QUICK REFERENCE GUIDE

National Instruments™ Switch Executive

This document contains quick reference information about examples, functions, route specification strings, and error codes.

Examples

| ICON	FUNCTION NAME AND DESCRIPTION
	Getting Started Opens a session and makes a route connection
	Interactive Control Uses many of the API functions through an interactive tool
	Route Specification Syntax Example Demonstrates the many different aspects of route specifications, including usage of routes, route groups, fully specified routes, and combinations of route types
	Sequenced Connect And Disconnect Uses Connect and Disconnect to sequence through different switching system states
	Using Find Route to Connect Two Channels Uses Find Route to determine a path between two channels and then connects the path

Functions

ICON	TYPE †	PARAMETER	VALUE TO SET, COMMENTS
	niSE Close Session (niSE_CloseSession)		
	NISESession	sessionHandle	Reference to virtual device session
	niSE Connect (niSE_Connect)		
	NISESession	sessionHandle	Reference to virtual device session
	NISEConstString	connectSpec	String describing the connections to be made
	NISEInt32	multiconnectMode	• NO_MULTICONNECT • MULTICONNECT_ROUTES
	NISEBoolean	waitForDebounce	• NISE_TRUE • NISE_FALSE
	niSE Connect And Disconnect (niSE_ConnectAndDisconnect)		
	NISESession	sessionHandle	Reference to virtual device session
	NISEConstString	connectSpec	String describing the connections to be made
	NISEConstString	disconnectSpec	String describing the disconnections to be made
	NISEInt32	multiconnectMode	• NO_MULTICONNECT • MULTICONNECT_ROUTES
	NISEInt32	operationOrder	• BREAK_BEFORE_MAKE • BREAK_AFTER_MAKE
	NISEBoolean	waitForDebounce	• NISE_TRUE • NISE_FALSE
	niSE Disconnect (niSE_Disconnect)		
	NISESession	sessionHandle	Reference to virtual device session
	NISEConstString	disconnectSpec	String describing the disconnections to be made
	niSE Disconnect All (niSE_DisconnectAll)		
	NISESession	sessionHandle	Reference to virtual device session

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† Function names for C, C++, LabWindows™/CVI™, and Visual Basic are in parentheses.

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
niSE Find Route (niSE_FindRoute)			
	NISESession	sessionHandle	Reference to virtual device session
	NISEConstString	channel 1	Channel name of one of the end points of the route to find
	NISEConstString	channel 2	Channel name of one of the end points of the route to find
	NISEBuffer* [out]	routeSpec	Returns the path between the channels if PATH_EXISTS or PATH_AVAILABLE
	NISEInt32 * [in/out]	routeSpecSize	• Input = size of the route string buffer being passed • Return = the size required to hold the entire route string
	NISEInt32 * [out]	routeCapability	• PATH_AVAILABLE (1) • PATH_EXISTS (2) • PATH_UNSUPPORTED (3) • RSRC_IN_USE (4) • SOURCE_CONFLICT (5) • CHANNEL_NOT_AVAILABLE (6) • CHANNELS_HARDWIRED (7)
niSE Get Ivi Device Session (niSE_GetIviDeviceSession)			
	NISESession	sessionHandle	Reference to virtual device session
	NISEConstString	iviLogicalname	IVI device to retrieve an IVI device session for
	ViSession* [out]	iviSessionHandle	Returns the ViSession instrument handle of the specified IVI device
niSE Is Debounced (niSE_IsDebounced)			
	NISESession	sessionHandle	Reference to virtual device session
	NISEBoolean* [out]	isDebounced	• NISE_TRUE • NISE_FALSE

Functions continued on the next page

Functions (continued)

ICON	TYPE	PARAMETER	VALUE TO SET, COMMENTS
	niSE Open Session (niSE_OpenSession)		
	NISEConstString	virtualDeviceName	Name of the Switch Executive virtual device to open a session to
	NISEConstString	options	Used to pass information to each of the IVI devices on startup
	NISESession* [out]	sessionHandle	Reference to virtual device session
	niSE Wait For Debounce (niSE_WaitForDebounce)		
	NISESession	sessionHandle	Reference to virtual device session
	NISEInt32	maxTime	Amount of time to wait (in ms) for the debounce to complete before timing out

Additional C/C++/Visual Basic Functions

C, C++, and Visual Basic users have two additional functions available that are not needed in LabVIEW.

TYPE	PARAMETER	VALUE TO SET, COMMENTS
niSE_ClearError		
NISESession	sessionHandle	Reference to virtual device session
niSE_GetError		
NISESession	sessionHandle	Reference to virtual device session
NISEStatus* [out]	errorNumber	Returns the error number of the first error that occurred in the session since the error was last cleared
NISEBuffer* [out]	errorDescription	Returns a string describing the error
NISEInt32* [out]	errorDescriptionSize	• Input = size of the error description buffer being passed • Return = size required to hold entire string

Route Specification Strings

Route specification strings are the paths connecting two channels and are composed of one or more routes delimited by ampersands (`&`). For example, in the following line of syntax, there are three defined routes or route groups:

```
routeOrGroup & routeOrGroup & routeOrGroup...
```

where `routeOrGroup` can be:

- Route name
- Route group name
- Fully specified path

where the fully specified path is enclosed in square brackets and consists of one or more channels delimited by `->`:

```
[channel -> channel -> channel...]
```

where `channel` can be:

- A channel alias name
- A unique name created by combining the IVI device logical name and IVI channel name separated by a forward slash (`/`) delimiter. For example, (`device/iviChan`).

Note
- Any `channel`, other than an endpoint, within a route specification string must be a configuration channel or directly hardwired to one of the endpoint channels.
- The `channel` on either end of the bracketed list must *not* be:
  - marked as a source channel (one or the other is valid)
  - a configuration channel
- When connecting a route, the list of channels may only include a single source channel either explicitly or implicitly by means of a previous connection. Attempts to connect two sources together result in errors.

The following are samples of route specification strings for a matrix:

- `[SampleMatrix1/c0->SampleMatrix1/r1->SampleMatrix1/c4]`
- `[Scope->R3->SampleMatrix1/c6]`
- `ArbToInput & ScopeToOutput`
- `PowerDevice & [Scope->R3->UUT_Out]`

Each supported ADE has an associated Route Specification String Example. Refer to the examples for the appropriate ADE to see how route specification strings are used when programming.

Error Codes

VALUE (HEX)	VALUE (DECIMAL)	DESCRIPTION
INTERNAL		
FFFF8EB8	–29000	An internal error has occurred. Please contact National Instruments technical support.
IVI_DRIVER_NO_SIMULATION		
FFFF8EB7	–29001	The IVI-specific driver does not support simulation mode.
INVALID_VIRUTUAL_DEVICE_NAME		
FFFF8EB6	–29002	The specified Switch Executive virtual device is invalid or does not exist.
INVALID_SESSION		
FFFF8EB5	–29003	This session is not a valid Switch Executive virtual device session.
INSUFFICIENT_SYSTEM_RESOURCES		
FFFF8EB4	–29004	Switch Executive requires system resources that are currently unavailable. Close other applications and try again.
AMBIGUOUS_NAME		
FFFF8EB3	–29005	The specified name is ambiguous. Specify a unique name.
INVALID_IVI_LOGICAL_NAME		
FFFF8EB2	–29006	The IVI logical name is invalid or the device does not exist.
INVALID_ROUTE_SPECIFICATION		
FFFF8EB1	–29007	The route specification string contains invalid characters or could not be understood.
EVAL_TIMED_OUT		
FFFF8EAF	–29008	Switch Executive is running in Evaluation Mode and the time limit for this session has expired. Restart your application to continue evaluating.
INVALID_NAME		
FFFF8EAE	–29009	The name contains invalid characters.
RUNTIME_IMPORTING_EVAL		
FFFF8EAD	–29010	This configuration was created with an evaluation version. Switch Executive in Run-Time Mode can only import configurations created with a development system version. Import the configuration into a development system and re-export the file from there to resolve the problem.
EVAL_EXPIRED_IMPORTING		
FFFF8EAC	–29011	Switch Executive cannot import configurations once the evaluation period has expired.
RUNTIME_EXPORTING		
FFFF8EAB	–29012	Switch Executive Deployment Mode cannot export configurations. The operation requested requires a development license.
IMPORTING_FILE_ACCESS		
FFFF8EAA	–29013	There was an error when accessing (open or read) the Switch Executive configuration file.

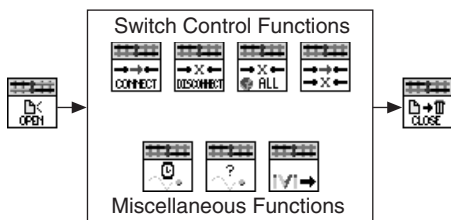| VALUE (HEX)	VALUE (DECIMAL)	DESCRIPTION
IMPORTING_FILE_FORMAT		
FFFF8EA9	–29014	The file is not a valid NI Switch Executive configuration file.
INVALID_END_POINTS		
FFFF8EA8	–29015	The endpoints of the path do not match the existing endpoints.
INVALID_PATH		
FFFF8EA7	–29016	Cannot connect this path on the device.
INVALID_CHANNEL_SPECIFICATION		
FFFF8EA6	–29017	The channel specification string contains invalid characters or could not be understood.
DLL_NOT_FOUND		
FFFF8EA5	–29018	A needed DLL was not found. Check to ensure that the NI Switch Executive is properly installed and that all needed DLLs are in the search path.
FUNCTION_NOT_FOUND		
FFFF8EA4	–29019	A needed function in a DLL could not be found. Although the DLL exists, it may be an incorrect version and may not contain the needed function.
MAX_TIME_EXCEEDED		
FFFF8EA3	–29020	One or more switching devices have not debounced within the specified maximum time.
ROUTE_ALREADY_EXISTS		
FFFF8EA2	–29021	The route you are trying to connect or a route with the same endpoints is already connected.
ROUTE_EXISTS_AS_UNSHAREABLE		
FFFF8EA1	–29022	The route you are trying to connect already exists as an unshareable route. It must be disconnected before you can make a reference counted route.
ROUTE_EXISTS_BY_DIFFERENT_PATH		
FFFF8EA0	–29023	The route you are trying to connect already exists but is connected via a different path than the one specified.
ROUTE_DOES_NOT_EXIST		
FFFF8E9F	–29024	The specified route does not exist. You cannot disconnect a route that does not exist.
PARTIAL_DISCONNECT		
FFFF8E9E	–29025	Device specific errors occurred during the disconnect operation.
RESOURCE_IN_USE		
FFFF8E9E	–29026	A connection could not be made because one of the switch resources needed to make the connection is being used as part of another currently connected route.

Error Codes (continued)

VALUE (HEX)	VALUE (DECIMAL)	DESCRIPTION
FILE_READ		
FFFF8E9D	–29027	An error occurred while attempting to read from file.
FILE_WRITE		
FFFF8E9C	–29028	An error occurred while attempting to write to file.
INVALID_MULTICONNECT_MODE		
FFFF8E9B	–29029	Invalid multiconnect mode.
INVALID_OPERATION_ORDER		
FFFF8E9A	–29030	Invalid operation order.
CONFIG_CHANNEL_CONFLICT		
FFFF8E99	–29031	A configuration channel required for connecting this route is already in use by another route.
SOURCE_CHANNEL_CONFLICT		
FFFF8E98	–29032	Connecting this route would cause source channels to be shorted together.

Programming Flow

The following diagram shows a typical programming flow for Switch Executive.