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# NI-SWITCH Python API Documentation

*Release 1.4.7*

NI

Dec 15, 2023



# DOCUMENTATION

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## ABOUT

The **niswitch** module provides a Python API for NI-SWITCH. The code is maintained in the Open Source repository for [nimi-python](#).

### 1.1 Support Policy

**niswitch** supports all the Operating Systems supported by NI-SWITCH.

It follows [Python Software Foundation](#) support policy for different versions of CPython.



## CONTRIBUTING

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





## SUPPORT / FEEDBACK

For support specific to the Python API, follow the processs in [Bugs / Feature Requests](#). For support with hardware, the driver runtime or any other questions not specific to the Python API, please visit [NI Community Forums](#).



## BUGS / FEATURE REQUESTS

To report a bug or submit a feature request specific to Python API, please use the [GitHub issues page](#).  
Fill in the issue template as completely as possible and we will respond as soon as we can.

### 4.1 niswitch module

#### 4.1.1 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~=1.4.7
```

#### 4.1.2 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')
```

Other usage examples can be found on [GitHub](#).

#### 4.1.3 API Reference

##### Session

**class** `niswitch.Session`(*self*, *resource\_name*, *topology*='Configured Topology', *simulate*=False, *reset\_device*=False, \*, *grpc\_options*=None)

Returns a session handle used to identify the switch in all subsequent instrument driver calls and sets the topology of the switch. `niswitch.Session.__init__()` creates a new IVI instrument driver session for the switch specified in the `resourceName` parameter. The driver uses the topology specified in the `topology` parameter and overrides the topology specified in MAX. Note: When initializing an NI SwitchBlock device with topology, you must specify the topology created when you configured the device in MAX, using either “Configured Topology” or the topology string of the device. Refer to the Initializing with Topology for NI SwitchBlock Devices topic in the NI Switches Help for information about determining the topology string of an NI SwitchBlock device.

By default, the switch is reset to a known state. Enable simulation by specifying the topology and setting the simulate parameter to True.

### Parameters

- **resource\_name** (*str*) – Resource name of the switch module to initialize. Default value: None Syntax: Optional fields are shown in square brackets ([]). Configured in MAX Under Valid Syntax Devices and Interfaces DeviceName Traditional NI-DAQ Devices SCXI[chassis ID]::slot number PXI System PXI[bus number]::device number TIP: IVI logical names are also valid for the resource name. Default values for optional fields: chassis ID = 1 bus number = 0 Example resource names: Resource Name Description SC1Mod3 NI-DAQmx module in chassis “SC1” slot 3 MySwitch NI-DAQmx module renamed to “MySwitch” SCXI1::3 Traditional NI-DAQ module in chassis 1, slot 3 SCXI::3 Traditional NI-DAQ module in chassis 1, slot 3 PXI0::16 PXI bus 0, device number 16 PXI::16 PXI bus 0, device number 16
- **topology** (*str*) – Pass the topology name you want to use for the switch you specify with Resource Name parameter. You can also pass “Configured Topology” to use the last topology that was configured for the device in MAX. Default Value: “Configured Topology” Valid Values: “Configured Topology” “2501/1-Wire 48x1 Mux” “2501/1-Wire 48x1 Amplified Mux” “2501/2-Wire 24x1 Mux” “2501/2-Wire 24x1 Amplified Mux” “2501/2-Wire Dual 12x1 Mux” “2501/2-Wire Quad 6x1 Mux” “2501/2-Wire 4x6 Matrix” “2501/4-Wire 12x1 Mux” “2503/1-Wire 48x1 Mux” “2503/2-Wire 24x1 Mux” “2503/2-Wire Dual 12x1 Mux” “2503/2-Wire Quad 6x1 Mux” “2503/2-Wire 4x6 Matrix” “2503/4-Wire 12x1 Mux” “2510/Independent” “2512/Independent” “2514/Independent” “2515/Independent” “2520/80-SPST” “2521/40-DPST” “2522/53-SPDT” “2523/26-DPDT” “2524/1-Wire 128x1 Mux” “2524/1-Wire Dual 64x1 Mux” “2524/1-Wire Quad 32x1 Mux” “2524/1-Wire Octal 16x1 Mux” “2524/1-Wire Sixteen 8x1 Mux” “2525/2-Wire 64x1 Mux” “2525/2-Wire Dual 32x1 Mux” “2525/2-Wire Quad 16x1 Mux” “2525/2-Wire Octal 8x1 Mux” “2525/2-Wire Sixteen 4x1 Mux” “2526/1-Wire 158x1 Mux” “2526/2-Wire 79x1 Mux” “2527/1-Wire 64x1 Mux” “2527/1-Wire Dual 32x1 Mux” “2527/2-Wire 32x1 Mux” “2527/2-Wire Dual 16x1 Mux” “2527/4-Wire 16x1 Mux” “2527/Independent” “2529/2-Wire Dual 4x16 Matrix” “2529/2-Wire 8x16 Matrix” “2529/2-Wire 4x32 Matrix” “2530/1-Wire 128x1 Mux” “2530/1-Wire Dual 64x1 Mux” “2530/1-Wire 4x32 Matrix” “2530/1-Wire 8x16 Matrix” “2530/1-Wire Octal 16x1 Mux” “2530/1-Wire Quad 32x1 Mux” “2530/2-Wire 4x16 Matrix” “2530/2-Wire 64x1 Mux” “2530/2-Wire Dual 32x1 Mux” “2530/2-Wire Quad 16x1 Mux” “2530/4-Wire 32x1 Mux” “2530/4-Wire Dual 16x1 Mux” “2530/Independent” “2531/1-Wire 4x128 Matrix” “2531/1-Wire 8x64 Matrix” “2531/1-Wire Dual 4x64 Matrix” “2531/1-Wire Dual 8x32 Matrix” “2531/2-Wire 4x64 Matrix” “2531/2-Wire 8x32 Matrix” “2532/1-Wire 16x32 Matrix” “2532/1-Wire 4x128 Matrix” “2532/1-Wire 8x64 Matrix” “2532/1-Wire Dual 16x16 Matrix” “2532/1-Wire Dual 4x64 Matrix” “2532/1-Wire Dual 8x32 Matrix” “2532/1-Wire Quad 4x32 Matrix” “2532/1-Wire Sixteen 2x16 Matrix” “2532/2-Wire 16x16 Matrix” “2532/2-Wire 4x64 Matrix” “2532/2-Wire 8x32 Matrix” “2532/2-Wire Dual 4x32 Matrix” “2533/1-Wire 4x64 Matrix” “2534/1-Wire 8x32 Matrix” “2535/1-Wire 4x136 Matrix” “2536/1-Wire 8x68 Matrix” “2540/1-Wire 8x9 Matrix” “2541/1-Wire 8x12 Matrix” “2542/Quad 2x1 Terminated Mux” “2543/Dual 4x1 Terminated Mux” “2544/8x1 Terminated Mux” “2545/4x1 Terminated Mux” “2546/Dual 4x1 Mux” “2547/8x1 Mux” “2548/4-SPDT” “2549/Terminated 2-SPDT” “2554/4x1 Mux” “2555/4x1 Terminated Mux” “2556/Dual 4x1 Mux” “2557/8x1 Mux” “2558/4-SPDT” “2559/Terminated 2-SPDT” “2564/16-SPST” “2564/8-DPST” “2565/16-SPST” “2566/16-SPDT” “2566/8-DPDT” “2567/Independent” “2568/15-DPST” “2568/31-SPST” “2569/100-SPST” “2569/50-DPST” “2570/20-DPDT” “2570/40-SPDT” “2571/66-SPDT” “2575/1-Wire 196x1 Mux” “2575/2-Wire 98x1 Mux” “2575/2-Wire 95x1 Mux” “2576/2-Wire 64x1 Mux” “2576/2-Wire Dual 32x1 Mux” “2576/2-Wire Octal 8x1 Mux” “2576/2-Wire Quad 16x1 Mux” “2576/2-Wire Sixteen 4x1 Mux”

“2576/Independent” “2584/1-Wire 12x1 Mux” “2584/1-Wire Dual 6x1 Mux” “2584/2-Wire 6x1 Mux” “2584/Independent” “2585/1-Wire 10x1 Mux” “2586/10-SPST” “2586/5-DPST” “2590/4x1 Mux” “2591/4x1 Mux” “2593/16x1 Mux” “2593/8x1 Terminated Mux” “2593/Dual 8x1 Mux” “2593/Dual 4x1 Terminated Mux” “2593/Independent” “2594/4x1 Mux” “2595/4x1 Mux” “2596/Dual 6x1 Mux” “2597/6x1 Terminated Mux” “2598/Dual Transfer” “2599/2-SPDT” “2720/Independent” “2722/Independent” “2725/Independent” “2727/Independent” “2737/2-Wire 4x64 Matrix” “2738/2-Wire 8x32 Matrix” “2739/2-Wire 16x16 Matrix” “2746/Quad 4x1 Mux” “2747/Dual 8x1 Mux” “2748/16x1 Mux” “2790/Independent” “2796/Dual 6x1 Mux” “2797/6x1 Terminated Mux” “2798/Dual Transfer” “2799/2-SPDT”

- **simulate** (*bool*) – Enables simulation of the switch module specified in the resource name parameter. Valid Values: True - simulate False - Don't simulate (Default Value)
- **reset\_device** (*bool*) – Specifies whether to reset the switch module during the initialization process. Valid Values: True - Reset Device (Default Value) False - Currently unsupported. The device will not reset.
- **grpc\_options** (*niswitch.GrpcSessionOptions*) – MeasurementLink gRPC session options

## Methods

### abort

`niswitch.Session.abort()`

Aborts the scan in progress. Initiate a scan with `niswitch.Session.initiate()`. If the switch module is not scanning, NISWITCH\_ERROR\_NO\_SCAN\_IN\_PROGRESS error is returned.

### can\_connect

`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, ctemp 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, ctemp Default value: ""

#### Return type

*niswitch.PathCapability*

#### Returns

Indicates whether a path is valid. Possible values include:

- *PATH\_AVAILABLE* 1

- `PATH_EXISTS` 2
- `PATH_UNSUPPORTED` 3
- `RESOURCE_IN_USE` 4
- `SOURCE_CONFLICT` 5
- `CHANNEL_NOT_AVAILABLE` 6

Notes: (1) `PATH_AVAILABLE` indicates that the driver can create the path at this time. (2) `PATH_EXISTS` indicates that the path already exists. (3) `PATH_UNSUPPORTED` indicates that the instrument is not capable of creating a path between the channels you specify. (4) `RESOURCE_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) `SOURCE_CONFLICT` indicates that the instrument cannot create a path because both channels are connected to a different source channel. (6) `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.

## close

`niswitch.Session.close()`

Terminates the NI-SWITCH session and all of its properties and deallocates any memory resources the driver uses. Notes: (1) You must unlock the session before calling `niswitch.Session._close()`. (2) After calling `niswitch.Session._close()`, you cannot use the instrument driver again until you call `niswitch.Session.init()` or `niswitch.Session.InitWithOptions()`.

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

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**Note:** This method is not needed when using the session context manager

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## commit

`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()`. Use `niswitch.Session.commit()` to arm triggers in a given order or to control when expensive hardware operations are performed.

## connect

`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`
- **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: `None`

## connect\_multiple

`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

## disable

`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.

## disconnect

`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
- **channel2** (*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

## disconnect\_all

`niswitch.Session.disconnect_all()`

Breaks all existing paths. If the switch module cannot break all paths, `NISWITCH_WARN_PATH_REMAINS` warning is returned.

## disconnect\_multiple

`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



## get\_channel\_name

`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.

### Return type

*str*

### Returns

Returns the channel name that is in the channel table at the index you specify.

## get\_path

`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 and 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: ""

### Return type

*str*

### Returns

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. All other channels in the path are configuration channels. Examples of returned paths: ch0->com0, com0->ab0

## get\_relay\_count

`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.

## get\_relay\_name

`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.

### Return type

*str*

### Returns

Returns the relay name for the index you specify.

## get\_relay\_position

`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. *OPEN* 10 *CLOSED* 11

## initiate

### `niswitch.Session.initiate()`

Commits the configured scan list and trigger settings to hardware and initiates the scan. If `niSwitch Commit` was called earlier, `niSwitch Initiate Scan` only initiates the scan and returns immediately. Once the scanning operation begins, you cannot perform any other operation other than `GetAttribute`, `AbortScan`, or `SendSoftwareTrigger`. All other methods return `NISWITCH_ERROR_SCAN_IN_PROGRESS`. To stop the scanning operation, To stop the scanning operation, call `niswitch.Session.abort()`.

---

**Note:** This method will return a Python context manager that will initiate on entering and abort on exit.

---

## lock

### `niswitch.Session.lock()`

Obtains a multithread lock on the device session. Before doing so, the software waits until all other execution threads release their locks on the device session.

Other threads may have obtained a lock on this session for the following reasons:

- The application called the `niswitch.Session.lock()` method.
- A call to NI-SWITCH locked the session.
- After a call to the `niswitch.Session.lock()` method returns successfully, no other threads can access the device session until you call the `niswitch.Session.unlock()` method or exit out of the with block when using lock context manager.
- Use the `niswitch.Session.lock()` method and the `niswitch.Session.unlock()` method around a sequence of calls to instrument driver methods if you require that the device retain its settings through the end of the sequence.

You can safely make nested calls to the `niswitch.Session.lock()` method within the same thread. To completely unlock the session, you must balance each call to the `niswitch.Session.lock()` method with a call to the `niswitch.Session.unlock()` method.

One method for ensuring there are the same number of unlock method calls as there is lock calls is to use lock as a context manager

```
with niswitch.Session('dev1') as session:
    with session.lock():
        # Calls to session within a single lock context
```

The first *with* block ensures the session is closed regardless of any exceptions raised

The second *with* block ensures that unlock is called regardless of any exceptions raised

#### Return type

context manager

#### Returns

When used in a *with* statement, `niswitch.Session.lock()` acts as a context manager and unlock will be called when the *with* block is exited

## relay\_control

`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: *OPEN CLOSE* (Default Value)

## reset

`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.

## reset\_with\_defaults

`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()*.

## route\_scan\_advanced\_output

`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*

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**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.

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- **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*

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**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.

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- **invert** (*bool*) – If True, inverts the input trigger signal from falling to rising or vice versa. Default value: False

## route\_trigger\_input

`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

## self\_test

`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

## send\_software\_trigger

`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.ConfigureScanTrigger()` 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.

---

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

---

## set\_path

`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()`.

## unlock

`niswitch.Session.unlock()`

Releases a lock that you acquired on an device session using `niswitch.Session.lock()`. Refer to `niswitch.Session.unlock()` for additional information on session locks.

## wait\_for\_debounce

`niswitch.Session.wait_for_debounce(maximum_time_ms=hightime.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** (*hightime.timedelta*, *datetime.timedelta*, or *int in milliseconds*) – 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

## wait\_for\_scan\_complete

`niswitch.Session.wait_for_scan_complete(maximum_time_ms=hightime.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** (*hightime.timedelta*, *datetime.timedelta*, or *int in milliseconds*) – 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

## Properties

### analog\_bus\_sharing\_enable

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].analog_bus_sharing_enable`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.analog_bus_sharing_enable`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Repeated Capabilities	channels

---

**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**
-

## bandwidth

### `niswitch.Session.bandwidth`

This channel-based property returns the bandwidth for the channel. The units are hertz.

---

**Tip:** This property can be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].bandwidth`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.bandwidth`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

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

- LabVIEW Property: **Module Characteristics:Bandwidth**
  - C Attribute: **NISWITCH\_ATTR\_BANDWIDTH**
- 

## channel\_count

### `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
Repeated Capabilities	None

---

**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**
-



## characteristic\_impedance

### `niswitch.Session.characteristic_impedance`

This channel-based property returns the characteristic impedance for the channel. The units are ohms.

**Tip:** This property can be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].characteristic_impedance`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.characteristic_impedance`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

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

- LabVIEW Property: **Module Characteristics:Characteristic Impedance**
- C Attribute: **NISWITCH\_ATTR\_CHARACTERISTIC\_IMPEDANCE**

## continuous\_scan

### `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
Repeated Capabilities	None

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

- LabVIEW Property: **Scanning Configuration:Continuous Scan**
- C Attribute: **NISWITCH\_ATTR\_CONTINUOUS\_SCAN**

## digital\_filter\_enable

### `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
Repeated Capabilities	None

---

**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**
- 

## driver\_setup

### `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
Repeated Capabilities	None

---

**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**
-

## handshaking\_initiation

`niswitch.Session.handshaking_initiation`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.HandshakingInitiation</code>
Permissions	read-write
Repeated Capabilities	None

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

- LabVIEW Property: **Scanning Configuration:Handshaking Initiation**
- C Attribute: **NISWITCH\_ATTR\_HANDSHAKING\_INITIATION**

## instrument\_firmware\_revision

`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	<code>str</code>
Permissions	read only
Repeated Capabilities	None

**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**

## instrument\_manufacturer

`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	<code>str</code>
Permissions	read only
Repeated Capabilities	None

---

**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**
- 

## instrument\_model

`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
Repeated Capabilities	None

---

**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**
- 

## io\_resource\_descriptor

`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
Repeated Capabilities	None

---

**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**
-

## is\_configuration\_channel

### `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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].is_configuration_channel`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.is_configuration_channel`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Repeated Capabilities	channels

---

**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**
- 

## is\_debounced

### `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
Repeated Capabilities	None

---

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

- LabVIEW Property: **Module Characteristics:Is Debounced**
  - C Attribute: **NISWITCH\_ATTR\_IS\_DEBOUNCED**
- 

## is\_scanning

### `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
Repeated Capabilities	None

---

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

- LabVIEW Property: **Scanning Configuration:Is Scanning**
  - C Attribute: **NISWITCH\_ATTR\_IS\_SCANNING**
- 

## is\_source\_channel

### `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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].is_source_channel`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.is_source_channel`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	bool
Permissions	read-write
Repeated Capabilities	channels

---

**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**
- 

## is\_waiting\_for\_trig

### `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
Repeated Capabilities	None

---

**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**
- 

## logical\_name

### `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
Repeated Capabilities	None

---

**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**
- 

## max\_ac\_voltage

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_ac_voltage`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_ac_voltage`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
-



## max\_carry\_ac\_current

### `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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_carry_ac_current`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_carry_ac_current`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

**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**

## max\_carry\_ac\_power

### `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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_carry_ac_power`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_carry_ac_power`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## `max_carry_dc_current`

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_carry_dc_current`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_carry_dc_current`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## `max_carry_dc_power`

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_carry_dc_power`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_carry_dc_power`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## max\_dc\_voltage

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_dc_voltage`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_dc_voltage`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
-

## max\_switching\_ac\_current

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_switching_ac_current`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_switching_ac_current`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## max\_switching\_ac\_power

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_switching_ac_power`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_switching_ac_power`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## max\_switching\_dc\_current

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_switching_dc_current`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_switching_dc_current`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## max\_switching\_dc\_power

`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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].max_switching_dc_power`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.max_switching_dc_power`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	float
Permissions	read only
Repeated Capabilities	channels

---

**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**
- 

## number\_of\_relays

`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
Repeated Capabilities	None

---

**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**
- 

## num\_of\_columns

`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
Repeated Capabilities	None

---

**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**
- 

## num\_of\_rows

### `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
Repeated Capabilities	None

---

**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**
- 

## power\_down\_latching\_relays\_after\_debounce

### `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
Repeated Capabilities	None

---

**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**
-

## scan\_advanced\_output

### `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	<code>enums.ScanAdvancedOutput</code>
Permissions	read-write
Repeated Capabilities	None

---

**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**
- 

## scan\_advanced\_polarity

### `niswitch.Session.scan_advanced_polarity`

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	<code>enums.ScanAdvancedPolarity</code>
Permissions	read-write
Repeated Capabilities	None

---

**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**
- 

## scan\_delay

### `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	hightime.timedelta, datetime.timedelta, or float in seconds
Permissions	read-write
Repeated Capabilities	None

---

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

- LabVIEW Property: **Scanning Configuration:Scan Delay**
  - C Attribute: **NISWITCH\_ATTR\_SCAN\_DELAY**
- 

## scan\_list

### `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()` 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
Repeated Capabilities	None

---

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

- LabVIEW Property: **Scanning Configuration:Scan List**
  - C Attribute: **NISWITCH\_ATTR\_SCAN\_LIST**
-

## scan\_mode

### `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	<code>enums.ScanMode</code>
Permissions	read-write
Repeated Capabilities	None

---

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

- LabVIEW Property: **Scanning Configuration:Scan Mode**
  - C Attribute: **NISWITCH\_ATTR\_SCAN\_MODE**
- 

## serial\_number

### `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	<code>str</code>
Permissions	read only
Repeated Capabilities	None

---

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

- LabVIEW Property: **Module Characteristics:Serial Number**
  - C Attribute: **NISWITCH\_ATTR\_SERIAL\_NUMBER**
-

## settling\_time

### `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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].settling_time`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.settling_time`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	highime.timedelta, datetime.timedelta, or float in seconds
Permissions	read-write
Repeated Capabilities	channels

---

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

- LabVIEW Property: **Module Characteristics: Settling Time**
  - C Attribute: **NISWITCH\_ATTR\_SETTLING\_TIME**
- 

## simulate

### `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
Repeated Capabilities	None

---

**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**
- 

### **specific\_driver\_description**

`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
Repeated Capabilities	None

---

**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**
- 

### **specific\_driver\_revision**

`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
Repeated Capabilities	None

---

**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**

---

### `specific_driver_vendor`

#### `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
Repeated Capabilities	None

---

**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**
- 

### `supported_instrument_models`

#### `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
Repeated Capabilities	None

---

**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**
-

## temperature

### `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
Repeated Capabilities	None

---

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

- LabVIEW Property: **Module Characteristics:Temperature**
  - C Attribute: **NISWITCH\_ATTR\_TEMPERATURE**
- 

## trigger\_input

### `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	<code>enums.TriggerInput</code>
Permissions	read-write
Repeated Capabilities	None

---

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

- LabVIEW Property: **Scanning Configuration:Trigger Input**
  - C Attribute: **NISWITCH\_ATTR\_TRIGGER\_INPUT**
- 

## trigger\_input\_polarity

### `niswitch.Session.trigger_input_polarity`

Determines the behavior of the trigger Input.

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	enums.TriggerInputPolarity
Permissions	read-write
Repeated Capabilities	None

---

**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**
- 

## wire\_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 be set/get on specific channels within your `niswitch.Session` instance. Use Python index notation on the repeated capabilities container channels to specify a subset.

Example: `my_session.channels[ ... ].wire_mode`

To set/get on all channels, you can call the property directly on the `niswitch.Session`.

Example: `my_session.wire_mode`

---

The following table lists the characteristics of this property.

Characteristic	Value
Datatype	int
Permissions	read only
Repeated Capabilities	channels

---

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

- LabVIEW Property: **Module Characteristics:Wire mode**
  - C Attribute: **NISWITCH\_ATTR\_WIRE\_MODE**
- 

## Session

- *Session*
- *Methods*
  - *abort*

- *can\_connect*
- *close*
- *commit*
- *connect*
- *connect\_multiple*
- *disable*
- *disconnect*
- *disconnect\_all*
- *disconnect\_multiple*
- *get\_channel\_name*
- *get\_path*
- *get\_relay\_count*
- *get\_relay\_name*
- *get\_relay\_position*
- *initiate*
- *lock*
- *relay\_control*
- *reset*
- *reset\_with\_defaults*
- *route\_scan\_advanced\_output*
- *route\_trigger\_input*
- *self\_test*
- *send\_software\_trigger*
- *set\_path*
- *unlock*
- *wait\_for\_debounce*
- *wait\_for\_scan\_complete*
- *Properties*
  - *analog\_bus\_sharing\_enable*
  - *bandwidth*
  - *channel\_count*
  - *characteristic\_impedance*
  - *continuous\_scan*
  - *digital\_filter\_enable*
  - *driver\_setup*



- *handshaking\_initiation*
- *instrument\_firmware\_revision*
- *instrument\_manufacturer*
- *instrument\_model*
- *io\_resource\_descriptor*
- *is\_configuration\_channel*
- *is\_debounced*
- *is\_scanning*
- *is\_source\_channel*
- *is\_waiting\_for\_trig*
- *logical\_name*
- *max\_ac\_voltage*
- *max\_carry\_ac\_current*
- *max\_carry\_ac\_power*
- *max\_carry\_dc\_current*
- *max\_carry\_dc\_power*
- *max\_dc\_voltage*
- *max\_switching\_ac\_current*
- *max\_switching\_ac\_power*
- *max\_switching\_dc\_current*
- *max\_switching\_dc\_power*
- *number\_of\_relays*
- *num\_of\_columns*
- *num\_of\_rows*
- *power\_down\_latching\_relays\_after\_debounce*
- *scan\_advanced\_output*
- *scan\_advanced\_polarity*
- *scan\_delay*
- *scan\_list*
- *scan\_mode*
- *serial\_number*
- *settling\_time*
- *simulate*
- *specific\_driver\_description*
- *specific\_driver\_revision*

- *specific\_driver\_vendor*
- *supported\_instrument\_models*
- *temperature*
- *trigger\_input*
- *trigger\_input\_polarity*
- *wire\_mode*

## Repeated Capabilities

Repeated capabilities attributes are used to set the *channel\_string* parameter to the underlying driver function call. This can be the actual function based on the *Session* method being called, or it can be the appropriate Get/Set Attribute function, such as `niSwitch_SetAttributeViInt32()`.

Repeated capabilities attributes use the indexing operator `[]` to indicate the repeated capabilities. The parameter can be a string, list, tuple, or slice (range). Each element of those can be a string or an integer. If it is a string, you can indicate a range using the same format as the driver: `'0-2'` or `'0:2'`

Some repeated capabilities use a prefix before the number and this is optional

## channels

`niswitch.Session.channels`

```
session.channels['0-2'].channel_enabled = True
```

passes a string of `'0, 1, 2'` to the set attribute function.

## Enums

Enums used in NI-SWITCH

## HandshakingInitiation

`class niswitch.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.

### 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.

## PathCapability

```
class niswitch.PathCapability
```

**PATH\_AVAILABLE**

Path Available

**PATH\_EXISTS**

Path Exists

**PATH\_UNSUPPORTED**

Path Unsupported

**RESOURCE\_IN\_USE**

Resource in use

**SOURCE\_CONFLICT**

Source conflict

**CHANNEL\_NOT\_AVAILABLE**

Channel not available

## RelayAction

```
class niswitch.RelayAction
```

**OPEN**

Open Relay

**CLOSE**

Close Relay

## RelayPosition

```
class niswitch.RelayPosition
```

**OPEN**

Open

**CLOSED**

Closed

## ScanAdvancedOutput

**class** `niswitch.ScanAdvancedOutput`

### **NONE**

The switch device does not produce a Scan Advanced Output trigger.

### **EXTERNAL**

External Trigger. The switch device produces the Scan Advanced Output trigger on the external trigger output.

### **TTL0**

The switch device produces the Scan Advanced Output on the PXI TRIG0 line.

### **TTL1**

The switch device produces the Scan Advanced Output on the PXI TRIG1 line.

### **TTL2**

The switch device produces the Scan Advanced Output on the PXI TRIG2 line.

### **TTL3**

The switch device produces the Scan Advanced Output on the PXI TRIG3 line.

### **TTL4**

The switch device produces the Scan Advanced Output on the PXI TRIG4 line.

### **TTL5**

The switch device produces the Scan Advanced Output on the PXI TRIG5 line.

### **TTL6**

The switch device produces the Scan Advanced Output on the PXI TRIG6 line.

### **TTL7**

The switch device produces the Scan Advanced Output on the PXI TRIG7 line.

### **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.

### **REARCONNECTOR**

The switch device produces the Scan Advanced Output trigger on the rear connector.

### **FRONTCONNECTOR**

The switch device produces the Scan Advanced Output trigger on the front connector.

### **REARCONNECTOR\_MODULE1**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 1.

### **REARCONNECTOR\_MODULE2**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 2.

### **REARCONNECTOR\_MODULE3**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 3.

### **REARCONNECTOR\_MODULE4**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 4.

**REARCONNECTOR\_MODULE5**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 5.

**REARCONNECTOR\_MODULE6**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 6.

**REARCONNECTOR\_MODULE7**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 7.

**REARCONNECTOR\_MODULE8**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 8.

**REARCONNECTOR\_MODULE9**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 9.

**REARCONNECTOR\_MODULE10**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 10.

**REARCONNECTOR\_MODULE11**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 11.

**REARCONNECTOR\_MODULE12**

The switch module produces the Scan Advanced Output Trigger on the rear connector module 12.

**FRONTCONNECTOR\_MODULE1**

The switch module produces the Scan Advanced Output Trigger on the front connector module 1.

**FRONTCONNECTOR\_MODULE2**

The switch module produces the Scan Advanced Output Trigger on the front connector module 2.

**FRONTCONNECTOR\_MODULE3**

The switch module produces the Scan Advanced Output Trigger on the front connector module 3.

**FRONTCONNECTOR\_MODULE4**

The switch module produces the Scan Advanced Output Trigger on the front connector module 4.

**FRONTCONNECTOR\_MODULE5**

The switch module produces the Scan Advanced Output Trigger on the front connector module 5.

**FRONTCONNECTOR\_MODULE6**

The switch module produces the Scan Advanced Output Trigger on the front connector module 6.

**FRONTCONNECTOR\_MODULE7**

The switch module produces the Scan Advanced Output Trigger on the front connector module 7.

**FRONTCONNECTOR\_MODULE8**

The switch module produces the Scan Advanced Output Trigger on the front connector module 8.

**FRONTCONNECTOR\_MODULE9**

The switch module produces the Scan Advanced Output Trigger on the front connector module 9.

**FRONTCONNECTOR\_MODULE10**

The switch module produces the Scan Advanced Output Trigger on the front connector module 10.

**FRONTCONNECTOR\_MODULE11**

The switch module produces the Scan Advanced Output Trigger on the front connector module 11.

**FRONTCONNECTOR\_MODULE12**

The switch module produces the Scan Advanced Output Trigger on the front connector module 12.

## ScanAdvancedPolarity

**class** `niswitch.ScanAdvancedPolarity`

### **RISING**

The trigger occurs on the rising edge of the signal.

### **FALLING**

The trigger occurs on the falling edge of the signal.

## ScanMode

**class** `niswitch.ScanMode`

### **NONE**

No implicit action on connections when scanning.

### **BREAK\_BEFORE\_MAKE**

When scanning, the switch device breaks existing connections before making new connections.

### **BREAK\_AFTER\_MAKE**

When scanning, the switch device breaks existing connections after making new connections.

## TriggerInput

**class** `niswitch.TriggerInput`

### **IMMEDIATE**

Immediate Trigger. The switch device does not wait for a trigger before processing the next entry in the scan list.

### **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.

### **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.

### **TTL0**

The switch device waits until it receives a trigger on the PXI TRIG0 line before processing the next entry in the scan list.

### **TTL1**

The switch device waits until it receives a trigger on the PXI TRIG1 line before processing the next entry in the scan list.

### **TTL2**

The switch device waits until it receives a trigger on the PXI TRIG2 line before processing the next entry in the scan list.

### **TTL3**

The switch device waits until it receives a trigger on the PXI TRIG3 line before processing the next entry in the scan list.

**TTL4**

The switch device waits until it receives a trigger on the PXI TRIG4 line before processing the next entry in the scan list.

**TTL5**

The switch device waits until it receives a trigger on the PXI TRIG5 line before processing the next entry in the scan list.

**TTL6**

The switch device waits until it receives a trigger on the PXI TRIG6 line before processing the next entry in the scan list.

**TTL7**

The switch device waits until it receives a trigger on the PXI TRIG7 line before processing the next entry in the scan list.

**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.

**REARCONNECTOR**

The switch device waits until it receives a trigger on the rear connector.

**FRONTCONNECTOR**

The switch device waits until it receives a trigger on the front connector.

**REARCONNECTOR\_MODULE1**

The switch module waits until it receives a trigger on the rear connector module 1.

**REARCONNECTOR\_MODULE2**

The switch module waits until it receives a trigger on the rear connector module 2.

**REARCONNECTOR\_MODULE3**

The switch module waits until it receives a trigger on the rear connector module 3.

**REARCONNECTOR\_MODULE4**

The switch module waits until it receives a trigger on the rear connector module 4.

**REARCONNECTOR\_MODULE5**

The switch module waits until it receives a trigger on the rear connector module 5.

**REARCONNECTOR\_MODULE6**

The switch module waits until it receives a trigger on the rear connector module 6.

**REARCONNECTOR\_MODULE7**

The switch module waits until it receives a trigger on the rear connector module 7.

**REARCONNECTOR\_MODULE8**

The switch module waits until it receives a trigger on the rear connector module 8.

**REARCONNECTOR\_MODULE9**

The switch module waits until it receives a trigger on the rear connector module 9.

**REARCONNECTOR\_MODULE10**

The switch module waits until it receives a trigger on the rear connector module 10.

**REARCONNECTOR\_MODULE11**

The switch module waits until it receives a trigger on the rear connector module 11.

**REARCONNECTOR\_MODULE12**

The switch module waits until it receives a trigger on the rear connector module 12.

**FRONTCONNECTOR\_MODULE1**

The switch module waits until it receives a trigger on the front connector module 1.

**FRONTCONNECTOR\_MODULE2**

The switch module waits until it receives a trigger on the front connector module 2.

**FRONTCONNECTOR\_MODULE3**

The switch module waits until it receives a trigger on the front connector module 3.

**FRONTCONNECTOR\_MODULE4**

The switch module waits until it receives a trigger on the front connector module 4.

**FRONTCONNECTOR\_MODULE5**

The switch module waits until it receives a trigger on the front connector module 5.

**FRONTCONNECTOR\_MODULE6**

The switch module waits until it receives a trigger on the front connector module 6.

**FRONTCONNECTOR\_MODULE7**

The switch module waits until it receives a trigger on the front connector module 7.

**FRONTCONNECTOR\_MODULE8**

The switch module waits until it receives a trigger on the front connector module 8.

**FRONTCONNECTOR\_MODULE9**

The switch module waits until it receives a trigger on the front connector module 9.

**FRONTCONNECTOR\_MODULE10**

The switch module waits until it receives a trigger on the front connector module 10.

**FRONTCONNECTOR\_MODULE11**

The switch module waits until it receives a trigger on the front connector module 11.

**FRONTCONNECTOR\_MODULE12**

The switch module waits until it receives a trigger on the front connector module 12.

## TriggerInputPolarity

```
class niswitch.TriggerInputPolarity
```

**RISING**

The trigger occurs on the rising edge of the signal.

**FALLING**

The trigger occurs on the falling edge of the signal.



## Exceptions and Warnings

### Error

**exception** `niswitch.errors.Error`

Base exception type that all NI-SWITCH exceptions derive from

### DriverError

**exception** `niswitch.errors.DriverError`

An error originating from the NI-SWITCH driver

### UnsupportedConfigurationError

**exception** `niswitch.errors.UnsupportedConfigurationError`

An error due to using this module in an unsupported platform.

### DriverNotInstalledError

**exception** `niswitch.errors.DriverNotInstalledError`

An error due to using this module without the driver runtime installed.

### DriverTooOldError

**exception** `niswitch.errors.DriverTooOldError`

An error due to using this module with an older version of the NI-SWITCH driver runtime.

### DriverTooNewError

**exception** `niswitch.errors.DriverTooNewError`

An error due to the NI-SWITCH driver runtime being too new for this module.

### InvalidRepeatedCapabilityError

**exception** `niswitch.errors.InvalidRepeatedCapabilityError`

An error due to an invalid character in a repeated capability

## SelfTestError

**exception** `niswitch.errors.SelfTestError`

An error due to a failed self-test

## RpcError

**exception** `niswitch.errors.RpcError`

An error specific to sessions to the NI gRPC Device Server

## DriverWarning

**exception** `niswitch.errors.DriverWarning`

A warning originating from the NI-SWITCH driver

## Examples

You can download all `niswitch` examples [here](#)

### `niswitch_connect_channels.py`

Listing 1: (`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-SWITCH
21 ↪Channels.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
22     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource
23 ↪name of an NI switch.')
24     parser.add_argument('-ch1', '--channel1', default='c0', help='Channel One.')
```

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```

23     parser.add_argument('-ch2', '--channel2', default='r0', help='Channel Two.')
24     parser.add_argument('-t', '--topology', default='Configured Topology', help=
↳ 'Topology.')
25     parser.add_argument('-s', '--simulate', default=False, action='store_true', help=
↳ 'Simulate device.')
26     args = parser.parse_args(argv)
27     example(args.resource_name, args.channel1, args.channel2, args.topology, args.
↳ simulate)
28
29
30 def test_example():
31     example('', 'c0', 'r0', '2737/2-Wire 4x64 Matrix', True)
32
33
34 def test_main():
35     cmd_line = ['--topology', '2737/2-Wire 4x64 Matrix', '--simulate']
36     _main(cmd_line)
37
38
39 def main():
40     _main(sys.argv[1:])
41
42
43 if __name__ == '__main__':
44     main()
45
46

```

## niswitch\_get\_device\_info.py

Listing 2: (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,
↳ simulate=simulate) as session:
13         if device:
14             print('Device Info:')
15             row_format = '{:<18}' * (2)
16             print(row_format.format('Device Name: ', session.io_resource_descriptor))
17             print(row_format.format('Device Model: ', session.instrument_model))

```

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```

18         print(row_format.format('Driver Revision: ', session.specific_driver_
↪revision))
19         print(row_format.format('Channel count: ', session.channel_count))
20         print(row_format.format('Relay count: ', session.number_of_relays))
21     if channel:
22         print('Channel Info:')
23         row_format = '{:6}' + ' ' * 12 + '{:<15}{:<22}{:6}'
24         print(row_format.format('Number', 'Name', 'Is Configuration', 'Is Source'))
25         for i in range(1, session.channel_count + 1):
26             channel_name = session.get_channel_name(index=i)
27             channel = session.channels[channel_name]
28             print(row_format.format(i, channel_name, str(channel.is_configuration_
↪channel), str(channel.is_source_channel)))
29     if relay:
30         print('Relay Info:')
31         row_format = '{:6}' + ' ' * 12 + '{:<15}{:<22}{:6}'
32         print(row_format.format('Number', 'Name', 'Position', 'Count'))
33         for i in range(1, session.number_of_relays + 1):
34             relay_name = session.get_relay_name(index=i)
35             print(row_format.format(i, relay_name, session.get_relay_position(relay_
↪name=relay_name), session.get_relay_count(relay_name=relay_name)))
36
37
38 def _main(argv):
39     parser = argparse.ArgumentParser(description='Prints information for the specified_
↪NI-SWITCH.', formatter_class=argparse.ArgumentDefaultsHelpFormatter)
40     parser.add_argument('-n', '--resource-name', default='PXI1Slot2', help='Resource_
↪name of an NI switch.')
41     parser.add_argument('-d', '--device', default=False, action='store_true', help=
↪'Prints information for the device')
42     parser.add_argument('-c', '--channel', default=False, action='store_true', help=
↪'Prints information for all channels on the device')
43     parser.add_argument('-r', '--relay', default=False, action='store_true', help=
↪'Prints information for all relays on the device')
44     parser.add_argument('-t', '--topology', default='Configured Topology', help=
↪'Topology.')
45     parser.add_argument('-s', '--simulate', default=False, action='store_true', help=
↪'Simulate device.')
46     args = parser.parse_args(argv)
47
48     if not (args.device or args.channel or args.relay):
49         print('You must specify at least one of -d, -c, or -r!')
50         parser.print_help()
51         sys.exit(1)
52
53     example(args.resource_name, args.topology, args.simulate, args.device, args.channel,
↪args.relay)
54
55
56 def test_example():
57     example('', '2737/2-Wire 4x64 Matrix', True, True, True, True)
58

```

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```

59
60 def test_main():
61     cmd_line = ['--topology', '2737/2-Wire 4x64 Matrix', '--simulate', '--device', '--
↳ channel', '--relay', ]
62     _main(cmd_line)
63
64
65 def main():
66     _main(sys.argv[1:])
67
68
69 if __name__ == '__main__':
70     main()
71
72

```

### niswitch\_relay\_control.py

Listing 3: (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 an NI 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.')

```

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```
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', 'kr0c0
34     ↪']
35     _main(cmd_line)
36
37
38 def main():
39     _main(sys.argv[1:])
40
41 if __name__ == '__main__':
42     main()
43
44
```

## gRPC Support

Support for using NI-SWITCH over gRPC

### SessionInitializationBehavior

**class** niswitch.SessionInitializationBehavior

#### AUTO

The NI gRPC Device Server will attach to an existing session with the specified name if it exists, otherwise the server will initialize a new session.

---

**Note:** When using the Session as a context manager and the context exits, the behavior depends on what happened when the constructor was called. If it resulted in a new session being initialized on the NI gRPC Device Server, then it will automatically close the server session. If it instead attached to an existing session, then it will detach from the server session and leave it open.

---

#### INITIALIZE\_SERVER\_SESSION

Require the NI gRPC Device Server to initialize a new session with the specified name.

---

**Note:** When using the Session as a context manager and the context exits, it will automatically close the server session.

---

#### ATTACH\_TO\_SERVER\_SESSION

Require the NI gRPC Device Server to attach to an existing session with the specified name.

---

**Note:** When using the Session as a context manager and the context exits, it will detach from the server session and leave it open.

---

## GrpcSessionOptions

```
class niswitch.GrpcSessionOptions(self, grpc_channel, session_name,  
                                initialization_behavior=SessionInitializationBehavior.AUTO)
```

Collection of options that specifies session behaviors related to gRPC.

Creates and returns an object you can pass to a Session constructor.

### Parameters

- **grpc\_channel** (*grpc.Channel*) – Specifies the channel to the NI gRPC Device Server.
- **session\_name** (*str*) – User-specified name that identifies the driver session on the NI gRPC Device Server.

This is different from the resource name parameter many APIs take as a separate parameter. Specifying a name makes it easy to share sessions across multiple gRPC clients. You can use an empty string if you want to always initialize a new session on the server. To attach to an existing session, you must specify the session name it was initialized with.

- **initialization\_behavior** (*niswitch.SessionInitializationBehavior*) – Specifies whether it is acceptable to initialize a new session or attach to an existing one, or if only one of the behaviors is desired.

The driver session exists on the NI gRPC Device Server.

## 4.2 Additional Documentation

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

Refer to the [nimi-python Read the Docs project](#) for documentation of versions 1.4.4 of the module or earlier.





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### **gRPC Features**

For driver APIs that support it, passing a `GrpcSessionOptions` instance as a parameter to `Session.__init__()` is subject to the NI General Purpose EULA (see [NILICENSE](#)).



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