgen.Session.func_dc_offset*, and *nifgen.Session.func_start_phase* properties).

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the *nifgen.Session* object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an *nifgen.Session* instance, and calling this method on the result:

```
session.channels['0,1'].configure_freq_list(frequency_list_handle, amplitude, dc_
↪offset=0.0, start_phase=0.0)
```

Parameters

- **frequency_list_handle** (*int*) – Specifies the handle of the frequency list that you want the signal generator to produce. NI-FGEN sets the *nifgen.Session.freq_list_handle* property to this value. You can create a frequency list using the *nifgen.Session.create_freq_list()* method, which returns a handle that you use to identify the list. **Default Value:** None

- **amplitude** (*float*) – Specifies the amplitude of the standard waveform that you want the signal generator to produce. This value is the amplitude at the output terminal. NI-FGEN sets the `nifgen.Session.func_amplitude` property to this value.

For example, to produce a waveform ranging from –5.00 V to +5.00 V, set the amplitude to 10.00 V.

Units: peak-to-peak voltage

Default Value: None

Note: This parameter does not affect signal generator behavior when you set the **waveform** parameter of the `nifgen.Session.configure_standard_waveform()` method to `DC`.

- **dc_offset** (*float*) – Specifies the DC offset of the standard waveform that you want the signal generator to produce. The value is the offset from ground to the center of the waveform you specify with the **waveform** parameter, observed at the output terminal. For example, to configure a waveform with an amplitude of 10.00 V to range from 0.00 V to +10.00 V, set the **dcOffset** to 5.00 V. NI-FGEN sets the `nifgen.Session.func_dc_offset` property to this value.

Units: volts

Default Value: None

- **start_phase** (*float*) – Specifies the horizontal offset of the standard waveform you want the signal generator to produce. Specify this property in degrees of one waveform cycle. NI-FGEN sets the `nifgen.Session.func_start_phase` property to this value. A start phase of 180 degrees means output generation begins halfway through the waveform. A start phase of 360 degrees offsets the output by an entire waveform cycle, which is identical to a start phase of 0 degrees.

Units: degrees of one cycle

Default Value: None degrees

Note: This parameter does not affect signal generator behavior when you set the **waveform** parameter to `DC`.

```
nifgen.Session.configure_standard_waveform(waveform, amplitude, frequency,
                                           dc_offset=0.0, start_phase=0.0)
```

Configures the following properties of the signal generator that affect standard waveform generation:

- `nifgen.Session.func_waveform`
- `nifgen.Session.func_amplitude`
- `nifgen.Session.func_dc_offset`
- `nifgen.Session.func_frequency`
- `nifgen.Session.func_start_phase`

Note: You must call the `nifgen.Session.ConfigureOutputMode()` method with the **outputMode** parameter set to `FUNC` before calling this method.

Note: One or more of the referenced methods are not in the Python API for this driver.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].configure_standard_waveform(waveform, amplitude,
↪frequency, dc_offset=0.0, start_phase=0.0)
```

Parameters

- **waveform** (`nifgen.Waveform`) – Specifies the standard waveform that you want the signal generator to produce. NI-FGEN sets the `nifgen.Session.func_waveform` property to this value.

****Defined Values****

Default Value: `SINE`

<code>SINE</code>	Specifies that the signal generator produces a sinusoid waveform.
<code>SQUARE</code>	Specifies that the signal generator produces a square waveform.
<code>TRIANGLE</code>	Specifies that the signal generator produces a triangle waveform.
<code>RAMP_UP</code>	Specifies that the signal generator produces a positive ramp waveform.
<code>RAMP_DOWN</code>	Specifies that the signal generator produces a negative ramp waveform.
<code>DC</code>	Specifies that the signal generator produces a constant voltage.
<code>NOISE</code>	Specifies that the signal generator produces white noise.
<code>USER</code>	Specifies that the signal generator produces a user-defined waveform as defined with the <code>nifgen.DefineUserStandardWaveform</code> method.

- **amplitude** (`float`) – Specifies the amplitude of the standard waveform that you want the signal generator to produce. This value is the amplitude at the output terminal. NI-FGEN sets the `nifgen.Session.func_amplitude` property to this value.

For example, to produce a waveform ranging from -5.00 V to $+5.00$ V, set the amplitude to 10.00 V.

Units: peak-to-peak voltage

Default Value: None

Note: This parameter does not affect signal generator behavior when you set the **waveform** parameter of the `nifgen.Session.configure_standard_waveform()` method to `DC`.

- **frequency** (`float`) –

Specifies the frequency of the standard waveform that you want the signal generator to produce. NI-FGEN sets the `nifgen.Session.func_frequency` property to this value.

Units: hertz

Default Value: None

Note: This parameter does not affect signal generator behavior when you set the **waveform** parameter of the `nifgen.Session.configure_standard_waveform()` method to *DC*.

- **dc_offset** (*float*) – Specifies the DC offset of the standard waveform that you want the signal generator to produce. The value is the offset from ground to the center of the waveform you specify with the **waveform** parameter, observed at the output terminal. For example, to configure a waveform with an amplitude of 10.00 V to range from 0.00 V to +10.00 V, set the **dcOffset** to 5.00 V. NI-FGEN sets the `nifgen.Session.func_dc_offset` property to this value.

Units: volts

Default Value: None

- **start_phase** (*float*) – Specifies the horizontal offset of the standard waveform that you want the signal generator to produce. Specify this parameter in degrees of one waveform cycle. NI-FGEN sets the `nifgen.Session.func_start_phase` property to this value. A start phase of 180 degrees means output generation begins halfway through the waveform. A start phase of 360 degrees offsets the output by an entire waveform cycle, which is identical to a start phase of 0 degrees.

Units: degrees of one cycle

Default Value: 0.00

Note: This parameter does not affect signal generator behavior when you set the **waveform** parameter to *DC*.

```
nifgen.Session.create_advanced_arb_sequence (waveform_handles_array,
                                             loop_counts_array,           sam-
                                             ple_counts_array=None,
                                             marker_location_array=None)
```

Creates an arbitrary sequence from an array of waveform handles and an array of corresponding loop counts. This method returns a handle that identifies the sequence. You pass this handle to the `nifgen.Session.configure_arb_sequence()` method to specify what arbitrary sequence you want the signal generator to produce.

The `nifgen.Session.create_advanced_arb_sequence()` method extends on the `nifgen.Session.create_arb_sequence()` method by adding the ability to set the number of samples in each sequence step and to set marker locations.

An arbitrary sequence consists of multiple waveforms. For each waveform, you specify the number of times the signal generator produces the waveform before proceeding to the next waveform. The number of times to repeat a specific waveform is called the loop count.

Note: The signal generator must not be in the Generating state when you call this method. You must call the `nifgen_ConfigureOutputMode` method to set the **outputMode** parameter to *SEQ* before calling this method.

Parameters

- **waveform_handles_array** (*list of int*) – Specifies the array of waveform handles from which you want to create a new arbitrary sequence. The array must have at least as

many elements as the value that you specify in **sequenceLength**. Each **waveformHandlesArray** element has a corresponding **loopCountsArray** element that indicates how many times that waveform is repeated. You obtain waveform handles when you create arbitrary waveforms with the `nifgen_AllocateWaveform` method or one of the following niFgen CreateWaveform methods:

- `nifgen_CreateWaveformF64`
- `nifgen_CreateWaveformI16`
- `nifgen_CreateWaveformFromFileI16`
- `nifgen_CreateWaveformFromFileF64`
- `nifgen_CreateWaveformFromFileHWS`

Default Value: None

- **loop_counts_array** (*list of int*) – Specifies the array of loop counts you want to use to create a new arbitrary sequence. The array must have at least as many elements as the value that you specify in the **sequenceLength** parameter. Each **loopCountsArray** element corresponds to a **waveformHandlesArray** element and indicates how many times to repeat that waveform. Each element of the **loopCountsArray** must be less than or equal to the maximum number of loop counts that the signal generator allows. You can obtain the maximum loop count from **maximumLoopCount** in the `nifgen_QueryArbSeqCapabilities` method.

Default Value: None

- **sample_counts_array** (*list of int*) – Specifies the array of sample counts that you want to use to create a new arbitrary sequence. The array must have at least as many elements as the value you specify in the **sequenceLength** parameter. Each **sampleCountsArray** element corresponds to a **waveformHandlesArray** element and indicates the subset, in samples, of the given waveform to generate. Each element of the **sampleCountsArray** must be larger than the minimum waveform size, a multiple of the waveform quantum and no larger than the number of samples in the corresponding waveform. You can obtain these values by calling the `nifgen_QueryArbWfmCapabilities` method.

Default Value: None

- **marker_location_array** (*list of int*) – Specifies the array of marker locations to where you want a marker to be generated in the sequence. The array must have at least as many elements as the value you specify in the **sequenceLength** parameter. Each **markerLocationArray** element corresponds to a **waveformHandlesArray** element and indicates where in the waveform a marker is to generate. The marker location must be less than the size of the waveform the marker is in. The markers are coerced to the nearest marker quantum and the coerced values are returned in the **coercedMarkersArray** parameter.

If you do not want a marker generated for a particular sequence stage, set this parameter to `NIFGEN_VAL_NO_MARKER`.

Defined Value: `NIFGEN_VAL_NO_MARKER`

Default Value: None

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Return type

tuple (coerced_markers_array, sequence_handle)

WHERE

coerced_markers_array (list of int):

Returns an array of all given markers that are coerced (rounded) to the nearest marker quantum. Not all devices coerce markers.

Default Value: None

sequence_handle (int):

Returns the handle that identifies the new arbitrary sequence. You can pass this handle to `nifgen_ConfigureArbSequence` to generate the arbitrary sequence.

`nifgen.Session.create_arb_sequence(waveform_handles_array, loop_counts_array)`

Creates an arbitrary sequence from an array of waveform handles and an array of corresponding loop counts. This method returns a handle that identifies the sequence. You pass this handle to the `nifgen_ConfigureArbSequence` method to specify what arbitrary sequence you want the signal generator to produce.

An arbitrary sequence consists of multiple waveforms. For each waveform, you can specify the number of times that the signal generator produces the waveform before proceeding to the next waveform. The number of times to repeat a specific waveform is called the loop count.

Note: You must call the `nifgen_ConfigureOutputMode` method to set the **outputMode** parameter to `SEQ` before calling this method.

Parameters

- **waveform_handles_array** (*list of int*) – Specifies the array of waveform handles from which you want to create a new arbitrary sequence. The array must have at least as many elements as the value that you specify in **sequenceLength**. Each **waveformHandlesArray** element has a corresponding **loopCountsArray** element that indicates how many times that waveform is repeated. You obtain waveform handles when you create arbitrary waveforms with the `nifgen_AllocateWaveform` method or one of the following niFgen CreateWaveform methods:

- `nifgen_CreateWaveformF64`
- `nifgen_CreateWaveformI16`
- `nifgen_CreateWaveformFromFileI16`
- `nifgen_CreateWaveformFromFileF64`
- `nifgen_CreateWaveformFromFileHWS`

Default Value: None

- **loop_counts_array** (*list of int*) – Specifies the array of loop counts you want to use to create a new arbitrary sequence. The array must have at least as many elements as the value that you specify in the **sequenceLength** parameter. Each **loopCountsArray** element corresponds to a **waveformHandlesArray** element and indicates how many times to repeat that waveform. Each element of the **loopCountsArray** must be less than or equal to the maximum number of loop counts that the signal generator allows. You can obtain the maximum loop count from **maximumLoopCount** in the `nifgen_QueryArbSeqCapabilities` method.

Default Value: None

Return type `int`

Returns Returns the handle that identifies the new arbitrary sequence. You can pass this handle to `nifgen_ConfigureArbSequence` to generate the arbitrary sequence.

`nifgen.Session.create_freq_list(waveform, frequency_array, duration_array)`

Creates a frequency list from an array of frequencies (**frequencyArray**) and an array of durations (**durationArray**). The two arrays should have the same number of elements, and this value must also be the size of the **frequencyListLength**. The method returns a handle that identifies the frequency list (the **frequencyListHandle**). You can pass this handle to `nifgen_ConfigureFreqList` to specify what frequency list you want the signal generator to produce.

A frequency list consists of a list of frequencies and durations. The signal generator generates each frequency for the given amount of time and then proceeds to the next frequency. When the end of the list is reached, the signal generator starts over at the beginning of the list.

Note: The signal generator must not be in the Generating state when you call this method.

Parameters

- **waveform** (`nifgen.Waveform`) – Specifies the standard waveform that you want the signal generator to produce. NI-FGEN sets the `nifgen.Session.func_waveform` property to this value.

****Defined Values****

Default Value: `SINE`

<code>SINE</code>	Specifies that the signal generator produces a sinusoid waveform.
<code>SQUARE</code>	Specifies that the signal generator produces a square waveform.
<code>TRIANGLE</code>	Specifies that the signal generator produces a triangle waveform.
<code>RAMP_UP</code>	Specifies that the signal generator produces a positive ramp waveform.
<code>RAMP_DOWN</code>	Specifies that the signal generator produces a negative ramp waveform.
<code>DC</code>	Specifies that the signal generator produces a constant voltage.
<code>NOISE</code>	Specifies that the signal generator produces white noise.
<code>USER</code>	Specifies that the signal generator produces a user-defined waveform as defined with the <code>nifgen_DefineUserStandardWaveform</code> method.

- **frequency_array** (`list of float`) – Specifies the array of frequencies to form the frequency list. The array must have at least as many elements as the value you specify in **frequencyListLength**. Each **frequencyArray** element has a corresponding **durationArray** element that indicates how long that frequency is repeated.

Units: hertz

Default Value: None

- **duration_array** (`list of float`) – Specifies the array of durations to form the frequency list. The array must have at least as many elements as the value that you specify in **frequencyListLength**. Each **durationArray** element has a corresponding **frequencyArray** element and indicates how long in seconds to generate the corresponding frequency.

Units: seconds

Default Value: None

Return type `int`

Returns Returns the handle that identifies the new frequency list. You can pass this handle to `nifgen.ConfigureFreqList` to generate the arbitrary sequence.

`nifgen.Session.create_waveform_from_file_f64(file_name, byte_order)`

This method takes the floating point double (F64) data from the specified file and creates an onboard waveform for use in Arbitrary Waveform or Arbitrary Sequence output mode. The **waveformHandle** returned by this method can later be used for setting the active waveform, changing the data in the waveform, building sequences of waveforms, or deleting the waveform when it is no longer needed.

Note: The F64 data must be between -1.0 and $+1.0$ V. Use the `nifgen.Session.digital_gain` property to generate different voltage outputs.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].create_waveform_from_file_f64(file_name, byte_order)
```

Parameters

- **file_name** (*str*) – The full path and name of the file where the waveform data resides.
- **byte_order** (*nifgen.ByteOrder*) – Specifies the byte order of the data in the file.

****Defined Values****

****Default Value:**** `LITTLE`

<code>LITTLE</code>	Little Endian Data—The least significant bit is stored at the lowest address, followed by the other bits, in order of increasing significance.
<code>BIG</code>	Big Endian Data—The most significant bit is stored at the lowest address, followed by the other bits, in order of decreasing significance.

Note: Data written by most applications in Windows (including LabWindows™/CVI™) is in Little Endian format. Data written to a file from LabVIEW is in Big Endian format by default on all platforms. Big Endian and Little Endian refer to the way data is stored in memory, which can differ on different processors.

Return type `int`

Returns The handle that identifies the new waveform. This handle is used later when referring to this waveform.

`nifgen.Session.create_waveform_from_file_i16(file_name, byte_order)`

Takes the binary 16-bit signed integer (I16) data from the specified file and creates an onboard waveform for

use in Arbitrary Waveform or Arbitrary Sequence output mode. The **waveformHandle** returned by this method can later be used for setting the active waveform, changing the data in the waveform, building sequences of waveforms, or deleting the waveform when it is no longer needed.

Note: The I16 data (values between –32768 and +32767) is assumed to represent –1 to +1 V. Use the `nifgen.Session.digital_gain` property to generate different voltage outputs.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].create_waveform_from_file_i16(file_name, byte_order)
```

Parameters

- **file_name** (*str*) – The full path and name of the file where the waveform data resides.
- **byte_order** (*nifgen.ByteOrder*) – Specifies the byte order of the data in the file.

****Defined Values****

****Default Value:**** *LITTLE*

<i>LITTLE</i>	Little Endian Data—The least significant bit is stored at the lowest address, followed by the other bits, in order of increasing significance.
<i>BIG</i>	Big Endian Data—The most significant bit is stored at the lowest address, followed by the other bits, in order of decreasing significance.

Note: Data written by most applications in Windows (including LabWindows™/CVI™) is in Little Endian format. Data written to a file from LabVIEW is in Big Endian format by default on all platforms. Big Endian and Little Endian refer to the way data is stored in memory, which can differ on different processors.

Return type *int*

Returns The handle that identifies the new waveform. This handle is used later when referring to this waveform.

`nifgen.Session.create_waveform_numpy` (*waveform_data_array*)

Creates an onboard waveform for use in Arbitrary Waveform output mode or Arbitrary Sequence output mode.

Note: You must set `nifgen.Session.output_mode` to *ARB* or *SEQ* before calling this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated

capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].create_waveform(waveform_data_array)
```

Parameters `waveform_data_array` (*list of float*) – Array of data for the new arbitrary waveform. This may be an iterable of float, or for best performance a `numpy.ndarray` of dtype `int16` or `float64`.

Return type `int`

Returns The handle that identifies the new waveform. This handle is used in other methods when referring to this waveform.

`nifgen.Session.define_user_standard_waveform(waveform_data_array)`

Defines a user waveform for use in either Standard Method or Frequency List output mode.

To select the waveform, set the **waveform** parameter to `USER` with either the `nifgen.ConfigureStandardWaveform` or the `nifgen.CreateFreqList` method.

The waveform data must be scaled between `-1.0` and `1.0`. Use the **amplitude** parameter in the `nifgen.Session.configure_standard_waveform()` method to generate different output voltages.

Note: You must call the `nifgen.ConfigureOutputMode` method to set the **outputMode** parameter to `FUNC` or `FREQ_LIST` before calling this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].define_user_standard_waveform(waveform_data_array)
```

Parameters `waveform_data_array` (*list of float*) – Specifies the array of data you want to use for the new arbitrary waveform. The array must have at least as many elements as the value that you specify in **waveformSize**.

You must normalize the data points in the array to be between `-1.00` and `+1.00`.

Default Value: None

`nifgen.Session.delete_named_waveform(waveform_name)`

Removes a previously created arbitrary waveform from the signal generator memory and invalidates the waveform handle.

Note: The signal generator must not be in the Generating state when you call this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].delete_named_waveform(waveform_name)
```

Parameters `waveform_name` (*str*) – Specifies the name to associate with the allocated waveform.

`nifgen.Session.delete_script(script_name)`

Deletes the specified script from onboard memory.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].delete_script(script_name)
```

Parameters `script_name` (*str*) – Specifies the name of the script you want to delete. The script name appears in the text of the script following the script keyword.

`nifgen.Session.disable()`

Places the instrument in a quiescent state where it has minimal or no impact on the system to which it is connected. The analog output and all exported signals are disabled.

`nifgen.Session.export_signal(signal, output_terminal, signal_identifier="")`

Routes signals (clocks, triggers, and events) to the output terminal you specify.

Any routes created within a session persist after the session closes to prevent signal glitching. To unconfigure signal routes created in previous sessions, set **resetDevice** in the `nifgen.Session.init()` method to True or use the `nifgen.Session.reset_device()` method.

If you export a signal with this method and commit the session, the signal is routed to the output terminal you specify.

Note: One or more of the referenced methods are not in the Python API for this driver.

Parameters

- **signal** (*nifgen.Signal*) – Specifies the source of the signal to route. ****Defined Values****

<code>ONBOARD_REFERENCE</code>	Onboard 10 MHz synchronization clock (PCI only)
<code>SYNC_OUT</code>	SYNC OUT signal The SYNC OUT signal is normally generated on the SYNC OUT front panel connector.
<code>START_TRIGGER</code>	Start Trigger
<code>MARKER_EVENT</code>	Marker Event
<code>SAMPLE_CLOCK</code>	The clock from which the Sample Clock is derived
<code>SYNCHRONIZATION</code>	Synchronization strobe (NI 5404/5411/5431 only) A synchronization strobe is used to guarantee absolute synchronization between two or more signal generators.
<code>SAMPLE_CLOCK</code>	Sample Clock
<code>REFERENCE_CLOCK</code>	Reference Clock
<code>SCRIPT_TRIGGER</code>	Script Trigger
<code>READY_FOR_START</code>	Ready For Start Event
<code>STARTED_EVENT</code>	Started Event
<code>DONE_EVENT</code>	Done Event
<code>DATA_MARKER</code>	Data Marker Event

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **output_terminal** (*str*) – Specifies the output terminal to export the signal. ****Defined Values****

"" (empty string)	Do not export signal
"PFI0"	PFI line 0
"PFI1"	PFI line 1
"PFI4"	PFI line 4
"PFI5"	PFI line 5
"PXI_Trig0"	PXI or RTSI line 0
"PXI_Trig1"	PXI or RTSI line 1
"PXI_Trig2"	PXI or RTSI line 2
"PXI_Trig3"	PXI or RTSI line 3
"PXI_Trig4"	PXI or RTSI line 4
"PXI_Trig5"	PXI or RTSI line 5
"PXI_Trig6"	PXI or RTSI line 6
"PXI_Trig7"	PXI or RTSI line 7
"DDC_ClkOut"	Clock out from DDC connector
"PXI_Star"	PXI star trigger line

Note: The following **Defined Values** are examples of possible output terminals. For a complete list of the output terminals available on your device, refer to the Routes topic for your device or the **Device Routes** tab in MAX.

- **signal_identifier** (*str*) – Specifies which instance of the selected signal to export. ****Defined Values****

"" (empty string)	De- fault (for non instance- based sig- nals)
"ScriptTrigger0"	Script Trig- ger 0
"ScriptTrigger1"	Script Trig- ger 1
"ScriptTrigger2"	Script Trig- ger 2
"ScriptTrigger3"	Script Trig- ger 3
"Marker0"	Marker 0
"Marker1"	Marker 1
"Marker2"	Marker 2
"Marker3"	Marker 3
"DataMarker0"	Data Marker 0*
"DataMarker1"	Data Marker 1*
"DataMarker2"	Data Marker 2*
"DataMarker3"	Data Marker 3*
<p>* These Data Marker values apply only to single-channel devices or to multi-channel devices that are configured for single-channel operation. When using a device that is configured for multichannel operation, specify the channel number along with the signal identifier. For example, to export Data Marker 0 on channel 1 of a device configured for multichannel operation, use the value "1/DataMarker0." If you do not specify a channel when using a device configured for multichannel generation, DataMarker0 generates on all channels.</p>	

```
nifgen.Session.get_ext_cal_last_date_and_time()
```

Returns the date and time of the last successful external calibration. The time returned is 24-hour (military) local time; for example, if the device was calibrated at 2:30 PM, this method returns 14 for the **hour** parameter and 30 for the **minute** parameter.

Return type `datetime.datetime`

Returns Indicates date and time of the last calibration.

`nifgen.Session.get_ext_cal_last_temp()`

Returns the temperature at the last successful external calibration. The temperature is returned in degrees Celsius.

Return type `float`

Returns Specifies the temperature at the last successful calibration in degrees Celsius.

`nifgen.Session.get_ext_cal_recommended_interval()`

Returns the recommended interval between external calibrations in months.

Return type `datetime.timedelta`

Returns Specifies the recommended interval between external calibrations in months.

`nifgen.Session.get_fir_filter_coefficients()`

Returns the FIR filter coefficients used by the onboard signal processing block. These coefficients are determined by NI-FGEN and based on the FIR filter type and corresponding property (Alpha, Passband, BT) unless you are using the custom filter. If you are using a custom filter, the coefficients returned are those set with the `nifgen.ConfigureCustomFIRFilterCoefficients` method coerced to the quantized values used by the device.

To use this method, first call an instance of the

`nifgen.Session.get_fir_filter_coefficients()` method with the **coefficientsArray** parameter set to `VI_NULL`. Calling the method in this state returns the current size of the **coefficientsArray** as the value of the **numberOfCoefficientsRead** parameter. Create an array of this size, and call the `nifgen.Session.get_fir_filter_coefficients()` method a second time, passing the new array as the **coefficientsArray** parameter and the size as the **arraySize** parameter. This second method call populates the array with the FIR filter coefficients.

Refer to the FIR Filter topic for your device in the *NI Signal Generators Help* for more information about FIR filter coefficients. This method is supported only for the NI 5441.

Default Value: None

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].get_fir_filter_coefficients()
```

Return type `int`

Returns Specifies the array of data containing the number of coefficients you want to read.

`nifgen.Session.get_hardware_state()`

Returns the current hardware state of the device and, if the device is in the hardware error state, the current hardware error.

Note: Hardware states do not necessarily correspond to NI-FGEN states.

Return type `nifgen.HardwareState`

Returns

Returns the hardware state of the signal generator.

Defined Values

<code>IDLE</code>	The device is in the Idle state.
<code>WAITING_FOR_START_TRIGGER</code>	The device is waiting for Start Trigger.
<code>RUNNING</code>	The device is in the Running state.
<code>DONE</code>	The generation has completed successfully.
<code>HARDWARE_ERROR</code>	There is a hardware error.

`nifgen.Session.get_self_cal_last_date_and_time()`

Returns the date and time of the last successful self-calibration.

Return type `datetime.datetime`

Returns Returns the date and time the device was last calibrated.

`nifgen.Session.get_self_cal_last_temp()`

Returns the temperature at the last successful self-calibration. The temperature is returned in degrees Celsius.

Return type `float`

Returns Specifies the temperature at the last successful calibration in degrees Celsius.

`nifgen.Session.get_self_cal_supported()`

Returns whether the device supports self-calibration.

Return type `bool`

Returns

Returns whether the device supports self-calibration.

****Defined Values****

True	Self-calibration is supported.
False	Self-calibration is not supported.

`nifgen.Session.is_done()`

Determines whether the current generation is complete. This method sets the **done** parameter to True if the session is in the Idle or Committed states.

Note: NI-FGEN only reports the **done** parameter as True after the current generation is complete in Single trigger mode.

Return type `bool`

Returns

Returns information about the completion of waveform generation.

Defined Values

True	Generation is complete.
False	Generation is not complete.

`nifgen.Session.query_arb_seq_capabilities()`

Returns the properties of the signal generator that are related to creating arbitrary sequences (the `nifgen.Session.max_num_sequences`, `nifgen.Session.min_sequence_length`, `nifgen.Session.max_sequence_length`, and `nifgen.Session.max_loop_count` properties).

Return type

tuple (maximum_number_of_sequences, minimum_sequence_length, maximum_sequence_length, maximum_loop_count)

WHERE

`maximum_number_of_sequences` (int):

Returns the maximum number of arbitrary waveform sequences that the signal generator allows. NI-FGEN obtains this value from the `nifgen.Session.max_num_sequences` property.

`minimum_sequence_length` (int):

Returns the minimum number of arbitrary waveforms the signal generator allows in a sequence. NI-FGEN obtains this value from the `nifgen.Session.min_sequence_length` property.

`maximum_sequence_length` (int):

Returns the maximum number of arbitrary waveforms the signal generator allows in a sequence. NI-FGEN obtains this value from the `nifgen.Session.max_sequence_length` property.

`maximum_loop_count` (int):

Returns the maximum number of times the signal generator can repeat an arbitrary waveform in a sequence. NI-FGEN obtains this value from the `nifgen.Session.max_loop_count` property.

`nifgen.Session.query_arb_wfm_capabilities()`

Returns the properties of the signal generator that are related to creating arbitrary waveforms. These properties are the maximum number of waveforms, waveform quantum, minimum waveform size, and maximum waveform size.

Note: If you do not want to obtain the waveform quantum, pass a value of VI_NULL for this parameter.

Return type

tuple (maximum_number_of_waveforms, waveform_quantum, minimum_waveform_size, maximum_waveform_size)

WHERE

`maximum_number_of_waveforms` (int):

Returns the maximum number of arbitrary waveforms that the signal generator allows. NI-FGEN obtains this value from the `nifgen.Session.max_num_waveforms` property.

`waveform_quantum (int):`

The size (number of points) of each waveform must be a multiple of a constant quantum value. This parameter obtains the quantum value that the signal generator uses. NI-FGEN returns this value from the `nifgen.Session.waveform_quantum` property.

For example, when this property returns a value of 8, all waveform sizes must be a multiple of 8.

`minimum_waveform_size (int):`

Returns the minimum number of points that the signal generator allows in a waveform. NI-FGEN obtains this value from the `nifgen.Session.min_waveform_size` property.

`maximum_waveform_size (int):`

Returns the maximum number of points that the signal generator allows in a waveform. NI-FGEN obtains this value from the `nifgen.Session.max_waveform_size` property.

`nifgen.Session.query_freq_list_capabilities()`

Returns the properties of the signal generator that are related to creating frequency lists. These properties are `nifgen.Session.max_num_freq_lists`, `nifgen.Session.min_freq_list_length`, `nifgen.Session.max_freq_list_length`, `nifgen.Session.min_freq_list_duration`, `nifgen.Session.max_freq_list_duration`, and `nifgen.Session.freq_list_duration_quantum`.

Return type

tuple (maximum_number_of_freq_lists, minimum_frequency_list_length, maximum_frequency_list_length, minimum_frequency_list_duration, maximum_frequency_list_duration, frequency_list_duration_quantum)

WHERE

`maximum_number_of_freq_lists (int):`

Returns the maximum number of frequency lists that the signal generator allows. NI-FGEN obtains this value from the `nifgen.Session.max_num_freq_lists` property.

`minimum_frequency_list_length (int):`

Returns the minimum number of steps that the signal generator allows in a frequency list. NI-FGEN obtains this value from the `nifgen.Session.min_freq_list_length` property.

`maximum_frequency_list_length (int):`

Returns the maximum number of steps that the signal generator allows in a frequency list. NI-FGEN obtains this value from the `nifgen.Session.max_freq_list_length` property.

`minimum_frequency_list_duration (float):`

Returns the minimum duration that the signal generator allows in a step of a frequency list. NI-FGEN obtains this value from the `nifgen.Session.min_freq_list_duration` property.

`maximum_frequency_list_duration (float):`

Returns the maximum duration that the signal generator allows in a step of a frequency list. NI-FGEN obtains this value from the `nifgen.Session.max_freq_list_duration` property.

`frequency_list_duration_quantum` (float):

Returns the quantum of which all durations must be a multiple in a frequency list. NI-FGEN obtains this value from the `nifgen.Session.freq_list_duration_quantum` property.

`nifgen.Session.read_current_temperature()`

Reads the current onboard temperature of the device. The temperature is returned in degrees Celsius.

Return type `float`

Returns Returns the current temperature read from onboard temperature sensors, in degrees Celsius.

`nifgen.Session.reset()`

Resets the instrument to a known state. This method aborts the generation, clears all routes, and resets session properties to the default values. This method does not, however, commit the session properties or configure the device hardware to its default state.

Note: For the NI 5401/5404/5411/5431, this method exhibits the same behavior as the `nifgen_ResetDevice` method.

`nifgen.Session.reset_device()`

Performs a hard reset on the device. Generation is stopped, all routes are released, external bidirectional terminals are tristated, FPGAs are reset, hardware is configured to its default state, and all session properties are reset to their default states.

`nifgen.Session.reset_with_defaults()`

Resets the instrument and reapplies initial user-specified settings from the logical name that was used to initialize the session. If the session was created without a logical name, this method is equivalent to the `nifgen_reset` method.

`nifgen.Session.self_cal()`

Performs a full internal self-calibration on the device. If the calibration is successful, new calibration data and constants are stored in the onboard EEPROM.

`nifgen.Session.self_test()`

Runs the instrument self-test routine and returns the test result(s).

Raises `SelfTestError` on self test failure. Properties on exception object:

- `code` - failure code from driver
- `message` - status message from driver

Self-Test Code	Description
0	Passed self-test
1	Self-test failed

Note: When used on some signal generators, the device is reset after the `nifgen.Session.self_test()` method runs. If you use the `nifgen.Session.self_test()` method, your device may not be in its previously configured state after the method runs.

`nifgen.Session.send_software_edge_trigger(trigger, trigger_id)`

Sends a command to trigger the signal generator. This VI can act as an override for an external edge trigger.

Note: This VI does not override external digital edge triggers of the NI 5401/5411/5431.

Parameters

- **trigger** (`nifgen.Trigger`) – Sets the clock mode of the signal generator.

****Defined Values****

<code>DIVIDE_DOWN</code>
<code>HIGH_RESOLUTION</code>
<code>AUTOMATIC</code>

- **trigger_id** (`str`) –

`nifgen.Session.set_named_waveform_next_write_position(waveform_name, relative_to, offset)`

Sets the position in the waveform to which data is written at the next write. This method allows you to write to arbitrary locations within the waveform. These settings apply only to the next write to the waveform specified by the **waveformHandle** parameter. Subsequent writes to that waveform begin where the last write left off, unless this method is called again. The **waveformHandle** passed in must have been created with a call to one of the following methods:

- `nifgen_AllocateWaveform`
- `nifgen_CreateWaveformF64`
- `nifgen_CreateWaveformI16`
- `nifgen_CreateWaveformFromFileI16`
- `nifgen_CreateWaveformFromFileF64`
- `nifgen_CreateWaveformFromFileHWS`

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].set_named_waveform_next_write_position(waveform_name,
↳relative_to, offset)
```

Parameters

- **waveform_name** (`str`) – Specifies the name to associate with the allocated waveform.
- **relative_to** (`nifgen.RelativeTo`) – Specifies the reference position in the waveform. This position and **offset** together determine where to start loading data into the waveform.

****Defined Values****

<code>START (0)</code>	Use the start of the waveform as the reference position.
<code>CURRENT (1)</code>	Use the current position within the waveform as the reference position.

- **offset** (*int*) – Specifies the offset from the **relativeTo** parameter at which to start loading the data into the waveform.

`nifgen.Session.set_waveform_next_write_position(waveform_handle, relative_to, offset)`

Sets the position in the waveform at which the next waveform data is written. This method allows you to write to arbitrary locations within the waveform. These settings apply only to the next write to the waveform specified by the `waveformHandle` parameter. Subsequent writes to that waveform begin where the last write left off, unless this method is called again. The `waveformHandle` passed in must have been created by a call to the `nifgen_AllocateWaveform` method or one of the following niFgen CreateWaveform methods:

- `nifgen_CreateWaveformF64`
- `nifgen_CreateWaveformI16`
- `nifgen_CreateWaveformFromFileI16`
- `nifgen_CreateWaveformFromFileF64`
- `nifgen_CreateWaveformFromFileHWS`

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].set_waveform_next_write_position(waveform_handle,   
↪relative_to, offset)
```

Parameters

- **waveform_handle** (*int*) – Specifies the handle of the arbitrary waveform previously allocated with the `nifgen_AllocateWaveform` method.
- **relative_to** (*nifgen.RelativeTo*) – Specifies the reference position in the waveform. This position and **offset** together determine where to start loading data into the waveform.

****Defined Values****

<code>START</code> (0)	Use the start of the waveform as the reference position.
<code>CURRENT</code> (1)	Use the current position within the waveform as the reference position.

- **offset** (*int*) – Specifies the offset from **relativeTo** at which to start loading the data into the waveform.

`nifgen.Session.wait_until_done(max_time=10000)`

Waits until the device is done generating or until the maximum time has expired.

Parameters **max_time** (*float in seconds or datetime.timedelta*) – Specifies the timeout value in milliseconds.

`nifgen.Session.write_script(script)`

Writes a string containing one or more scripts that govern the generation of waveforms.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].write_script(script)
```

Parameters **script** (*str*) – Contains the text of the script you want to use for your generation operation. Refer to [scripting Instructions](#) for more information about writing scripts.

`nifgen.Session.write_waveform(waveform_name_or_handle, data)`

Writes data to the waveform in onboard memory.

By default, subsequent calls to this method continue writing data from the position of the last sample written. You can set the write position and offset by calling the `nifgen_SetNamedWaveformNextWritePosition` or `nifgen_SetWaveformNextWritePosition` method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `nifgen.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `nifgen.Session` instance, and calling this method on the result:

```
session.channels['0,1'].write_waveform(waveform_name_or_handle, data)
```

Parameters

- **waveform_name_or_handle** (*int*) – The name (*str*) or handle (*int*) of an arbitrary waveform previously allocated with `nifgen.Session.allocate_named_waveform()` or `nifgen.Session.allocate_waveform()`.
- **data** (*list of float*) – Array of data to load into the waveform. This may be an iterable of float, or for best performance a `numpy.ndarray` of dtype `int16` or `float64`.

nifgen.Session properties

`nifgen.Session.all_marker_events_latched_status`

Returns a bit field of the latched status of all Marker Events. Write 0 to this property to clear the latched status of all Marker Events.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:All Marker Events Latched Status**
- C Attribute: **NIFGEN_ATTR_ALL_MARKER_EVENTS_LATCHED_STATUS**

`nifgen.Session.all_marker_events_live_status`

Returns a bit field of the live status of all Marker Events.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:All Marker Events Live Status**
 - C Attribute: **NIFGEN_ATTR_ALL_MARKER_EVENTS_LIVE_STATUS**
-

`nifgen.Session.analog_data_mask`

Specifies the mask to apply to the analog output. The masked data is replaced with the data in `nifgen.Session.analog_static_value`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Data Mask:Analog Data Mask**
 - C Attribute: **NIFGEN_ATTR_ANALOG_DATA_MASK**
-

`nifgen.Session.analog_filter_enabled`

Controls whether the signal generator applies to an analog filter to the output signal. This property is valid in arbitrary waveform, arbitrary sequence, and script modes. This property can also be used in standard method and frequency list modes for user-defined waveforms.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Filters:Analog Filter Enabled**
 - C Attribute: **NIFGEN_ATTR_ANALOG_FILTER_ENABLED**
-

`nifgen.Session.analog_path`

Specifies the analog signal path that should be used. The main path allows you to configure gain, offset, analog filter status, output impedance, and output enable. The main path has two amplifier options, high- and low-gain. The direct path presents a much smaller gain range, and you cannot adjust offset or the filter status. The direct path also provides a smaller output range but also lower distortion. NI-FGEN normally chooses the amplifier based on the user-specified gain.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.AnalogPath</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Analog Path**
 - C Attribute: **NIFGEN_ATTR_ANALOG_PATH**
-

`nifgen.Session.analog_static_value`

Specifies the static value that replaces data masked by `nifgen.Session.analog_data_mask`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>int</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Data Mask:Analog Static Value**
 - C Attribute: **NIFGEN_ATTR_ANALOG_STATIC_VALUE**
-

`nifgen.Session.arb_gain`

Specifies the factor by which the signal generator scales the arbitrary waveform data. When you create arbitrary waveforms, you must first normalize the data points to the range -1.0 to +1.0. Use this property to scale the arbitrary waveform to other ranges. For example, when you set this property to 2.0, the output signal ranges from -2.0 V to +2.0 V. Use this property when `nifgen.Session.output_mode` is set to `ARB` or `SEQ`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>float</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Gain**
 - C Attribute: **NIFGEN_ATTR_ARB_GAIN**
-

`nifgen.Session.arb_marker_position`

Specifies the position for a marker to be asserted in the arbitrary waveform. This property defaults to -1 when no marker position is specified. Use this property when `nifgen.Session.output_mode` is set to `ARB`. Use `nifgen.Session.export_signal()` to export the marker signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Waveform Mode:Marker Position**
 - C Attribute: **NIFGEN_ATTR_ARB_MARKER_POSITION**
-

`nifgen.Session.arb_offset`

Specifies the value that the signal generator adds to the arbitrary waveform data. When you create arbitrary waveforms, you must first normalize the data points to the range -1.0 to +1.0. Use this property to shift the arbitrary waveform range. For example, when you set this property to 1.0, the output signal ranges from 2.0 V to 0.0 V. Use this property when `nifgen.Session.output_mode` is set to `ARB` or `SEQ`. Units: Volts

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Offset**
 - C Attribute: **NIFGEN_ATTR_ARB_OFFSET**
-

`nifgen.Session.arb_repeat_count`

Specifies number of times to repeat the arbitrary waveform when the triggerMode parameter of `nifgen.ConfigureTriggerMode` is set to `SINGLE` or `STEPPED`. This property is ignored if the triggerMode parameter is set to `CONTINUOUS` or `BURST`. Use this property when `nifgen.Session.output_mode` is set to `ARB`. When used during streaming, this property specifies the number of times to repeat the streaming waveform (the onboard memory allocated for streaming). For more information about streaming, refer to the Streaming topic.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Waveform Mode:Repeat Count**
 - C Attribute: **NIFGEN_ATTR_ARB_REPEAT_COUNT**
-

`nifgen.Session.arb_sample_rate`

Specifies the rate at which the signal generator outputs the points in arbitrary waveforms. Use this property when `nifgen.Session.output_mode` is set to `ARB` or `SEQ`. Units: Samples/s

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock:Rate**
 - C Attribute: **NIFGEN_ATTR_ARB_SAMPLE_RATE**
-

`nifgen.Session.arb_sequence_handle`

This channel-based property identifies which sequence the signal generator produces. You can create multiple sequences using `nifgen.Session.create_arb_sequence()`. `nifgen.Session.create_arb_sequence()` returns a handle that you can use to identify the particular sequence. To configure the signal generator to produce a particular sequence, set this property to the sequence handle. Use this property only when `nifgen.Session.output_mode` is set to `SEQ`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Sequence Mode:Arbitrary Sequence Handle**
 - C Attribute: **NIFGEN_ATTR_ARB_SEQUENCE_HANDLE**
-

nifgen.Session.arb_waveform_handle

Selects which arbitrary waveform the signal generator produces. You can create multiple arbitrary waveforms using one of the following niFgen Create Waveform methods:

```
nifgen.Session.create_waveform()          nifgen.Session.create_waveform()
nifgen.Session.create_waveform_from_file_i16()  nifgen.Session.
create_waveform_from_file_f64() nifgen.Session.CreateWaveformFromFileHWS()
```

These methods return a handle that you can use to identify the particular waveform. To configure the signal generator to produce a particular waveform, set this property to the waveform handle. Use this property only when `nifgen.Session.output_mode` is set to `ARB`.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Waveform Mode:Arbitrary Waveform Handle**
 - C Attribute: **NIFGEN_ATTR_ARB_WAVEFORM_HANDLE**
-

nifgen.Session.aux_power_enabled

Controls the specified auxiliary power pin. Setting this property to TRUE energizes the auxiliary power when the session is committed. When this property is FALSE, the power pin of the connector outputs no power.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:AUX Power Enabled**
 - C Attribute: **NIFGEN_ATTR_AUX_POWER_ENABLED**
-

nifgen.Session.bus_type

The bus type of the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.BusType
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Bus Type**
 - C Attribute: **NIFGEN_ATTR_BUS_TYPE**
-

`nifgen.Session.cache`

Specifies whether to cache the value of properties. When caching is enabled, NI-FGEN keeps track of the current device settings and avoids sending redundant commands to the device. Thus, you can significantly increase execution speed. NI-FGEN can choose to always cache or to never cache particular properties regardless of the setting of this property. Use `nifgen.Session.InitWithOptions()` to override the default value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:User Options:Cache**
 - C Attribute: **NIFGEN_ATTR_CACHE**
-

`nifgen.Session.channel_delay`

Specifies, in seconds, the delay to apply to the analog output of the channel specified by the channel string. You can use the channel delay to configure the timing relationship between channels on a multichannel device. Values for this property can be zero or positive. A value of zero indicates that the channels are aligned. A positive value delays the analog output by the specified number of seconds.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Channel Delay**
 - C Attribute: **NIFGEN_ATTR_CHANNEL_DELAY**
-

`nifgen.Session.clock_mode`

Controls which clock mode is used for the signal generator. For signal generators that support it, this property allows switching the sample clock to High-Resolution mode. When in Divide-Down mode, the sample rate can only be set to certain frequencies, based on dividing down the update clock. However, in High-Resolution mode, the sample rate may be set to any value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ClockMode</code>
Permissions	read-write
Channel Based	False
Resetable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock:Mode**
 - C Attribute: **NIFGEN_ATTR_CLOCK_MODE**
-

`nifgen.Session.common_mode_offset`

Specifies, in volts, the value the signal generator adds to or subtracts from the arbitrary waveform data. This property applies only when you set the `nifgen.Session.terminal_configuration` property to `DIFFERENTIAL`. Common mode offset is applied to the signals generated at each differential output terminal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resetable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Common Mode Offset**
 - C Attribute: **NIFGEN_ATTR_COMMON_MODE_OFFSET**
-

`nifgen.Session.data_marker_events_count`

Returns the number of Data Marker Events supported by the device.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Data Marker Events Count**
 - C Attribute: **NIFGEN_ATTR_DATA_MARKER_EVENTS_COUNT**
-

`nifgen.Session.data_marker_event_data_bit_number`

Specifies the bit number to assign to the Data Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Data Marker:Data Bit Number**
 - C Attribute: **NIFGEN_ATTR_DATA_MARKER_EVENT_DATA_BIT_NUMBER**
-

`nifgen.Session.data_marker_event_level_polarity`

Specifies the output polarity of the Data marker event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DataMarkerEventLevelPolarity
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Data Marker:Level:Active Level**
 - C Attribute: **NIFGEN_ATTR_DATA_MARKER_EVENT_LEVEL_POLARITY**
-

`nifgen.Session.data_marker_event_output_terminal`

Specifies the destination terminal for the Data Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Data Marker:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_DATA_MARKER_EVENT_OUTPUT_TERMINAL**
-

`nifgen.Session.data_transfer_block_size`

The number of samples at a time to download to onboard memory. Useful when the total data to be transferred to onboard memory is large.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Data Transfer Block Size**
 - C Attribute: **NIFGEN_ATTR_DATA_TRANSFER_BLOCK_SIZE**
-

`nifgen.Session.data_transfer_maximum_bandwidth`

Specifies the maximum amount of bus bandwidth (in bytes per second) to use for data transfers. The signal generator limits data transfer speeds on the PCIe bus to the value you specify for this property. Set this property to optimize bus bandwidth usage for multi-device streaming applications by preventing the signal generator from consuming all of the available bandwidth on a PCI express link when waveforms are being written to the onboard memory of the device.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Maximum Bandwidth**
 - C Attribute: **NIFGEN_ATTR_DATA_TRANSFER_MAXIMUM_BANDWIDTH**
-

`nifgen.Session.data_transfer_maximum_in_flight_reads`

Specifies the maximum number of concurrent PCI Express read requests the signal generator can issue. When transferring data from computer memory to device onboard memory across the PCI Express bus, the signal generator can issue multiple memory reads at the same time. In general, the larger the number of read requests, the more efficiently the device uses the bus because the multiple read requests keep the data flowing, even in a PCI Express topology that has high latency due to PCI Express switches in the data path. Most NI devices can issue a large number of read requests (typically 8 or 16). By default, this property is set to the highest value the signal generator supports. If other devices in your system cannot tolerate long data latencies, it may be helpful to decrease the number of in-flight read requests the NI signal generator issues. This helps to reduce the amount of data the signal generator reads at one time.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform>Data Transfer:Advanced:Maximum In-Flight Read Requests**
 - C Attribute: **NIFGEN_ATTR_DATA_TRANSFER_MAXIMUM_IN_FLIGHT_READS**
-

`nifgen.Session.data_transfer_preferred_packet_size`

Specifies the preferred size of the data field in a PCI Express read request packet. In general, the larger the packet size, the more efficiently the device uses the bus. By default, NI signal generators use the largest packet size allowed by the system. However, due to different system implementations, some systems may perform better with smaller packet sizes. Recommended values for this property are powers of two between 64 and 512. In some cases, the signal generator generates packets smaller than the preferred size you set with this property. You cannot change this property while the device is generating a waveform. If you want to change the device configuration, call the `nifgen.Session.abort()` method or wait for the generation to complete.

Note: :

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform>Data Transfer:Advanced:Preferred Packet Size**
 - C Attribute: **NIFGEN_ATTR_DATA_TRANSFER_PREFERRED_PACKET_SIZE**
-

`nifgen.Session.digital_data_mask`

Specifies the mask to apply to the output on the digital connector. The masked data is replaced with the data in `nifgen.Session.digital_static_value`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Data Mask:Digital Data Mask**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_DATA_MASK**
-

`nifgen.Session.digital_edge_script_trigger_edge`

Specifies the active edge for the Script trigger. This property is used when `nifgen.Session.script_trigger_type` is set to Digital Edge.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ScriptTriggerDigitalEdgeEdge
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Digital Edge:Edge**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_EDGE_SCRIPT_TRIGGER_EDGE**
-

`nifgen.Session.digital_edge_script_trigger_source`

Specifies the source terminal for the Script trigger. This property is used when `nifgen.Session.script_trigger_type` is set to Digital Edge.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Digital Edge:Source**
- C Attribute: **NIFGEN_ATTR_DIGITAL_EDGE_SCRIPT_TRIGGER_SOURCE**

nifgen.Session.digital_edge_start_trigger_edge

Specifies the active edge for the Start trigger. This property is used only when *nifgen.Session.start_trigger_type* is set to Digital Edge.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.StartTriggerDigitalEdgeEdge
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start:Digital Edge:Edge**
- C Attribute: **NIFGEN_ATTR_DIGITAL_EDGE_START_TRIGGER_EDGE**

nifgen.Session.digital_edge_start_trigger_source

Specifies the source terminal for the Start trigger. This property is used only when *nifgen.Session.start_trigger_type* is set to Digital Edge.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start:Digital Edge:Source**
- C Attribute: **NIFGEN_ATTR_DIGITAL_EDGE_START_TRIGGER_SOURCE**

nifgen.Session.digital_filter_enabled

Controls whether the signal generator applies a digital filter to the output signal. This property is valid in arbitrary waveform, arbitrary sequence, and script modes. This property can also be used in standard method and frequency list modes for user-defined waveforms.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Filters:Digital Filter Enabled**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_FILTER_ENABLED**
-

`nifgen.Session.digital_filter_interpolation_factor`

This property only affects the device when `nifgen.Session.digital_filter_enabled` is set to True. If you do not set this property directly, NI-FGEN automatically selects the maximum interpolation factor allowed for the current sample rate. Valid values are 2, 4, and 8.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Filters:Digital Filter Interpolation Factor**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_FILTER_INTERPOLATION_FACTOR**
-

`nifgen.Session.digital_gain`

Specifies a factor by which the signal generator digitally multiplies generated data before converting it to an analog signal in the DAC. For a digital gain greater than 1.0, the product of digital gain times the generated data must be inside the range plus or minus 1.0 (assuming floating point data). If the product exceeds these limits, the signal generator clips the output signal, and an error results. Some signal generators support both digital gain and an analog gain (analog gain is specified with the `nifgen.Session.func_amplitude` property or the `nifgen.Session.arb_gain` property). Digital gain can be changed during generation without the glitches that may occur when changing analog gains, due to relay switching. However, the DAC output resolution is a method of analog gain, so only analog gain makes full use of the resolution of the DAC.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Digital Gain**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_GAIN**
-

`nifgen.Session.digital_level_script_trigger_active_level`

Specifies the active level for the Script trigger. This property is used when `nifgen.Session.script_trigger_type` is set to Digital Level.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ScriptTriggerDigitalLevelActiveLevel
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Digital Level:Active Level**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_LEVEL_SCRIPT_TRIGGER_ACTIVE_LEVEL**
-

`nifgen.Session.digital_level_script_trigger_source`

Specifies the source terminal for the Script trigger. This property is used when `nifgen.Session.script_trigger_type` is set to Digital Level.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Digital Level:Source**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_LEVEL_SCRIPT_TRIGGER_SOURCE**
-

`nifgen.Session.digital_pattern_enabled`

Controls whether the signal generator generates a digital pattern of the output signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:Digital Pattern Enabled**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_PATTERN_ENABLED**
-

`nifgen.Session.digital_static_value`

Specifies the static value that replaces data masked by `nifgen.Session.digital_data_mask`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Data Mask:Digital Static Value**
 - C Attribute: **NIFGEN_ATTR_DIGITAL_STATIC_VALUE**
-

`nifgen.Session.direct_dma_enabled`

Enable the device for Direct DMA writes. When enabled, all Create Waveform and Write Waveform method calls that are given a data address in the Direct DMA Window will download data residing on the Direct DMA device to the instrument's onboard memory.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Direct DMA:Direct DMA Enabled**
 - C Attribute: **NIFGEN_ATTR_DIRECT_DMA_ENABLED**
-

`nifgen.Session.direct_dma_window_address`

Specifies the window address (beginning of window) of the waveform data source. This window address is specified by your Direct DMA-compatible data source.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Direct DMA:Window Address**
 - C Attribute: **NIFGEN_ATTR_DIRECT_DMA_WINDOW_ADDRESS**
-

`nifgen.Session.direct_dma_window_size`

Specifies the size of the memory window in bytes (not samples) provided by your Direct DMA-compatible data source.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Direct DMA:Window Size in Bytes**
 - C Attribute: **NIFGEN_ATTR_DIRECT_DMA_WINDOW_SIZE**
-

`nifgen.Session.done_event_delay`

Specifies the amount of delay applied to a Done Event with respect to the analog output of the signal generator. A positive delay value indicates that the Done Event will come out after the analog data, while a negative delay value indicates that the Done Event will come out before the analog data. The default value is zero, which will align the Done Event with the analog output. You can specify the units of the delay value by setting the `nifgen.Session.done_event_delay` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Advanced:Delay Value**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_DELAY**
-

`nifgen.Session.done_event_delay_units`

Specifies the units applied to the value of the `nifgen.Session.done_event_delay` property. Valid units are seconds and sample clock periods.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DoneEventDelayUnits
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Advanced:Delay Units**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_DELAY_UNITS**
-

`nifgen.Session.done_event_latched_status`

Returns the latched status of the specified Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Advanced:Latched Status**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_LATCHED_STATUS**
-

`nifgen.Session.done_event_level_active_level`

Specifies the output polarity of the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DoneEventActiveLevel
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Level:Active Level**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_LEVEL_ACTIVE_LEVEL**
-

`nifgen.Session.done_event_output_behavior`

Specifies the output behavior for the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DoneEventOutputBehavior
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Output Behavior**

- C Attribute: **NIFGEN_ATTR_DONE_EVENT_OUTPUT_BEHAVIOR**
-

`nifgen.Session.done_event_output_terminal`

Specifies the destination terminal for the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_OUTPUT_TERMINAL**
-

`nifgen.Session.done_event_pulse_polarity`

Specifies the output polarity of the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DoneEventPulsePolarity
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Pulse:Polarity**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_PULSE_POLARITY**
-

`nifgen.Session.done_event_pulse_width`

Specifies the pulse width for the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Pulse:Width Value**
- C Attribute: **NIFGEN_ATTR_DONE_EVENT_PULSE_WIDTH**

`nifgen.Session.done_event_pulse_width_units`

Specifies the pulse width units for the Done Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.DoneEventPulseWidthUnits</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Done:Pulse:Width Units**
 - C Attribute: **NIFGEN_ATTR_DONE_EVENT_PULSE_WIDTH_UNITS**
-

`nifgen.Session.driver_setup`

Specifies the driver setup portion of the option string that was passed into the `nifgen.Session.InitWithOptions()` method.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	0
Resettable	0

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIFGEN_ATTR_DRIVER_SETUP**
-

`nifgen.Session.exported_onboard_reference_clock_output_terminal`

Specifies the terminal to which to export the Onboard Reference Clock.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Reference Clock:Onboard Reference Clock:Export Output Terminal**

-
- C Attribute: **NIFGEN_ATTR_EXPORTED_ONBOARD_REFERENCE_CLOCK_OUTPUT_TERMINAL**
-

`nifgen.Session.exported_reference_clock_output_terminal`

Specifies the terminal to which to export the Reference Clock.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Reference Clock:Export Output Terminal**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_REFERENCE_CLOCK_OUTPUT_TERMINAL**
-

`nifgen.Session.exported_sample_clock_divisor`

Specifies the factor by which to divide the Sample clock, also known as the Update clock, before it is exported. To export the Sample clock, use the `nifgen.Session.export_signal()` method or the `nifgen.Session.exported_sample_clock_output_terminal` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock:Exported Sample Clock Divisor**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_SAMPLE_CLOCK_DIVISOR**
-

`nifgen.Session.exported_sample_clock_output_terminal`

Specifies the terminal to which to export the Sample Clock.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock:Export Output Terminal**

- C Attribute: **NIFGEN_ATTR_EXPORTED_SAMPLE_CLOCK_OUTPUT_TERMINAL**
-

nifgen.Session.exported_sample_clock_timebase_divisor

Specifies the factor by which to divide the sample clock timebase (board clock) before it is exported. To export the Sample clock timebase, use the `nifgen.Session.export_signal()` method or the `nifgen.Session.exported_sample_clock_timebase_output_terminal` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock Timebase:Exported Sample Clock Timebase Divisor**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_SAMPLE_CLOCK_TIMEBASE_DIVISOR**
-

nifgen.Session.exported_sample_clock_timebase_output_terminal

Specifies the terminal to which to export the Sample clock timebase. If you specify a divisor with the `nifgen.Session.exported_sample_clock_timebase_divisor` property, the Sample clock exported with the `nifgen.Session.exported_sample_clock_timebase_output_terminal` property is the value of the Sample clock timebase after it is divided-down. For a list of the terminals available on your device, refer to the Device Routes tab in MAX. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

Note: The signal generator must not be in the Generating state when you change this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock Timebase:Export Output Terminal**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_SAMPLE_CLOCK_TIMEBASE_OUTPUT_TERMINAL**
-

nifgen.Session.exported_script_trigger_output_terminal

Specifies the output terminal for the exported Script trigger. Setting this property to an empty string means that when you commit the session, the signal is removed from that terminal and, if possible, the terminal is tristated.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_SCRIPT_TRIGGER_OUTPUT_TERMINAL**
-

`nifgen.Session.exported_start_trigger_output_terminal`

Specifies the destination terminal for exporting the Start trigger.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_EXPORTED_START_TRIGGER_OUTPUT_TERMINAL**
-

`nifgen.Session.external_clock_delay_binary_value`

Binary value of the external clock delay.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Advanced:External Clock Delay Binary Value**
 - C Attribute: **NIFGEN_ATTR_EXTERNAL_CLOCK_DELAY_BINARY_VALUE**
-

`nifgen.Session.external_sample_clock_multiplier`

Specifies a multiplication factor to use to obtain a desired sample rate from an external Sample clock. The resulting sample rate is equal to this factor multiplied by the external Sample clock rate. You can use this property to generate samples at a rate higher than your external clock rate. When using this property, you do not need to explicitly set the external clock rate.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Advanced:External Sample Clock Multiplier**
 - C Attribute: **NIFGEN_ATTR_EXTERNAL_SAMPLE_CLOCK_MULTIPLIER**
-

`nifgen.Session.file_transfer_block_size`

The number of samples at a time to read from the file and download to onboard memory. Used in conjunction with the Create From File and Write From File methods.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:File Transfer Block Size**
 - C Attribute: **NIFGEN_ATTR_FILE_TRANSFER_BLOCK_SIZE**
-

`nifgen.Session.filter_correction_frequency`

Controls the filter correction frequency of the analog filter. This property corrects for the ripples in the analog filter frequency response at the frequency specified. For standard waveform output, the filter correction frequency should be set to be the same as the frequency of the standard waveform. To have no filter correction, set this property to 0 Hz.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:5401/5411/5431:Filter Correction Frequency**
 - C Attribute: **NIFGEN_ATTR_FILTER_CORRECTION_FREQUENCY**
-

`nifgen.Session.flatness_correction_enabled`

When True, the signal generator applies a flatness correction factor to the generated sine wave in order to ensure the same output power level at all frequencies. This property should be set to False when performing Flatness Calibration.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Filters:Flatness Correction Enabled**
 - C Attribute: **NIFGEN_ATTR_FLATNESS_CORRECTION_ENABLED**
-

`nifgen.Session.fpga_bitfile_path`

Gets the absolute file path to the bitfile loaded on the FPGA.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:FPGA Bitfile Path**
 - C Attribute: **NIFGEN_ATTR_FPGA_BITFILE_PATH**
-

`nifgen.Session.freq_list_duration_quantum`

Returns the quantum of which all durations must be a multiple in a frequency list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Frequency List Duration Quantum**
 - C Attribute: **NIFGEN_ATTR_FREQ_LIST_DURATION_QUANTUM**
-

nifgen.Session.freq_list_handle

Sets which frequency list the signal generator produces. Create a frequency list using `nifgen.Session.create_freq_list()`. `nifgen.Session.create_freq_list()` returns a handle that you can use to identify the list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Frequency List Handle**
 - C Attribute: **NIFGEN_ATTR_FREQ_LIST_HANDLE**
-

nifgen.Session.func_amplitude

Controls the amplitude of the standard waveform that the signal generator produces. This value is the amplitude at the output terminal. For example, to produce a waveform ranging from -5.00 V to +5.00 V, set the amplitude to 10.00 V. set the Waveform parameter to [DC](#). Units: Vpk-pk

Note: This parameter does not affect signal generator behavior when you

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Amplitude**
 - C Attribute: **NIFGEN_ATTR_FUNC_AMPLITUDE**
-

nifgen.Session.func_buffer_size

This property contains the number of samples used in the standard method waveform buffer. This property is only valid on devices that implement standard method mode in software, and is read-only for all other devices. implementation of Standard Method Mode on your device.

Note: Refer to the Standard Method Mode topic for more information on the

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Standard Function Mode:Buffer Size**
 - C Attribute: **NIFGEN_ATTR_FUNC_BUFFER_SIZE**
-

`nifgen.Session.func_dc_offset`

Controls the DC offset of the standard waveform that the signal generator produces. This value is the offset at the output terminal. The value is the offset from ground to the center of the waveform that you specify with the Waveform parameter. For example, to configure a waveform with an amplitude of 10.00 V to range from 0.00 V to +10.00 V, set DC Offset to 5.00 V. Units: volts

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:DC Offset**
 - C Attribute: **NIFGEN_ATTR_FUNC_DC_OFFSET**
-

`nifgen.Session.func_duty_cycle_high`

Controls the duty cycle of the square wave the signal generator produces. Specify this property as a percentage of the time the square wave is high in a cycle. set the Waveform parameter to *SQUARE*. Units: Percentage of time the waveform is high

Note: This parameter only affects signal generator behavior when you

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Duty Cycle High**

- C Attribute: **NIFGEN_ATTR_FUNC_DUTY_CYCLE_HIGH**
-

`nifgen.Session.func_frequency`

Controls the frequency of the standard waveform that the signal generator produces. Units: hertz (1) This parameter does not affect signal generator behavior when you set the Waveform parameter of the `nifgen.Session.configure_standard_waveform()` method to *DC*. (2) For *SINE*, the range is between 0 MHz and 16 MHz, but the range is between 0 MHz and 1 MHz for all other waveforms.

Note: :

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Standard Function Mode:Frequency**
 - C Attribute: **NIFGEN_ATTR_FUNC_FREQUENCY**
-

`nifgen.Session.func_max_buffer_size`

This property sets the maximum number of samples that can be used in the standard method waveform buffer. Increasing this value may increase the quality of the waveform. This property is only valid on devices that implement standard method mode in software, and is read-only for all other devices. implementation of Standard Method Mode on your device.

Note: Refer to the Standard Method Mode topic for more information on the

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Standard Function Mode:Maximum Buffer Size**
 - C Attribute: **NIFGEN_ATTR_FUNC_MAX_BUFFER_SIZE**
-

`nifgen.Session.func_start_phase`

Controls horizontal offset of the standard waveform the signal generator produces. Specify this property in degrees of one waveform cycle. A start phase of 180 degrees means output generation begins halfway through

the waveform. A start phase of 360 degrees offsets the output by an entire waveform cycle, which is identical to a start phase of 0 degrees. set the Waveform parameter to *DC*. Units: Degrees of one cycle

Note: This parameter does not affect signal generator behavior when you

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Start Phase**
 - C Attribute: **NIFGEN_ATTR_FUNC_START_PHASE**
-

`nifgen.Session.func_waveform`

This channel-based property specifies which standard waveform the signal generator produces. Use this property only when `nifgen.Session.output_mode` is set to *FUNC*. *SINE* - Sinusoid waveform *SQUARE* - Square waveform *TRIANGLE* - Triangle waveform *RAMP_UP* - Positive ramp waveform *RAMP_DOWN* - Negative ramp waveform *DC* - Constant voltage *NOISE* - White noise *USER* - User-defined waveform as defined with `nifgen.Session.define_user_standard_waveform()`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.Waveform
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Waveform**
 - C Attribute: **NIFGEN_ATTR_FUNC_WAVEFORM**
-

`nifgen.Session.gain_dac_value`

Specifies the value programmed to the gain DAC. The value should be treated as an unsigned, right-justified number.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Calibration:Gain DAC Value**
 - C Attribute: **NIFGEN_ATTR_GAIN_DAC_VALUE**
-

`nifgen.Session.group_capabilities`

Returns a string that contains a comma-separated list of class-extension groups that NI-FGEN implements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Capabilities:Class Group Capabilities**
 - C Attribute: **NIFGEN_ATTR_GROUP_CAPABILITIES**
-

`nifgen.Session.idle_behavior`

Specifies the behavior of the output during the Idle state. The output can be configured to hold the last generated voltage before entering the Idle state or jump to the Idle Value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.IdleBehavior
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:Idle Behavior**
 - C Attribute: **NIFGEN_ATTR_IDLE_BEHAVIOR**
-

`nifgen.Session.idle_value`

Specifies the value to generate in the Idle state. The Idle Behavior must be configured to jump to this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:Idle Value**
 - C Attribute: **NIFGEN_ATTR_IDLE_VALUE**
-

`nifgen.Session.id_query_response`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	0
Resettable	0

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIFGEN_ATTR_ID_QUERY_RESPONSE**
-

`nifgen.Session.instrument_firmware_revision`

A string that contains the firmware revision information for the device that you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Instrument Identification:Firmware Revision**
 - C Attribute: **NIFGEN_ATTR_INSTRUMENT_FIRMWARE_REVISION**
-

`nifgen.Session.instrument_manufacturer`

A string that contains the name of the device manufacturer you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Instrument Identification:Manufacturer**

- C Attribute: **NIFGEN_ATTR_INSTRUMENT_MANUFACTURER**
-

`nifgen.Session.instrument_model`

A string that contains the model number or name of the device that you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Instrument Identification:Model**
 - C Attribute: **NIFGEN_ATTR_INSTRUMENT_MODEL**
-

`nifgen.Session.interchange_check`

Specifies whether to perform interchangeability checking and retrieve interchangeability warnings when you call `nifgen.Session._initiate_generation()`. Interchangeability warnings indicate that using your application with a different device might cause different behavior. Call `nifgen.Session.GetNextInterchangeWarning()` to extract interchange warnings. Call `nifgen.Session.ClearInterchangeWarnings()` to clear the list of interchangeability warnings without reading them. Interchangeability checking examines the properties in a capability group only if you specify a value for at least one property within that group. Interchangeability warnings can occur when a property affects the behavior of the device and you have not set that property, or the property has been invalidated since you set it.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:User Options:Interchange Check**
 - C Attribute: **NIFGEN_ATTR_INTERCHANGE_CHECK**
-

`nifgen.Session.io_resource_descriptor`

Indicates the resource descriptor that NI-FGEN uses to identify the physical device. If you initialize NI-FGEN with a logical name, this property contains the resource descriptor that corresponds to the entry in the IVI Configuration Utility. If you initialize NI-FGEN with the resource descriptor, this property contains that value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Advanced Session Information:Resource Descriptor**
 - C Attribute: **NIFGEN_ATTR_IO_RESOURCE_DESCRIPTOR**
-

`nifgen.Session.load_impedance`

This channel-based property specifies the load impedance connected to the analog output of the channel. If you set this property to `NIFGEN_VAL_MATCHED_LOAD_IMPEDANCE` (-1.0), NI-FGEN assumes that the load impedance matches the output impedance. NI-FGEN compensates to give the desired peak-to-peak voltage amplitude or arbitrary gain (relative to 1 V).

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Load Impedance**
 - C Attribute: **NIFGEN_ATTR_LOAD_IMPEDANCE**
-

`nifgen.Session.logical_name`

A string containing the logical name that you specified when opening the current IVI session. You may pass a logical name to `nifgen.Session.init()` or `nifgen.Session.InitWithOptions()`. The IVI Configuration Utility must contain an entry for the logical name. The logical name entry refers to a virtual instrument section in the IVI Configuration file. The virtual instrument section specifies a physical device and initial user options.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Advanced Session Information:Logical Name**
 - C Attribute: **NIFGEN_ATTR_LOGICAL_NAME**
-

`nifgen.Session.major_version`

Returns the major version number of NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Obsolete:Major Version**
 - C Attribute: **NIFGEN_ATTR_MAJOR_VERSION**
-

`nifgen.Session.marker_events_count`

Returns the number of markers supported by the device. Use this property when `nifgen.Session.output_mode` is set to `SCRIPT`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Marker Events Count**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENTS_COUNT**
-

`nifgen.Session.marker_event_delay`

Specifies the amount of delay applied to a Marker Event with respect to the analog output of the signal generator. A positive delay value indicates that the Marker Event will come out after the analog data, while a negative delay

value indicates that the Marker Event will come out before the analog data. The default value is zero, which will align the Marker Event with the analog output. You can specify the units of the delay value by setting the `nifgen.Session.marker_event_delay` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:Delay Value**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_DELAY**
-

`nifgen.Session.marker_event_delay_units`

Specifies the units applied to the value of the `nifgen.Session.marker_event_delay` property. Valid units are seconds and sample clock periods.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.MarkerEventDelayUnits
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:Delay Units**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_DELAY_UNITS**
-

`nifgen.Session.marker_event_latched_status`

Specifies the latched status of the specified Marker Event. Write True to this property to clear the latched status of the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:Latched Status**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_LATCHED_STATUS**
-

`nifgen.Session.marker_event_live_status`

Returns the live status of the specified Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Advanced:Live Status**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_LIVE_STATUS**
-

`nifgen.Session.marker_event_output_behavior`

Specifies the output behavior for the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.MarkerEventOutputBehavior
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Output Behavior**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_OUTPUT_BEHAVIOR**
-

`nifgen.Session.marker_event_output_terminal`

Specifies the destination terminal for the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_OUTPUT_TERMINAL**
-

`nifgen.Session.marker_event_pulse_polarity`

Specifies the output polarity of the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.MarkerEventPulsePolarity</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Pulse:Polarity**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_PULSE_POLARITY**
-

`nifgen.Session.marker_event_pulse_width`

Specifies the pulse width for the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>float</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Pulse:Width Value**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_PULSE_WIDTH**
-

`nifgen.Session.marker_event_pulse_width_units`

Specifies the pulse width units for the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.MarkerEventPulseWidthUnits</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Pulse:Width Units**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_PULSE_WIDTH_UNITS**
-

`nifgen.Session.marker_event_toggle_initial_state`

Specifies the output polarity of the Marker Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.MarkerEventToggleInitialState</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Marker:Toggle:Initial State**
 - C Attribute: **NIFGEN_ATTR_MARKER_EVENT_TOGGLE_INITIAL_STATE**
-

`nifgen.Session.max_freq_list_duration`

Returns the maximum duration of any one step in the frequency list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Maximum Frequency List Duration**
 - C Attribute: **NIFGEN_ATTR_MAX_FREQ_LIST_DURATION**
-

`nifgen.Session.max_freq_list_length`

Returns the maximum number of steps that can be in a frequency list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Maximum Frequency List Length**
 - C Attribute: **NIFGEN_ATTR_MAX_FREQ_LIST_LENGTH**
-

`nifgen.Session.max_loop_count`

Returns the maximum number of times that the signal generator can repeat a waveform in a sequence. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Sequence Mode:Max Loop Count**
 - C Attribute: **NIFGEN_ATTR_MAX_LOOP_COUNT**
-

`nifgen.Session.max_num_freq_lists`

Returns the maximum number of frequency lists the signal generator allows.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Maximum Number Of Frequency Lists**
 - C Attribute: **NIFGEN_ATTR_MAX_NUM_FREQ_LISTS**
-

`nifgen.Session.max_num_sequences`

Returns the maximum number of arbitrary sequences that the signal generator allows. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Sequence Mode:Max Number of Sequences**
 - C Attribute: **NIFGEN_ATTR_MAX_NUM_SEQUENCES**
-

`nifgen.Session.max_num_waveforms`

Returns the maximum number of arbitrary waveforms that the signal generator allows. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Capabilities:Max Number of Waveforms**
 - C Attribute: **NIFGEN_ATTR_MAX_NUM_WAVEFORMS**
-

`nifgen.Session.max_sequence_length`

Returns the maximum number of arbitrary waveforms that the signal generator allows in a sequence. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Sequence Mode:Max Sequence Length**
 - C Attribute: **NIFGEN_ATTR_MAX_SEQUENCE_LENGTH**
-

`nifgen.Session.max_waveform_size`

Returns the size, in samples, of the largest waveform that can be created. This property reflects the space currently available, taking into account previously allocated waveforms and instructions.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Capabilities:Max Waveform Size**

- C Attribute: **NIFGEN_ATTR_MAX_WAVEFORM_SIZE**
-

`nifgen.Session.memory_size`

The total amount of memory, in bytes, on the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Memory Size**
 - C Attribute: **NIFGEN_ATTR_MEMORY_SIZE**
-

`nifgen.Session.minor_version`

Returns the minor version number of NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Obsolete:Minor Version**
 - C Attribute: **NIFGEN_ATTR_MINOR_VERSION**
-

`nifgen.Session.min_freq_list_duration`

Returns the minimum number of steps that can be in a frequency list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Minimum Frequency List Duration**
- C Attribute: **NIFGEN_ATTR_MIN_FREQ_LIST_DURATION**

`nifgen.Session.min_freq_list_length`

Returns the minimum number of frequency lists that the signal generator allows.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Frequency List Mode:Minimum Frequency List Length**
 - C Attribute: **NIFGEN_ATTR_MIN_FREQ_LIST_LENGTH**
-

`nifgen.Session.min_sequence_length`

Returns the minimum number of arbitrary waveforms that the signal generator allows in a sequence. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Arbitrary Sequence Mode:Min Sequence Length**
 - C Attribute: **NIFGEN_ATTR_MIN_SEQUENCE_LENGTH**
-

`nifgen.Session.min_waveform_size`

Returns the minimum number of points that the signal generator allows in an arbitrary waveform. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Capabilities:Min Waveform Size**

- C Attribute: **NIFGEN_ATTR_MIN_WAVEFORM_SIZE**
-

`nifgen.Session.module_revision`

A string that contains the module revision for the device that you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Instrument Identification:Module Revision**
 - C Attribute: **NIFGEN_ATTR_MODULE_REVISION**
-

`nifgen.Session.num_channels`

Indicates the number of channels that the specific instrument driver supports. For each property for which `IVI_VAL_MULTI_CHANNEL` is set, the IVI Engine maintains a separate cache value for each channel.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Capabilities:Channel Count**
 - C Attribute: **NIFGEN_ATTR_NUM_CHANNELS**
-

`nifgen.Session.offset_dac_value`

Specifies the value programmed to the offset DAC. The value should be treated as an unsigned, right-justified number.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Calibration:Offset DAC Value**

- C Attribute: **NIFGEN_ATTR_OFFSET_DAC_VALUE**
-

`nifgen.Session.oscillator_freq_dac_value`

Specifies the value programmed to the oscillator frequency DAC. The value should be treated as an unsigned, right-justified number.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Calibration:Oscillator Freq DAC Value**
 - C Attribute: **NIFGEN_ATTR_OSCILLATOR_FREQ_DAC_VALUE**
-

`nifgen.Session.oscillator_phase_dac_value`

The value of the oscillator phase DAC.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Advanced:Oscillator Phase DAC Value**
 - C Attribute: **NIFGEN_ATTR_OSCILLATOR_PHASE_DAC_VALUE**
-

`nifgen.Session.osp_carrier_enabled`

Enables or disables generation of the carrier.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Carrier Enabled**

- C Attribute: **NIFGEN_ATTR_OSP_CARRIER_ENABLED**
-

`nifgen.Session.osp_carrier_frequency`

The frequency of the generated carrier.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Carrier Frequency**
 - C Attribute: **NIFGEN_ATTR_OSP_CARRIER_FREQUENCY**
-

`nifgen.Session.osp_carrier_phase_i`

I Carrier Phase in degrees at the first point of the generation.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Carrier Phase:Carrier Phase I**
 - C Attribute: **NIFGEN_ATTR_OSP_CARRIER_PHASE_I**
-

`nifgen.Session.osp_carrier_phase_q`

Q Carrier Phase in degrees at the first point of the generation. This property is only used when the `nifgen.Session.osp_data_processing_mode` property is set to `COMPLEX`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Carrier Phase:Carrier Phase Q**
 - C Attribute: **NIFGEN_ATTR_OSP_CARRIER_PHASE_Q**
-

`nifgen.Session.osp_cic_filter_enabled`

Enables or disables the CIC filter. The `nifgen.Session.osp_cic_filter_enabled` and `nifgen.Session.osp_fir_filter_enabled` properties must have the same enable/disable setting.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:CIC Filter Enabled**
 - C Attribute: **NIFGEN_ATTR_OSP_CIC_FILTER_ENABLED**
-

`nifgen.Session.osp_cic_filter_gain`

Gain applied at the final stage of the CIC filter. Commonly used to compensate for attenuation in the FIR filter. For FIR filter types other than Custom, NI-FGEN calculates the CIC gain in order to achieve unity gain between the FIR and CIC filters. Setting this property overrides the value set by NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:CIC Filter Gain**
 - C Attribute: **NIFGEN_ATTR_OSP_CIC_FILTER_GAIN**
-

`nifgen.Session.osp_cic_filter_interpolation`

Interpolation factor for the CIC filter. If you do not set this value, NI-FGEN calculates the appropriate value based on the value of the `nifgen.Session.osp_iq_rate` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:CIC Interpolation Factor**
 - C Attribute: **NIFGEN_ATTR_OSP_CIC_FILTER_INTERPOLATION**
-

`nifgen.Session.osp_compensate_for_filter_group_delay`

Compensate for OSP Filter Group Delay. If this is enabled, the Event Outputs will be aligned with the Analog Output. The Analog output will also be aligned between synchronized devices (using NI-TClk).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:Compensate for Filter Group Delay**
 - C Attribute: **NIFGEN_ATTR_OSP_COMPENSATE_FOR_FILTER_GROUP_DELAY**
-

`nifgen.Session.osp_data_processing_mode`

The way in which data is processed by the OSP block.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.DataProcessingMode
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Data Processing Mode**
 - C Attribute: **NIFGEN_ATTR_OSP_DATA_PROCESSING_MODE**
-

`nifgen.Session.osp_enabled`

Enables or disables the OSP block of the signal generator. When the OSP block is disabled, all OSP-related properties are disabled and have no effect on the generated signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:OSP Enabled**
 - C Attribute: **NIFGEN_ATTR_OSP_ENABLED**
-

`nifgen.Session.osp_fir_filter_enabled`

Enables or disables the FIR filter. The `nifgen.Session.osp_cic_filter_enabled` and `nifgen.Session.osp_fir_filter_enabled` properties must have the same enable/disable setting.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:FIR Filter Enabled**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_ENABLED**
-

`nifgen.Session.osp_fir_filter_flat_passband`

Passband value to use when calculating the FIR filter coefficients. The FIR filter is designed to be flat to passband \times IQ rate. This property is used only when the `nifgen.Session.osp_fir_filter_type` property is set to `FLAT`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:FIR Filter:Flat:Passband**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_FLAT_PASSBAND**
-

`nifgen.Session.osp_fir_filter_gaussian_bt`

BT value to use when calculating the pulse-shaping FIR filter coefficients. Only used when the `nifgen.Session.osp_fir_filter_type` property is set to `GAUSSIAN`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:FIR Filter:Gaussian:BT**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_GAUSSIAN_BT**
-

`nifgen.Session.osp_fir_filter_interpolation`

Interpolation factor for the FIR filter. If you do not set this value, NI-FGEN calculates the appropriate value based on the value of the `nifgen.Session.osp_iq_rate` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:FIR Interpolation Factor**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_INTERPOLATION**
-

`nifgen.Session.osp_fir_filter_raised_cosine_alpha`

Alpha value to use when calculating the pulse shaping FIR filter coefficients. Only used when the `nifgen.Session.osp_fir_filter_type` property is set to `RAISED_COSINE`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:FIR Filter:Raised Co-sine:Alpha**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_RAISED_COSINE_ALPHA**
-

`nifgen.Session.osp_fir_filter_root_raised_cosine_alpha`

Alpha value to use when calculating the pulse-shaping FIR filter coefficients. This property is used only when the `nifgen.Session.osp_fir_filter_type` property is set to `ROOT_RAISED_COSINE`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:FIR Filter:Root Raised Co-sine:Alpha**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_ROOT_RAISED_COSINE_ALPHA**
-

`nifgen.Session.osp_fir_filter_type`

Pulse-shaping filter type for the FIR filter.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.FilterType
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:FIR Filter:Filter Type**
 - C Attribute: **NIFGEN_ATTR_OSP_FIR_FILTER_TYPE**
-

`nifgen.Session.osp_frequency_shift`

Specifies the amount of frequency shift applied to the baseband signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Frequency Shift**
 - C Attribute: **NIFGEN_ATTR_OSP_FREQUENCY_SHIFT**
-

`nifgen.Session.osp_mode`

Specifies the generation mode of the OSP, which determines the type of data contained in the output signal.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OSPMode
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:OSP Mode**
 - C Attribute: **NIFGEN_ATTR_OSP_MODE**
-

`nifgen.Session.osp_overflow_error_reporting`

Configures error reporting when the OSP block detects an overflow in any of its stages. Overflows lead to clipping of the waveform. You can use the `nifgen.Session.osp_overflow_status` property to query for overflow conditions whether or not the `nifgen.Session.osp_overflow_error_reporting` property is enabled. The device will continue to generate after an overflow whether or not the `nifgen.Session.osp_overflow_error_reporting` property is enabled.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OSPOverflowErrorReporting
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:OSP Overflow Error Reporting**
 - C Attribute: **NIFGEN_ATTR_OSP_OVERFLOW_ERROR_REPORTING**
-

`nifgen.Session.osp_overflow_status`

Returns a bit field of the overflow status in any stage of the OSP block. This property is functional regardless of the value for the `nifgen.Session.osp_overflow_error_reporting` property. Write 0 to this property to clear the current `nifgen.Session.osp_overflow_error_reporting` value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:Advanced:OSP Overflow Status**
 - C Attribute: **NIFGEN_ATTR_OSP_OVERFLOW_STATUS**
-

`nifgen.Session.osp_pre_filter_gain_i`

Digital gain to apply to the I data stream before any filtering by the OSP block.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Gain:Pre-filter Gain I**
 - C Attribute: **NIFGEN_ATTR_OSP_PRE_FILTER_GAIN_I**
-

`nifgen.Session.osp_pre_filter_gain_q`

Digital gain to apply to the Q data stream before any filtering by the OSP block. This property is only used when the `nifgen.Session.osp_data_processing_mode` property is set to `COMPLEX`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Gain:Pre-filter Gain Q**
 - C Attribute: **NIFGEN_ATTR_OSP_PRE_FILTER_GAIN_Q**
-

`nifgen.Session.osp_pre_filter_offset_i`

Digital offset to apply to the I data stream. This offset is applied after the Pre-Filter Gain and before any filtering.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Offset:Pre-filter Offset I**
 - C Attribute: **NIFGEN_ATTR_OSP_PRE_FILTER_OFFSET_I**
-

`nifgen.Session.osp_pre_filter_offset_q`

Digital offset to apply to the Q data stream. This offset is applied after the Pre-Filter Gain and before any filtering. This property is used only when the `nifgen.Session.osp_data_processing_mode` property is set to `COMPLEX`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Onboard Signal Processing:IQ Signal Adjustments:Offset:Pre-filter Offset Q**
 - C Attribute: **NIFGEN_ATTR_OSP_PRE_FILTER_OFFSET_Q**
-

`nifgen.Session.output_enabled`

This channel-based property specifies whether the signal that the signal generator produces appears at the output connector.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Output Enabled**
 - C Attribute: **NIFGEN_ATTR_OUTPUT_ENABLED**
-

`nifgen.Session.output_impedance`

This channel-based property specifies the signal generator output impedance at the output connector. NI signal sources modules have an output impedance of 50 ohms and an optional 75 ohms on select modules. If the load impedance matches the output impedance, then the voltage at the signal output connector is at the needed level. The voltage at the signal output connector varies with load output impedance, up to doubling the voltage for a high-impedance load.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Output Impedance**
 - C Attribute: **NIFGEN_ATTR_OUTPUT_IMPEDANCE**
-

`nifgen.Session.output_mode`

Sets which output mode the signal generator will use. The value you specify determines which methods and properties you use to configure the waveform the signal generator produces.

Note: The signal generator must not be in the Generating state when you change this property. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OutputMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Output Mode**
 - C Attribute: **NIFGEN_ATTR_OUTPUT_MODE**
-

`nifgen.Session.p2p_endpoint_fullness_start_trigger_level`

Specifies the Endpoint threshold for the Start trigger. This property is used only when `nifgen.Session.start_trigger_type` is set to P2P Endpoint Fullness.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start:P2P Endpoint Fullness:Level**
 - C Attribute: **NIFGEN_ATTR_P2P_ENDPOINT_FULLNESS_START_TRIGGER_LEVEL**
-

`nifgen.Session.pci_dma_optimizations_enabled`

Controls whether or not NI-FGEN allows performance optimizations for DMA transfers. This property is only valid for PCI and PXI SMC-based devices. This property is enabled (True) by default, and NI recommends leaving it enabled.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Advanced:PCI DMA Optimizations Enabled**
 - C Attribute: **NIFGEN_ATTR_PCI_DMA_OPTIMIZATIONS_ENABLED**
-

`nifgen.Session.post_amplifier_attenuation`

Specifies the amount of post-amplifier attenuation that should be applied to the signal (in dB).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Calibration:Post-Amplifier Attenuation**
 - C Attribute: **NIFGEN_ATTR_POST_AMPLIFIER_ATTENUATION**
-

`nifgen.Session.pre_amplifier_attenuation`

Specifies the amount of pre-amplifier attenuation that should be applied to the signal (in dB).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Calibration:Pre-Amplifier Attenuation**
 - C Attribute: **NIFGEN_ATTR_PRE_AMPLIFIER_ATTENUATION**
-

`nifgen.Session.range_check`

Specifies whether to validate property values and method parameters. If enabled, NI-FGEN validates the parameter values that you pass to the methods. Range-checking parameters is very useful for debugging. After you validate your program, you can set this property to False to disable range checking and maximize performance. Default Value: True Use `nifgen.Session.InitWithOptions()` to override the default value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:User Options:Range Check**
 - C Attribute: **NIFGEN_ATTR_RANGE_CHECK**
-

`nifgen.Session.ready_for_start_event_level_active_level`

Specifies the output polarity of the Ready for Start Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ReadyForStartEventActiveLevel</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Start:Level:Active Level**

-
- C Attribute: **NIFGEN_ATTR_READY_FOR_START_EVENT_LEVEL_ACTIVE_LEVEL**
-

`nifgen.Session.ready_for_start_event_live_status`

Returns the live status of the specified Ready For Start Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Start:Advanced:Live Status**
 - C Attribute: **NIFGEN_ATTR_READY_FOR_START_EVENT_LIVE_STATUS**
-

`nifgen.Session.ready_for_start_event_output_terminal`

Specifies the destination terminal for the Ready for Start Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Ready For Start:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_READY_FOR_START_EVENT_OUTPUT_TERMINAL**
-

`nifgen.Session.record_coercions`

Specifies whether the IVI Engine keeps a list of the value coercions it makes for ViInt32 and ViReal64 properties. Call `nifgen.Session.GetNextCoercionRecord()` to extract and delete the oldest coercion record from the list. Default Value: False Use `nifgen.Session.InitWithOptions()` to override default value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes>User Options:Record Value Coercions**
 - C Attribute: **NIFGEN_ATTR_RECORD_COERCIONS**
-

`nifgen.Session.reference_clock_source`

Specifies the reference clock source used by the signal generator. The signal generator derives the frequencies and sample rates that it uses to generate waveforms from the source you specify. For example, when you set this property to `ClkIn`, the signal generator uses the signal it receives at the CLK IN front panel connector as the Reference clock. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

Note: The signal generator must not be in the Generating state when you change this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ReferenceClockSource</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Reference Clock:Source**
 - C Attribute: **NIFGEN_ATTR_REFERENCE_CLOCK_SOURCE**
-

`nifgen.Session.ref_clock_frequency`

Sets the frequency of the signal generator reference clock. The signal generator uses the reference clock to derive frequencies and sample rates when generating output.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Reference Clock:Frequency**
 - C Attribute: **NIFGEN_ATTR_REF_CLOCK_FREQUENCY**
-

`nifgen.Session.sample_clock_absolute_delay`

Specifies the absolute delay adjustment of the sample clock. The sample clock delay adjustment is expressed in seconds. can only be applied when an external sample clock is used.

Note: For the NI 5421, absolute delay

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Advanced:Sample Clock Absolute Delay**
 - C Attribute: **NIFGEN_ATTR_SAMPLE_CLOCK_ABSOLUTE_DELAY**
-

`nifgen.Session.sample_clock_source`

Specifies the Sample clock source. If you specify a divisor with the `nifgen.Session.exported_sample_clock_divisor` property, the Sample clock exported with the `nifgen.Session.exported_sample_clock_output_terminal` property is the value of the Sample clock after it is divided-down. For a list of the terminals available on your device, refer to the Device Routes tab in MAX. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

Note: The signal generator must not be in the Generating state when you change this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.SampleClockSource</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock:Source**
 - C Attribute: **NIFGEN_ATTR_SAMPLE_CLOCK_SOURCE**
-

`nifgen.Session.sample_clock_timebase_rate`

Specifies the Sample clock timebase rate. This property applies only to external Sample clock timebases. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

Note: The signal generator must not be in the Generating state when you change this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock Timebase:Rate**
 - C Attribute: **NIFGEN_ATTR_SAMPLE_CLOCK_TIMEBASE_RATE**
-

`nifgen.Session.sample_clock_timebase_source`

Specifies the Sample Clock Timebase source. To change the device configuration, call the `nifgen.Session.abort()` method or wait for the generation to complete.

Note: The signal generator must not be in the Generating state when you change this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.SampleClockTimebaseSource
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocks:Sample Clock Timebase:Source**
 - C Attribute: **NIFGEN_ATTR_SAMPLE_CLOCK_TIMEBASE_SOURCE**
-

`nifgen.Session.script_to_generate`

Specifies which script the generator produces. To configure the generator to run a particular script, set this property to the name of the script. Use `nifgen.Session.write_script()` to create multiple scripts. Use this property when `nifgen.Session.output_mode` is set to `SCRIPT`.

Note: The signal generator must not be in the Generating state when you change this property. To change the device configuration, call `nifgen.Session.abort()` or wait for the generation to complete.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Script Mode:Script to Generate**
 - C Attribute: **NIFGEN_ATTR_SCRIPT_TO_GENERATE**
-

`nifgen.Session.script_triggers_count`

Specifies the number of Script triggers supported by the device. Use this property when `nifgen.Session.output_mode` is set to `SCRIPT`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Script Triggers Count**
 - C Attribute: **NIFGEN_ATTR_SCRIPT_TRIGGERS_COUNT**
-

`nifgen.Session.script_trigger_type`

Specifies the Script trigger type. Depending upon the value of this property, additional properties may need to be configured to fully configure the trigger.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ScriptTriggerType</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Script:Trigger Type**
 - C Attribute: **NIFGEN_ATTR_SCRIPT_TRIGGER_TYPE**
-

`nifgen.Session.serial_number`

The signal generator's serial number.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Serial Number**
 - C Attribute: **NIFGEN_ATTR_SERIAL_NUMBER**
-

`nifgen.Session.simulate`

Specifies whether to simulate NI-FGEN I/O operations. If simulation is enabled, NI-FGEN methods perform range checking and call `Ivi_GetAttribute` and `Ivi_SetAttribute`, but they do not perform device I/O. For output parameters that represent device data, NI-FGEN methods return calculated values. Default Value: False Use `nifgen.Session.InitWithOptions()` to override default value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes>User Options:Simulate**
 - C Attribute: **NIFGEN_ATTR_SIMULATE**
-

`nifgen.Session.specific_driver_class_spec_major_version`

Returns the major version number of the class specification with which NI-FGEN is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Identification:Class Specification Major Version**
 - C Attribute: **NIFGEN_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION**
-

`nifgen.Session.specific_driver_class_spec_minor_version`

Returns the minor version number of the class specification with which NI-FGEN is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Identification:Class Specification Minor Version**
 - C Attribute: **NIFGEN_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION**
-

`nifgen.Session.specific_driver_description`

Returns a brief description of NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Identification:Description**
 - C Attribute: **NIFGEN_ATTR_SPECIFIC_DRIVER_DESCRIPTION**
-

`nifgen.Session.specific_driver_revision`

A string that contains additional version information about NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Identification:Revision**
 - C Attribute: **NIFGEN_ATTR_SPECIFIC_DRIVER_REVISION**
-

`nifgen.Session.specific_driver_vendor`

A string that contains the name of the vendor that supplies NI-FGEN.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Identification:Driver Vendor**
 - C Attribute: **NIFGEN_ATTR_SPECIFIC_DRIVER_VENDOR**
-

`nifgen.Session.started_event_delay`

Specifies the amount of delay applied to a Started Event with respect to the analog output of the signal generator. A positive delay value specifies that the Started Event occurs after the analog data, and a negative delay value specifies that the Started Event occurs before the analog data. The default value is zero, which will align the Started event with the analog output. You can specify the units of the delay value by setting the `nifgen.Session.started_event_delay` property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Advanced:Delay Value**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_DELAY**
-

`nifgen.Session.started_event_delay_units`

Specifies the units applied to the value of the `nifgen.Session.started_event_delay` property. Valid units are seconds and sample clock periods.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.StartedEventDelayUnits
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Advanced:Delay Units**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_DELAY_UNITS**
-

`nifgen.Session.started_event_latched_status`

Specifies the latched status of the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Advanced:Latched Status**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_LATCHED_STATUS**
-

`nifgen.Session.started_event_level_active_level`

Specifies the output polarity of the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.StartedEventActiveLevel
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Level:Active Level**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_LEVEL_ACTIVE_LEVEL**
-

`nifgen.Session.started_event_output_behavior`

Specifies the output behavior for the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.StartedEventOutputBehavior
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Output Behavior**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_OUTPUT_BEHAVIOR**
-

`nifgen.Session.started_event_output_terminal`

Specifies the destination terminal for the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Output Terminal**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_OUTPUT_TERMINAL**
-

`nifgen.Session.started_event_pulse_polarity`

Specifies the output polarity of the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.StartedEventPulsePolarity
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Pulse:Polarity**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_PULSE_POLARITY**
-

`nifgen.Session.started_event_pulse_width`

Specifies the pulse width for the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Pulse:Width Value**
 - C Attribute: **NIFGEN_ATTR_STARTED_EVENT_PULSE_WIDTH**
-

`nifgen.Session.started_event_pulse_width_units`

Specifies the pulse width units for the Started Event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.StartedEventPulseWidthUnits</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Events:Started:Pulse:Width Units**
- C Attribute: **NIFGEN_ATTR_STARTED_EVENT_PULSE_WIDTH_UNITS**

`nifgen.Session.start_trigger_type`

Specifies whether you want the Start trigger to be a Digital Edge, or Software trigger. You can also choose None as the value for this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.StartTriggerType</code>
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Start:Trigger Type**
- C Attribute: **NIFGEN_ATTR_START_TRIGGER_TYPE**

`nifgen.Session.streaming_space_available_in_waveform`

Indicates the space available (in samples) in the streaming waveform for writing new data. During generation, this available space may be in multiple locations with, for example, part of the available space at the end of the streaming waveform and the rest at the beginning. In this situation, writing a block of waveform data the size of the total space available in the streaming waveform causes NI-FGEN to return an error, as NI-FGEN will not wrap the data from the end of the waveform to the beginning and cannot write data past the end of the waveform buffer. To avoid writing data past the end of the waveform, write new data to the waveform in a fixed size that is an integer divisor of the total size of the streaming waveform. Used in conjunction with the `nifgen.Session.streaming_waveform_handle` or `nifgen.Session.streaming_waveform_name` properties.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>int</code>
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Streaming:Space Available in Streaming Waveform**
 - C Attribute: **NIFGEN_ATTR_STREAMING_SPACE_AVAILABLE_IN_WAVEFORM**
-

`nifgen.Session.streaming_waveform_handle`

Specifies the waveform handle of the waveform used to continuously stream data during generation. This property defaults to -1 when no streaming waveform is specified. Used in conjunction with `nifgen.Session.streaming_space_available_in_waveform`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Streaming:Streaming Waveform Handle**
 - C Attribute: **NIFGEN_ATTR_STREAMING_WAVEFORM_HANDLE**
-

`nifgen.Session.streaming_waveform_name`

Specifies the name of the waveform used to continuously stream data during generation. This property defaults to // when no streaming waveform is specified. Use in conjunction with `nifgen.Session.streaming_space_available_in_waveform`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Data Transfer:Streaming:Streaming Waveform Name**
 - C Attribute: **NIFGEN_ATTR_STREAMING_WAVEFORM_NAME**
-

`nifgen.Session.streaming_write_timeout`

Specifies the maximum amount of time allowed to complete a streaming write operation.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform>Data Transfer:Streaming:Streaming Write Timeout**
 - C Attribute: **NIFGEN_ATTR_STREAMING_WRITE_TIMEOUT**
-

`nifgen.Session.supported_instrument_models`

Returns a model code of the device. For NI-FGEN versions that support more than one device, this property contains a comma-separated list of supported device models.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:Inherent IVI Attributes:Driver Capabilities:Supported Instrument Models**
 - C Attribute: **NIFGEN_ATTR_SUPPORTED_INSTRUMENT_MODELS**
-

`nifgen.Session.synchronization`

Specify the source of the synchronization signal that you want to use.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.SynchronizationSource
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:5401/5411/5431:Synchronization Source**
 - C Attribute: **NIFGEN_ATTR_SYNCHRONIZATION**
-

`nifgen.Session.sync_duty_cycle_high`

Controls the duty cycle of the square wave the signal generator produces on the SYNC out line. Specify this

property as a percentage of the time the square wave is high in each cycle. Units: Percentage of time the waveform is high

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Sync Duty Cycle High**
 - C Attribute: **NIFGEN_ATTR_SYNC_DUTY_CYCLE_HIGH**
-

`nifgen.Session.sync_out_output_terminal`

Specifies the terminal to which to export the SYNC OUT signal. This property is not supported for all devices.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Standard Function:Sync Out Output Terminal**
 - C Attribute: **NIFGEN_ATTR_SYNC_OUT_OUTPUT_TERMINAL**
-

`nifgen.Session.terminal_configuration`

Specifies whether gain and offset values will be analyzed based on single-ended or differential operation.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TerminalConfiguration
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Terminal Configuration**
 - C Attribute: **NIFGEN_ATTR_TERMINAL_CONFIGURATION**
-

`nifgen.Session.trigger_mode`

Controls the trigger mode.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggers:Trigger Mode**
 - C Attribute: **NIFGEN_ATTR_TRIGGER_MODE**
-

`nifgen.Session.trigger_source`

Controls which trigger source the signal generator uses. After you call the `nifgen.Session._initiate_generation()` method, the signal generator waits for the trigger that you specify in the `triggerSource` parameter. After the signal generator receives a trigger, it produces the number of cycles that you specify in the `nifgen.Session.CYCLE_COUNT` property. This property is also the source for the trigger in the other trigger modes as specified by the `nifgen.Session.trigger_mode` property.

Note: One or more of the referenced properties are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerSource
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:5401/5411/5431:Trigger Source**
 - C Attribute: **NIFGEN_ATTR_TRIGGER_SOURCE**
-

`nifgen.Session.video_waveform_type`

Selects which waveform type that the NI 5431 generates. Setting this property ensures that the crystal is set to the proper frequency.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.VideoWaveformType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Instrument:5401/5411/5431:Video Waveform Type**
 - C Attribute: **NIFGEN_ATTR_VIDEO_WAVEFORM_TYPE**
-

`nifgen.Session.wait_behavior`

Specifies the behavior of the output while waiting for a script trigger or during a wait instruction. The output can be configured to hold the last generated voltage before waiting or jump to the Wait Value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.WaitBehavior
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:Wait Behavior**
 - C Attribute: **NIFGEN_ATTR_WAIT_BEHAVIOR**
-

`nifgen.Session.wait_value`

Specifies the value to generate while waiting. The Wait Behavior must be configured to jump to this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Output:Advanced:Wait Value**
 - C Attribute: **NIFGEN_ATTR_WAIT_VALUE**
-

`nifgen.Session.waveform_quantum`

The size of each arbitrary waveform must be a multiple of a quantum value. This property returns the quantum value that the signal generator allows. For example, when this property returns a value of 8, all waveform sizes must be a multiple of 8. Typically, this value is constant for the signal generator.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Arbitrary Waveform:Capabilities:Waveform Quantum**
 - C Attribute: **NIFGEN_ATTR_WAVEFORM_QUANTUM**
-

Enums

Enums used in NI-FGEN

`nifgen.AnalogPath`

`AnalogPath.MAIN`

Specifies use of the main path. NI-FGEN chooses the amplifier based on the user-specified gain.

`AnalogPath.DIRECT`

Specifies use of the direct path.

`AnalogPath.FIXED_LOW_GAIN`

Specifies use of the low-gain amplifier in the main path, no matter what value the user specifies for gain. This setting limits the output range.

`AnalogPath.FIXED_HIGH_GAIN`

Specifies use of the high-gain amplifier in the main path.

`nifgen.BusType`

`BusType.INVALID`

Indicates an invalid bus type.

`BusType.AT`

Indicates the signal generator is the AT bus type.

`BusType.PCI`

Indicates the signal generator is the PCI bus type.

`BusType.PXI`

Indicates the signal generator is the PXI bus type.

`BusType.VXI`

Indicates the signal generator is the VXI bus type.

`BusType.PCMCIA`

Indicates the signal generator is the PCI-CMA bus type.

`BusType.PXIE`

Indicates the signal generator is the PXI Express bus type.

`nifgen.ByteOrder`

`ByteOrder.LITTLE`

`ByteOrder.BIG`

`nifgen.ClockMode`

`ClockMode.HIGH_RESOLUTION`

High resolution sampling—Sample rate is generated by a high-resolution clock source.

`ClockMode.DIVIDE_DOWN`

Divide down sampling—Sample rates are generated by dividing the source frequency.

`ClockMode.AUTOMATIC`

Automatic Selection—NI-FGEN selects between the divide-down and high-resolution clocking modes.

`nifgen.DataMarkerEventLevelPolarity`

`DataMarkerEventLevelPolarity.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`DataMarkerEventLevelPolarity.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.DataProcessingMode`

`DataProcessingMode.REAL`

The waveform data points are real numbers (I data).

`DataProcessingMode.COMPLEX`

The waveform data points are complex numbers (I/Q data).

`nifgen.DoneEventActiveLevel`

`DoneEventActiveLevel.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`DoneEventActiveLevel.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.DoneEventDelayUnits`

`DoneEventDelayUnits.SAMPLE_CLOCK_PERIODS`

Specifies the pulse width in Sample clock periods.

`DoneEventDelayUnits.SECONDS`

Specifies the pulse width in seconds.

`nifgen.DoneEventOutputBehavior`

`DoneEventOutputBehavior.PULSE`

Triggers a pulse for a specified period of time.

`DoneEventOutputBehavior.LEVEL`

Shifts high or low while the event is active, depending on the active state you specify.

`nifgen.DoneEventPulsePolarity`

`DoneEventPulsePolarity.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`DoneEventPulsePolarity.LOW`

When the operation is ready to start, the Ready for Start event level is low.

nifgen.DoneEventPulseWidthUnits**DoneEventPulseWidthUnits.SAMPLE_CLOCK_PERIODS**

Specifies the pulse width in Sample clock periods.

DoneEventPulseWidthUnits.SECONDS

Specifies the pulse width in seconds.

nifgen.FilterType**FilterType.FLAT**

Applies a flat filter to the data with the passband value specified in the *nifgen.Session.osp_fir_filter_flat_passband* property.

FilterType.RAISED_COSINE

Applies a raised cosine filter to the data with the alpha value specified in the *nifgen.Session.osp_fir_filter_raised_cosine_alpha* property.

FilterType.ROOT_RAISED_COSINE

Applies a root raised cosine filter to the data with the alpha value specified in the *nifgen.Session.osp_fir_filter_root_raised_cosine_alpha* property.

FilterType.GAUSSIAN

Applies a Gaussian filter to the data with the BT value specified in the *nifgen.Session.osp_fir_filter_gaussian_bt* property.

FilterType.CUSTOM

Applies a custom filter to the data. If *CUSTOM* is selected, you must provide a set of FIR filter coefficients with the *nifgen.Session.configure_custom_fir_filter_coefficients()* method.

nifgen.HardwareState**HardwareState.IDLE****HardwareState.WAITING_FOR_START_TRIGGER****HardwareState.RUNNING****HardwareState.DONE****HardwareState.HARDWARE_ERROR****nifgen.IdleBehavior****IdleBehavior.HOLD_LAST**

While in an Idle or Wait state, the output signal remains at the last voltage generated prior to entering the state.

IdleBehavior.JUMP_TO

While in an Idle or Wait state, the output signal remains at the value configured in the Idle or Wait value property.

nifgen.MarkerEventDelayUnits**MarkerEventDelayUnits.SAMPLE_CLOCK_PERIODS**

Specifies the pulse width in Sample clock periods.

MarkerEventDelayUnits.SECONDS

Specifies the pulse width in seconds.

`nifgen.MarkerEventOutputBehavior`

`MarkerEventOutputBehavior.PULSE`

Triggers a pulse for a specified period of time.

`MarkerEventOutputBehavior.LEVEL`

Shifts high or low while the event is active, depending on the active state you specify.

`MarkerEventOutputBehavior.TOGGLE`

Changes to high or low while the event is active, depending on the active state you specify.

`nifgen.MarkerEventPulsePolarity`

`MarkerEventPulsePolarity.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`MarkerEventPulsePolarity.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.MarkerEventPulseWidthUnits`

`MarkerEventPulseWidthUnits.SAMPLE_CLOCK_PERIODS`

Specifies the pulse width in Sample clock periods.

`MarkerEventPulseWidthUnits.SECONDS`

Specifies the pulse width in seconds.

`nifgen.MarkerEventToggleInitialState`

`MarkerEventToggleInitialState.HIGH`

Sets the initial state of the Marker event to high.

`MarkerEventToggleInitialState.LOW`

Sets the initial state of the Marker event to low.

`nifgen.OSPMode`

`OSPMode.IF`

The OSP block generates intermediate frequency (IF) data.

`OSPMode.BASEBAND`

The OSP block generates baseband data.

`nifgen.OSPOverflowErrorReporting`

`OSPOverflowErrorReporting.ERROR`

NI-FGEN returns errors whenever an overflow has occurred in the OSP block.

`OSPOverflowErrorReporting.DISABLED`

NI-FGEN does not return errors when an overflow occurs in the OSP block.

`nifgen.OutputMode`

`OutputMode.FUNC`

Standard Method mode— Generates standard method waveforms such as sine, square, triangle, and so on.

`OutputMode.ARB`

Arbitrary waveform mode—Generates waveforms from user-created/provided waveform arrays of numeric data.

`OutputMode.SEQ`

Arbitrary sequence mode — Generates downloaded waveforms in an order you specify.

`OutputMode.FREQ_LIST`

Frequency List mode—Generates a standard method using a list of frequencies you define.

`OutputMode.SCRIPT`

Script mode—Allows you to use scripting to link and loop multiple waveforms in complex combinations.

`nifgen.ReadyForStartEventActiveLevel`

`ReadyForStartEventActiveLevel.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`ReadyForStartEventActiveLevel.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.ReferenceClockSource`

`ReferenceClockSource.CLOCK_IN`

Specifies that the CLK IN input signal from the front panel connector is used as the Reference Clock source.

`ReferenceClockSource.NONE`

Specifies that a Reference Clock is not used.

`ReferenceClockSource.ONBOARD_REFERENCE_CLOCK`

Specifies that the onboard Reference Clock is used as the Reference Clock source.

`ReferenceClockSource.PXI_CLOCK`

Specifies the PXI Clock is used as the Reference Clock source.

`ReferenceClockSource.RTSI_7`

Specifies that the RTSI line 7 is used as the Reference Clock source.

`nifgen.RelativeTo`

`RelativeTo.START`

`RelativeTo.CURRENT`

`nifgen.SampleClockSource`

`SampleClockSource.CLOCK_IN`

Specifies that the signal at the CLK IN front panel connector is used as the Sample Clock source.

`SampleClockSource.DDC_CLOCK_IN`

Specifies that the Sample Clock from DDC connector is used as the Sample Clock source.

`SampleClockSource.ONBOARD_CLOCK`

Specifies that the onboard clock is used as the Sample Clock source.

`SampleClockSource.PXI_STAR_LINE`

Specifies that the PXI_STAR trigger line is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_0RTSI_0`
 Specifies that the PXI or RTSI line 0 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_1RTSI_1`
 Specifies that the PXI or RTSI line 1 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_2RTSI_2`
 Specifies that the PXI or RTSI line 2 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_3RTSI_3`
 Specifies that the PXI or RTSI line 3 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_4RTSI_4`
 Specifies that the PXI or RTSI line 4 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_5RTSI_5`
 Specifies that the PXI or RTSI line 5 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_6RTSI_6`
 Specifies that the PXI or RTSI line 6 is used as the Sample Clock source.

`SampleClockSource.PXI_TRIGGER_LINE_7RTSI_7`
 Specifies that the PXI or RTSI line 7 is used as the Sample Clock source.

`nifgen.SampleClockTimebaseSource`

`SampleClockTimebaseSource.CLOCK_IN`
 Specifies that the external signal on the CLK IN front panel connector is used as the source.

`SampleClockTimebaseSource.ONBOARD_CLOCK`
 Specifies that the onboard Sample Clock timebase is used as the source.

`nifgen.ScriptTriggerDigitalEdgeEdge`

`ScriptTriggerDigitalEdgeEdge.RISING`
 Rising Edge

`ScriptTriggerDigitalEdgeEdge.FALLING`
 Falling Edge

`nifgen.ScriptTriggerDigitalLevelActiveLevel`

`ScriptTriggerDigitalLevelActiveLevel.HIGH`
 High Level

`ScriptTriggerDigitalLevelActiveLevel.LOW`
 Low Level

`nifgen.ScriptTriggerType`

`ScriptTriggerType.TRIG_NONE`
 No trigger is configured. Signal generation starts immediately.

`ScriptTriggerType.DIGITAL_EDGE`
 Trigger is asserted when a digital edge is detected.

`ScriptTriggerType.DIGITAL_LEVEL`
 Trigger is asserted when a digital level is detected.

`ScriptTriggerType.SFTWARE_EDGE`

Trigger is asserted when a software edge is detected.

`nifgen.Signal`

`Signal.ONBOARD_REFERENCE_CLOCK`

`Signal.SYNC_OUT`

`Signal.START_TRIGGER`

`Signal.MARKER_EVENT`

`Signal.SAMPLE_CLOCK_TIMEBASE`

`Signal.SYNCHRONIZATION`

`Signal.SAMPLE_CLOCK`

`Signal.REFERENCE_CLOCK`

`Signal.SCRIPT_TRIGGER`

`Signal.READY_FOR_START_EVENT`

`Signal.STARTED_EVENT`

`Signal.DONE_EVENT`

`Signal.DATA_MARKER_EVENT`

`nifgen.StartTriggerDigitalEdgeEdge`

`StartTriggerDigitalEdgeEdge.RISING`

Rising Edge

`StartTriggerDigitalEdgeEdge.FALLING`

Falling Edge

`nifgen.StartTriggerType`

`StartTriggerType.TRIG_NONE`

None

`StartTriggerType.DIGITAL_EDGE`

Digital Edge

`StartTriggerType.SFTWARE_EDGE`

Software Edge

`StartTriggerType.P2P_ENDPOINT_FULLNESS`

P2P Endpoint Fullness

`nifgen.StartedEventActiveLevel`

`StartedEventActiveLevel.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`StartedEventActiveLevel.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.StartedEventDelayUnits`

`StartedEventDelayUnits.SAMPLE_CLOCK_PERIODS`

Specifies the pulse width in Sample clock periods.

`StartedEventDelayUnits.SECONDS`

Specifies the pulse width in seconds.

`nifgen.StartedEventOutputBehavior`

`StartedEventOutputBehavior.PULSE`

Triggers a pulse for a specified period of time.

`StartedEventOutputBehavior.LEVEL`

Shifts high or low while the event is active, depending on the active state you specify.

`nifgen.StartedEventPulsePolarity`

`StartedEventPulsePolarity.HIGH`

When the operation is ready to start, the Ready for Start event level is high.

`StartedEventPulsePolarity.LOW`

When the operation is ready to start, the Ready for Start event level is low.

`nifgen.StartedEventPulseWidthUnits`

`StartedEventPulseWidthUnits.SAMPLE_CLOCK_PERIODS`

Specifies the pulse width in Sample clock periods.

`StartedEventPulseWidthUnits.SECONDS`

Specifies the pulse width in seconds.

`nifgen.SynchronizationSource`

`SynchronizationSource.TTL0`

PXI TRIG0 or VXI TTL0

`SynchronizationSource.TTL1`

PXI TRIG1 or VXI TTL1

`SynchronizationSource.TTL2`

PXI TRIG2 or VXI TTL2

`SynchronizationSource.TTL3`

PXI TRIG3 or VXI TTL3

`SynchronizationSource.TTL4`

PXI TRIG4 or VXI TTL4

`SynchronizationSource.TTL5`

PXI TRIG5 or VXI TTL5

`SynchronizationSource.TTL6`

PXI TRIG6 or VXI TTL6

`SynchronizationSource.RTSI_0`

RTSI 0

`SynchronizationSource.RTSI_1`

RTSI 1

`SynchronizationSource.RTSI_2`
RTSI 2

`SynchronizationSource.RTSI_3`
RTSI 3

`SynchronizationSource.RTSI_4`
RTSI 4

`SynchronizationSource.RTSI_5`
RTSI 5

`SynchronizationSource.RTSI_6`
RTSI 6

`SynchronizationSource.NONE`
No Synchronization Source

`nifgen.TerminalConfiguration`

`TerminalConfiguration.SINGLE_ENDED`
Single-ended operation

`TerminalConfiguration.DIFFERENTIAL`
Differential operation

`nifgen.Trigger`

`Trigger.START`

`Trigger.SCRIPT`

`nifgen.TriggerMode`

`TriggerMode.SINGLE`

Single Trigger Mode - The waveform you describe in the sequence list is generated only once by going through the entire staging list. Only one trigger is required to start the waveform generation. You can use Single trigger mode with the output mode in any mode. After a trigger is received, the waveform generation starts from the first stage and continues through to the last stage. Then, the last stage generates repeatedly until you stop the waveform generation.

`TriggerMode.CONTINUOUS`

Continuous Trigger Mode - The waveform you describe in the staging list generates infinitely by repeatedly cycling through the staging list. After a trigger is received, the waveform generation starts from the first stage and continues through to the last stage. After the last stage completes, the waveform generation loops back to the start of the first stage and continues until it is stopped. Only one trigger is required to start the waveform generation.

`TriggerMode.STEPPED`

Stepped Trigger Mode - After a start trigger is received, the waveform described by the first stage generates. Then, the device waits for the next trigger signal. On the next trigger, the waveform described by the second stage generates, and so on. After the staging list completes, the waveform generation returns to the first stage and continues in a cyclic fashion. After any stage has generated completely, the first eight samples of the next stage are repeated continuously until the next trigger is received. trigger mode.

Note: In Frequency List mode, Stepped trigger mode is the same as Burst

`TriggerMode.BURST`

Burst Trigger Mode - After a start trigger is received, the waveform described by the first stage generates until another trigger is received. At the next trigger, the buffer of the previous stage completes, and then the waveform described by the second stage generates. After the staging list completes, the waveform generation returns to the first stage and continues in a cyclic fashion. In Frequency List mode, the duration instruction is ignored, and the trigger switches the frequency to the next frequency in the list. trigger mode.

Note: In Frequency List mode, Stepped trigger mode is the same as Burst

`nifgen.TriggerSource`

`TriggerSource.IMMEDIATE`

Immediate-The signal generator does not wait for a trigger of any kind.

`TriggerSource.EXTERNAL`

External-The signal generator waits for a trigger on the external trigger input

`TriggerSource.SOFTWARE_TRIG`

Software Trigger-The signal generator waits until you call `nifgen.Session.SendSWTrigger()`.

`TriggerSource.TTL0`

PXI TRIG0 or VXI TTL0

`TriggerSource.TTL1`

PXI TRIG1 or VXI TTL1

`TriggerSource.TTL2`

PXI TRIG2 or VXI TTL2

`TriggerSource.TTL3`

PXI TRIG3 or VXI TTL3

`TriggerSource.TTL4`

PXI TRIG4 or VXI TTL4

`TriggerSource.TTL5`

PXI TRIG5 or VXI TTL5

`TriggerSource.TTL6`

PXI TRIG6 or VXI TTL6

`TriggerSource.PXI_STAR`

PXI star

`TriggerSource.RTSI_0`

RTSI line 0

`TriggerSource.RTSI_1`

RTSI line 1

`TriggerSource.RTSI_2`

RTSI line 2

`TriggerSource.RTSI_3`

RTSI line 3

`TriggerSource.RTSI_4`

RTSI line 4

`TriggerSource.RTSI_5`
RTSI line 5

`TriggerSource.RTSI_6`
RTSI line 6

`TriggerSource.RTSI_7`
RTSI line 7

`TriggerSource.PFI_0`
PFI 0

`TriggerSource.PFI_1`
PFI 1

`TriggerSource.PFI_2`
PFI 2

`TriggerSource.PFI_3`
PFI 3

`TriggerSource.OTHER_TERMINAL`
Specifies that another terminal is used.

`nifgen.TriggerWhen`

`TriggerWhen.HIGH`

`TriggerWhen.LOW`

`nifgen.VideoWaveformType`

`VideoWaveformType.PAL_B`
PAL B Video Type

`VideoWaveformType.PAL_D`
PAL D Video Type

`VideoWaveformType.PAL_G`
PAL G Video Type

`VideoWaveformType.PAL_H`
PAL H Video Type

`VideoWaveformType.PAL_I`
PAL I Video Type

`VideoWaveformType.PAL_M`
PAL M Video Type

`VideoWaveformType.PAL_N`
PAL N Video Type

`VideoWaveformType.NTSC_M`
NTSC M Video Type

`nifgen.WaitBehavior`

`WaitBehavior.HOLD_LAST`
While in an Idle or Wait state, the output signal remains at the last voltage generated prior to entering the state.

`WaitBehavior.JUMP_TO`

While in an Idle or Wait state, the output signal remains at the value configured in the Idle or Wait value property.

`nifgen.Waveform`

`Waveform.SINE`

Sinusoid waveform

`Waveform.SQUARE`

Square waveform

`Waveform.TRIANGLE`

Triange waveform

`Waveform.RAMP_UP`

Positive ramp waveform

`Waveform.RAMP_DOWN`

Negative ramp waveform

`Waveform.DC`

Constant voltage

`Waveform.NOISE`

White noise

`Waveform.USER`

User-defined waveform as defined by the `nifgen.Session.define_user_standard_waveform()` method.

Examples

`nifgen_arb_waveform.py`

Listing 7.6: (`nifgen_arb_waveform.py`)

```
1  #!/usr/bin/python
2
3  import argparse
4  import math
5  import nifgen
6  import sys
7  import time
8
9
10 def create_waveform_data(number_of_samples):
11     waveform_data = []
12     angle_per_sample = (2 * math.pi) / number_of_samples
13     for i in range(number_of_samples):
14         waveform_data.append(math.sin(i * angle_per_sample) * math.sin(i * angle_per_
15 ↪sample * 20))
16     return waveform_data
17
18 def example(resource_name, options, samples, gain, offset, gen_time):
19     waveform_data = create_waveform_data(samples)
20     with nifgen.Session(resource_name=resource_name, options=options) as session:
```



```

21     session.output_mode = nifgen.OutputMode.ARB
22     waveform = session.create_waveform(waveform_data_array=waveform_data)
23     session.configure_arb_waveform(waveform_handle=waveform, gain=gain,
↳offset=offset)
24     with session.initiate():
25         time.sleep(gen_time)
26
27
28 def _main(argv):
29     parser = argparse.ArgumentParser(description='Continuously generates an arbitrary_
↳waveform.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
30     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
↳name of a National Instruments Arbitrary Waveform Generator')
31     parser.add_argument('-s', '--samples', default=100000, type=int, help='Number of_
↳samples')
32     parser.add_argument('-g', '--gain', default=1.0, type=float, help='Gain')
33     parser.add_argument('-o', '--offset', default=0.0, type=float, help='DC offset (V)
↳')
34     parser.add_argument('-t', '--time', default=5.0, type=float, help='Generation_
↳time (s)')
35     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
↳string')
36     args = parser.parse_args(argv)
37     example(args.resource_name, args.option_string, args.samples, args.gain, args.
↳offset, args.time)
38
39
40 def main():
41     _main(sys.argv[1:])
42
43
44 def test_example():
45     options = {'simulate': True, 'driver_setup': {'Model': '5433 (2CH)', 'BoardType':
↳'PXIe', }, }
46     example('PXI1Slot2', options, 100000, 1.0, 0.0, 5.0)
47
48
49 def test_main():
50     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:5433 (2CH);
↳BoardType:PXIe', ]
51     _main(cmd_line)
52
53
54 if __name__ == '__main__':
55     main()
56
57

```

nifgen_standard_function.py

Listing 7.7: (nifgen_standard_function.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import nifgen

```

```

5 import sys
6 import time
7
8
9 def example(resource_name, options, waveform, frequency, amplitude, offset, phase,
↳ gen_time):
10     with nifgen.Session(resource_name=resource_name, options=options) as session:
11         session.output_mode = nifgen.OutputMode.FUNC
12         session.configure_standard_waveform(waveform=nifgen.Waveform[waveform],
↳ amplitude=amplitude, frequency=frequency, dc_offset=offset, start_phase=phase)
13         with session.initiate():
14             time.sleep(gen_time)
15
16
17 def _main(argv):
18     supported_waveforms = list(nifgen.Waveform.__members__.keys())[:-1] # no support
↳ for user-defined waveforms in example
19     parser = argparse.ArgumentParser(description='Generates the standard function.',
↳ formatter_class=argparse.ArgumentDefaultsHelpFormatter)
20     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
↳ name of a National Instruments Function Generator')
21     parser.add_argument('-w', '--waveform', default=supported_waveforms[0],
↳ choices=supported_waveforms, type=str.upper, help='Standard waveform')
22     parser.add_argument('-f', '--frequency', default=1000, type=float, help=
↳ 'Frequency (Hz)')
23     parser.add_argument('-a', '--amplitude', default=1.0, type=float, help='Amplitude
↳ (Vpk-pk)')
24     parser.add_argument('-o', '--offset', default=0.0, type=float, help='DC offset (V)
↳ ')
25     parser.add_argument('-p', '--phase', default=0.0, type=float, help='Start phase
↳ (deg)')
26     parser.add_argument('-t', '--time', default=5.0, type=float, help='Generation
↳ time (s)')
27     parser.add_argument('-op', '--option-string', default='', type=str, help='Option
↳ string')
28     args = parser.parse_args(argv)
29     example(args.resource_name, args.option_string, args.waveform, args.frequency,
↳ args.amplitude, args.offset, args.phase, args.time)
30
31
32 def main():
33     _main(sys.argv[1:])
34
35
36 def test_example():
37     options = {'simulate': True, 'driver_setup': {'Model': '5433 (2CH)', 'BoardType':
↳ 'PXIe', }, }
38     example('PXI1Slot2', options, 'SINE', 1000, 1.0, 0.0, 0.0, 5.0)
39
40
41 def test_main():
42     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:5433 (2CH);
↳ BoardType:PXIe', ]
43     _main(cmd_line)
44
45
46 if __name__ == '__main__':
47     main()

```

48
49
50

7.4 niscscope module

7.4.1 Installation

As a prerequisite to using the niscscope module, you must install the NI-SCOPE runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The nimi-python modules (i.e. for **NI-SCOPE**) can be installed with **pip**:

```
$ python -m pip install niscscope~=0.8.0
```

Or **easy_install** from **setuptools**:

```
$ python -m easy_install niscscope
```

7.4.2 Usage

The following is a basic example of using the **niscscope** module to open a session to a High Speed Digitizer and capture a single record of 1000 points.

```
import niscscope
with niscscope.Session("Dev1") as session:
    session.channels[0].configure_vertical(range=1.0, coupling=niscscope.
↪VerticalCoupling.AC)
    session.channels[1].configure_vertical(range=10.0, coupling=niscscope.
↪VerticalCoupling.DC)
    session.configure_horizontal_timing(min_sample_rate=50000000, min_num_pts=1000,
↪ref_position=50.0, num_records=5, enforce_realtime=True)
    with session.initiate():
        waveforms = session.channels[0,1].fetch(num_records=5)
        for wfm in waveforms:
            print('Channel {0}, record {1} samples acquired: {2:,}\n'.format(wfm.channel,
↪wfm.record, len(wfm.samples)))

    # Find all channel 1 records (Note channel name is always a sting even if
↪integers used in channel[])
    chan1 = [wfm for wfm in waveforms if wfm.channel == '0']

    # Find all record number 3
    rec3 = [wfm for wfm in waveforms if wfm.record == 3]
```

The waveform returned from **fetch** is a flat list of Python objects

- Attributes:
 - **relative_initial_x** (float) the time (in seconds) from the trigger to the first sample in the fetched waveform
 - **absolute_initial_x** (float) timestamp (in seconds) of the first fetched sample. This timestamp is comparable between records and acquisitions; devices that do not support this parameter use 0 for this output.
 - **x_increment** (float) the time between points in the acquired waveform in seconds

- **channel** (str) channel name this waveform was asquire from
- **record** (int) record number of this waveform
- **gain** (float) the gain factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **offset** (float) the offset factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **samples** (array of float) floating point array of samples. Length will be of the actual samples acquired
- Such that all record 0 waveforms are first. For example, with a channel list of 0,1, you would have the following index values:
 - index 0 = record 0, channel 0
 - index 1 = record 0, channel 1
 - index 2 = record 1, channel 0
 - index 3 = record 1, channel 1
 - etc.

If you need more performance or need to work with [SciPy](#), you can use the `fetch_into()` method instead of `fetch()`. This method takes an already allocated [numpy](#) array and puts the acquired samples in it. Data types supported:

- `numpy.float64`
- `numpy.int8`
- `numpy.int16`
- `numpy.int32`

```
voltage_range = 1.0
record_length = 2000
channels = [0, 1]
num_channels = len(channels)
num_records = 5
wfm = numpy.ndarray(num_channels * record_length, dtype=numpy.int8)
session.configure_vertical(voltage_range, niscopes.VerticalCoupling.AC)
session.configure_horizontal_timing(50000000, record_length, 50.0, num_records, True)
with session.initiate():
    waveform_infos = session.channels[channels].fetch_into(wfm=wfm, num_records=num_
↪records)
```

The waveform_infos returned from `fetch_into` is a 1D list of Python objects

- Attributes:
 - **relative_initial_x** (float) the time (in seconds) from the trigger to the first sample in the fetched waveform
 - **absolute_initial_x** (float) timestamp (in seconds) of the first fetched sample. This timestamp is comparable between records and acquisitions; devices that do not support this parameter use 0 for this output.

- **x_increment** (float) the time between points in the acquired waveform in seconds
- **channel** (str) channel name this waveform was asquire from
- **record** (int) record number of this waveform
- **gain** (float) the gain factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **offset** (float) the offset factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **samples** (numpy array of datatype used) floating point array of samples. Length will be of the actual samples acquired

Note: Python 3 only

- Such that all record 0 waveforms are first. For example, with a channel list of 0,1, you would have the following index values:
 - index 0 = record 0, channel 0
 - index 1 = record 0, channel 1
 - index 2 = record 1, channel 0
 - index 3 = record 1, channel 1
 - etc.

Note: When using Python 2, the waveform_infos objects do not include the waveform for that record. Instead, samples are in the waveform passed into the function using the following layout:

- index 0 = record 0, channel 0
 - index x = record 0, channel 1
 - index $2x$ = record 1, channel 0
 - index $3x$ = record 1, channel 1
 - etc.
 - Where x = the record length
-

Additional examples for NI-SCOPE are located in src/niscope/examples/ directory.

7.4.3 API Reference

niscope.Session

class `niscope.Session`

An NI-SCOPE session to a National Instruments Digitizer.

Properties

Property	Datatype
<code>adjust_pretrigger_samples_5102</code>	bool
<code>five_v_out_output_terminal</code>	str
<code>absolute_sample_clock_offset</code>	float in seconds or datetime.timedelta
<code>accessory_gain</code>	float
<code>accessory_offset</code>	float
<code>acquisition_start_time</code>	float in seconds or datetime.timedelta
<code>acquisition_type</code>	<i>AcquisitionType</i>
<code>acq_arm_source</code>	str
<code>adv_trig_src</code>	str
<code>allow_more_records_than_memory</code>	bool
<code>arm_ref_trig_src</code>	str
<code>backlog</code>	float
<code>bandpass_filter_enabled</code>	bool
<code>binary_sample_width</code>	int
<code>cache</code>	bool
<code>channel_count</code>	int
<code>channel_enabled</code>	bool
<code>channel_terminal_configuration</code>	<i>TerminalConfiguration</i>
<code>clock_sync_pulse_source</code>	str
<code>data_transfer_block_size</code>	int
<code>data_transfer_maximum_bandwidth</code>	float
<code>data_transfer_preferred_packet_size</code>	int
<code>ddc_center_frequency</code>	float
<code>ddc_data_processing_mode</code>	<i>DataProcessingMode</i>
<code>ddc_enabled</code>	bool
<code>ddc_frequency_translation_enabled</code>	bool
<code>ddc_frequency_translation_phase_i</code>	float
<code>ddc_frequency_translation_phase_q</code>	float
<code>ddc_q_source</code>	str
<code>device_number</code>	int
<code>device_temperature</code>	float
<code>digital_gain</code>	float
<code>digital_offset</code>	float
<code>dither_enabled</code>	bool
<code>driver_setup</code>	str
<code>enable_dc_restore</code>	bool
<code>enable_time_interleaved_sampling</code>	bool
<code>end_of_acquisition_event_output_terminal</code>	str
<code>end_of_record_event_output_terminal</code>	str
<code>end_of_record_to_advance_trigger_holdoff</code>	float in seconds or datetime.timedelta
<code>equalization_filter_enabled</code>	bool

Continued on next page

Table 7.7 – continued from previous page

Property	Datatype
<code>equalization_num_coefficients</code>	int
<code>exported_advance_trigger_output_terminal</code>	str
<code>exported_ref_trigger_output_terminal</code>	str
<code>exported_start_trigger_output_terminal</code>	str
<code>fetch_interleaved_data</code>	bool
<code>fetch_interleaved_iq_data</code>	bool
<code>flex_fir_antialias_filter_type</code>	<i>FlexFIRAntialiasFilterType</i>
<code>fpga_bitfile_path</code>	str
<code>fractional_resample_enabled</code>	bool
<code>group_capabilities</code>	str
<code>high_pass_filter_frequency</code>	float
<code>horz_enforce_realtime</code>	bool
<code>horz_min_num_pts</code>	int
<code>horz_num_records</code>	int
<code>horz_record_length</code>	int
<code>horz_record_ref_position</code>	float
<code>horz_sample_rate</code>	float
<code>horz_time_per_record</code>	float in seconds or datetime.timedelta
<code>input_clock_source</code>	str
<code>input_impedance</code>	float
<code>instrument_firmware_revision</code>	str
<code>instrument_manufacturer</code>	str
<code>instrument_model</code>	str
<code>interchange_check</code>	bool
<code>interleaving_offset_correction_enabled</code>	bool
<code>io_resource_descriptor</code>	str
<code>logical_name</code>	str
<code>master_enable</code>	bool
<code>max_input_frequency</code>	float
<code>max_real_time_sampling_rate</code>	float
<code>max_ris_rate</code>	float
<code>min_sample_rate</code>	float
<code>mux_mode_register</code>	int
<code>onboard_memory_size</code>	int
<code>oscillator_phase_dac_value</code>	int
<code>output_clock_source</code>	str
<code>overflow_error_reporting</code>	<i>OverflowErrorReporting</i>
<code>pll_lock_status</code>	bool
<code>points_done</code>	float
<code>poll_interval</code>	int
<code>probe_attenuation</code>	float
<code>range_check</code>	bool
<code>ready_for_advance_event_output_terminal</code>	str
<code>ready_for_ref_event_output_terminal</code>	str
<code>ready_for_start_event_output_terminal</code>	str
<code>records_done</code>	int
<code>record_arm_source</code>	str
<code>record_coercions</code>	bool
<code>ref_clk_rate</code>	float

Continued on next page

Table 7.7 – continued from previous page

Property	Datatype
<code>ref_trigger_detector_location</code>	<i>RefTriggerDetectorLocation</i>
<code>ref_trigger_minimum_quiet_time</code>	float in seconds or <code>datetime.timedelta</code>
<code>ref_trig_tdc_enable</code>	bool
<code>resolution</code>	int
<code>ris_in_auto_setup_enable</code>	bool
<code>ris_method</code>	<i>RISMethod</i>
<code>ris_num_averages</code>	int
<code>sample_clock_timebase_multiplier</code>	int
<code>sample_mode</code>	int
<code>samp_clk_timebase_div</code>	int
<code>samp_clk_timebase_rate</code>	float
<code>samp_clk_timebase_src</code>	str
<code>serial_number</code>	str
<code>simulate</code>	bool
<code>slave_trigger_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>specific_driver_class_spec_major_version</code>	int
<code>specific_driver_class_spec_minor_version</code>	int
<code>specific_driver_description</code>	str
<code>specific_driver_revision</code>	str
<code>specific_driver_vendor</code>	str
<code>start_to_ref_trigger_holdoff</code>	float in seconds or <code>datetime.timedelta</code>
<code>stream_relative_to</code>	<i>StreamingPositionType</i>
<code>supported_instrument_models</code>	str
<code>trigger_auto_triggered</code>	bool
<code>trigger_coupling</code>	<i>TriggerCoupling</i>
<code>trigger_delay_time</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_from_pfi_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_from_rtsi_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_from_star_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_holdoff</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_hysteresis</code>	float
<code>trigger_impedance</code>	float
<code>trigger_level</code>	float
<code>trigger_modifier</code>	<i>TriggerModifier</i>
<code>trigger_slope</code>	<i>TriggerSlope</i>
<code>trigger_source</code>	str
<code>trigger_to_pfi_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_to_rtsi_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_to_star_delay</code>	float in seconds or <code>datetime.timedelta</code>
<code>trigger_type</code>	<i>TriggerType</i>
<code>trigger_window_high_level</code>	float
<code>trigger_window_low_level</code>	float
<code>trigger_window_mode</code>	<i>TriggerWindowMode</i>
<code>tv_trigger_event</code>	<i>VideoTriggerEvent</i>
<code>tv_trigger_line_number</code>	int
<code>tv_trigger_polarity</code>	<i>VideoPolarity</i>
<code>tv_trigger_signal_format</code>	<i>VideoSignalFormat</i>
<code>vertical_coupling</code>	<i>VerticalCoupling</i>
<code>vertical_offset</code>	float

Continued on next page

Table 7.7 – continued from previous page

Property	Datatype
<i>vertical_range</i>	float

Public methods

Method name
<i>abort()</i>
<i>acquisition_status()</i>
<i>auto_setup()</i>
<i>commit()</i>
<i>configure_chan_characteristics()</i>
<i>configure_equalization_filter_coefficients()</i>
<i>configure_horizontal_timing()</i>
<i>configure_trigger_digital()</i>
<i>configure_trigger_edge()</i>
<i>configure_trigger_hysteresis()</i>
<i>configure_trigger_immediate()</i>
<i>configure_trigger_software()</i>
<i>configure_trigger_video()</i>
<i>configure_trigger_window()</i>
<i>configure_vertical()</i>
<i>disable()</i>
<i>export_signal()</i>
<i>fetch()</i>
<i>fetch_into()</i>
<i>get_equalization_filter_coefficients()</i>
<i>get_frequency_response()</i>
<i>probe_compensation_signal_start()</i>
<i>probe_compensation_signal_stop()</i>
<i>read()</i>
<i>reset()</i>
<i>reset_device()</i>
<i>reset_with_defaults()</i>
<i>self_cal()</i>
<i>self_test()</i>
<i>send_software_trigger_edge()</i>

niscope.Session methods

`niscope.Session.abort()`

Aborts an acquisition and returns the digitizer to the Idle state. Call this method if the digitizer times out waiting for a trigger.

`niscope.Session.acquisition_status()`

Returns status information about the acquisition to the **status** output parameter.

Return type `niscope.AcquisitionStatus`

Returns

Returns whether the acquisition is complete, in progress, or unknown.

Defined Values

COMPLETE

IN_PROGRESS

STATUS_UNKNOWN

`niscope.Session.auto_setup()`

Automatically configures the instrument. When you call this method, the digitizer senses the input signal and automatically configures many of the instrument settings. If a signal is detected on a channel, the driver chooses the smallest available vertical range that is larger than the signal range. For example, if the signal is a 1.2 V_{pk-pk} sine wave, and the device supports 1 V and 2 V vertical ranges, the driver will choose the 2 V vertical range for that channel.

If no signal is found on any analog input channel, a warning is returned, and all channels are enabled. A channel is considered to have a signal present if the signal is at least 10% of the smallest vertical range available for that channel.

The following settings are changed:

General	
Acquisition mode	Normal
Reference clock	Internal
Vertical	
Vertical coupling	AC (DC for NI 5621)
Vertical bandwidth	Full
Vertical range	Changed by auto setup
Vertical offset	0 V
Probe attenuation	Unchanged by auto setup
Input impedance	Unchanged by auto setup
Horizontal	
Sample rate	Changed by auto setup
Min record length	Changed by auto setup
Enforce realtime	True
Number of Records	Changed to 1
Triggering	
Trigger type	Edge if signal present, otherwise immediate
Trigger channel	Lowest numbered channel with a signal present
Trigger slope	Positive
Trigger coupling	DC
Reference position	50%
Trigger level	50% of signal on trigger channel
Trigger delay	0
Trigger holdoff	0
Trigger output	None

`niscope.Session.commit()`

Commits to hardware all the parameter settings associated with the task. Use this method if you want a parameter change to be immediately reflected in the hardware. This method is not supported for Traditional NI-DAQ (Legacy) devices.

`niscope.Session.configure_chan_characteristics(input_impedance, max_input_frequency)`

Configures the properties that control the electrical characteristics of the channel—the input impedance and the bandwidth.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].configure_chan_characteristics(input_impedance, max_input_
↪frequency)
```

Parameters

- **input_impedance** (*float*) – The input impedance for the channel; NI-SCOPE sets `niscope.Session.input_impedance` to this value.
- **max_input_frequency** (*float*) – The bandwidth for the channel; NI-SCOPE sets `niscope.Session.max_input_frequency` to this value. Pass 0 for this value to use the hardware default bandwidth. Pass -1 for this value to achieve full bandwidth.

`niscope.Session.configure_equalization_filter_coefficients` (*coefficients*)

Configures the custom coefficients for the equalization FIR filter on the device. This filter is designed to compensate the input signal for artifacts introduced to the signal outside of the digitizer. Because this filter is a generic FIR filter, any coefficients are valid. Coefficient values should be between +1 and -1.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].configure_equalization_filter_coefficients(coefficients)
```

Parameters **coefficients** (*list of float*) – The custom coefficients for the equalization FIR filter on the device. These coefficients should be between +1 and -1. You can obtain the number of coefficients from the `:py:data:'niscope.Session.equalization_num_coefficients'` `<cv:py:data:niscope.Session.equalization_num_coefficients.html>` property. The `:py:data:'niscope.Session.equalization_filter_enabled'` `<cv:py:data:niscope.Session.equalization_filter_enabled.html>` property must be set to `TRUE` to enable the filter.

`niscope.Session.configure_horizontal_timing` (*min_sample_rate*, *min_num_pts*, *ref_position*, *num_records*, *enforce_realtime*)

Configures the common properties of the horizontal subsystem for a multirecord acquisition in terms of minimum sample rate.

Parameters

- **min_sample_rate** (*float*) – The sampling rate for the acquisition. Refer to `niscope.Session.min_sample_rate` for more information.
- **min_num_pts** (*int*) – The minimum number of points you need in the record for each channel; call `niscope.Session.ActualRecordLength()` to obtain the actual record length used.

Valid Values: Greater than 1; limited by available memory

Note: One or more of the referenced methods are not in the Python API for this driver.

- **ref_position** (*float*) – The position of the Reference Event in the waveform record specified as a percentage.
- **num_records** (*int*) – The number of records to acquire
- **enforce_realtime** (*bool*) – Indicates whether the digitizer enforces real-time measurements or allows equivalent-time (RIS) measurements; not all digitizers support RIS—refer to [Features Supported by Device](#) for more information.

Default value: True

Defined Values

True—Allow real-time acquisitions only

False—Allow real-time and equivalent-time acquisitions

```
niscopesession.Session.configure_trigger_digital(trigger_source, slope=niscopesession.TriggerSlope.POSITIVE,
                                                holdoff=datetime.timedelta(seconds=0.0), delay=datetime.timedelta(seconds=0.0))
```

Configures the common properties of a digital trigger.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscopesession.Session.acq_arm_source` (Start Trigger Source) property. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each `Configure Trigger` method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

Note: For multirecord acquisitions, all records after the first record are started by using the Advance Trigger Source. The default is immediate.

You can adjust the amount of pre-trigger and post-trigger samples using the reference position parameter on the `niscopesession.Session.configure_horizontal_timing()` method. The default is half of the record length.

Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Digital triggering is not supported in RIS mode.

Parameters

- **trigger_source** (*str*) – Specifies the trigger source. Refer to `niscopesession.Session.trigger_source` for defined values.
- **slope** (*niscopesession.TriggerSlope*) – Specifies whether you want a rising edge or a falling edge to trigger the digitizer. Refer to `niscopesession.Session.trigger_slope` for more information.
- **holdoff** (*float in seconds or datetime.timedelta*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscopesession.Session.trigger_holdoff` for more information.
- **delay** (*float in seconds or datetime.timedelta*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscopesession.Session.trigger_delay_time` for more information.

```
niscopesession.configure_trigger_edge(trigger_source, trigger_coupling, level=0.0,
                                     slope=niscopesession.TriggerSlope.POSITIVE, hold-
                                     off=datetime.timedelta(seconds=0.0), de-
                                     lay=datetime.timedelta(seconds=0.0))
```

Configures common properties for analog edge triggering.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscopesession.acq_arm_source` (Start Trigger Source) property. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each Configure Trigger method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

Note: Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Parameters

- **trigger_source** (*str*) – Specifies the trigger source. Refer to `niscopesession.trigger_source` for defined values.
- **trigger_coupling** (`niscopesession.TriggerCoupling`) – Applies coupling and filtering options to the trigger signal. Refer to `niscopesession.trigger_coupling` for more information.
- **level** (*float*) – The voltage threshold for the trigger. Refer to `niscopesession.trigger_level` for more information.
- **slope** (`niscopesession.TriggerSlope`) – Specifies whether you want a rising edge or a falling edge to trigger the digitizer. Refer to `niscopesession.trigger_slope` for more information.
- **holdoff** (*float in seconds or datetime.timedelta*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscopesession.trigger_holdoff` for more information.
- **delay** (*float in seconds or datetime.timedelta*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscopesession.trigger_delay_time` for more information.

```
niscopesession.configure_trigger_hysteresis(trigger_source, trigger_coupling,
                                             level=0.0, hysteresis=0.05,
                                             slope=niscopesession.TriggerSlope.POSITIVE,
                                             holdoff=datetime.timedelta(seconds=0.0),
                                             delay=datetime.timedelta(seconds=0.0))
```

Configures common properties for analog hysteresis triggering. This kind of trigger specifies an additional value, specified in the **hysteresis** parameter, that a signal must pass through before a trigger can occur. This additional value acts as a kind of buffer zone that keeps noise from triggering an acquisition.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscopesession.acq_arm_source`. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each Configure Trigger method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

Note: Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Parameters

- **trigger_source** (*str*) – Specifies the trigger source. Refer to `niscope.Session.trigger_source` for defined values.
- **trigger_coupling** (`niscope.TriggerCoupling`) – Applies coupling and filtering options to the trigger signal. Refer to `niscope.Session.trigger_coupling` for more information.
- **level** (*float*) – The voltage threshold for the trigger. Refer to `niscope.Session.trigger_level` for more information.
- **hysteresis** (*float*) – The size of the hysteresis window on either side of the **level** in volts; the digitizer triggers when the trigger signal passes through the hysteresis value you specify with this parameter, has the slope you specify with **slope**, and passes through the **level**. Refer to `niscope.Session.trigger_hysteresis` for defined values.
- **slope** (`niscope.TriggerSlope`) – Specifies whether you want a rising edge or a falling edge to trigger the digitizer. Refer to `niscope.Session.trigger_slope` for more information.
- **holdoff** (*float in seconds or datetime.timedelta*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscope.Session.trigger_holdoff` for more information.
- **delay** (*float in seconds or datetime.timedelta*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscope.Session.trigger_delay_time` for more information.

`niscope.Session.configure_trigger_immediate()`

Configures common properties for immediate triggering. Immediate triggering means the digitizer triggers itself.

When you initiate an acquisition, the digitizer waits for a trigger. You specify the type of trigger that the digitizer waits for with a Configure Trigger method, such as `niscope.Session.configure_trigger_immediate()`.

`niscope.Session.configure_trigger_software(holdoff=datetime.timedelta(seconds=0.0), delay=datetime.timedelta(seconds=0.0))`

Configures common properties for software triggering.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscope.Session.acq_arm_source` (Start Trigger Source) property. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each Configure Trigger method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

To trigger the acquisition, use `niscope.Session.send_software_trigger_edge()`.

Note: Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Parameters

- **holdoff** (*float in seconds or `datetime.timedelta`*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscope.Session.trigger_holdoff` for more information.
- **delay** (*float in seconds or `datetime.timedelta`*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscope.Session.trigger_delay_time` for more information.

```
niscope.Session.configure_trigger_video(trigger_source,      signal_format,      event,
                                       polarity,            trigger_coupling,      en-
                                       able_dc_restore=False, line_number=1,
                                       holdoff=datetime.timedelta(seconds=0.0), de-
                                       lay=datetime.timedelta(seconds=0.0))
```

Configures the common properties for video triggering, including the signal format, TV event, line number, polarity, and enable DC restore. A video trigger occurs when the digitizer finds a valid video signal sync.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscope.Session.acq_arm_source` (Start Trigger Source) property. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each Configure Trigger method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

Note: Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Parameters

- **trigger_source** (*str*) – Specifies the trigger source. Refer to `niscope.Session.trigger_source` for defined values.
- **signal_format** (*`niscope.VideoSignalFormat`*) – Specifies the type of video signal sync the digitizer should look for. Refer to `niscope.Session.tv_trigger_signal_format` for more information.
- **event** (*`niscope.VideoTriggerEvent`*) – Specifies the TV event you want to trigger on. You can trigger on a specific or on the next coming line or field of the signal.
- **polarity** (*`niscope.VideoPolarity`*) – Specifies the polarity of the video signal sync.
- **trigger_coupling** (*`niscope.TriggerCoupling`*) – Applies coupling and filtering options to the trigger signal. Refer to `niscope.Session.trigger_coupling` for more information.
- **enable_dc_restore** (*bool*) – Offsets each video line so the clamping level (the portion of the video line between the end of the color burst and the beginning of the active image) is moved to zero volt. Refer to `niscope.Session.enable_dc_restore` for defined values.
- **line_number** (*int*) – Selects the line number to trigger on. The line number range covers an entire frame and is referenced as shown on [Vertical Blanking and Synchronization Signal](#). Refer to `niscope.Session.tv_trigger_line_number` for more information.

Default value: 1

- **holdoff** (*float in seconds or `datetime.timedelta`*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscope.Session.trigger_holdoff` for more information.
- **delay** (*float in seconds or `datetime.timedelta`*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscope.Session.trigger_delay_time` for more information.

```
niscope.Session.configure_trigger_window(trigger_source, low_level, high_level,
                                         window_mode, trigger_coupling, hold-
                                         off=datetime.timedelta(seconds=0.0), de-
                                         lay=datetime.timedelta(seconds=0.0))
```

Configures common properties for analog window triggering. A window trigger occurs when a signal enters or leaves a window you specify with the **high level** or **low level** parameters.

When you initiate an acquisition, the digitizer waits for the start trigger, which is configured through the `niscope.Session.acq_arm_source` (Start Trigger Source) property. The default is immediate. Upon receiving the start trigger the digitizer begins sampling pretrigger points. After the digitizer finishes sampling pretrigger points, the digitizer waits for a reference (stop) trigger that you specify with a method such as this one. Upon receiving the reference trigger the digitizer finishes the acquisition after completing posttrigger sampling. With each Configure Trigger method, you specify configuration parameters such as the trigger source and the amount of trigger delay.

To trigger the acquisition, use `niscope.Session.send_software_trigger_edge()`.

Note: Some features are not supported by all digitizers. Refer to [Features Supported by Device](#) for more information.

Parameters

- **trigger_source** (*str*) – Specifies the trigger source. Refer to `niscope.Session.trigger_source` for defined values.
- **low_level** (*float*) – Passes the voltage threshold you want the digitizer to use for low triggering.
- **high_level** (*float*) – Passes the voltage threshold you want the digitizer to use for high triggering.
- **window_mode** (*`niscope.TriggerWindowMode`*) – Specifies whether you want the trigger to occur when the signal enters or leaves a window.
- **trigger_coupling** (*`niscope.TriggerCoupling`*) – Applies coupling and filtering options to the trigger signal. Refer to `niscope.Session.trigger_coupling` for more information.
- **holdoff** (*float in seconds or `datetime.timedelta`*) – The length of time the digitizer waits after detecting a trigger before enabling NI-SCOPE to detect another trigger. Refer to `niscope.Session.trigger_holdoff` for more information.
- **delay** (*float in seconds or `datetime.timedelta`*) – How long the digitizer waits after receiving the trigger to start acquiring data. Refer to `niscope.Session.trigger_delay_time` for more information.

`niscope.Session.configure_vertical` (*range*, *coupling*, *offset*=0.0, *probe_attenuation*=1.0, *enabled*=True)

Configures the most commonly configured properties of the digitizer vertical subsystem, such as the range, offset, coupling, probe attenuation, and the channel.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].configure_vertical(range, coupling, offset=0.0, probe_
↪attenuation=1.0, enabled=True)
```

Parameters

- **range** (*float*) – Specifies the vertical range. Refer to `niscope.Session.vertical_range` for more information.
- **coupling** (`niscope.VerticalCoupling`) – Specifies how to couple the input signal. Refer to `niscope.Session.vertical_coupling` for more information.
- **offset** (*float*) – Specifies the vertical offset. Refer to `niscope.Session.vertical_offset` for more information.
- **probe_attenuation** (*float*) – Specifies the probe attenuation. Refer to `niscope.Session.probe_attenuation` for valid values.
- **enabled** (*bool*) – Specifies whether the channel is enabled for acquisition. Refer to `niscope.Session.channel_enabled` for more information.

`niscope.Session.disable` ()

Aborts any current operation, opens data channel relays, and releases RTSI and PFI lines.

`niscope.Session.export_signal` (*signal*, *output_terminal*, *signal_identifier*="None")

Configures the digitizer to generate a signal that other devices can detect when configured for digital triggering or sharing clocks. The **signal** parameter specifies what condition causes the digitizer to generate the signal. The **outputTerminal** parameter specifies where to send the signal on the hardware (such as a PFI connector or RTSI line).

In cases where multiple instances of a particular signal exist, use the **signalIdentifier** input to specify which instance to control. For normal signals, only one instance exists and you should leave this parameter set to the empty string. You can call this method multiple times and set each available line to a different signal.

To unprogram a specific line on device, call this method with the signal you no longer want to export and set **outputTerminal** to `NISCOPE_VAL_NONE`.

Note: This method replaces `niscope.Session.ConfigureTriggerOutput` ().

Note: One or more of the referenced methods are not in the Python API for this driver.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Parameters

- **signal** (*niscope.ExportableSignals*) – signal (clock, trigger, or event) to export.

Defined Values

<i>REF_TRIGGER</i>	1.	Generate a pulse when detecting the Stop/Reference trigger.
<i>START_TRIGGER</i>	2.	Generate a pulse when detecting a Start trigger.
<i>END_OF_ACQUISITION_EVENT</i>	3.	Generate a pulse when the acquisition finishes.
<i>END_OF_RECORD_EVENT</i>	4.	Generate a pulse at the end of the record.
<i>ADVANCE_TRIGGER</i>	5.	Generate a pulse when detecting an Advance trigger.
<i>READY_FOR_ADVANCE_EVENT</i>	6.	Asserts when the digitizer is ready to advance to the next record.
<i>READY_FOR_START_EVENT</i>	7.	Asserts when the digitizer is initiated and ready to accept a Start trigger and begin sampling.
<i>READY_FOR_REF_EVENT</i>	10.	Asserts when the digitizer is ready to accept a Reference trigger.
<i>REF_CLOCK</i>	100.	Export the Reference clock for the digitizer to the specified terminal.
<i>SAMPLE_CLOCK</i>	101.	Export the Sample clock for the digitizer to the specified terminal.
<i>FIVE_V_OUT</i>	13.	Exports a 5 V power supply.

- **output_terminal** (*str*) – Identifies the hardware signal line on which the digital pulse is generated.

Defined Values

NISCOPE_VAL_RTISI_0	("VAL_RTISI_0")
NISCOPE_VAL_RTISI_1	("VAL_RTISI_1")
NISCOPE_VAL_RTISI_2	("VAL_RTISI_2")
NISCOPE_VAL_RTISI_3	("VAL_RTISI_3")
NISCOPE_VAL_RTISI_4	("VAL_RTISI_4")
NISCOPE_VAL_RTISI_5	("VAL_RTISI_5")
NISCOPE_VAL_RTISI_6	("VAL_RTISI_6")
NISCOPE_VAL_RTISI_7	("VAL_RTISI_7")
NISCOPE_VAL_PXI_STAR	("VAL_PXI_STAR")
NISCOPE_VAL_PFI_0	("VAL_PFI_0")
NISCOPE_VAL_PFI_1	("VAL_PFI_1")
NISCOPE_VAL_PFI_2	("VAL_PFI_2")
NISCOPE_VAL_CLK_OUT	("VAL_CLK_OUT")

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **signal_identifier** (*str*) – Describes the signal being exported.

```
niscope.Session.fetch(num_samples=None, relative_to=niscope.FetchRelativeTo.PRETRIGGER,
                      offset=0, record_number=0, num_records=None, time-
                      out=datetime.timedelta(seconds=5.0))
```

Returns the waveform from a previously initiated acquisition that the digitizer acquires for the specified channel. This method returns scaled voltage waveforms.

This method may return multiple waveforms depending on the number of channels, the acquisition type, and the number of records you specify.

Note: Some functionality, such as time stamping, is not supported in all digitizers.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].fetch(num_samples=None, relative_to=niscope.
    ↳FetchRelativeTo.PRETRIGGER, offset=0, record_number=0, num_records=None,
    ↳timeout=datetime.timedelta(seconds=5.0))
```

Parameters

- **num_samples** (*int*) – The maximum number of samples to fetch for each waveform. If the acquisition finishes with fewer points than requested, some devices return partial data if the acquisition finished, was aborted, or a timeout of 0 was used. If it fails to complete within the timeout period, the method raises.
- **relative_to** (*niscope.FetchRelativeTo*) – Position to start fetching within one record.

- **offset** (*int*) – Offset in samples to start fetching data within each record. The offset can be positive or negative.
- **record_number** (*int*) – Zero-based index of the first record to fetch.
- **num_records** (*int*) – Number of records to fetch. Use -1 to fetch all configured records.
- **timeout** (*float or datetime.timedelta*) – The time to wait for data to be acquired; using 0 for this parameter tells NI-SCOPE to fetch whatever is currently available. Using -1 seconds for this parameter implies infinite timeout.

Return type list of WaveformInfo

Returns

Returns an array of classes with the following timing and scaling information about each waveform:

- **relative_initial_x** (float) the time (in seconds) from the trigger to the first sample in the fetched waveform
- **absolute_initial_x** (float) timestamp (in seconds) of the first fetched sample. This timestamp is comparable between records and acquisitions; devices that do not support this parameter use 0 for this output.
- **x_increment** (float) the time between points in the acquired waveform in seconds
- **channel** (str) channel name this waveform was asquire from
- **record** (int) record number of this waveform
- **gain** (float) the gain factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **offset** (float) the offset factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **samples** (array of float) floating point array of samples. Length will be of the actual samples acquired

```
niscope.Session.fetch_into (waveform,          relative_to=niscope.FetchRelativeTo.PRETRIGGER,
                           offset=0,          record_number=0,          num_records=None,          time-
                           out=datetime.timedelta(seconds=5.0))
```

Returns the waveform from a previously initiated acquisition that the digitizer acquires for the specified channel. This method returns scaled voltage waveforms.

This method may return multiple waveforms depending on the number of channels, the acquisition type, and the number of records you specify.

Note: Some functionality, such as time stamping, is not supported in all digitizers.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].fetch(waveform, relative_to=niscope.FetchRelativeTo.  
    ↳PRETRIGGER, offset=0, record_number=0, num_records=None, timeout=datetime.  
    ↳timedelta(seconds=5.0))
```

Parameters

- **waveform** (`array.array("d")`) – numpy array of the appropriate type and size the should be acquired as a 1D array. Size should be **num_samples** times number of waveforms. Call `niscope.Session._actual_num_wfms()` to determine the number of waveforms.

Types supported are

- `numpy.float64`
- `numpy.int8`
- `numpy.in16`
- `numpy.int32`

Example:

```
waveform = numpy.ndarray(num_samples * session.actual_num_wfms(),  
    ↳dtype=numpy.float64)  
wfm_info = session['0,1'].fetch_into(num_samples, waveform,  
    ↳timeout=5.0)
```

- **relative_to** (`niscope.FetchRelativeTo`) – Position to start fetching within one record.
- **offset** (`int`) – Offset in samples to start fetching data within each record. The offset can be positive or negative.
- **record_number** (`int`) – Zero-based index of the first record to fetch.
- **num_records** (`int`) – Number of records to fetch. Use -1 to fetch all configured records.
- **timeout** (`float`) – The time to wait in seconds for data to be acquired; using 0 for this parameter tells NI-SCOPE to fetch whatever is currently available. Using -1 for this parameter implies infinite timeout.

Return type list of WaveformInfo

Returns

Returns an array of classed with the following timing and scaling information about each waveform:

- **relative_initial_x** (`float`) the time (in seconds) from the trigger to the first sample in the fetched waveform
- **absolute_initial_x** (`float`) timestamp (in seconds) of the first fetched sample. This timestamp is comparable between records and acquisitions; devices that do not support this parameter use 0 for this output.

- **x_increment** (float) the time between points in the acquired waveform in seconds
- **channel** (str) channel name this waveform was asquire from
- **record** (int) record number of this waveform
- **gain** (float) the gain factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **offset** (float) the offset factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **samples** (array of float) floating point array of samples. Length will be of the actual samples acquired

`niscope.Session.get_equalization_filter_coefficients()`

Retrieves the custom coefficients for the equalization FIR filter on the device. This filter is designed to compensate the input signal for artifacts introduced to the signal outside of the digitizer. Because this filter is a generic FIR filter, any coefficients are valid. Coefficient values should be between +1 and -1.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].get_equalization_filter_coefficients()
```

`niscope.Session.get_frequency_response()`

Gets the frequency response of the digitizer for the current configurations of the channel properties. Not all digitizers support this method.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].get_frequency_response()
```

Return type `int`

Returns Returns the number of frequencies in the returned spectrum.

`niscope.Session.probe_compensation_signal_start()`

Starts the 1 kHz square wave output on PFI 1 for probe compensation.

```
niscopesession.probe_compensation_signal_stop()
```

Stops the 1 kHz square wave output on PFI 1 for probe compensation.

```
niscopesession.read(num_samples=None, relative_to=niscopesession.FetchRelativeTo.PRETRIGGER,
                    offset=0, record_number=0, num_records=None, timeout=
                    datetime.timedelta(seconds=5.0))
```

Initiates an acquisition, waits for it to complete, and retrieves the data. The process is similar to calling `niscopesession._initiate_acquisition()`, `niscopesession.acquisition_status()`, and `niscopesession.fetch()`. The only difference is that with `niscopesession.read()`, you enable all channels specified with **channelList** before the acquisition; in the other method, you enable the channels with `niscopesession.configure_vertical()`.

This method may return multiple waveforms depending on the number of channels, the acquisition type, and the number of records you specify.

Note: Some functionality, such as time stamping, is not supported in all digitizers.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscopesession` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscopesession` instance, and calling this method on the result.:

```
session.channels['0,1'].read(num_samples=None, relative_to=niscopesession.
    ↳FetchRelativeTo.PRETRIGGER, offset=0, record_number=0, num_records=None,
    ↳timeout=datetime.timedelta(seconds=5.0))
```

Parameters

- **num_samples** (*int*) – The maximum number of samples to fetch for each waveform. If the acquisition finishes with fewer points than requested, some devices return partial data if the acquisition finished, was aborted, or a timeout of 0 was used. If it fails to complete within the timeout period, the method raises.
- **relative_to** (*niscopesession.FetchRelativeTo*) – Position to start fetching within one record.
- **offset** (*int*) – Offset in samples to start fetching data within each record. The offset can be positive or negative.
- **record_number** (*int*) – Zero-based index of the first record to fetch.
- **num_records** (*int*) – Number of records to fetch. Use -1 to fetch all configured records.
- **timeout** (*float or datetime.timedelta*) – The time to wait for data to be acquired; using 0 for this parameter tells NI-SCOPE to fetch whatever is currently available. Using -1 seconds for this parameter implies infinite timeout.

Return type list of WaveformInfo

Returns

Returns an array of classes with the following timing and scaling information about each waveform:

- **relative_initial_x** (*float*) the time (in seconds) from the trigger to the first sample in the fetched waveform

- **absolute_initial_x** (float) timestamp (in seconds) of the first fetched sample. This timestamp is comparable between records and acquisitions; devices that do not support this parameter use 0 for this output.
- **x_increment** (float) the time between points in the acquired waveform in seconds
- **channel** (str) channel name this waveform was asquire from
- **record** (int) record number of this waveform
- **gain** (float) the gain factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **offset** (float) the offset factor of the given channel; useful for scaling binary data with the following formula:

$$voltage = binarydata * gainfactor + offset$$

- **samples** (array of float) floating point array of samples. Length will be of the actual samples acquired

`niscope.Session.reset()`

Stops the acquisition, releases routes, and all session properties are reset to their [default states](#).

`niscope.Session.reset_device()`

Performs a hard reset of the device. Acquisition stops, all routes are released, RTSI and PFI lines are tristated, hardware is configured to its default state, and all session properties are reset to their default state.

- [Thermal Shutdown](#)

`niscope.Session.reset_with_defaults()`

Performs a software reset of the device, returning it to the default state and applying any initial default settings from the IVI Configuration Store.

`niscope.Session.self_cal(option=niscope.Option.SELF_CALIBRATE_ALL_CHANNELS)`

Self-calibrates most NI digitizers, including all SMC-based devices and most Traditional NI-DAQ (Legacy) devices. To verify that your digitizer supports self-calibration, refer to [Features Supported by Device](#).

For SMC-based digitizers, if the self-calibration is performed successfully in a regular session, the calibration constants are immediately stored in the self-calibration area of the EEPROM. If the self-calibration is performed in an external calibration session, the calibration constants take effect immediately for the duration of the session. However, they are not stored in the EEPROM until `niscope.Session.CalEnd()` is called with **action** set to `NISCOPE_VAL_ACTION_STORE` and no errors occur.

Note: One or more of the referenced methods are not in the Python API for this driver.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This method requires repeated capabilities (usually channels). If called directly on the `niscope.Session` object, then the method will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `niscope.Session` instance, and calling this method on the result.:

```
session.channels['0,1'].self_cal(option=niscope.Option.SELF_CALIBRATE_ALL_
↳CHANNELS)
```

Parameters `option` (`niscope.Option`) – The calibration option. Use `VI_NULL` for a normal self-calibration operation or `NISCOPE_VAL_CAL_RESTORE_EXTERNAL_CALIBRATION` to restore the previous calibration.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`niscope.Session.self_test()`

Runs the instrument self-test routine and returns the test result(s). Refer to the device-specific help topics for an explanation of the message contents.

Raises `SelfTestError` on self test failure. Properties on exception object:

- `code` - failure code from driver
- `message` - status message from driver

Self-Test Code	Description
0	Passed self-test
1	Self-test failed

`niscope.Session.send_software_trigger_edge(which_trigger)`

Sends the selected trigger to the digitizer. Call this method if you called `niscope.Session.configure_trigger_software()` when you want the Reference trigger to occur. You can also call this method to override a misused edge, digital, or hysteresis trigger. If you have configured `niscope.Session.acq_arm_source`, `niscope.Session.arm_ref_trig_src`, or `niscope.Session.adv_trig_src`, call this method when you want to send the corresponding trigger to the digitizer.

Parameters `which_trigger` (`niscope.WhichTrigger`) – Specifies the type of trigger to send to the digitizer.

Defined Values

`START` (0L)

`ARM_REFERENCE` (1L)

`REFERENCE` (2L)

`ADVANCE` (3L)

niscope.Session properties

`niscope.Session.adjust_pretrigger_samples_5102`

When set to true and the digitizer is set to master, the number of pretrigger samples and total samples are

adjusted to be able to synchronize a master and slave 5102.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Advanced:5102 Adjust Pretrigger Samples**
 - C Attribute: **NISCOPE_ATTR_5102_ADJUST_PRETRIGGER_SAMPLES**
-

`niscope.Session.five_v_out_output_terminal`

Specifies the destination for the 5 Volt signal. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:5 Volt Power:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_5V_OUT_OUTPUT_TERMINAL**
-

`niscope.Session.absolute_sample_clock_offset`

Gets or sets the absolute time offset of the sample clock relative to the reference clock in terms of seconds.

Note: Configures the sample clock relationship with respect to the reference clock. This parameter is factored into NI-TClk adjustments and is typically used to improve the repeatability of NI-TClk Synchronization. When this parameter is read, the currently programmed value is returned. The range of the absolute sample clock offset is [-.5 sample clock periods, .5 sample clock periods]. The default absolute sample clock offset is 0s.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Advanced:Absolute Sample Clock Offset**
 - C Attribute: **NISCOPE_ATTR_ABSOLUTE_SAMPLE_CLOCK_OFFSET**
-

`niscope.Session.accessory_gain`

Returns the calibration gain for the current device configuration. **Related topics:** [NI 5122/5124/5142 Calibration](#)

Note: This property is only supported by the NI PXI-5900 differential amplifier.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `accessory_gain.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `accessory_gain.Session` instance, and calling set/get value on the result.:

```
session['0,1'].accessory_gain = var
var = session['0,1'].accessory_gain
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device:Accessory:Gain**
 - C Attribute: **NISCOPE_ATTR_ACCESSORY_GAIN**
-

`niscope.Session.accessory_offset`

Returns the calibration offset for the current device configuration. **Related topics:** [NI 5122/5124/5142 Calibration](#)

Note: This property is supported only by the NI PXI-5900 differential amplifier.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `accessory_offset.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `accessory_offset.Session` instance, and calling set/get value on the result.:

```
session['0,1'].accessory_offset = var
var = session['0,1'].accessory_offset
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device:Accessory:Offset**
 - C Attribute: **NISCOPE_ATTR_ACCESSORY_OFFSET**
-

`niscope.Session.acquisition_start_time`

Specifies the length of time from the trigger event to the first point in the waveform record in seconds. If the value is positive, the first point in the waveform record occurs after the trigger event (same as specifying `niscope.Session.trigger_delay_time`). If the value is negative, the first point in the waveform record occurs before the trigger event (same as specifying `niscope.Session.horz_record_ref_position`).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Advanced:Acquisition Start Time**
 - C Attribute: **NISCOPE_ATTR_ACQUISITION_START_TIME**
-

`niscope.Session.acquisition_type`

Specifies how the digitizer acquires data and fills the waveform record.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.AcquisitionType
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Acquisition:Acquisition Type**
 - C Attribute: **NISCOPE_ATTR_ACQUISITION_TYPE**
-

`niscope.Session.acq_arm_source`

Specifies the source the digitizer monitors for a start (acquisition arm) trigger. When the start trigger is received, the digitizer begins acquiring pretrigger samples. Valid Values: `NISCOPE_VAL_IMMEDIATE` ('VAL_IMMEDIATE') - Triggers immediately `NISCOPE_VAL_RTSI_0` ('VAL_RTSI_0') - RTSI 0 `NISCOPE_VAL_RTSI_1` ('VAL_RTSI_1') - RTSI 1 `NISCOPE_VAL_RTSI_2` ('VAL_RTSI_2') - RTSI 2 `NISCOPE_VAL_RTSI_3` ('VAL_RTSI_3') - RTSI 3 `NISCOPE_VAL_RTSI_4` ('VAL_RTSI_4') - RTSI 4 `NISCOPE_VAL_RTSI_5` ('VAL_RTSI_5') - RTSI 5 `NISCOPE_VAL_RTSI_6` ('VAL_RTSI_6') - RTSI 6 `NISCOPE_VAL_PFI_0` ('VAL_PFI_0') - PFI 0 `NISCOPE_VAL_PFI_1` ('VAL_PFI_1') - PFI 1 `NISCOPE_VAL_PFI_2` ('VAL_PFI_2') - PFI 2 `NISCOPE_VAL_PXI_STAR` ('VAL_PXI_STAR') - PXI Star Trigger

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Start Trigger (Acq. Arm):Source**
 - C Attribute: **NISCOPE_ATTR_ACQ_ARM_SOURCE**
-

`niscope.Session.adv_trig_src`

Specifies the source the digitizer monitors for an advance trigger. When the advance trigger is received, the digitizer begins acquiring pretrigger samples.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Advance Trigger:Source**
 - C Attribute: **NISCOPE_ATTR_ADV_TRIG_SRC**
-

`niscope.Session.allow_more_records_than_memory`

Indicates whether more records can be configured with `niscope.Session.configure_horizontal_timing()` than fit in the onboard memory. If this property is set to True, it is necessary to fetch records while the acquisition is in progress. Eventually, some of the records

will be overwritten. An error is returned from the fetch method if you attempt to fetch a record that has been overwritten.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Enable Records > Memory**
 - C Attribute: **NISCOPE_ATTR_ALLOW_MORE_RECORDS_THAN_MEMORY**
-

`niscope.Session.arm_ref_trig_src`

Specifies the source the digitizer monitors for an arm reference trigger. When the arm reference trigger is received, the digitizer begins looking for a reference (stop) trigger from the user-configured trigger source.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Arm Reference Trigger:Source**
 - C Attribute: **NISCOPE_ATTR_ARM_REF_TRIG_SRC**
-

`niscope.Session.backlog`

Returns the number of samples (*`niscope.Session.points_done`*) that have been acquired but not fetched for the record specified by `niscope.Session.fetch_record_number`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Fetch Backlog**
 - C Attribute: **NISCOPE_ATTR_BACKLOG**
-

`niscope.Session.bandpass_filter_enabled`

Enables the bandpass filter on the specified channel. The default value is FALSE.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `bandpass_filter_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `bandpass_filter_enabled.Session` instance, and calling set/get value on the result:

```
session['0,1'].bandpass_filter_enabled = var
var = session['0,1'].bandpass_filter_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Bandpass Filter Enabled**
- C Attribute: **NISCOPE_ATTR_BANDPASS_FILTER_ENABLED**

`niscope.Session.binary_sample_width`

Indicates the bit width of the binary data in the acquired waveform. Useful for determining which Binary Fetch method to use. Compare to `niscope.Session.resolution`. To configure the device to store samples with a lower resolution than the native, set this property to the desired binary width. This can be useful for streaming at faster speeds at the cost of resolution. The least significant bits will be lost with this configuration. Valid Values: 8, 16, 32

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Acquisition:Binary Sample Width**
- C Attribute: **NISCOPE_ATTR_BINARY_SAMPLE_WIDTH**

`niscope.Session.cache`

Specifies whether to cache the value of properties. When caching is enabled, the instrument driver keeps track of the current instrument settings and avoids sending redundant commands to the instrument. Thus, you can significantly increase execution speed. The instrument driver can choose to always cache or to never cache

particular properties regardless of the setting of this property. The default value is True. Use `niscope.Session.__init__()` to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Cache**
 - C Attribute: **NISCOPE_ATTR_CACHE**
-

`niscope.Session.channel_count`

Indicates the number of channels that the specific instrument driver supports. For channel-based properties, the IVI engine maintains a separate cache value for each channel.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Channel Count**
 - C Attribute: **NISCOPE_ATTR_CHANNEL_COUNT**
-

`niscope.Session.channel_enabled`

Specifies whether the digitizer acquires a waveform for the channel. Valid Values: True (1) - Acquire data on this channel False (0) - Don't acquire data on this channel

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `channel_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `channel_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].channel_enabled = var
var = session['0,1'].channel_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Channel Enabled**
 - C Attribute: **NISCOPE_ATTR_CHANNEL_ENABLED**
-

`niscope.Session.channel_terminal_configuration`

Specifies the terminal configuration for the channel.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `channel_terminal_configuration.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `channel_terminal_configuration.Session` instance, and calling set/get value on the result:

```
session['0,1'].channel_terminal_configuration = var
var = session['0,1'].channel_terminal_configuration
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.TerminalConfiguration</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Channel Terminal Configuration**
 - C Attribute: **NISCOPE_ATTR_CHANNEL_TERMINAL_CONFIGURATION**
-

`niscope.Session.clock_sync_pulse_source`

For the NI 5102, specifies the line on which the sample clock is sent or received. For the NI 5112/5620/5621/5911, specifies the line on which the one-time sync pulse is sent or received. This line should be the same for all devices to be synchronized.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Clock Sync Pulse Source**
 - C Attribute: **NISCOPE_ATTR_CLOCK_SYNC_PULSE_SOURCE**
-

`niscope.Session.data_transfer_block_size`

Specifies the maximum number of samples to transfer at one time from the device to host memory. Increasing this number should result in better fetching performance because the driver does not need to restart the transfers as often. However, increasing this number may also increase the amount of page-locked memory required from the system.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Data Transfer Block Size**
 - C Attribute: **NISCOPE_ATTR_DATA_TRANSFER_BLOCK_SIZE**
-

`niscope.Session.data_transfer_maximum_bandwidth`

This property specifies the maximum bandwidth that the device is allowed to consume.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Advanced:Maximum Bandwidth**
 - C Attribute: **NISCOPE_ATTR_DATA_TRANSFER_MAXIMUM_BANDWIDTH**
-

`niscope.Session.data_transfer_preferred_packet_size`

This property specifies the size of (read request/memory write) data payload. Due to alignment of the data buffers, the hardware may not always generate a packet of this size.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Advanced:Preferred Packet Size**
 - C Attribute: **NISCOPE_ATTR_DATA_TRANSFER_PREFERRED_PACKET_SIZE**
-

`niscope.Session.ddc_center_frequency`

The frequency at which the DDC block frequency translates the input data. Default Value: 10 MHz

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_center_frequency.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_center_frequency.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_center_frequency = var
var = session['0,1'].ddc_center_frequency
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Center Frequency**
 - C Attribute: **NISCOPE_ATTR_DDC_CENTER_FREQUENCY**
-

`niscope.Session.ddc_data_processing_mode`

The way in which data is processed by the DDC block. Valid Values: Real (0) Complex (1) Default Value: Complex

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.DataProcessingMode</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Data Processing Mode**
 - C Attribute: **NISCOPE_ATTR_DDC_DATA_PROCESSING_MODE**
-

`niscope.Session.ddc_enabled`

Enables/disables the Digital Down Converter (DDC) block of the digitizer. When the DDC block is disabled, all DDC-related properties are disabled and have no effect on the acquired signal. Default Value: False

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_enabled = var
var = session['0,1'].ddc_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:DDC Enabled**
 - C Attribute: **NISCOPE_ATTR_DDC_ENABLED**
-

`niscope.Session.ddc_frequency_translation_enabled`

Enables/disables frequency translating the data around the user-selected center frequency down to baseband. Default Value: True

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_frequency_translation_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_frequency_translation_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_frequency_translation_enabled = var
var = session['0,1'].ddc_frequency_translation_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Frequency Translation Enabled**
 - C Attribute: **NISCOPE_ATTR_DDC_FREQUENCY_TRANSLATION_ENABLED**
-

`niscope.Session.ddc_frequency_translation_phase_i`

The I center frequency phase in degrees at the first point of the acquisition. Default Value: 0

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_frequency_translation_phase_i.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_frequency_translation_phase_i.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_frequency_translation_phase_i = var
var = session['0,1'].ddc_frequency_translation_phase_i
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Signal Adjustments:Frequency Translation:Frequency Translation Phase I**
 - C Attribute: **NISCOPE_ATTR_DDC_FREQUENCY_TRANSLATION_PHASE_I**
-

`niscope.Session.ddc_frequency_translation_phase_q`

The Q center frequency phase in degrees at the first point of the acquisition. Use this property only when `niscope.Session.ddc_data_processing_mode` is set to Complex. Default Value: 90

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_frequency_translation_phase_q.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_frequency_translation_phase_q.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_frequency_translation_phase_q = var
var = session['0,1'].ddc_frequency_translation_phase_q
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Signal Adjustments:Frequency Translation:Frequency Translation Phase Q**
 - C Attribute: **NISCOPE_ATTR_DDC_FREQUENCY_TRANSLATION_PHASE_Q**
-

`niscope.Session.ddc_q_source`

Indicates the channel that is the input of the Q path of the DDC. Default Value: The channel that the property is configured off of.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `ddc_q_source.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `ddc_q_source.Session` instance, and calling set/get value on the result.:

```
session['0,1'].ddc_q_source = var
var = session['0,1'].ddc_q_source
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Q Source**
 - C Attribute: **NISCOPE_ATTR_DDC_Q_SOURCE**
-

`niscope.Session.device_number`

Indicates the device number associated with the current session.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device Specific:IF Digitizer (5620 and 5621):Advanced:Device Number**
 - C Attribute: **NISCOPE_ATTR_DEVICE_NUMBER**
-

`niscope.Session.device_temperature`

Returns the temperature of the device in degrees Celsius from the onboard sensor.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device:Temperature**
 - C Attribute: **NISCOPE_ATTR_DEVICE_TEMPERATURE**
-

`niscope.Session.digital_gain`

Applies gain to the specified channel in hardware before any onboard processing. Valid Values: -1.5 to 1.5

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `digital_gain.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `digital_gain.Session` instance, and calling set/get value on the result.:

```
session['0,1'].digital_gain = var
var = session['0,1'].digital_gain
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Digital Gain**
 - C Attribute: **NISCOPE_ATTR_DIGITAL_GAIN**
-

`niscope.Session.digital_offset`

Applies offset to the specified channel in hardware before any onboard processing. Valid Values: -1.5 to 1.5 V

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `digital_offset.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `digital_offset.Session` instance, and calling set/get value on the result.:

```
session['0,1'].digital_offset = var
var = session['0,1'].digital_offset
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Digital Offset**
 - C Attribute: **NISCOPE_ATTR_DIGITAL_OFFSET**
-

`niscope.Session.dither_enabled`

Enables or Disables the analog dither on the device. The default value is `FALSE`. Using dither can improve the spectral performance of the device by reducing the effects of quantization. However, adding dither increases the power level to the ADC, so you may need to either decrease the signal level or increase your vertical range.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `dither_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `dither_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].dither_enabled = var
var = session['0,1'].dither_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Dither Enabled**
 - C Attribute: **NISCOPE_ATTR_DITHER_ENABLED**
-

`niscope.Session.driver_setup`

This property indicates the Driver Setup string that the user specified when initializing the driver. Some cases exist where the end-user must specify instrument driver options at initialization. An example of this is specifying a particular instrument model from among a family of instruments that the driver supports. This is useful when using simulation. The end-user can specify driver-specific options through the DriverSetup keyword in the optionsString parameter in `niscope.Session.__init__()`, or through the IVI Configuration Utility. If the user does not specify a Driver Setup string, this property returns an empty string.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	0
Resettable	0

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NISCOPE_ATTR_DRIVER_SETUP**
-

`niscope.Session.enable_dc_restore`

Restores the video-triggered data retrieved by the digitizer to the video signal's zero reference point. Valid Values: True - Enable DC restore False - Disable DC restore

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Video:Enable DC Restore**
 - C Attribute: **NISCOPE_ATTR_ENABLE_DC_RESTORE**
-

`niscope.Session.enable_time_interleaved_sampling`

Specifies whether the digitizer acquires the waveform using multiple ADCs for the channel enabling a higher maximum real-time sampling rate. Valid Values: True (1) - Use multiple interleaved ADCs on this channel False (0) - Use only this channel's ADC to acquire data for this channel

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `enable_time_interleaved_sampling.Session` object, then the set/get will use all repeated capabilities in the

session. You can specify a subset of repeated capabilities using the Python index notation on an `enable_time_interleaved_sampling.Session` instance, and calling `set/get` value on the result.:

```
session['0,1'].enable_time_interleaved_sampling = var
var = session['0,1'].enable_time_interleaved_sampling
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Enable Time Interleaved Sampling**
 - C Attribute: **NISCOPE_ATTR_ENABLE_TIME_INTERLEAVED_SAMPLING**
-

`niscope.Session.end_of_acquisition_event_output_terminal`

Specifies the destination for the End of Acquisition Event. When this event is asserted, the digitizer has completed sampling for all records. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:End of Acquisition:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_END_OF_ACQUISITION_EVENT_OUTPUT_TERMINAL**
-

`niscope.Session.end_of_record_event_output_terminal`

Specifies the destination for the End of Record Event. When this event is asserted, the digitizer has completed sampling for the current record. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:End of Record:Output Terminal**
- C Attribute: **NISCOPE_ATTR_END_OF_RECORD_EVENT_OUTPUT_TERMINAL**

`niscope.Session.end_of_record_to_advance_trigger_holdoff`

End of Record to Advance Trigger Holdoff is the length of time (in seconds) that a device waits between the completion of one record and the acquisition of pre-trigger samples for the next record. During this time, the acquisition engine state delays the transition to the Wait for Advance Trigger state, and will not store samples in onboard memory, accept an Advance Trigger, or trigger on the input signal.. **Supported Devices:** NI 5185/5186

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:End of Record to Advance Trigger Holdoff**
- C Attribute: **NISCOPE_ATTR_END_OF_RECORD_TO_ADVANCE_TRIGGER_HOLDOFF**

`niscope.Session.equalization_filter_enabled`

Enables the onboard signal processing FIR block. This block is connected directly to the input signal. This filter is designed to compensate the input signal for artifacts introduced to the signal outside of the digitizer. However, since this is a generic FIR filter any coefficients are valid. Coefficients should be between +1 and -1 in value.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `equalization_filter_enabled.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `equalization_filter_enabled.Session` instance, and calling set/get value on the result.:

```
session['0,1'].equalization_filter_enabled = var
var = session['0,1'].equalization_filter_enabled
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:Equalization:Equalization Filter Enabled**
- C Attribute: **NISCOPE_ATTR_EQUALIZATION_FILTER_ENABLED**

niscope.Session.equalization_num_coefficients

Returns the number of coefficients that the FIR filter can accept. This filter is designed to compensate the input signal for artifacts introduced to the signal outside of the digitizer. However, since this is a generic FIR filter any coefficients are valid. Coefficients should be between +1 and -1 in value.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `equalization_num_coefficients.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `equalization_num_coefficients.Session` instance, and calling set/get value on the result.:

```
session['0,1'].equalization_num_coefficients = var
var = session['0,1'].equalization_num_coefficients
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:Equalization:Equalization Num Coefficients**
 - C Attribute: **NISCOPE_ATTR_EQUALIZATION_NUM_COEFFICIENTS**
-

niscope.Session.exported_advance_trigger_output_terminal

Specifies the destination to export the advance trigger. When the advance trigger is received, the digitizer begins acquiring samples for the Nth record. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Advance Trigger:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_EXPORTED_ADVANCE_TRIGGER_OUTPUT_TERMINAL**
-

niscope.Session.exported_ref_trigger_output_terminal

Specifies the destination export for the reference (stop) trigger. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Output Terminal**
 - C Attribute: **NISCOPE_ATTR_EXPORTED_REF_TRIGGER_OUTPUT_TERMINAL**
-

`niscope.Session.exported_start_trigger_output_terminal`

Specifies the destination to export the Start trigger. When the start trigger is received, the digitizer begins acquiring samples. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Start Trigger (Acq. Arm):Output Terminal**
 - C Attribute: **NISCOPE_ATTR_EXPORTED_START_TRIGGER_OUTPUT_TERMINAL**
-

`niscope.Session.fetch_interleaved_data`

Set to True to retrieve one array with alternating values on the NI 5620/5621. For example, this property can be used to retrieve a single array with I and Q interleaved instead of two separate arrays. If set to True, the resulting array will be twice the size of the actual record length.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device Specific:IF Digitizer (5620 and 5621):Advanced:Fetch Interleaved Data**
 - C Attribute: **NISCOPE_ATTR_FETCH_INTERLEAVED_DATA**
-

`niscope.Session.fetch_interleaved_iq_data`

Enables/disables interleaving of the I and Q data. When disabled, the traditional

`:py:meth:~niscope.Session.fetch()` methods will return the I waveform for each acquisition followed by the Q waveform. When enabled, the I and Q data are interleaved into a single waveform. In the interleaving case, you must allocate twice as many elements in the array as number of samples being fetched (since each sample contains an I and a Q component). Default Value: True

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:DDC:Fetch Interleaved IQ Data**
- C Attribute: **NISCOPE_ATTR_FETCH_INTERLEAVED_IQ_DATA**

`niscope.Session.flex_fir_antialias_filter_type`

The NI 5922 flexible-resolution digitizer uses an onboard FIR lowpass antialias filter. Use this property to select from several types of filters to achieve desired filtering characteristics.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `flex_fir_antialias_filter_type.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `flex_fir_antialias_filter_type.Session` instance, and calling set/get value on the result.:

```
session['0,1'].flex_fir_antialias_filter_type = var
var = session['0,1'].flex_fir_antialias_filter_type
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.FlexFIRAntialiasFilterType</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Flex FIR Antialias Filter Type**
- C Attribute: **NISCOPE_ATTR_FLEX_FIR_ANTIALIAS_FILTER_TYPE**

`niscope.Session.fpga_bitfile_path`

Gets the absolute file path to the bitfile loaded on the FPGA.

Note: Gets the absolute file path to the bitfile loaded on the FPGA.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device:FPGA Bitfile Path**
 - C Attribute: **NISCOPE_ATTR_FPGA_BITFILE_PATH**
-

`niscope.Session.fractional_resample_enabled`

Enables the onboard signal processing block that resamples the input waveform to the user desired sample rate. The default value is FALSE.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:Fractional Resample:Fractional Resample Enabled**
 - C Attribute: **NISCOPE_ATTR_FRACTIONAL_RESAMPLE_ENABLED**
-

`niscope.Session.group_capabilities`

A string that contains a comma-separated list of class extension groups that this driver implements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Class Group Capabilities**
 - C Attribute: **NISCOPE_ATTR_GROUP_CAPABILITIES**
-

`niscope.Session.high_pass_filter_frequency`

Specifies the frequency for the highpass filter in Hz. The device uses one of the valid values listed below. If

an invalid value is specified, no coercion occurs. The default value is 0. **(PXIe-5164) Valid Values:** 0 90 450

Related topics: [Digital Filtering](#)

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:High Pass Filter Frequency**
 - C Attribute: **NISCOPE_ATTR_HIGH_PASS_FILTER_FREQUENCY**
-

`niscope.Session.horz_enforce_realtime`

Indicates whether the digitizer enforces real-time measurements or allows equivalent-time measurements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Enforce Realtime**
 - C Attribute: **NISCOPE_ATTR_HORZ_ENFORCE_REALTIME**
-

`niscope.Session.horz_min_num_pts`

Specifies the minimum number of points you require in the waveform record for each channel. NI-SCOPE uses the value you specify to configure the record length that the digitizer uses for waveform acquisition. `niscope.Session.horz_record_length` returns the actual record length. Valid Values: 1 - available onboard memory

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Min Number of Points**
 - C Attribute: **NISCOPE_ATTR_HORZ_MIN_NUM_PTS**
-

`niscope.Session.horz_num_records`

Specifies the number of records to acquire. Can be used for multi-record acquisition and single-record acquisitions. Setting this to 1 indicates a single-record acquisition.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Number of Records**
 - C Attribute: **NISCOPE_ATTR_HORZ_NUM_RECORDS**
-

`niscope.Session.horz_record_length`

Returns the actual number of points the digitizer acquires for each channel. The value is equal to or greater than the minimum number of points you specify with `niscope.Session.horz_min_num_pts`. Allocate a ViReal64 array of this size or greater to pass as the WaveformArray parameter of the Read and Fetch methods. This property is only valid after a call to the one of the Configure Horizontal methods.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Actual Record Length**
 - C Attribute: **NISCOPE_ATTR_HORZ_RECORD_LENGTH**
-

`niscope.Session.horz_record_ref_position`

Specifies the position of the Reference Event in the waveform record. When the digitizer detects a trigger, it waits the length of time the `niscope.Session.trigger_delay_time` property specifies. The event that occurs when the delay time elapses is the Reference Event. The Reference Event is relative to the start of the record and is a percentage of the record length. For example, the value 50.0 corresponds to the center of the waveform record and 0.0 corresponds to the first element in the waveform record. Valid Values: 0.0 - 100.0

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Reference Position**
 - C Attribute: **NISCOPE_ATTR_HORZ_RECORD_REF_POSITION**
-

`niscope.Session.horz_sample_rate`

Returns the effective sample rate using the current configuration. The units are samples per second. This property is only valid after a call to the one of the Configure Horizontal methods. Units: Hertz (Samples / Second)

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Actual Sample Rate**
 - C Attribute: **NISCOPE_ATTR_HORZ_SAMPLE_RATE**
-

`niscope.Session.horz_time_per_record`

Specifies the length of time that corresponds to the record length. Units: Seconds

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Advanced:Time Per Record**
 - C Attribute: **NISCOPE_ATTR_HORZ_TIME_PER_RECORD**
-

`niscope.Session.input_clock_source`

Specifies the input source for the PLL reference clock (the 1 MHz to 20 MHz clock on the NI 5122, the 10 MHz clock for the NI 5112/5620/5621/5911) to which the digitizer will be phase-locked; for the NI 5102, this is the source of the board clock.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Reference (Input) Clock Source**
 - C Attribute: **NISCOPE_ATTR_INPUT_CLOCK_SOURCE**
-

`niscope.Session.input_impedance`

Specifies the input impedance for the channel in Ohms.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `input_impedance.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `input_impedance.Session` instance, and calling set/get value on the result.:

```
session['0,1'].input_impedance = var
var = session['0,1'].input_impedance
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Input Impedance**
 - C Attribute: **NISCOPE_ATTR_INPUT_IMPEDANCE**
-

`niscope.Session.instrument_firmware_revision`

A string that contains the firmware revision information for the instrument you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Firmware Revision**
 - C Attribute: **NISCOPE_ATTR_INSTRUMENT_FIRMWARE_REVISION**
-

`niscope.Session.instrument_manufacturer`

A string that contains the name of the instrument manufacturer.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Manufacturer**
 - C Attribute: **NISCOPE_ATTR_INSTRUMENT_MANUFACTURER**
-

`niscope.Session.instrument_model`

A string that contains the model number of the current instrument.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Model**
 - C Attribute: **NISCOPE_ATTR_INSTRUMENT_MODEL**
-

`niscope.Session.interchange_check`

NI-SCOPE does not generate interchange warnings and therefore ignores this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Interchange Check**

- C Attribute: **NISCOPE_ATTR_INTERCHANGE_CHECK**

`niscope.Session.interleaving_offset_correction_enabled`

Enables the interleaving offset correction on the specified channel. The default value is TRUE. **Related topics:** [Timed Interleaved Sampling](#)

Note: If disabled, warranted specifications are not guaranteed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Advanced:Interleaving Offset Correction Enabled**
 - C Attribute: **NISCOPE_ATTR_INTERLEAVING_OFFSET_CORRECTION_ENABLED**
-

`niscope.Session.io_resource_descriptor`

Indicates the resource descriptor the driver uses to identify the physical device. If you initialize the driver with a logical name, this property contains the resource descriptor that corresponds to the entry in the IVI Configuration utility. If you initialize the instrument driver with the resource descriptor, this property contains that value. You can pass a logical name to `niscope.Session.Init()` or `niscope.Session.__init__()`. The IVI Configuration utility must contain an entry for the logical name. The logical name entry refers to a virtual instrument section in the IVI Configuration file. The virtual instrument section specifies a physical device and initial user options.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Resource Descriptor**
 - C Attribute: **NISCOPE_ATTR_IO_RESOURCE_DESCRIPTOR**
-

`niscope.Session.logical_name`

A string containing the logical name you specified when opening the current IVI session. You can pass a logical

name to `niscope.Session.Init()` or `niscope.Session.__init__()`. The IVI Configuration utility must contain an entry for the logical name. The logical name entry refers to a virtual instrument section in the IVI Configuration file. The virtual instrument section specifies a physical device and initial user options.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Logical Name**
 - C Attribute: **NISCOPE_ATTR_LOGICAL_NAME**
-

`niscope.Session.master_enable`

Specifies whether you want the device to be a master or a slave. The master typically originates the trigger signal and clock sync pulse. For a standalone device, set this property to False.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Master Enable**
 - C Attribute: **NISCOPE_ATTR_MASTER_ENABLE**
-

`niscope.Session.max_input_frequency`

Specifies the bandwidth of the channel. Express this value as the frequency at which the input circuitry attenuates the input signal by 3 dB. The units are hertz. Defined Values: `NISCOPE_VAL_BANDWIDTH_FULL` (-1.0) `NISCOPE_VAL_BANDWIDTH_DEVICE_DEFAULT` (0.0) `NISCOPE_VAL_20MHZ_BANDWIDTH` (20000000.0) `NISCOPE_VAL_100MHZ_BANDWIDTH` (100000000.0) `NISCOPE_VAL_20MHZ_MAX_INPUT_FREQUENCY` (20000000.0) `NISCOPE_VAL_100MHZ_MAX_INPUT_FREQUENCY` (100000000.0)

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_input_frequency.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_input_frequency.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_input_frequency = var
var = session['0,1'].max_input_frequency
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Maximum Input Frequency**
- C Attribute: **NISCOPE_ATTR_MAX_INPUT_FREQUENCY**

`niscope.Session.max_real_time_sampling_rate`

Returns the maximum real time sample rate in Hz.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Maximum Real Time Sample Rate**
- C Attribute: **NISCOPE_ATTR_MAX_REAL_TIME_SAMPLING_RATE**

`niscope.Session.max_ris_rate`

Returns the maximum sample rate in RIS mode in Hz.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Maximum RIS Rate**
 - C Attribute: **NISCOPE_ATTR_MAX_RIS_RATE**
-

`niscope.Session.min_sample_rate`

Specify the sampling rate for the acquisition in Samples per second. Valid Values: The combination of sampling rate and min record length must allow the digitizer to sample at a valid sampling rate for the acquisition type specified in `niscope.Session.ConfigureAcquisition()` and not require more memory than the onboard memory module allows.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	Yes

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Min Sample Rate**
 - C Attribute: **NISCOPE_ATTR_MIN_SAMPLE_RATE**
-

`niscope.Session.mux_mode_register`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device Specific:IF Digitizer (5620 and 5621):Advanced:Mux Mode**
 - C Attribute: **NISCOPE_ATTR_MUX_MODE_REGISTER**
-

`niscope.Session.onboard_memory_size`

Returns the total combined amount of onboard memory for all channels in bytes.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Memory Size**
 - C Attribute: **NISCOPE_ATTR_ONBOARD_MEMORY_SIZE**
-

`niscope.Session.oscillator_phase_dac_value`

Gets or sets the binary phase DAC value that controls the delay added to the Phase Locked Loop (PLL) of the sample clock.

Note: if this value is set, sample clock adjust and TCk will not be able to do any sub-sample adjustment of the timebase sample clock.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Advanced:Oscillator Phase DAC Value**
 - C Attribute: **NISCOPE_ATTR_OSCILLATOR_PHASE_DAC_VALUE**
-

`niscope.Session.output_clock_source`

Specifies the output source for the 10 MHz clock to which another digitizer's sample clock can be phased-locked.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Output Clock Source**
 - C Attribute: **NISCOPE_ATTR_OUTPUT_CLOCK_SOURCE**
-

`niscope.Session.overflow_error_reporting`

Configures error reporting when the DDC block detects an overflow in any of its stages. Overflows lead to clipping of the waveform. Valid Values: Warning (0) Error (1) Disabled (2) Default Value: Warning

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.OverflowErrorReporting
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Onboard Signal Processing:OSP Overflow Error Reporting**
 - C Attribute: **NISCOPE_ATTR_OVERFLOW_ERROR_REPORTING**
-

`niscope.Session.pll_lock_status`

If TRUE, the PLL has remained locked to the external reference clock since it was last checked. If FALSE, the PLL has become unlocked from the external reference clock since it was last checked.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:PLL Lock Status**
 - C Attribute: **NISCOPE_ATTR_PLL_LOCK_STATUS**
-

`niscope.Session.points_done`

Actual number of samples acquired in the record specified by `niscope.Session.fetch_record_number` from the `niscope.Session.fetch_relative_to` and `niscope.Session.fetch_offset` properties.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Points Done**

- C Attribute: **NISCOPE_ATTR_POINTS_DONE**

`niscope.Session.poll_interval`

Specifies the poll interval in milliseconds to use during RIS acquisitions to check whether the acquisition is complete.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	0
Resettable	0

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NISCOPE_ATTR_POLL_INTERVAL**

`niscope.Session.probe_attenuation`

Specifies the probe attenuation for the input channel. For example, for a 10:1 probe, set this property to 10.0. Valid Values: Any positive real number. Typical values are 1, 10, and 100.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `probe_attenuation.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `probe_attenuation.Session` instance, and calling set/get value on the result.:

```
session['0,1'].probe_attenuation = var
var = session['0,1'].probe_attenuation
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Probe Attenuation**
- C Attribute: **NISCOPE_ATTR_PROBE_ATTENUATION**

`niscope.Session.range_check`

Specifies whether to validate property values and method parameters. If enabled, the instrument driver validates the parameters values that you pass to driver methods. Range checking parameters is very useful for debugging. After you validate your program, you can set this property to False to disable range checking and maximize performance. The default value is True. Use the `niscope.Session.__init__()` method to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Range Check**
 - C Attribute: **NISCOPE_ATTR_RANGE_CHECK**
-

`niscope.Session.ready_for_advance_event_output_terminal`

Specifies the destination for the Ready for Advance Event. When this event is asserted, the digitizer is ready to receive an advance trigger. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Ready for Advance:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_READY_FOR_ADVANCE_EVENT_OUTPUT_TERMINAL**
-

`niscope.Session.ready_for_ref_event_output_terminal`

Specifies the destination for the Ready for Reference Event. When this event is asserted, the digitizer is ready to receive a reference trigger. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Ready for Reference:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_READY_FOR_REF_EVENT_OUTPUT_TERMINAL**
-

`niscope.Session.ready_for_start_event_output_terminal`

Specifies the destination for the Ready for Start Event. When this event is asserted, the digitizer is ready to receive a start trigger. Consult your device documentation for a specific list of valid destinations.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Ready for Start:Output Terminal**
 - C Attribute: **NISCOPE_ATTR_READY_FOR_START_EVENT_OUTPUT_TERMINAL**
-

`niscope.Session.records_done`

Specifies the number of records that have been completely acquired.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Fetch:Records Done**
 - C Attribute: **NISCOPE_ATTR_RECORDS_DONE**
-

`niscope.Session.record_arm_source`

Specifies the record arm source.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Record Arm Source**
 - C Attribute: **NISCOPE_ATTR_RECORD_ARM_SOURCE**
-

`niscope.Session.record_coercions`

Specifies whether the IVI engine keeps a list of the value coercions it makes for ViInt32 and ViReal64 properties. You call `Ivi_GetNextCoercionInfo` to extract and delete the oldest coercion record from the list. The default value is False. Use the `niscope.Session.__init__()` method to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Record Value Coercions**
 - C Attribute: **NISCOPE_ATTR_RECORD_COERCIONS**
-

`niscope.Session.ref_clk_rate`

If `niscope.Session.input_clock_source` is an external source, this property specifies the frequency of the input, or reference clock, to which the internal sample clock timebase is synchronized. The frequency is in hertz.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Reference Clock Rate**
 - C Attribute: **NISCOPE_ATTR_REF_CLK_RATE**
-

`niscope.Session.ref_trigger_detector_location`

Indicates which analog compare circuitry to use on the device.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.RefTriggerDetectorLocation</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Onboard Signal Processing:Ref Trigger Detection Location**

- C Attribute: **NISCOPE_ATTR_REF_TRIGGER_DETECTOR_LOCATION**

`niscope.Session.ref_trigger_minimum_quiet_time`

The amount of time the trigger circuit must not detect a signal above the trigger level before the trigger is armed. This property is useful for triggering at the beginning and not in the middle of signal bursts.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or <code>datetime.timedelta</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Onboard Signal Processing:Ref Trigger Min Quiet Time**
- C Attribute: **NISCOPE_ATTR_REF_TRIGGER_MINIMUM_QUIET_TIME**

`niscope.Session.ref_trig_tdc_enable`

This property controls whether the TDC is used to compute an accurate trigger.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:Advanced:Enable TDC**
- C Attribute: **NISCOPE_ATTR_REF_TRIG_TDC_ENABLE**

`niscope.Session.resolution`

Indicates the bit width of valid data (as opposed to padding bits) in the acquired waveform. Compare to `niscope.Session.binary_sample_width`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Acquisition:Resolution**

- C Attribute: **NISCOPE_ATTR_RESOLUTION**
-

`niscope.Session.ris_in_auto_setup_enable`

Indicates whether the digitizer should use RIS sample rates when searching for a frequency in autosetup. Valid Values: True (1) - Use RIS sample rates in autosetup False (0) - Do not use RIS sample rates in autosetup

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Acquisition:Advanced:Enable RIS in Auto Setup**
 - C Attribute: **NISCOPE_ATTR_RIS_IN_AUTO_SETUP_ENABLE**
-

`niscope.Session.ris_method`

Specifies the algorithm for random-interleaved sampling, which is used if the sample rate exceeds the value of `niscope.Session.max_real_time_sampling_rate`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.RISMethod
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:RIS Method**
 - C Attribute: **NISCOPE_ATTR_RIS_METHOD**
-

`niscope.Session.ris_num_averages`

The number of averages for each bin in an RIS acquisition. The number of averages times the oversampling factor is the minimum number of real-time acquisitions necessary to reconstruct the RIS waveform. Averaging is useful in RIS because the trigger times are not evenly spaced, so adjacent points in the reconstructed waveform not be accurately spaced. By averaging, the errors in both time and voltage are smoothed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Horizontal:RIS Num Avg**
 - C Attribute: **NISCOPE_ATTR_RIS_NUM_AVERAGES**
-

`niscope.Session.sample_clock_timebase_multiplier`

If *Sample Clock Timebase Source* `<p:py:meth:'niscope.Session.SampleClockTimebaseSource.html'>__` is an external source, this property specifies the ratio between the *Sample Clock Timebase Rate* `<p:py:meth:'niscope.Session.SampleClockTimebaseRate.html'>__` and the actual sample rate, which can be higher. This property can be used in conjunction with the [Sample Clock Timebase Divisor Property](#). Some devices use multiple ADCs to sample the same channel at an effective sample rate that is greater than the specified clock rate. When providing an external sample clock use this property to indicate when you want a higher sample rate. Valid values for this property vary by device and current configuration. **Related topics:** [Sample Clock](#)

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Sample Clock Timebase Multiplier**
 - C Attribute: **NISCOPE_ATTR_SAMPLE_CLOCK_TIMEBASE_MULTIPLIER**
-

`niscope.Session.sample_mode`

Indicates the sample mode the digitizer is currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Acquisition:Sample Mode**
 - C Attribute: **NISCOPE_ATTR_SAMPLE_MODE**
-

`niscope.Session.samp_clk_timebase_div`

If `niscope.Session.samp_clk_timebase_src` is an external source, specifies the ratio between the sample clock timebase rate and the actual sample rate, which can be slower.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Sample Clock Timebase Divisor**
 - C Attribute: **NISCOPE_ATTR_SAMP_CLK_TIMEBASE_DIV**
-

`niscope.Session.samp_clk_timebase_rate`

If `niscope.Session.samp_clk_timebase_src` is an external source, specifies the frequency in hertz of the external clock used as the timebase source.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Sample Clock Timebase Rate**
 - C Attribute: **NISCOPE_ATTR_SAMP_CLK_TIMEBASE_RATE**
-

`niscope.Session.samp_clk_timebase_src`

Specifies the source of the sample clock timebase, which is the timebase used to control waveform sampling. The actual sample rate may be the timebase itself or a divided version of the timebase, depending on the `niscope.Session.min_sample_rate` (for internal sources) or the `niscope.Session.samp_clk_timebase_div` (for external sources).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Clocking:Sample Clock Timebase Source**
 - C Attribute: **NISCOPE_ATTR_SAMP_CLK_TIMEBASE_SRC**
-

`niscope.Session.serial_number`

Returns the serial number of the device.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Device:Serial Number**
 - C Attribute: **NISCOPE_ATTR_SERIAL_NUMBER**
-

`niscope.Session.simulate`

Specifies whether or not to simulate instrument driver I/O operations. If simulation is enabled, instrument driver methods perform range checking and call `Ivi_GetAttribute` and `Ivi_SetAttribute` methods, but they do not perform instrument I/O. For output parameters that represent instrument data, the instrument driver methods return calculated values. The default value is False. Use the `niscope.Session.__init__()` method to override this value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Simulate**
 - C Attribute: **NISCOPE_ATTR_SIMULATE**
-

`niscope.Session.slave_trigger_delay`

Specifies the delay for the trigger from the master to the slave in seconds. This value adjusts the initial X value of the slave devices to correct for the propagation delay between the master trigger output and slave trigger input.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Slave Trigger Delay**
 - C Attribute: **NISCOPE_ATTR_SLAVE_TRIGGER_DELAY**
-

`niscope.Session.specific_driver_class_spec_major_version`

The major version number of the class specification with which this driver is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Major Version**
 - C Attribute: **NISCOPE_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION**
-

`niscope.Session.specific_driver_class_spec_minor_version`

The minor version number of the class specification with which this driver is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Minor Version**
 - C Attribute: **NISCOPE_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION**
-

`niscope.Session.specific_driver_description`

A string that contains a brief description of the specific driver

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Description**
 - C Attribute: **NISCOPE_ATTR_SPECIFIC_DRIVER_DESCRIPTION**
-

`niscope.Session.specific_driver_revision`

A string that contains additional version information about this instrument driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Revision**
 - C Attribute: **NISCOPE_ATTR_SPECIFIC_DRIVER_REVISION**
-

`niscope.Session.specific_driver_vendor`

A string that contains the name of the vendor that supplies this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Driver Vendor**
 - C Attribute: **NISCOPE_ATTR_SPECIFIC_DRIVER_VENDOR**
-

`niscope.Session.start_to_ref_trigger_holdoff`

Pass the length of time you want the digitizer to wait after it starts acquiring data until the digitizer enables the trigger system to detect a reference (stop) trigger. Units: Seconds Valid Values: 0.0 - 171.8

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `start_to_ref_trigger_holdoff.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `start_to_ref_trigger_holdoff.Session` instance, and calling set/get value on the result.:

```
session['0,1'].start_to_ref_trigger_holdoff = var
var = session['0,1'].start_to_ref_trigger_holdoff
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or <code>datetime.timedelta</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Start To Ref Trigger Holdoff**
 - C Attribute: **NISCOPE_ATTR_START_TO_REF_TRIGGER_HOLDOFF**
-

`niscope.Session.stream_relative_to`

Determines which trigger peer-to-peer data is streamed relative to. The default value is **Start Trigger**.

Note: On the NI 5122/5622, only **Start Trigger** is valid for this property.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.StreamingPositionType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Peer-to-Peer:Stream Relative To**
 - C Attribute: **NISCOPE_ATTR_STREAM_RELATIVE_TO**
-

`niscope.Session.supported_instrument_models`

A string that contains a comma-separated list of the instrument model numbers supported by this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Supported Instrument Models**
 - C Attribute: **NISCOPE_ATTR_SUPPORTED_INSTRUMENT_MODELS**
-

`niscope.Session.trigger_auto_triggered`

Specifies if the last acquisition was auto triggered. You can use the Auto Triggered property to find out if the last acquisition was triggered.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Auto Triggered**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_AUTO_TRIGGERED**
-

`niscope.Session.trigger_coupling`

Specifies how the digitizer couples the trigger source. This property affects instrument operation only when `niscope.Session.trigger_type` is set to *EDGE*, *HYSTERESIS*, or *WINDOW*.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerCoupling
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Coupling**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_COUPLING**
-

`niscope.Session.trigger_delay_time`

Specifies the trigger delay time in seconds. The trigger delay time is the length of time the digitizer waits after it

receives the trigger. The event that occurs when the trigger delay elapses is the Reference Event. Valid Values: 0.0 - 171.8

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Delay**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_DELAY_TIME**
-

`niscope.Session.trigger_from_pfi_delay`

This is a factory-programmed value that specifies the delay for the PFI lines to the trigger input in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger from PFI Delay**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_FROM_PFI_DELAY**
-

`niscope.Session.trigger_from_rtsi_delay`

This is a factory-programmed value that specifies the delay for the RTSI bus to the trigger input in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger from RTSI Delay**
- C Attribute: **NISCOPE_ATTR_TRIGGER_FROM_RTSI_DELAY**

`niscope.Session.trigger_from_star_delay`

This is a factory-programmed value that specifies the delay for PXI Star Trigger line to the trigger input in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or <code>datetime.timedelta</code>
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger from Star Delay**
- C Attribute: **NISCOPE_ATTR_TRIGGER_FROM_STAR_DELAY**

`niscope.Session.trigger_holdoff`

Specifies the length of time (in seconds) the digitizer waits after detecting a trigger before enabling the trigger subsystem to detect another trigger. This property affects instrument operation only when the digitizer requires multiple acquisitions to build a complete waveform. The digitizer requires multiple waveform acquisitions when it uses equivalent-time sampling or when the digitizer is configured for a multi-record acquisition through a call to `niscope.Session.configure_horizontal_timing()`. Valid Values: 0.0 - 171.8

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or <code>datetime.timedelta</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Holdoff**
- C Attribute: **NISCOPE_ATTR_TRIGGER_HOLDOFF**

`niscope.Session.trigger_hysteresis`

Specifies the size of the hysteresis window on either side of the trigger level. The digitizer triggers when the trigger signal passes through the threshold you specify with the Trigger Level parameter, has the slope you specify with the Trigger Slope parameter, and passes through the hysteresis window that you specify with this parameter.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Hysteresis**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_HYSTERESIS**
-

`niscope.Session.trigger_impedance`

Specifies the input impedance for the external analog trigger channel in Ohms. Valid Values: 50 - 50 ohms 1000000 - 1 mega ohm

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Impedance**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_IMPEDANCE**
-

`niscope.Session.trigger_level`

Specifies the voltage threshold for the trigger subsystem. The units are volts. This property affects instrument behavior only when the `niscope.Session.trigger_type` is set to `EDGE`, `HYSTERESIS`, or `WINDOW`. Valid Values: The values of the range and offset parameters in `niscope.Session.configure_vertical()` determine the valid range for the trigger level on the channel you use as the Trigger Source. The value you pass for this parameter must meet the following conditions:

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Level**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_LEVEL**
-

`niscope.Session.trigger_modifier`

Configures the device to automatically complete an acquisition if a trigger has not been received. Valid Values: None (1) - Normal triggering Auto Trigger (2) - Auto trigger acquisition if no trigger arrives

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerModifier
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Modifier**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_MODIFIER**
-

`niscope.Session.trigger_slope`

Specifies if a rising or a falling edge triggers the digitizer. This property affects instrument operation only when `niscope.Session.trigger_type` is set to *EDGE*, *HYSTERESIS*, or *WINDOW*.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerSlope
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Slope**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_SLOPE**
-

`niscope.Session.trigger_source`

Specifies the source the digitizer monitors for the trigger event.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Source**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_SOURCE**
-

`niscope.Session.trigger_to_pfi_delay`

This is a factory-programmed value that specifies the delay for the trigger to the PFI lines in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger to PFI Delay**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_TO_PFI_DELAY**
-

`niscope.Session.trigger_to_rtsi_delay`

This is a factory-programmed value that specifies the delay for the trigger to the RTSI bus in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger to RTSI Delay**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_TO_RTSI_DELAY**
-

`niscope.Session.trigger_to_star_delay`

This is a factory-programmed value that specifies the delay for the trigger to the PXI Star Trigger line in seconds. By itself, this property has no effect on the acquired data. However, depending on how the trigger lines are routed between the master and slave devices, you can use this value as a starting point to set `niscope.Session.slave_trigger_delay`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Synchronization:Trigger Calibration Delay:Trigger to Star Delay**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_TO_STAR_DELAY**
-

`niscope.Session.trigger_type`

Specifies the type of trigger to use.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.TriggerType</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Type**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_TYPE**
-

`niscope.Session.trigger_window_high_level`

Pass the upper voltage threshold you want the digitizer to use for window triggering. The digitizer triggers when the trigger signal enters or leaves the window you specify with `niscope.Session.trigger_window_low_level` and `niscope.Session.trigger_window_high_level`. Valid Values: The values of the Vertical Range and Vertical Offset parameters in `niscope.Session.configure_vertical()` determine the valid range for the High Window Level on the channel you use as the Trigger Source parameter in `niscope.Session.ConfigureTriggerSource()`. The value you pass for this parameter must meet the following conditions. High Trigger Level \leq Vertical Range/2 + Vertical Offset High Trigger Level \geq (-Vertical Range/2) + Vertical Offset High Trigger Level > Low Trigger Level

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Window:High Level**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_WINDOW_HIGH_LEVEL**
-

`niscope.Session.trigger_window_low_level`

Pass the lower voltage threshold you want the digitizer to use for window triggering. The digitizer

triggers when the trigger signal enters or leaves the window you specify with `niscope.Session.trigger_window_low_level` and `niscope.Session.trigger_window_high_level`. Units: Volts Valid Values: The values of the Vertical Range and Vertical Offset parameters in `niscope.Session.configure_vertical()` determine the valid range for the Low Window Level on the channel you use as the Trigger Source parameter in `niscope.Session.ConfigureTriggerSource()`. The value you pass for this parameter must meet the following conditions. Low Trigger Level \leq Vertical Range/2 + Vertical Offset Low Trigger Level \geq (-Vertical Range/2) + Vertical Offset Low Trigger Level < High Trigger Level

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Window:Low Level**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_WINDOW_LOW_LEVEL**
-

`niscope.Session.trigger_window_mode`

Specifies whether you want a trigger to occur when the signal enters or leaves the window specified by `niscope.Session.trigger_window_low_level`, or `niscope.Session.trigger_window_high_level`.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerWindowMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Window:Window Mode**
 - C Attribute: **NISCOPE_ATTR_TRIGGER_WINDOW_MODE**
-

`niscope.Session.tv_trigger_event`

Specifies the condition in the video signal that causes the digitizer to trigger.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.VideoTriggerEvent
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Video:Event**
 - C Attribute: **NISCOPE_ATTR_TV_TRIGGER_EVENT**
-

`niscope.Session.tv_trigger_line_number`

Specifies the line on which to trigger, if `niscope.Session.tv_trigger_event` is set to line number. The valid ranges of the property depend on the signal format selected. M-NTSC has a valid range of 1 to 525. B/G-PAL, SECAM, 576i, and 576p have a valid range of 1 to 625. 720p has a valid range of 1 to 750. 1080i and 1080p have a valid range of 1125.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Video:Line Number**
 - C Attribute: **NISCOPE_ATTR_TV_TRIGGER_LINE_NUMBER**
-

`niscope.Session.tv_trigger_polarity`

Specifies whether the video signal sync is positive or negative.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.VideoPolarity
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Video:Polarity**
 - C Attribute: **NISCOPE_ATTR_TV_TRIGGER_POLARITY**
-

`niscope.Session.tv_trigger_signal_format`

Specifies the type of video signal, such as NTSC, PAL, or SECAM.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `tv_trigger_signal_format.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `tv_trigger_signal_format.Session` instance, and calling set/get value on the result.:

```
session['0,1'].tv_trigger_signal_format = var
var = session['0,1'].tv_trigger_signal_format
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.VideoSignalFormat
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Triggering:Trigger Video:Signal Format**
- C Attribute: **NISCOPE_ATTR_TV_TRIGGER_SIGNAL_FORMAT**

`niscope.Session.vertical_coupling`

Specifies how the digitizer couples the input signal for the channel. When input coupling changes, the input stage takes a finite amount of time to settle.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `vertical_coupling.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `vertical_coupling.Session` instance, and calling set/get value on the result.:

```
session['0,1'].vertical_coupling = var
var = session['0,1'].vertical_coupling
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.VerticalCoupling
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Vertical Coupling**
- C Attribute: **NISCOPE_ATTR_VERTICAL_COUPLING**

niscope.Session.vertical_offset

Specifies the location of the center of the range. The value is with respect to ground and is in volts. For example, to acquire a sine wave that spans between 0.0 and 10.0 V, set this property to 5.0 V.

Note: This property is not supported by all digitizers. Refer to the NI High-Speed Digitizers Help for a list of vertical offsets supported for each device.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `vertical_offset.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `vertical_offset.Session` instance, and calling set/get value on the result.:

```
session['0,1'].vertical_offset = var
var = session['0,1'].vertical_offset
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Vertical Offset**
- C Attribute: **NISCOPE_ATTR_VERTICAL_OFFSET**

niscope.Session.vertical_range

Specifies the absolute value of the input range for a channel in volts. For example, to acquire a sine wave that spans between -5 and +5 V, set this property to 10.0 V. Refer to the NI High-Speed Digitizers Help for a list of supported vertical ranges for each device. If the specified range is not supported by a device, the value is coerced up to the next valid range.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `vertical_range.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `vertical_range.Session` instance, and calling set/get value on the result.:

```
session['0,1'].vertical_range = var
var = session['0,1'].vertical_range
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Vertical:Vertical Range**
 - C Attribute: **NISCOPE_ATTR_VERTICAL_RANGE**
-

Enums

Enums used in NI-SCOPE

`niscope.AcquisitionStatus`

`AcquisitionStatus.COMPLETE`

`AcquisitionStatus.IN_PROGRESS`

`AcquisitionStatus.STATUS_UNKNOWN`

`niscope.AcquisitionType`

`AcquisitionType.NORMAL`

Sets the digitizer to normal resolution mode. The digitizer can use real-time sampling or equivalent-time sampling.

`AcquisitionType.FLEXRES`

Sets the digitizer to flexible resolution mode if supported. The digitizer uses different hardware configurations to change the resolution depending on the sampling rate used.

`AcquisitionType.DDC`

Sets the digitizer to DDC mode on the NI 5620/5621.

`niscope.DataProcessingMode`

`DataProcessingMode.REAL`

The waveform data points are real numbers (I data).

`DataProcessingMode.COMPLEX`

The waveform data points are complex numbers (IQ data).

`niscope.ExportableSignals`

`ExportableSignals.START_TRIGGER`

`ExportableSignals.ADVANCE_TRIGGER`

`ExportableSignals.REF_TRIGGER`

`ExportableSignals.END_OF_RECORD_EVENT`

`ExportableSignals.END_OF_ACQUISITION_EVENT`

`ExportableSignals.READY_FOR_START_EVENT`

`ExportableSignals.READY_FOR_ADVANCE_EVENT`

`ExportableSignals.READY_FOR_REF_EVENT`

`ExportableSignals.REF_CLOCK`

`ExportableSignals.SAMPLE_CLOCK`

`ExportableSignals.FIVE_V_OUT`

`niscope.FetchRelativeTo`

`FetchRelativeTo.READ_POINTER`

The read pointer is set to zero when a new acquisition is initiated. After every fetch the read pointer is incremented to be the sample after the last sample retrieved. Therefore, you can repeatedly fetch relative to the read pointer for a continuous acquisition program.

`FetchRelativeTo.PRETRIGGER`

Fetches relative to the first pretrigger point requested with `niscope.Session.configure_horizontal_timing()`.

`FetchRelativeTo.NOW`

Fetch data at the last sample acquired.

`FetchRelativeTo.START`

Fetch data starting at the first point sampled by the digitizer.

`FetchRelativeTo.TRIGGER`

Fetch at the first posttrigger sample.

`niscope.FlexFIRAntialiasFilterType`

`FlexFIRAntialiasFilterType.FOURTYEIGHT_TAP_STANDARD`

This filter is optimized for alias protection and frequency-domain flatness

`FlexFIRAntialiasFilterType.FOURTYEIGHT_TAP_HANNING`

This filter is optimized for the lowest possible bandwidth for a 48 tap filter and maximizes the SNR

`FlexFIRAntialiasFilterType.SIXTEEN_TAP_HANNING`

This filter is optimized for the lowest possible bandwidth for a 16 tap filter and maximizes the SNR

`FlexFIRAntialiasFilterType.EIGHT_TAP_HANNING`

This filter is optimized for the lowest possible bandwidth for a 8 tap filter and maximizes the SNR

`niscope.Option`

`Option.SELF_CALIBRATE_ALL_CHANNELS`

Self Calibrating all Channels

`Option.RESTORE_EXTERNAL_CALIBRATION`

Restore External Calibration.

`niscope.OverflowErrorReporting`

`OverflowErrorReporting.ERROR`

Execution stops and NI-SCOPE returns an error when an overflow has occurred in the OSP block.

`OverflowErrorReporting.WARNING`

Execution continues and NI-SCOPE returns a warning when an overflow has occurred in the OSP block.

`OverflowErrorReporting.DISABLED`

NI-SCOPE does not return an error when an overflow has occurred in the OSP block.

`niscope.RISMethod`

`RISMethod.EXACT_NUM_AVERAGES`

Acquires exactly the specified number of records for each bin in the RIS acquisition. An error is returned from the fetch method if the RIS acquisition does not successfully acquire the specified number of waveforms within the timeout period. You may call the fetch method again to allow more time for the acquisition to finish.

`RISMethod.MIN_NUM_AVERAGES`

Each RIS sample is the average of a least a minimum number of randomly distributed points.

`RISMethod.INCOMPLETE`

Returns the RIS waveform after the specified timeout even if it is incomplete. If no waveforms have been acquired in certain bins, these bins will have a NaN (when fetching scaled data) or a zero (when fetching binary data). A warning (positive error code) is returned from the fetch method if the RIS acquisition did not finish. The acquisition aborts when data is returned.

`RISMethod.LIMITED_BIN_WIDTH`

Limits the waveforms in the various bins to be within 200 ps of the center of the bin.

`niscope.RefTriggerDetectorLocation`

`RefTriggerDetectorLocation.ANALOG_DETECTION_CIRCUIT`

use the hardware analog circuitry to implement the reference trigger. This option will trigger before any onboard signal processing.

`RefTriggerDetectorLocation.DDC_OUTPUT`

use the onboard signal processing logic to implement the reference trigger. This option will trigger based on the onboard signal processed data.

`niscope.StreamingPositionType`

`StreamingPositionType.START`

Data is streamed from the start trigger.

`StreamingPositionType.REFERENCE`

Data is streamed relative to the reference trigger and reference position.

`StreamingPositionType.SYNC`

Data is streamed relative to the sync trigger and reference position.

`niscope.TerminalConfiguration`

`TerminalConfiguration.SINGLE_ENDED`

Channel is single ended

`TerminalConfiguration.UNBALANCED_DIFFERENTIAL`

Channel is unbalanced differential

`TerminalConfiguration.DIFFERENTIAL`

Channel is differential

`niscope.TriggerCoupling`

`TriggerCoupling.AC`
AC coupling

`TriggerCoupling.DC`
DC coupling

`TriggerCoupling.HF_REJECT`
Highpass filter coupling

`TriggerCoupling.LF_REJECT`
Lowpass filter coupling

`TriggerCoupling.AC_PLUS_HF_REJECT`
Highpass and lowpass filter coupling

`niscope.TriggerModifier`

`TriggerModifier.NO_TRIGGER_MOD`
Normal triggering.

`TriggerModifier.AUTO`
Software will trigger an acquisition automatically if no trigger arrives after a certain amount of time.

`niscope.TriggerSlope`

`TriggerSlope.NEGATIVE`
Falling edge

`TriggerSlope.POSITIVE`
Rising edge

`niscope.TriggerType`

`TriggerType.EDGE`
Configures the digitizer for edge triggering. An edge trigger occurs when the trigger signal crosses the trigger level specified with the set trigger slope. You configure the trigger level and slope with `niscope.Session.configure_trigger_edge()`.

`TriggerType.TV`
Configures the digitizer for video/TV triggering. You configure the video trigger parameters like signal Format, Line to trigger off of, Polarity, and Enable DC Restore with `niscope.Session.configure_trigger_video()`.

`TriggerType.IMMEDIATE`
Configures the digitizer for immediate triggering. An immediate trigger occurs as soon as the pretrigger samples are acquired.

`TriggerType.HYSTERESIS`
Configures the digitizer for hysteresis triggering. A hysteresis trigger occurs when the trigger signal crosses the trigger level with the specified slope and passes through the hysteresis window you specify. You configure the trigger level, slope, and hysteresis with `niscope.Session.configure_trigger_hysteresis()`.

`TriggerType.DIGITAL`
Configures the digitizer for digital triggering. A digital trigger occurs when the trigger signal has the specified slope. You configure the trigger slope with `niscope.Session.configure_trigger_digital()`.

`TriggerType.WINDOW`

Configures the digitizer for window triggering. A window trigger occurs when the trigger signal enters or leaves the window defined by the values you specify with the Low Window Level, High Window Level, and Window Mode Parameters. You configure the low window level high window level, and window mode with `niscope.Session.configure_trigger_window()`.

`TriggerType.SOFTWARE`

Configures the digitizer for software triggering. A software trigger occurs when `niscope.Session.SendSoftwareTrigger()` is called.

`niscope.TriggerWindowMode`

`TriggerWindowMode.ENTERING`

Trigger upon entering the window

`TriggerWindowMode.LEAVING`

Trigger upon leaving the window

`niscope.VerticalCoupling`

`VerticalCoupling.AC`

AC coupling

`VerticalCoupling.DC`

DC coupling

`VerticalCoupling.GND`

GND coupling

`niscope.VideoPolarity`

`VideoPolarity.POSITIVE`

Specifies that the video signal has positive polarity.

`VideoPolarity.NEGATIVE`

Specifies that the video signal has negative polarity.

`niscope.VideoSignalFormat`

`VideoSignalFormat.NTSC`

NTSC signal format supports line numbers from 1 to 525

`VideoSignalFormat.PAL`

PAL signal format supports line numbers from 1 to 625

`VideoSignalFormat.SECAM`

SECAM signal format supports line numbers from 1 to 625

`VideoSignalFormat.M_PAL`

M-PAL signal format supports line numbers from 1 to 525

`VideoSignalFormat.VIDEO_480I_59_94_FIELDS_PER_SECOND`

480 lines, interlaced, 59.94 fields per second

`VideoSignalFormat.VIDEO_480I_60_FIELDS_PER_SECOND`

480 lines, interlaced, 60 fields per second

`VideoSignalFormat.VIDEO_480P_59_94_FRAMES_PER_SECOND`

480 lines, progressive, 59.94 frames per second

`VideoSignalFormat.VIDEO_480P_60_FRAMES_PER_SECOND`
480 lines, progressive, 60 frames per second

`VideoSignalFormat.VIDEO_576I_50_FIELDS_PER_SECOND`
576 lines, interlaced, 50 fields per second

`VideoSignalFormat.VIDEO_576P_50_FRAMES_PER_SECOND`
576 lines, progressive, 50 frames per second

`VideoSignalFormat.VIDEO_720P_50_FRAMES_PER_SECOND`
720 lines, progressive, 50 frames per second

`VideoSignalFormat.VIDEO_720P_59_94_FRAMES_PER_SECOND`
720 lines, progressive, 59.94 frames per second

`VideoSignalFormat.VIDEO_720P_60_FRAMES_PER_SECOND`
720 lines, progressive, 60 frames per second

`VideoSignalFormat.VIDEO_1080I_50_FIELDS_PER_SECOND`
1,080 lines, interlaced, 50 fields per second

`VideoSignalFormat.VIDEO_1080I_59_94_FIELDS_PER_SECOND`
1,080 lines, interlaced, 59.94 fields per second

`VideoSignalFormat.VIDEO_1080I_60_FIELDS_PER_SECOND`
1,080 lines, interlaced, 60 fields per second

`VideoSignalFormat.VIDEO_1080P_24_FRAMES_PER_SECOND`
1,080 lines, progressive, 24 frames per second

`niscope.VideoTriggerEvent`

`VideoTriggerEvent.FIELD1`
Trigger on field 1 of the signal

`VideoTriggerEvent.FIELD2`
Trigger on field 2 of the signal

`VideoTriggerEvent.ANY_FIELD`
Trigger on the first field acquired

`VideoTriggerEvent.ANY_LINE`
Trigger on the first line acquired

`VideoTriggerEvent.LINE_NUMBER`
Trigger on a specific line of a video signal. Valid values vary depending on the signal format configured.

`niscope.WhichTrigger`

`WhichTrigger.START`

`WhichTrigger.ARM_REFERENCE`

`WhichTrigger.REFERENCE`

`WhichTrigger.ADVANCE`

Examples

`niscope_fetch.py`

Listing 7.8: (niscope_fetch.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import niscope
5  import pprint
6  import sys
7
8  pp = pprint.PrettyPrinter(indent=4, width=80)
9
10
11 def example(resource_name, channels, options, length, voltage):
12     with niscope.Session(resource_name=resource_name, options=options) as session:
13         session.configure_vertical(range=voltage, coupling=niscope.VerticalCoupling.
14     ↪AC)
15         session.configure_horizontal_timing(min_sample_rate=50000000, min_num_
16     ↪pts=length, ref_position=50.0, num_records=1, enforce_realtime=True)
17         with session.initiate():
18             waveforms = session.channels[channels].fetch(num_samples=length)
19             for i in range(len(waveforms)):
20                 print('Waveform {0} information:'.format(i))
21                 print(str(waveforms[i]) + '\n\n')
22
23 def _main(argv):
24     parser = argparse.ArgumentParser(description='Acquires one record from the given_
25     ↪channels.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
26     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
27     ↪name of a National Instruments Digitizer')
28     parser.add_argument('-c', '--channels', default='0', help='Channel(s) to use')
29     parser.add_argument('-l', '--length', default=1000, type=int, help='Measure_
30     ↪record length')
31     parser.add_argument('-v', '--voltage', default=1.0, type=float, help='Voltage_
32     ↪range (V)')
33     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
34     ↪string')
35     args = parser.parse_args(argv)
36     example(args.resource_name, args.channels, args.option_string, args.length, args.
37     ↪voltage)
38
39 def main():
40     _main(sys.argv[1:])
41
42 def test_example():
43     options = {'simulate': True, 'driver_setup': {'Model': '5164', 'BoardType': 'PXIe
44     ↪', }, }
45     example('PXI1Slot2', '0', options, 1000, 1.0)
46
47 def test_main():
48     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:5164; BoardType:PXIe
49     ↪', ]
50     _main(cmd_line)

```



```

47 if __name__ == '__main__':
48     main()
49

```

niscope_read.py

Listing 7.9: (niscope_read.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import niscope
5  import pprint
6  import sys
7
8  pp = pprint.PrettyPrinter(indent=4, width=80)
9
10
11 def example(resource_name, channels, options, length, voltage):
12     with niscope.Session(resource_name=resource_name, options=options) as session:
13         session.configure_vertical(range=voltage, coupling=niscope.VerticalCoupling.
14         ↪AC)
15         session.configure_horizontal_timing(min_sample_rate=50000000, min_num_
16         ↪pts=length, ref_position=50.0, num_records=1, enforce_realtime=True)
17         waveforms = session.channels[channels].read(num_samples=length)
18         for i in range(len(waveforms)):
19             print('Waveform {0} information:'.format(i))
20             print(str(waveforms[i]) + '\n\n')
21
22 def _main(argv):
23     parser = argparse.ArgumentParser(description='Acquires one record from the given_
24     ↪channels.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
25     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
26     ↪name of a National Instruments Digitizer')
27     parser.add_argument('-c', '--channels', default='0', help='Channel(s) to use')
28     parser.add_argument('-l', '--length', default=1000, type=int, help='Measure_
29     ↪record length')
30     parser.add_argument('-v', '--voltage', default=1.0, type=float, help='Voltage_
31     ↪range (V)')
32     parser.add_argument('-op', '--option-string', default='', type=str, help='Option_
33     ↪string')
34     args = parser.parse_args(argv)
35     example(args.resource_name, args.channels, args.option_string, args.length, args.
36     ↪voltage)
37
38 def main():
39     _main(sys.argv[1:])
40
41
42 def test_example():
43     options = {'simulate': True, 'driver_setup': {'Model': '5164', 'BoardType': 'PXIe
44     ↪', }, }
45     example('PXI1Slot2', '0', options, 1000, 1.0)
46
47

```

```

40
41 def test_main():
42     cmd_line = ['--option-string', 'Simulate=1, DriverSetup=Model:5164; BoardType:PXIe
↪', ]
43     _main(cmd_line)
44
45
46 if __name__ == '__main__':
47     main()
48

```

7.5 niswitch module

7.5.1 Installation

As a prerequisite to using the niswitch module, you must install the NI-SWITCH runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The nimi-python modules (i.e. for **NI-SWITCH**) can be installed with [pip](#):

```
$ python -m pip install niswitch~=0.8.0
```

Or **easy_install** from [setuptools](#):

```
$ python -m easy_install niswitch
```

7.5.2 Usage

The following is a basic example of using the **niswitch** module to open a session to a Switch and connect channels.

```

import niswitch
with niswitch.Session("Dev1") as session:
    session.connect(channel1='r0', channel2='c0')

```

Additional examples for NI-SWITCH are located in `src/niswitch/examples/` directory.

7.5.3 API Reference

niswitch.Session

class `niswitch.Session`

An NI-SWITCH session to a National Instruments Switch Module

Properties

Property	Datatype
<code>analog_bus_sharing_enable</code>	bool
<code>bandwidth</code>	float
<code>cabled_module_scan_advanced_bus</code>	int
<code>cabled_module_trigger_bus</code>	int

Continued on next page

Table 7.9 – continued from previous page

Property	Datatype
<code>cache</code>	bool
<code>channel_count</code>	int
<code>characteristic_impedance</code>	float
<code>continuous_scan</code>	bool
<code>digital_filter_enable</code>	bool
<code>driver_setup</code>	str
<code>group_capabilities</code>	str
<code>handshaking_initiation</code>	<i>HandshakingInitiation</i>
<code>instrument_firmware_revision</code>	str
<code>instrument_manufacturer</code>	str
<code>instrument_model</code>	str
<code>interchange_check</code>	bool
<code>io_resource_descriptor</code>	str
<code>is_configuration_channel</code>	bool
<code>is_debounced</code>	bool
<code>is_scanning</code>	bool
<code>is_source_channel</code>	bool
<code>is_waiting_for_trig</code>	bool
<code>logical_name</code>	str
<code>master_slave_scan_advanced_bus</code>	int
<code>master_slave_trigger_bus</code>	int
<code>max_ac_voltage</code>	float
<code>max_carry_ac_current</code>	float
<code>max_carry_ac_power</code>	float
<code>max_carry_dc_current</code>	float
<code>max_carry_dc_power</code>	float
<code>max_dc_voltage</code>	float
<code>max_switching_ac_current</code>	float
<code>max_switching_ac_power</code>	float
<code>max_switching_dc_current</code>	float
<code>max_switching_dc_power</code>	float
<code>number_of_relays</code>	int
<code>num_of_columns</code>	int
<code>num_of_rows</code>	int
<code>parsed_scan_list</code>	str
<code>power_down_latching_relays_after_debounce</code>	bool
<code>range_check</code>	bool
<code>record_coercions</code>	bool
<code>scan_advanced_output</code>	<i>ScanAdvancedOutput</i>
<code>scan_advanced_polarity</code>	<i>ScanAdvancedPolarity</i>
<code>scan_delay</code>	float in seconds or datetime.timedelta
<code>scan_list</code>	str
<code>scan_mode</code>	<i>ScanMode</i>
<code>serial_number</code>	str
<code>settling_time</code>	float in seconds or datetime.timedelta
<code>simulate</code>	bool
<code>specific_driver_class_spec_major_version</code>	int
<code>specific_driver_class_spec_minor_version</code>	int
<code>specific_driver_description</code>	str

Continued on next page

Table 7.9 – continued from previous page

Property	Datatype
<i>specific_driver_revision</i>	str
<i>specific_driver_vendor</i>	str
<i>supported_instrument_models</i>	str
<i>temperature</i>	float
<i>trigger_input</i>	<i>TriggerInput</i>
<i>trigger_input_polarity</i>	<i>TriggerInputPolarity</i>
<i>trigger_mode</i>	int
<i>wire_mode</i>	int

Public methods

Method name
<i>abort()</i>
<i>can_connect()</i>
<i>commit()</i>
<i>configure_scan_list()</i>
<i>configure_scan_trigger()</i>
<i>connect()</i>
<i>connect_multiple()</i>
<i>disable()</i>
<i>disconnect()</i>
<i>disconnect_all()</i>
<i>disconnect_multiple()</i>
<i>get_channel_name()</i>
<i>get_path()</i>
<i>get_relay_count()</i>
<i>get_relay_name()</i>
<i>get_relay_position()</i>
<i>relay_control()</i>
<i>reset()</i>
<i>reset_with_defaults()</i>
<i>route_scan_advanced_output()</i>
<i>route_trigger_input()</i>
<i>self_test()</i>
<i>send_software_trigger()</i>
<i>set_continuous_scan()</i>
<i>set_path()</i>
<i>wait_for_debounce()</i>
<i>wait_for_scan_complete()</i>

niswitch.Session methods

`niswitch.Session.abort()`

Aborts the scan in progress. Initiate a scan with `niswitch.Session._initiate_scan()`. If the switch module is not scanning, `NISWITCH_ERROR_NO_SCAN_IN_PROGRESS` error is returned.

`niswitch.Session.can_connect(channel1, channel2)`

Verifies that a path between channel 1 and channel 2 can be created. If a path is possible in the switch module, the availability of that path is returned given the existing connections. If the path is possible but in use, a `NISWITCH_WARN_IMPLICIT_CONNECTION_EXISTS` warning is returned.

Parameters

- **channel1** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 2 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: ""
- **channel2** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 1 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: ""

Return type *niswitch.PathCapability*

Returns

Indicates whether a path is valid. Possible values include: _____

NISWITCH_VAL_PATH_AVAILABLE	1	NISWITCH_VAL_PATH_EXISTS	2
NISWITCH_VAL_PATH_UNSUPPORTED	3	NISWITCH_VAL_RSRC_IN_USE	4
NISWITCH_VAL_SOURCE_CONFLICT	5	NISWITCH_VAL_CHANNEL_NOT_AVAILABLE	6

Notes: (1) NISWITCH_VAL_PATH_AVAILABLE indicates that the driver can create the path at this time. (2) NISWITCH_VAL_PATH_EXISTS indicates that the path already exists. (3) NISWITCH_VAL_PATH_UNSUPPORTED indicates that the instrument is not capable of creating a path between the channels you specify. (4) NISWITCH_VAL_RSRC_IN_USE indicates that although the path is valid, the driver cannot create the path at this moment because the switch device is currently using one or more of the required channels to create another path. You must destroy the other path before creating this one. (5) NISWITCH_VAL_SOURCE_CONFLICT indicates that the instrument cannot create a path because both channels are connected to a different source channel. (6) NISWITCH_VAL_CHANNEL_NOT_AVAILABLE indicates that the driver cannot create a path between the two channels because one of the channels is a configuration channel and thus unavailable for external connections.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`niswitch.Session.commit()`

Downloads the configured scan list and trigger settings to hardware. Calling `niswitch.Session.commit()` optional as it is implicitly called during `niswitch.Session._initiate_scan()`. Use `niswitch.Session.commit()` to arm triggers in a given order or to control when expensive hardware operations are performed.

`niswitch.Session.configure_scan_list(scanlist, scan_mode=niswitch.ScanMode.BREAK_BEFORE_MAKE)`

Configures the scan list and scan mode used for scanning. Refer to Devices Overview to determine if the switch module supports scanning. The scan list is comprised of a list of channel connections separated by semi-colons. For example, the following scan list will scan the first three channels of a multiplexer: com0->ch0; com0->ch1; com0->ch2; Refer to Scan Lists for more information on scan list syntax To see the status of the scan, call either `niswitch.Session.IsScanning()` or `niswitch.Session.wait_for_scan_complete()`. Use the `niswitch.Session.configure_scan_trigger()` method to configure the scan trigger. Use the `niswitch.Session._initiate_scan()` method to start the scan.

Note: One or more of the referenced methods are not in the Python API for this driver.

Parameters

- **scanlist** (*str*) – The scan list to use. The driver uses this value to set the Scan List property. Default value: None
- **scan_mode** (*niswitch.ScanMode*) – Specifies how the switch module breaks existing connections when scanning. The driver uses this value to set the Scan Mode property. Refer to scan modes for more information. Default value: Break Before Make

`niswitch.Session.configure_scan_trigger(trigger_input, scan_advanced_output, scan_delay=datetime.timedelta(seconds=0.0))`

Configures the scan triggers for the scan list established with `niswitch.Session.configure_scan_list()`. Refer to Devices Overview to determine if the switch module supports scanning. `niswitch.Session.configure_scan_trigger()` sets the location that the switch expects to receive an input trigger to advance through the scan list. This method also sets the location where it outputs a scan advanced signal after it completes an entry in the scan list.

Parameters

- **trigger_input** (*niswitch.TriggerInput*) – Trigger source you want the switch module to use during scanning. The driver uses this value to set the `niswitch.Session.trigger_input` property. The switch device waits for the trigger you specify when it encounters a semicolon in the scanlist. When the trigger occurs, the switch device advances to the next entry in the scanlist. Refer to the `niswitch.Session.trigger_input` topic in the NI Switches Help for a list of valid values.
- **scan_advanced_output** (*niswitch.ScanAdvancedOutput*) – Output destination of the scan advanced trigger signal. The driver uses this value to set the `niswitch.Session.scan_advanced_output` property. After the switch processes each entry in the scan list, it waits the length of time you specify in the Scan Delay parameter and then asserts a trigger on the line you specify with this parameter. Refer to the `niswitch.Session.scan_advanced_output` topic in the NI Switches Help for a list of valid values.
- **scan_delay** (*float in seconds or datetime.timedelta*) – The minimum length of time you want the switch device to wait after it creates a path until it asserts a trigger on the scan advanced output line. The driver uses this value to set the Scan Delay property. The scan delay is in addition to the settling time. The driver uses this value to set the `niswitch.Session.scan_delay` property. Express this value in seconds. Default value: 0.0 s

`niswitch.Session.connect(channel1, channel2)`

Creates a path between channel 1 and channel 2. The driver calculates and uses the shortest path between the two channels. Refer to Immediate Operations for information about Channel Usage types. If a path is not available, the method returns one of the following errors: - `NISWITCH_ERROR_EXPLICIT_CONNECTION_EXISTS`, if the two channels are already explicitly connected by calling either the `niswitch.Session.connect()` or `niswitch.Session.set_path()` method. - `NISWITCH_ERROR_IS_CONFIGURATION_CHANNEL`, if a channel is a configuration channel. Error elaboration contains information about which of the two channels is a configuration channel. - `NISWITCH_ERROR_ATTEMPT_TO_CONNECT_SOURCES`, if both channels are connected to a different source. Error elaboration contains information about sources channel 1 and 2 connect to. - `NISWITCH_ERROR_CANNOT_CONNECT_TO_ITSELF`, if channels 1 and 2 are one and the same channel. - `NISWITCH_ERROR_PATH_NOT_FOUND`, if the driver cannot find a path between the two channels. Note: Paths are bidirectional. For example, if a path exists between channels CH1 and CH2, then the path also exists between channels CH2 and CH1.

Parameters

- **channel1** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 2 parameter. Refer to Devices Overview for valid channel

names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: None

- **channel12** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 1 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: None

`niswitch.Session.connect_multiple(connection_list)`

Creates the connections between channels specified in Connection List. Specify connections with two endpoints only or the explicit path between two endpoints. NI-SWITCH calculates and uses the shortest path between the channels. Refer to Setting Source and Configuration Channels for information about channel usage types. In the event of an error, connecting stops at the point in the list where the error occurred. If a path is not available, the method returns one of the following errors: - NISWITCH_ERROR_EXPLICIT_CONNECTION_EXISTS, if the two channels are already explicitly connected. - NISWITCH_ERROR_IS_CONFIGURATION_CHANNEL, if a channel is a configuration channel. Error elaboration contains information about which of the two channels is a configuration channel. - NISWITCH_ERROR_ATTEMPT_TO_CONNECT_SOURCES, if both channels are connected to a different source. Error elaboration contains information about sources channel 1 and 2 to connect. - NISWITCH_ERROR_CANNOT_CONNECT_TO_ITSELF, if channels 1 and 2 are one and the same channel. - NISWITCH_ERROR_PATH_NOT_FOUND, if the driver cannot find a path between the two channels. Note: Paths are bidirectional. For example, if a path exists between channels ch1 and ch2, then the path also exists between channels ch1 and ch2.

Parameters **connection_list** (*str*) – Connection List specifies a list of connections between channels to make. NI-SWITCH validates the connection list, and aborts execution of the list if errors are returned. Refer to Connection and Disconnection List Syntax for valid connection list syntax and examples. Refer to Devices Overview for valid channel names for the switch module. Example of a valid connection list: c0 -> r1, [c2 -> r2 -> c3] In this example, r2 is a configuration channel. Default value: None

`niswitch.Session.disable()`

Places the switch module in a quiescent state where it has minimal or no impact on the system to which it is connected. All channels are disconnected and any scan in progress is aborted.

`niswitch.Session.disconnect(channel1, channel2)`

This method destroys the path between two channels that you create with the `niswitch.Session.connect()` or `niswitch.Session.set_path()` method. If a path is not connected or not available, the method returns the IVISWITCH_ERROR_NO_SUCH_PATH error.

Parameters

- **channel1** (*str*) – Input one of the channel names of the path to break. Pass the other channel name as the channel 2 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: None
- **channel12** (*str*) – Input one of the channel names of the path to break. Pass the other channel name as the channel 1 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: ch0, com0, ab0, r1, c2, cjtemp Default value: None

`niswitch.Session.disconnect_all()`

Breaks all existing paths. If the switch module cannot break all paths, NISWITCH_WARN_PATH_REMAINS warning is returned.

`niswitch.Session.disconnect_multiple(disconnection_list)`

Breaks the connections between channels specified in Disconnection List. If no connections exist between

channels, NI-SWITCH returns an error. In the event of an error, the VI stops at the point in the list where the error occurred.

Parameters `disconnection_list` (*str*) – Disconnection List specifies a list of connections between channels to break. NI-SWITCH validates the disconnection list, and aborts execution of the list if errors are returned. Refer to Connection and Disconnection List Syntax for valid disconnection list syntax and examples. Refer to Devices Overview for valid channel names for the switch module. Example of a valid disconnection list: `c0 -> r1, [c2 -> r2 -> c3]` In this example, `r2` is a configuration channel. Default value: `None`

`niswitch.Session.get_channel_name(index)`

Returns the channel string that is in the channel table at the specified index. Use `niswitch.Session.get_channel_name()` in a For Loop to get a complete list of valid channel names for the switch module. Use the Channel Count property to determine the number of channels.

Parameters `index` (*int*) – A 1-based index into the channel table. Default value: 1 Maximum value: Value of Channel Count property.

`niswitch.Session.get_path(channel1, channel2)`

Returns a string that identifies the explicit path created with `niswitch.Session.connect()`. Pass this string to `niswitch.Session.set_path()` to establish the exact same path in future connections. In some cases, multiple paths are available between two channels. When you call `niswitch.Session.connect()`, the driver selects an available path. With `niswitch.Session.connect()`, there is no guarantee that the driver selected path will always be the same path through the switch module. `niswitch.Session.get_path()` only returns those paths explicitly created by `niSwitch Connect Channels` or `niswitch.Session.set_path()`. For example, if you connect channels CH1 and CH3, and then channels CH2 and CH3, an explicit path between channels CH1 and CH2 does not exist an error is returned

Parameters

- **channel1** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 2 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: `ch0`, `com0`, `ab0`, `r1`, `c2`, `cjtemp` Default value: `""`
- **channel2** (*str*) – Input one of the channel names of the desired path. Pass the other channel name as the channel 1 parameter. Refer to Devices Overview for valid channel names for the switch module. Examples of valid channel names: `ch0`, `com0`, `ab0`, `r1`, `c2`, `cjtemp` Default value: `""`

`niswitch.Session.get_relay_count(relay_name)`

Returns the number of times the relay has changed from Closed to Open. Relay count is useful for tracking relay lifetime and usage. Call `niswitch.Session.wait_for_debounce()` before `niswitch.Session.get_relay_count()` to ensure an accurate count. Refer to the Relay Count topic in the NI Switches Help to determine if the switch module supports relay counting.

Parameters `relay_name` (*str*) – Name of the relay. Default value: `None` Examples of valid relay names: `ch0`, `ab0`, `1wire`, `hlselect` Refer to Devices Overview for a list of valid relay names for the switch module.

Return type `int`

Returns The number of relay cycles.

`niswitch.Session.get_relay_name(index)`

Returns the relay name string that is in the relay list at the specified index. Use `niswitch.Session.get_relay_name()` in a For Loop to get a complete list of valid relay names for the switch module. Use the Number of Relays property to determine the number of relays.

Parameters `index` (*int*) – A 1-based index into the channel table. Default value: 1 Maximum value: Value of Channel Count property.

`niswitch.Session.get_relay_position` (*relay_name*)

Returns the relay position for the relay specified in the Relay Name parameter.

Parameters `relay_name` (*str*) – Name of the relay. Default value: None Examples of valid relay names: ch0, ab0, 1wire, hlselect Refer to Devices Overview for a list of valid relay names for the switch module.

Return type `niswitch.RelayPosition`

Returns

Indicates whether the relay is open or closed. NISWITCH_VAL_OPEN 10 NISWITCH_VAL_CLOSED 11

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`niswitch.Session.relay_control` (*relay_name*, *relay_action*)

Controls individual relays of the switch. When controlling individual relays, the protection offered by setting the usage of source channels and configuration channels, and by enabling or disabling analog bus sharing on the NI SwitchBlock, does not apply. Refer to the device book for your switch in the NI Switches Help to determine if the switch supports individual relay control.

Parameters

- **relay_name** (*str*) – Name of the relay. Default value: None Examples of valid relay names: ch0, ab0, 1wire, hlselect Refer to Devices Overview for a list of valid relay names for the switch module.
- **relay_action** (`niswitch.RelayAction`) – Specifies whether to open or close a given relay. Default value: Relay Close Defined values: NISWITCH_VAL_OPEN_RELAY NISWITCH_VAL_CLOSE_RELAY (Default Value)

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

`niswitch.Session.reset` ()

Disconnects all created paths and returns the switch module to the state at initialization. Configuration channel and source channel settings remain unchanged.

`niswitch.Session.reset_with_defaults` ()

Resets the switch module and applies initial user specified settings from the logical name used to initialize the session. If the session was created without a logical name, this method is equivalent to `niswitch.Session.reset` ().

`niswitch.Session.route_scan_advanced_output` (*scan_advanced_output_connector*, *scan_advanced_output_bus_line*, *invert=False*)

Routes the scan advanced output trigger from a trigger bus line (TTLx) to the front or rear connector.

Parameters

- **scan_advanced_output_connector** (`niswitch.ScanAdvancedOutput`) – The scan advanced trigger destination. Valid locations are the `FRONTCONNECTOR` and `REARCONNECTOR`. Default value: `FRONTCONNECTOR`

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **scan_advanced_output_bus_line** (*niswitch.ScanAdvancedOutput*) – The trigger line to route the scan advanced output trigger from the front or rear connector. Select *NONE* to break an existing route. Default value: *None* Valid Values: *NONE TTL0 TTL1 TTL2 TTL3 TTL4 TTL5 TTL6 TTL7*

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **invert** (*bool*) – If True, inverts the input trigger signal from falling to rising or vice versa. Default value: *False*

`niswitch.Session.route_trigger_input(trigger_input_connector, trigger_input_bus_line, invert=False)`

Routes the input trigger from the front or rear connector to a trigger bus line (TTLx). To disconnect the route, call this method again and specify *None* for trigger bus line parameter.

Parameters

- **trigger_input_connector** (*niswitch.TriggerInput*) – The location of the input trigger source on the switch module. Valid locations are the *FRONTCONNECTOR* and *REARCONNECTOR*. Default value: *FRONTCONNECTOR*

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **trigger_input_bus_line** (*niswitch.TriggerInput*) – The trigger line to route the input trigger. Select *NISWITCH_VAL_NONE* to break an existing route. Default value: *None* Valid Values: *NISWITCH_VAL_NONE TTL0 TTL1 TTL2 TTL3 TTL4 TTL5 TTL6 TTL7*

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

- **invert** (*bool*) – If True, inverts the input trigger signal from falling to rising or vice versa. Default value: *False*

`niswitch.Session.self_test()`

Verifies that the driver can communicate with the switch module.

Raises *SelfTestError* on self test failure. Properties on exception object:

- *code* - failure code from driver
- *message* - status message from driver

Self-Test Code	Description
0	Passed self-test
1	Self-test failed

```
niswitch.Session.send_software_trigger()
```

Sends a software trigger to the switch module specified in the NI-SWITCH session. When the trigger input is set to `SOFTWARE_TRIG` through either the `niswitch.Session.configure_scan_trigger()` or the `niswitch.Session.trigger_input` property, the scan does not proceed from a semi-colon (wait for trigger) until `niswitch.Session.send_software_trigger()` is called.

```
niswitch.Session.set_continuous_scan(continuous_scan)
```

Sets the loop to loop continuously through the scan list or to stop scanning after one pass through the scan list.

Parameters `continuous_scan` (*bool*) – If True, loops continuously through the scan list during scanning. If False, the scan stops after one pass through the scan list. Default value: False

```
niswitch.Session.set_path(path_list)
```

Connects two channels by specifying an explicit path in the path list parameter. `niswitch.Session.set_path()` is particularly useful where path repeatability is important, such as in calibrated signal paths. If this is not necessary, use `niswitch.Session.connect()`.

Parameters `path_list` (*str*) – A string composed of comma-separated paths between channel 1 and channel 2. The first and last names in the path are the endpoints of the path. Every other channel in the path are configuration channels. Example of a valid path list string: `ch0->com0, com0->ab0`. In this example, `com0` is a configuration channel. Default value: None Obtain the path list for a previously created path with `niswitch.Session.get_path()`.

```
niswitch.Session.wait_for_debounce(maximum_time_ms=datetime.timedelta(milliseconds=5000))
```

Pauses until all created paths have settled. If the time you specify with the Maximum Time (ms) parameter elapsed before the switch paths have settled, this method returns the `NISWITCH_ERROR_MAX_TIME_EXCEEDED` error.

Parameters `maximum_time_ms` (*float in seconds or datetime.timedelta*) – Specifies the maximum length of time to wait for all relays in the switch module to activate or deactivate. If the specified time elapses before all relays active or deactivate, a timeout error is returned. Default Value:5000 ms

```
niswitch.Session.wait_for_scan_complete(maximum_time_ms=datetime.timedelta(milliseconds=5000))
```

Pauses until the switch module stops scanning or the maximum time has elapsed and returns a timeout error. If the time you specify with the Maximum Time (ms) parameter elapsed before the scanning operation has finished, this method returns the `NISWITCH_ERROR_MAX_TIME_EXCEEDED` error.

Parameters `maximum_time_ms` (*float in seconds or datetime.timedelta*) – Specifies the maximum length of time to wait for the switch module to stop scanning. If the specified time elapses before the scan ends, `NISWITCH_ERROR_MAX_TIME_EXCEEDED` error is returned. Default Value:5000 ms

niswitch.Session properties

```
niswitch.Session.analog_bus_sharing_enable
```

Enables or disables sharing of an analog bus line so that multiple NI SwitchBlock devices may connect to it simultaneously. To enable multiple NI SwitchBlock devices to share an analog bus line, set this property to True for each device on the channel that corresponds with the shared analog bus line. The default value for all devices is False, which disables sharing of the analog bus. Refer to the Using the Analog Bus on an NI SwitchBlock Carrier topic in the NI Switches Help for more information about sharing the analog bus.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `analog_bus_sharing_enable.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `analog_bus_sharing_enable.Session` instance, and calling set/get value on the result.:

```
session['0,1'].analog_bus_sharing_enable = var  
var = session['0,1'].analog_bus_sharing_enable
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Channel Configuration:Analog Bus Sharing Enable**
 - C Attribute: **NISWITCH_ATTR_ANALOG_BUS_SHARING_ENABLE**
-

`niswitch.Session.bandwidth`

This channel-based property returns the bandwidth for the channel. The units are hertz.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `bandwidth.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `bandwidth.Session` instance, and calling set/get value on the result.:

```
session['0,1'].bandwidth = var  
var = session['0,1'].bandwidth
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Bandwidth**
 - C Attribute: **NISWITCH_ATTR_BANDWIDTH**
-

`niswitch.Session.cabled_module_scan_advanced_bus`

This property has been deprecated and may be removed from a future release of NI-SWITCH. Use the `niswitch.Session.route_scan_advanced_output()` method instead.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes:Cabled Module Scan Advanced Bus**
 - C Attribute: **NISWITCH_ATTR_CABLED_MODULE_SCAN_ADVANCED_BUS**
-

`niswitch.Session.cabled_module_trigger_bus`

This property has been deprecated and may be removed from a future release of NI-SWITCH. Use the `niswitch.Session.route_trigger_input()` method instead.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes:Cabled Module Trigger Bus**
 - C Attribute: **NISWITCH_ATTR_CABLED_MODULE_TRIGGER_BUS**
-

`niswitch.Session.cache`

Specifies whether to cache the value of properties. When caching is enabled, the instrument driver keeps track of the current instrument settings and avoids sending redundant commands to the instrument. The instrument driver can choose always to cache or never to cache particular properties regardless of the setting of this property. The default value is True. Use the `niswitch.Session.InitWithOptions()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Cache**

- C Attribute: **NISWITCH_ATTR_CACHE**
-

`niswitch.Session.channel_count`

Indicates the number of channels that the specific instrument driver supports.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Channel Count**
 - C Attribute: **NISWITCH_ATTR_CHANNEL_COUNT**
-

`niswitch.Session.characteristic_impedance`

This channel-based property returns the characteristic impedance for the channel. The units are ohms.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `characteristic_impedance.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `characteristic_impedance.Session` instance, and calling set/get value on the result.:

```
session['0,1'].characteristic_impedance = var
var = session['0,1'].characteristic_impedance
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Characteristic Impedance**
 - C Attribute: **NISWITCH_ATTR_CHARACTERISTIC_IMPEDANCE**
-

`niswitch.Session.continuous_scan`

When a switch device is scanning, the switch can either stop scanning when the end of the scan (False) or continue scanning from the top of the scan list again (True). Notice that if you set the scan to continuous (True), the Wait For Scan Complete operation will always time out and you must call Abort to stop the scan.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Continuous Scan**
 - C Attribute: **NISWITCH_ATTR_CONTINUOUS_SCAN**
-

`niswitch.Session.digital_filter_enable`

This property specifies whether to apply the pulse width filter to the Trigger Input. Enabling the Digital Filter (True) prevents the switch module from being triggered by pulses that are less than 150 ns on PXI trigger lines 0–7. When Digital Filter is disabled (False), it is possible for the switch module to be triggered by noise on the PXI trigger lines. If the device triggering the switch is capable of sending pulses greater than 150 ns, you should not disable the Digital Filter.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Digital Filter Enable**
 - C Attribute: **NISWITCH_ATTR_DIGITAL_FILTER_ENABLE**
-

`niswitch.Session.driver_setup`

This property indicates the Driver Setup string that the user specified when initializing the driver. Some cases exist where the end-user must specify instrument driver options at initialization time. An example of this is specifying a particular instrument model from among a family of instruments that the driver supports. This is useful when using simulation. The end-user can specify driver-specific options through the DriverSetup keyword in the optionsString parameter to the `niswitch.Session.InitWithOptions()` method, or through the IVI Configuration Utility. If the user does not specify a Driver Setup string, this property returns an empty string.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Driver Setup**
 - C Attribute: **NISWITCH_ATTR_DRIVER_SETUP**
-

`niswitch.Session.group_capabilities`

A string that contains a comma-separated list of class-extension groups that this driver implements.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Class Group Capabilities**
 - C Attribute: **NISWITCH_ATTR_GROUP_CAPABILITIES**
-

`niswitch.Session.handshaking_initiation`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.HandshakingInitiation
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Handshaking Initiation**
 - C Attribute: **NISWITCH_ATTR_HANDSHAKING_INITIATION**
-

`niswitch.Session.instrument_firmware_revision`

A string that contains the firmware revision information for the instrument you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Firmware Revision**
 - C Attribute: **NISWITCH_ATTR_INSTRUMENT_FIRMWARE_REVISION**
-

`niswitch.Session.instrument_manufacturer`

A string that contains the name of the instrument manufacturer you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Manufacturer**
 - C Attribute: **NISWITCH_ATTR_INSTRUMENT_MANUFACTURER**
-

`niswitch.Session.instrument_model`

A string that contains the model number or name of the instrument that you are currently using.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Instrument Identification:Model**
 - C Attribute: **NISWITCH_ATTR_INSTRUMENT_MODEL**
-

`niswitch.Session.interchange_check`

Specifies whether to perform interchangeability checking and retrieve interchangeability warnings when you call `niswitch.Session.connect()`, `niswitch.Session.set_path()` and `niswitch.Session._initiate_scan()` methods. The default value is False. Interchangeability warnings indicate that using your application with a different instrument might cause different behavior. You call `niswitch.Session.GetNextInterchangeWarning()` to extract interchange warnings. Call the `niswitch.Session.ClearInterchangeWarnings()` method to clear the list of interchangeability warnings without reading them. Interchangeability checking examines the properties in a capability group only if you specify a value for at least one property within that group. Interchangeability warnings can occur when a property affects the behavior of the instrument and you have not set that property, or the property has been invalidated since you set it.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Interchange Check**
 - C Attribute: **NISWITCH_ATTR_INTERCHANGE_CHECK**
-

`niswitch.Session.io_resource_descriptor`

Indicates the resource descriptor the driver uses to identify the physical device. If you initialize the driver with a logical name, this property contains the resource descriptor that corresponds to the entry in the IVI Configuration utility. If you initialize the instrument driver with the resource descriptor, this property contains that value.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:IO Resource Descriptor**
 - C Attribute: **NISWITCH_ATTR_IO_RESOURCE_DESCRIPTOR**
-

`niswitch.Session.is_configuration_channel`

This channel-based property specifies whether to reserve the channel for internal path creation. A channel that is available for internal path creation is called a configuration channel. The driver may use configuration channels to create paths between two channels you specify in the `niswitch.Session.connect()` method. Configuration channels are not available for external connections. Set this property to True to mark the channel as a configuration channel. Set this property to False to mark the channel as available for external connections. After you identify a channel as a configuration channel, you cannot use that channel for external connections. The `niswitch.Session.connect()` method returns the `NISWITCH_ERROR_IS_CONFIGURATION_CHANNEL` error when you attempt to establish a connection between a configuration channel and any other channel.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `is_configuration_channel.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `is_configuration_channel.Session` instance, and calling set/get value on the result.:

```
session['0,1'].is_configuration_channel = var
var = session['0,1'].is_configuration_channel
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Channel Configuration:Is Configuration Channel**
 - C Attribute: **NISWITCH_ATTR_IS_CONFIGURATION_CHANNEL**
-

`niswitch.Session.is_debounced`

This property indicates whether the entire switch device has settled since the last switching command. A value of True indicates that all signals going through the switch device are valid.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Is Debounced**
 - C Attribute: **NISWITCH_ATTR_IS_DEBOUNCED**
-

`niswitch.Session.is_scanning`

If True, the switch module is currently scanning through the scan list (i.e. it is not in the Idle state). If False, the switch module is not currently scanning through the scan list (i.e. it is in the Idle state).

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Is Scanning**
 - C Attribute: **NISWITCH_ATTR_IS_SCANNING**
-

niswitch.Session.is_source_channel

This channel-based property specifies whether you want to identify the channel as a source channel. Typically, you set this property to True when you attach the channel to a power supply, a method generator, or an active measurement point on the unit under test, and you do not want to connect the channel to another source. The driver prevents source channels from connecting to each other. The `niswitch.Session.connect()` method returns the `NISWITCH_ERROR_ATTEMPT_TO_CONNECT_SOURCES` when you attempt to connect two channels that you identify as source channels.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `is_source_channel.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `is_source_channel.Session` instance, and calling set/get value on the result.:

```
session['0,1'].is_source_channel = var
var = session['0,1'].is_source_channel
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Channel Configuration:Is Source Channel**
 - C Attribute: **NISWITCH_ATTR_IS_SOURCE_CHANNEL**
-

niswitch.Session.is_waiting_for_trig

In a scan list, a semi-colon (;) is used to indicate that at that point in the scan list, the scan engine should pause until a trigger is received from the trigger input. If that trigger is user generated through either a hardware pulse or the Send SW Trigger operation, it is necessary for the user to know when the scan engine has reached such a state.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Is Waiting for Trigger?**
 - C Attribute: **NISWITCH_ATTR_IS_WAITING_FOR_TRIG**
-

`niswitch.Session.logical_name`

A string containing the logical name you specified when opening the current IVI session. You may pass a logical name to the `niswitch.Session.init()` or `niswitch.Session.InitWithOptions()` methods. The IVI Configuration utility must contain an entry for the logical name. The logical name entry refers to a virtual instrument section in the IVI Configuration file. The virtual instrument section specifies a physical device and initial user options.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Advanced Session Information:Logical Name**
 - C Attribute: **NISWITCH_ATTR_LOGICAL_NAME**
-

`niswitch.Session.master_slave_scan_advanced_bus`

This property has been deprecated and may be removed from a future release of NI-SWITCH. Use the `niswitch.Session.route_scan_advanced_output()` method instead.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes:Master Slave Scan Advanced Bus**
 - C Attribute: **NISWITCH_ATTR_MASTER_SLAVE_SCAN_ADVANCED_BUS**
-

`niswitch.Session.master_slave_trigger_bus`

This property has been deprecated and may be removed from a future release of NI-SWITCH. Use the `niswitch.Session.route_trigger_input()` method instead.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes:Master Slave Trigger Bus**
 - C Attribute: **NISWITCH_ATTR_MASTER_SLAVE_TRIGGER_BUS**
-

`niswitch.Session.max_ac_voltage`

This channel-based property returns the maximum AC voltage the channel can switch. The units are volts RMS.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_ac_voltage.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_ac_voltage.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_ac_voltage = var
var = session['0,1'].max_ac_voltage
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum AC Voltage**
 - C Attribute: **NISWITCH_ATTR_MAX_AC_VOLTAGE**
-

`niswitch.Session.max_carry_ac_current`

This channel-based property returns the maximum AC current the channel can carry. The units are amperes RMS.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_carry_ac_current.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_carry_ac_current.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_carry_ac_current = var
var = session['0,1'].max_carry_ac_current
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Carry AC Current**
 - C Attribute: **NISWITCH_ATTR_MAX_CARRY_AC_CURRENT**
-

`niswitch.Session.max_carry_ac_power`

This channel-based property returns the maximum AC power the channel can carry. The units are volt-amperes.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_carry_ac_power.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_carry_ac_power.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_carry_ac_power = var
var = session['0,1'].max_carry_ac_power
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Carry AC Power**
 - C Attribute: **NISWITCH_ATTR_MAX_CARRY_AC_POWER**
-

`niswitch.Session.max_carry_dc_current`

This channel-based property returns the maximum DC current the channel can carry. The units are amperes.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_carry_dc_current.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_carry_dc_current.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_carry_dc_current = var
var = session['0,1'].max_carry_dc_current
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Carry DC Current**
 - C Attribute: **NISWITCH_ATTR_MAX_CARRY_DC_CURRENT**
-

`niswitch.Session.max_carry_dc_power`

This channel-based property returns the maximum DC power the channel can carry. The units are watts.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_carry_dc_power.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_carry_dc_power.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_carry_dc_power = var
var = session['0,1'].max_carry_dc_power
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Carry DC Power**
 - C Attribute: **NISWITCH_ATTR_MAX_CARRY_DC_POWER**
-

`niswitch.Session.max_dc_voltage`

This channel-based property returns the maximum DC voltage the channel can switch. The units are volts.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_dc_voltage.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_dc_voltage.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_dc_voltage = var
var = session['0,1'].max_dc_voltage
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum DC Voltage**
 - C Attribute: **NISWITCH_ATTR_MAX_DC_VOLTAGE**
-

`niswitch.Session.max_switching_ac_current`

This channel-based property returns the maximum AC current the channel can switch. The units are amperes RMS.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_switching_ac_current.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_switching_ac_current.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_switching_ac_current = var
var = session['0,1'].max_switching_ac_current
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Switching AC Current**
 - C Attribute: **NISWITCH_ATTR_MAX_SWITCHING_AC_CURRENT**
-

`niswitch.Session.max_switching_ac_power`

This channel-based property returns the maximum AC power the channel can switch. The units are volt-amperes.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_switching_ac_power.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_switching_ac_power.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_switching_ac_power = var
var = session['0,1'].max_switching_ac_power
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Switching AC Power**
 - C Attribute: **NISWITCH_ATTR_MAX_SWITCHING_AC_POWER**
-

`niswitch.Session.max_switching_dc_current`

This channel-based property returns the maximum DC current the channel can switch. The units are amperes.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_switching_dc_current.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_switching_dc_current.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_switching_dc_current = var
var = session['0,1'].max_switching_dc_current
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Switching DC Current**
 - C Attribute: **NISWITCH_ATTR_MAX_SWITCHING_DC_CURRENT**
-

`niswitch.Session.max_switching_dc_power`

This channel-based property returns the maximum DC power the channel can switch. The units are watts.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `max_switching_dc_power.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `max_switching_dc_power.Session` instance, and calling set/get value on the result.:

```
session['0,1'].max_switching_dc_power = var
var = session['0,1'].max_switching_dc_power
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Maximum Switching DC Power**
 - C Attribute: **NISWITCH_ATTR_MAX_SWITCHING_DC_POWER**
-

`niswitch.Session.number_of_relays`

This property returns the number of relays.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Number of Relays**
 - C Attribute: **NISWITCH_ATTR_NUMBER_OF_RELAYS**
-

`niswitch.Session.num_of_columns`

This property returns the number of channels on the column of a matrix or scanner. If the switch device is a scanner, this value is the number of input channels. The `niswitch.Session.wire_mode` property affects the number of available columns. For example, if your device has 8 input lines and you use the four-wire mode, then the number of columns you have available is 2.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Matrix Configuration:Number of Columns**
 - C Attribute: **NISWITCH_ATTR_NUM_OF_COLUMNS**
-

`niswitch.Session.num_of_rows`

This property returns the number of channels on the row of a matrix or scanner. If the switch device is a scanner, this value is the number of output channels. The `niswitch.Session.wire_mode` property affects the number of available rows. For example, if your device has 8 input lines and you use the two-wire mode, then the number of columns you have available is 4.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Matrix Configuration: Number of Rows**
 - C Attribute: **NISWITCH_ATTR_NUM_OF_ROWS**
-

`niswitch.Session.parsed_scan_list`

This property has been deprecated and may be removed from a future release of NI-SWITCH.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes: Parsed Scan List**
 - C Attribute: **NISWITCH_ATTR_PARSED_SCAN_LIST**
-

`niswitch.Session.power_down_latching_relays_after_debounce`

This property specifies whether to power down latching relays after calling Wait For Debounce. When Power Down Latching Relays After Debounce is enabled (True), a call to Wait For Debounce ensures that the relays are settled and the latching relays are powered down.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics: Power Down Latching Relays After Debounce**
 - C Attribute: **NISWITCH_ATTR_POWER_DOWN_LATCHING_RELAYS_AFTER_DEBOUNCE**
-

`niswitch.Session.range_check`

Specifies whether to validate property values and method parameters. If enabled, the instrument driver validates the parameter values that you pass to driver methods. Range checking parameters is very useful for debugging.

After you validate your program, you can set this property to False to disable range checking and maximize performance. The default value is True. Use the `niswitch.Session.InitWithOptions()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Range Check**
 - C Attribute: **NISWITCH_ATTR_RANGE_CHECK**
-

`niswitch.Session.record_coercions`

Specifies whether the IVI engine keeps a list of the value coercions it makes for ViInt32 and ViReal64 properties. You call `niswitch.Session.GetNextCoercionRecord()` to extract and delete the oldest coercion record from the list. The default value is False. Use the `niswitch.Session.InitWithOptions()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Record Value Coercions**
 - C Attribute: **NISWITCH_ATTR_RECORD_COERCIONS**
-

`niswitch.Session.scan_advanced_output`

This property specifies the method you want to use to notify another instrument that all signals going through the switch device have settled following the processing of one entry in the scan list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ScanAdvancedOutput
Permissions	read-write
Channel Based	False
Resetable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Scan Advanced Output**
 - C Attribute: **NISWITCH_ATTR_SCAN_ADVANCED_OUTPUT**
-

`niswitch.Session.scan_advanced_polarity`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ScanAdvancedPolarity
Permissions	read-write
Channel Based	False
Resetable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Scan Advanced Polarity**
 - C Attribute: **NISWITCH_ATTR_SCAN_ADVANCED_POLARITY**
-

`niswitch.Session.scan_delay`

This property specifies the minimum amount of time the switch device waits before it asserts the scan advanced output trigger after opening or closing the switch. The switch device always waits for debounce before asserting the trigger. The units are seconds. the greater value of the settling time and the value you specify as the scan delay.

Note: NI PXI-2501/2503/2565/2590/2591 Users—the actual delay will always be

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or datetime.timedelta
Permissions	read-write
Channel Based	False
Resetable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Scan Delay**
 - C Attribute: **NISWITCH_ATTR_SCAN_DELAY**
-

`niswitch.Session.scan_list`

This property contains a scan list, which is a string that specifies channel connections and trigger conditions. The `niswitch.Session._initiate_scan()` method makes or breaks connections and waits for triggers according to the instructions in the scan list. The scan list is comprised of channel names that you separate with special characters. These special characters determine the operations the scanner performs on the channels when it executes this scan list. To create a path between two channels, use the following character between the two channel names: `->` (a dash followed by a `>` sign) Example: `'CH1->CH2'` tells the switch to make a path from channel CH1 to channel CH2. To break or clear a path, use the following character as a prefix before the path: `~` (tilde) Example: `'~CH1->CH2'` tells the switch to break the path from channel CH1 to channel CH2. To tell the switch device to wait for a trigger event, use the following character as a separator between paths: `;` (semi-colon) Example: `'CH1->CH2;CH3->CH4'` tells the switch to make the path from channel CH1 to channel CH2, wait for a trigger, and then make the path from CH3 to CH4.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Scan List**
 - C Attribute: **NISWITCH_ATTR_SCAN_LIST**
-

`niswitch.Session.scan_mode`

This property specifies what happens to existing connections that conflict with the connections you make in a scan list. For example, if CH1 is already connected to CH2 and the scan list instructs the switch device to connect CH1 to CH3, this property specifies what happens to the connection between CH1 and CH2. If the value of this property is `NONE`, the switch device takes no action on existing paths. If the value is `BREAK_BEFORE_MAKE`, the switch device breaks conflicting paths before making new ones. If the value is `BREAK_AFTER_MAKE`, the switch device breaks conflicting paths after making new ones. Most switch devices support only one of the possible values. In such cases, this property serves as an indicator of the device's behavior.

Note: One or more of the referenced values are not in the Python API for this driver. Enums that only define values, or represent True/False, have been removed.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.ScanMode
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Scan Mode**
 - C Attribute: **NISWITCH_ATTR_SCAN_MODE**
-

`niswitch.Session.serial_number`

This read-only property returns the serial number for the switch device controlled by this instrument driver. If the device does not return a serial number, the driver returns the `IVI_ERROR_ATTRIBUTE_NOT_SUPPORTED` error.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Serial Number**
 - C Attribute: **NISWITCH_ATTR_SERIAL_NUMBER**
-

`niswitch.Session.settling_time`

This channel-based property returns the maximum length of time from after you make a connection until the signal flowing through the channel settles. The units are seconds. the greater value of the settling time and the value you specify as the scan delay.

Note: NI PXI-2501/2503/2565/2590/2591 Users—the actual delay will always be

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `settling_time.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `settling_time.Session` instance, and calling set/get value on the result.:

```
session['0,1'].settling_time = var
var = session['0,1'].settling_time
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float in seconds or <code>datetime.timedelta</code>
Permissions	read-write
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Settling Time**
 - C Attribute: **NISWITCH_ATTR_SETTLING_TIME**
-

`niswitch.Session.simulate`

Specifies whether or not to simulate instrument driver I/O operations. If simulation is enabled, instrument driver methods perform range checking and call `Ivi_GetAttribute` and `Ivi_SetAttribute` methods, but they do not perform instrument I/O. For output parameters that represent instrument data, the instrument driver methods return calculated values. The default value is `False`. Use the `niswitch.Session.InitWithOptions()` method to override this value.

Note: One or more of the referenced methods are not in the Python API for this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:User Options:Simulate**
 - C Attribute: **NISWITCH_ATTR_SIMULATE**
-

`niswitch.Session.specific_driver_class_spec_major_version`

The major version number of the IviSwch class specification.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Major Version**
 - C Attribute: **NISWITCH_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION**
-

`niswitch.Session.specific_driver_class_spec_minor_version`

The minor version number of the class specification with which this driver is compliant.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Class Specification Minor Version**
 - C Attribute: **NISWITCH_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION**
-

`niswitch.Session.specific_driver_description`

A string that contains a brief description of the specific driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Description**
 - C Attribute: **NISWITCH_ATTR_SPECIFIC_DRIVER_DESCRIPTION**
-

`niswitch.Session.specific_driver_revision`

A string that contains additional version information about this instrument driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Revision**
 - C Attribute: **NISWITCH_ATTR_SPECIFIC_DRIVER_REVISION**
-

`niswitch.Session.specific_driver_vendor`

A string that contains the name of the vendor that supplies this driver.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Identification:Driver Vendor**
 - C Attribute: **NISWITCH_ATTR_SPECIFIC_DRIVER_VENDOR**
-

`niswitch.Session.supported_instrument_models`

Contains a comma-separated list of supported instrument models.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Inherent IVI Attributes:Driver Capabilities:Supported Instrument Models**
 - C Attribute: **NISWITCH_ATTR_SUPPORTED_INSTRUMENT_MODELS**
-

`niswitch.Session.temperature`

This property returns the temperature as read by the Switch module. The units are degrees Celsius.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Temperature**
 - C Attribute: **NISWITCH_ATTR_TEMPERATURE**
-

`niswitch.Session.trigger_input`

This property specifies the source of the trigger for which the switch device can wait when processing a scan list. The switch device waits for a trigger when it encounters a semi-colon in a scan list. When the trigger occurs, the switch device advances to the next entry in the scan list.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerInput
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Trigger Input**
 - C Attribute: **NISWITCH_ATTR_TRIGGER_INPUT**
-

`niswitch.Session.trigger_input_polarity`

Determines the behavior of the trigger Input.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.TriggerInputPolarity</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Scanning Configuration:Trigger Input Polarity**
 - C Attribute: **NISWITCH_ATTR_TRIGGER_INPUT_POLARITY**
-

`niswitch.Session.trigger_mode`

This property has been deprecated and may be removed from a future release of NI-SWITCH. Use the `niswitch.Session.route_trigger_input()` and/or `niswitch.Session.route_scan_advanced_output()` methods instead.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>int</code>
Permissions	read-write
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Obsolete Attributes:Trigger Mode**
 - C Attribute: **NISWITCH_ATTR_TRIGGER_MODE**
-

`niswitch.Session.wire_mode`

This property returns the wire mode of the switch device. This property affects the values of the `niswitch.Session.num_of_rows` and `niswitch.Session.num_of_columns` properties. The actual number of input and output lines on the switch device is fixed, but the number of channels depends on how many lines constitute each channel.

Tip: This property can use repeated capabilities (usually channels). If set or get directly on the `wire_mode.Session` object, then the set/get will use all repeated capabilities in the session. You can specify a subset of repeated capabilities using the Python index notation on an `wire_mode.Session` instance, and calling set/get value on the result.:

```
session['0,1'].wire_mode = var
var = session['0,1'].wire_mode
```

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Channel Based	True
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- LabVIEW Property: **Module Characteristics:Wire mode**
- C Attribute: **NISWITCH_ATTR_WIRE_MODE**

Enums

Enums used in NI-SWITCH

`niswitch.HandshakingInitiation`

`HandshakingInitiation.MEASUREMENT_DEVICE`

The *niSwitch Initiate Scan* `<switchviref.chm::/py:meth:'niswitch.Session.Initiate_Scan.html>'__` VI does not return until the switch hardware is waiting for a trigger input. This ensures that if you initiate the measurement device after calling the *niSwitch Initiate Scan* `<switchviref.chm::/py:meth:'niswitch.Session.Initiate_Scan.html>'__` VI, the switch is sure to receive the first measurement complete (MC) signal sent by the measurement device. The measurement device should be configured to first take a measurement, send MC, then wait for scanner advanced output signal. Thus, the first MC of the measurement device initiates handshaking.

`HandshakingInitiation.SWITCH`

The *niSwitch Initiate Scan* `<switchviref.chm::/py:meth:'niswitch.Session.Initiate_Scan.html>'__` VI returns immediately after beginning scan list execution. It is assumed that the measurement device has already been configured and is waiting for the scanner advanced signal. The measurement should be configured to first wait for a trigger, then take a measurement. Thus, the first scanner advanced output signal of the switch module initiates handshaking.

`niswitch.PathCapability`

`PathCapability.PATH_AVAILABLE`

Path Available

`PathCapability.PATH_EXISTS`

Path Exists

`PathCapability.PATH_UNSUPPORTED`

Path Unsupported

`PathCapability.RESOURCE_IN_USE`

Resource in use

`PathCapability.SOURCE_CONFLICT`
Source conflict

`PathCapability.CHANNEL_NOT_AVAILABLE`
Channel not available

`niswitch.RelayAction`

`RelayAction.OPEN`
Open Relay

`RelayAction.CLOSE`
Close Relay

`niswitch.RelayPosition`

`RelayPosition.OPEN`
Open

`RelayPosition.CLOSED`
Closed

`niswitch.ScanAdvancedOutput`

`ScanAdvancedOutput.NONE`
The switch device does not produce a Scan Advanced Output trigger.

`ScanAdvancedOutput.EXTERNAL`
External Trigger. The switch device produces the Scan Advanced Output trigger on the external trigger output.

`ScanAdvancedOutput.TTL0`
The switch device produces the Scan Advanced Output on the PXI TRIG0 line.

`ScanAdvancedOutput.TTL1`
The switch device produces the Scan Advanced Output on the PXI TRIG1 line.

`ScanAdvancedOutput.TTL2`
The switch device produces the Scan Advanced Output on the PXI TRIG2 line.

`ScanAdvancedOutput.TTL3`
The switch device produces the Scan Advanced Output on the PXI TRIG3 line.

`ScanAdvancedOutput.TTL4`
The switch device produces the Scan Advanced Output on the PXI TRIG4 line.

`ScanAdvancedOutput.TTL5`
The switch device produces the Scan Advanced Output on the PXI TRIG5 line.

`ScanAdvancedOutput.TTL6`
The switch device produces the Scan Advanced Output on the PXI TRIG6 line.

`ScanAdvancedOutput.TTL7`
The switch device produces the Scan Advanced Output on the PXI TRIG7 line.

`ScanAdvancedOutput.PXI_STAR`
The switch module produces the Scan Advanced Output Trigger on the PXI Star trigger bus before processing the next entry in the scan list.

`ScanAdvancedOutput.REARCONNECTOR`
The switch device produces the Scan Advanced Output trigger on the rear connector.

`ScanAdvancedOutput.FRONTCONNECTOR`

The switch device produces the Scan Advanced Output trigger on the front connector.

`ScanAdvancedOutput.REARCONNECTOR_MODULE1`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 1.

`ScanAdvancedOutput.REARCONNECTOR_MODULE2`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 2.

`ScanAdvancedOutput.REARCONNECTOR_MODULE3`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 3.

`ScanAdvancedOutput.REARCONNECTOR_MODULE4`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 4.

`ScanAdvancedOutput.REARCONNECTOR_MODULE5`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 5.

`ScanAdvancedOutput.REARCONNECTOR_MODULE6`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 6.

`ScanAdvancedOutput.REARCONNECTOR_MODULE7`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 7.

`ScanAdvancedOutput.REARCONNECTOR_MODULE8`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 8.

`ScanAdvancedOutput.REARCONNECTOR_MODULE9`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 9.

`ScanAdvancedOutput.REARCONNECTOR_MODULE10`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 10.

`ScanAdvancedOutput.REARCONNECTOR_MODULE11`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 11.

`ScanAdvancedOutput.REARCONNECTOR_MODULE12`

The switch module produces the Scan Advanced Output Trigger on the rear connector module 12.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE1`

The switch module produces the Scan Advanced Output Trigger on the front connector module 1.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE2`

The switch module produces the Scan Advanced Output Trigger on the front connector module 2.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE3`

The switch module produces the Scan Advanced Output Trigger on the front connector module 3.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE4`

The switch module produces the Scan Advanced Output Trigger on the front connector module 4.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE5`

The switch module produces the Scan Advanced Output Trigger on the front connector module 5.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE6`

The switch module produces the Scan Advanced Output Trigger on the front connector module 6.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE7`

The switch module produces the Scan Advanced Output Trigger on the front connector module 7.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE8`

The switch module produces the Scan Advanced Output Trigger on the front connector module 8.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE9`

The switch module produces the Scan Advanced Output Trigger on the front connector module 9.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE10`

The switch module produces the Scan Advanced Output Trigger on the front connector module 10.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE11`

The switch module produces the Scan Advanced Output Trigger on the front connector module 11.

`ScanAdvancedOutput.FRONTCONNECTOR_MODULE12`

The switch module produces the Scan Advanced Output Trigger on the front connector module 12.

`niswitch.ScanAdvancedPolarity`

`ScanAdvancedPolarity.RISING`

The trigger occurs on the rising edge of the signal.

`ScanAdvancedPolarity.FALLING`

The trigger occurs on the falling edge of the signal.

`niswitch.ScanMode`

`ScanMode.NONE`

No implicit action on connections when scanning.

`ScanMode.BREAK_BEFORE_MAKE`

When scanning, the switch device breaks existing connections before making new connections.

`ScanMode.BREAK_AFTER_MAKE`

When scanning, the switch device breaks existing connections after making new connections.

`niswitch.TriggerInput`

`TriggerInput.IMMEDIATE`

Immediate Trigger. The switch device does not wait for a trigger before processing the next entry in the scan list.

`TriggerInput.EXTERNAL`

External Trigger. The switch device waits until it receives a trigger from an external source through the external trigger input before processing the next entry in the scan list.

`TriggerInput.SOFTWARE_TRIG`

The switch device waits until you call the `niswitch.Session.send_software_trigger()` method before processing the next entry in the scan list.

`TriggerInput.TTL0`

The switch device waits until it receives a trigger on the PXI TRIG0 line before processing the next entry in the scan list.

`TriggerInput.TTL1`

The switch device waits until it receives a trigger on the PXI TRIG1 line before processing the next entry in the scan list.

`TriggerInput.TTL2`

The switch device waits until it receives a trigger on the PXI TRIG2 line before processing the next entry in the scan list.

`TriggerInput.TTL3`

The switch device waits until it receives a trigger on the PXI TRIG3 line before processing the next entry in the scan list.

`TriggerInput.TTL4`

The switch device waits until it receives a trigger on the PXI TRIG4 line before processing the next entry in the scan list.

`TriggerInput.TTL5`

The switch device waits until it receives a trigger on the PXI TRIG5 line before processing the next entry in the scan list.

`TriggerInput.TTL6`

The switch device waits until it receives a trigger on the PXI TRIG6 line before processing the next entry in the scan list.

`TriggerInput.TTL7`

The switch device waits until it receives a trigger on the PXI TRIG7 line before processing the next entry in the scan list.

`TriggerInput.PXI_STAR`

The switch device waits until it receives a trigger on the PXI STAR trigger bus before processing the next entry in the scan list.

`TriggerInput.REARCONNECTOR`

The switch device waits until it receives a trigger on the rear connector.

`TriggerInput.FRONTCONNECTOR`

The switch device waits until it receives a trigger on the front connector.

`TriggerInput.REARCONNECTOR_MODULE1`

The switch module waits until it receives a trigger on the rear connector module 1.

`TriggerInput.REARCONNECTOR_MODULE2`

The switch module waits until it receives a trigger on the rear connector module 2.

`TriggerInput.REARCONNECTOR_MODULE3`

The switch module waits until it receives a trigger on the rear connector module 3.

`TriggerInput.REARCONNECTOR_MODULE4`

The switch module waits until it receives a trigger on the rear connector module 4.

`TriggerInput.REARCONNECTOR_MODULE5`

The switch module waits until it receives a trigger on the rear connector module 5.

`TriggerInput.REARCONNECTOR_MODULE6`

The switch module waits until it receives a trigger on the rear connector module 6.

`TriggerInput.REARCONNECTOR_MODULE7`

The switch module waits until it receives a trigger on the rear connector module 7.

`TriggerInput.REARCONNECTOR_MODULE8`

The switch module waits until it receives a trigger on the rear connector module 8.

`TriggerInput.REARCONNECTOR_MODULE9`

The switch module waits until it receives a trigger on the rear connector module 9.

`TriggerInput.REARCONNECTOR_MODULE10`

The switch module waits until it receives a trigger on the rear connector module 10.

`TriggerInput.REARCONNECTOR_MODULE11`

The switch module waits until it receives a trigger on the rear connector module 11.

`TriggerInput.REARCONNECTOR_MODULE12`

The switch module waits until it receives a trigger on the rear connector module 12.

`TriggerInput.FRONTCONNECTOR_MODULE1`

The switch module waits until it receives a trigger on the front connector module 1.

`TriggerInput.FRONTCONNECTOR_MODULE2`

The switch module waits until it receives a trigger on the front connector module 2.

`TriggerInput.FRONTCONNECTOR_MODULE3`

The switch module waits until it receives a trigger on the front connector module 3.

`TriggerInput.FRONTCONNECTOR_MODULE4`

The switch module waits until it receives a trigger on the front connector module 4.

`TriggerInput.FRONTCONNECTOR_MODULE5`

The switch module waits until it receives a trigger on the front connector module 5.

`TriggerInput.FRONTCONNECTOR_MODULE6`

The switch module waits until it receives a trigger on the front connector module 6.

`TriggerInput.FRONTCONNECTOR_MODULE7`

The switch module waits until it receives a trigger on the front connector module 7.

`TriggerInput.FRONTCONNECTOR_MODULE8`

The switch module waits until it receives a trigger on the front connector module 8.

`TriggerInput.FRONTCONNECTOR_MODULE9`

The switch module waits until it receives a trigger on the front connector module 9.

`TriggerInput.FRONTCONNECTOR_MODULE10`

The switch module waits until it receives a trigger on the front connector module 10.

`TriggerInput.FRONTCONNECTOR_MODULE11`

The switch module waits until it receives a trigger on the front connector module 11.

`TriggerInput.FRONTCONNECTOR_MODULE12`

The switch module waits until it receives a trigger on the front connector module 12.

`niswitch.TriggerInputPolarity`

`TriggerInputPolarity.RISING`

The trigger occurs on the rising edge of the signal.

`TriggerInputPolarity.FALLING`

The trigger occurs on the falling edge of the signal.

Examples

`niswitch_connect_channels.py`

Listing 7.10: (`niswitch_connect_channels.py`)

```
1  #!/usr/bin/python
2
3  import argparse
4  import niswitch
5  import sys
6
7
8  def example(resource_name, channel1, channel2, topology, simulate):
9      # if we are simulating resource name must be blank
```

```

10     resource_name = ' ' if simulate else resource_name
11
12     with niswitch.Session(resource_name=resource_name, topology=topology,
13 ↪simulate=simulate) as session:
14         session.connect(channel1=channel1, channel2=channel2)
15         print('Channel ', channel1, ' and ', channel2, ' are now connected.')
16         session.disconnect(channel1=channel1, channel2=channel2)
17         print('Channel ', channel1, ' and ', channel2, ' are now disconnected.')
18
19 def _main(argv):
20     parser = argparse.ArgumentParser(description='Performs a connection with NI-
21 ↪SWITCH Channels.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
22     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
23 ↪name of a National Instruments Switch.')
24     parser.add_argument('-ch1', '--channel1', default='c0', help='Channel One.')
25     parser.add_argument('-ch2', '--channel2', default='r0', help='Channel Two.')
26     parser.add_argument('-t', '--topology', default='Configured Topology', help=
27 ↪'Topology.')
28     parser.add_argument('-s', '--simulate', default=False, action='store_true', help=
29 ↪'Simulate device.')
30     args = parser.parse_args(argv)
31     example(args.resource_name, args.channel1, args.channel2, args.topology, args.
32 ↪simulate)
33
34 def test_example():
35     example(' ', 'c0', 'r0', '2737/2-Wire 4x64 Matrix', True)
36
37 def test_main():
38     cmd_line = ['--topology', '2737/2-Wire 4x64 Matrix', '--simulate']
39     _main(cmd_line)
40
41 def main():
42     _main(sys.argv[1:])
43
44 if __name__ == '__main__':
45     main()
46

```

niswitch_get_device_info.py

Listing 7.11: (niswitch_get_device_info.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import niswitch
5  import sys
6
7
8  def example(resource_name, topology, simulate, device, channel, relay):

```

```

9      # if we are simulating resource name must be blank
10     resource_name = ' ' if simulate else resource_name
11
12     with niswitch.Session(resource_name=resource_name, topology=topology,
13 ↪simulate=simulate) as session:
14         if device:
15             print('Device Info:')
16             row_format = '{:<18}' * (2)
17             print(row_format.format('Device Name: ', session.io_resource_descriptor))
18             print(row_format.format('Device Model: ', session.instrument_model))
19             print(row_format.format('Driver Revision: ', session.specific_driver_
13 ↪revision))
20             print(row_format.format('Channel count: ', session.channel_count))
21             print(row_format.format('Relay count: ', session.number_of_relays))
22         if channel:
23             print('Channel Info:')
24             row_format = '{:6}' + ' ' * 12 + '{:<15}{:<22}{:6}'
25             print(row_format.format('Number', 'Name', 'Is Configuration', 'Is Source
13 ↪'))
26             for i in range(1, session.channel_count + 1):
27                 channel_name = session.get_channel_name(index=i)
28                 channel = session.channels[channel_name]
29                 print(row_format.format(i, channel_name, str(channel.is_configuration_
13 ↪channel), str(channel.is_source_channel)))
30             if relay:
31                 print('Relay Info:')
32                 row_format = '{:6}' + ' ' * 12 + '{:<15}{:<22}{:6}'
33                 print(row_format.format('Number', 'Name', 'Position', 'Count'))
34                 for i in range(1, session.number_of_relays + 1):
35                     relay_name = session.get_relay_name(index=i)
36                     print(row_format.format(i, relay_name, session.get_relay_
13 ↪position(relay_name=relay_name), session.get_relay_count(relay_name=relay_name)))
37
38 def _main(argv):
39     parser = argparse.ArgumentParser(description='Prints information for the
13 ↪specified National Instruments Switch module.', formatter_class=argparse.
14 ↪ArgumentDefaultsHelpFormatter)
40     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
13 ↪name of a National Instruments Switch.')
41     parser.add_argument('-d', '--device', default=False, action='store_true', help=
13 ↪'Prints information for the device')
42     parser.add_argument('-c', '--channel', default=False, action='store_true', help=
13 ↪'Prints information for all relays on the device')
43     parser.add_argument('-r', '--relay', default=False, action='store_true', help=
13 ↪'Prints information for all channels on the device')
44     parser.add_argument('-t', '--topology', default='Configured Topology', help=
13 ↪'Topology.')
45     parser.add_argument('-s', '--simulate', default=False, action='store_true', help=
13 ↪'Simulate device.')
46     args = parser.parse_args(argv)
47
48     if not (args.device or args.channel or args.relay):
49         parser.print_help()
50         sys.exit(1)
51
52     example(args.resource_name, args.topology, args.simulate, args.device, args.
13 ↪channel, args.relay)

```

```

53
54
55 def test_example():
56     example('', '2737/2-Wire 4x64 Matrix', True, True, True, True)
57
58
59 def test_main():
60     cmd_line = ['--topology', '2737/2-Wire 4x64 Matrix', '--simulate', '--device', '--
↪channel', '--relay', ]
61     _main(cmd_line)
62
63
64 def main():
65     _main(sys.argv[1:])
66
67
68 if __name__ == '__main__':
69     main()
70
71

```

niswitch_relay_control.py

Listing 7.12: (niswitch_relay_control.py)

```

1  #!/usr/bin/python
2
3  import argparse
4  import niswitch
5  import sys
6
7
8  def example(resource_name, topology, simulate, relay, action):
9      # if we are simulating resource name must be blank
10     resource_name = '' if simulate else resource_name
11
12     with niswitch.Session(resource_name=resource_name, topology=topology,
↪simulate=simulate) as session:
13         session.relay_control(relay_name=relay, relay_action=niswitch.
↪RelayAction[action])
14         print('Relay ', relay, ' has had the action ', action, ' performed.')
15
16
17 def _main(argv):
18     parser = argparse.ArgumentParser(description='Performs relay control with NI-
↪SWITCH relays.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
19     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
↪name of a National Instruments Switch.')
20     parser.add_argument('-r', '--relay', default='k0', help='Relay Name.')
21     parser.add_argument('-a', '--action', default='OPEN', choices=niswitch.
↪RelayAction.__members__.keys(), type=str.upper, help='Relay Action.')
22     parser.add_argument('-t', '--topology', default='Configured Topology', help=
↪'Topology.')
23     parser.add_argument('-s', '--simulate', default=False, action='store_true', help=
↪'Simulate device.')
24     args = parser.parse_args(argv)

```

```
25     example(args.resource_name, args.topology, args.simulate, args.relay, args.action)
26
27
28 def test_example():
29     example('', '2737/2-Wire 4x64 Matrix', True, 'kr0c0', 'OPEN')
30
31
32 def test_main():
33     cmd_line = ['--topology', '2737/2-Wire 4x64 Matrix', '--simulate', '--relay',
34 ↪ 'kr0c0']
35     _main(cmd_line)
36
37 def main():
38     _main(sys.argv[1:])
39
40
41 if __name__ == '__main__':
42     main()
43
44
```

7.6 nimodinst module

7.6.1 Installation

As a prerequisite to using the nimodinst module, you must install the NI-ModInst runtime on your system. Visit ni.com/downloads to download the driver runtime for your devices.

The nimi-python modules (i.e. for **NI-ModInst**) can be installed with [pip](#):

```
$ python -m pip install nimodinst~=0.8.0
```

Or **easy_install** from [setuptools](#):

```
$ python -m easy_install nimodinst
```

7.6.2 Usage

The following is a basic example of using the **nimodinst** module to retrieve information on all High Speed Digitizers currently in the system.

```
import nimodinst
with nimodinst.Session("niscope") as session:
    for device in session:
        print("{: >20} {: >15} {: >10}".format(device.device_name, device.device_
↪ model, device.serial_number))
```

Additional examples for NI-ModInst are located in `src/nimodinst/examples/` directory.

7.6.3 API Reference

`nimodinst.Session`

class `nimodinst.Session`

A NI-ModInst session to get device information

Properties

Property	Datatype
<code>bus_number</code>	int
<code>chassis_number</code>	int
<code>device_model</code>	str
<code>device_name</code>	str
<code>max_pciexpress_link_width</code>	int
<code>pciexpress_link_width</code>	int
<code>serial_number</code>	str
<code>slot_number</code>	int
<code>socket_number</code>	int

Public methods

Method name
Method name

`nimodinst.Session` methods

`nimodinst.Session` properties

`nimodinst.Session.bus_number`

The bus on which the device has been enumerated.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_BUS_NUMBER**
-

`nimodinst.Session.chassis_number`

The number of the chassis in which the device is installed. This property can only be queried for PXI devices installed in a chassis that has been properly identified in MAX.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_CHASSIS_NUMBER**
-

`nimodinst.Session.device_model`

The model of the device (for example, NI PXI-5122)

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_DEVICE_MODEL**
-

`nimodinst.Session.device_name`

The name of the device, which can be used to open an instrument driver session for that device

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_DEVICE_NAME**
-

`nimodinst.Session.max_pcieexpress_link_width`
MAX_PCIEEXPRESS_LINK_WIDTH

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_MAX_PCIEXPRESS_LINK_WIDTH**
-

`nimodinst.Session.pciexpress_link_width`
PCIEXPRESS_LINK_WIDTH

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_PCIEXPRESS_LINK_WIDTH**
-

`nimodinst.Session.serial_number`

The serial number of the device

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	str
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_SERIAL_NUMBER**
-

`nimodinst.Session.slot_number`

The slot (for example, in a PXI chassis) in which the device is installed. This property can only be queried for PXI devices installed in a chassis that has been properly identified in MAX.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_SLOT_NUMBER**
-

`nimodinst.Session.socket_number`

The socket number on which the device has been enumerated

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read
Channel Based	False
Resettable	No

Tip: This property corresponds to the following LabVIEW Property or C Attribute:

- C Attribute: **NIMODINST_ATTR_SOCKET_NUMBER**

Examples

`nimodinst_all_devices.py`

Listing 7.13: (`nimodinst_all_devices.py`)

```

1  #!/usr/bin/python
2
3  import nimodinst
4
5
6  def example():
7      with nimodinst.Session('') as session:
8          if len(session) > 0:
9              print("%d items" % len(session))
10             print("{: >20} {: >15} {: >10}".format('Name', 'Model', 'S/N'))
11             for d in session:
12                 print("{: >20} {: >15} {: >10}".format(d.device_name, d.device_model, d.
↳serial_number))
13
14
15  def _main():
16      example()
17
18
19  def test_example():
20      example()
21
22
23  if __name__ == '__main__':
24      _main()
25
26

```

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