NI Spy Help

June 2008, 370140G-01

This help file describes the NI Spy software. NI Spy is an application that monitors, records, and displays National Instruments API calls made by applications. Use NI Spy to quickly locate and analyze any erroneous National Instruments API calls that your application makes, and to verify that the communication with your instrument is correct.

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[Technical Support and Professional Services](#)

To comment on National Instruments documentation, refer to the [National Instruments Web site](#).

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Conventions

This help file uses the following formatting and typographical conventions:

»	The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.
	This icon denotes a note, which alerts you to important information.
bold	Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.
green	Underlined text in this color denotes a link to a help topic, help file, or Web address.
monospace	Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.

Navigating Help (Windows Only)

To navigate this help file, use the **Contents**, **Index**, and **Search** tabs to the left of this window or use the following toolbar buttons located above the tabs:

- **Hide**—Hides the navigation pane from view.
- **Locate**—Locates the currently displayed topic in the **Contents** tab, allowing you to view related topics.
- **Back**—Displays the previously viewed topic.
- **Forward**—Displays the topic you viewed before clicking the **Back** button.
- **Options**—Displays a list of commands and viewing options for the help file.

Searching Help (Windows Only)

Use the **Search** tab to the left of this window to locate content in this help file. If you want to search for words in a certain order, such as "related documentation," add quotation marks around the search words as shown in the example. Searching for terms on the **Search** tab allows you to quickly locate specific information and information in topics that are not included on the **Contents** tab.

Wildcards

You also can search using asterisk (*) or question mark (?) wildcards. Use the asterisk wildcard to return topics that contain a certain string. For example, a search for "prog*" lists topics that contain the words "program," "programmatically," "progress," and so on.

Use the question mark wildcard as a substitute for a single character in a search term. For example, "?ext" lists topics that contain the words "next," "text," and so on.

Note Wildcard searching will not work on Simplified Chinese, Traditional Chinese, Japanese, and Korean systems.

Nested Expressions

Use nested expressions to combine searches to further refine a search. You can use Boolean expressions and wildcards in a nested expression. For example, "example AND (program OR VI)" lists topics that contain "example program" or "example VI." You cannot nest expressions more than five levels.

Boolean Expressions

Click the ▶ button to add Boolean expressions to a search. The following Boolean operators are available:

- **AND** (default)—Returns topics that contain both search terms. You do not need to specify this operator unless you are using nested expressions.
- **OR**—Returns topics that contain either the first or second term.
- **NOT**—Returns topics that contain the first term without the second term.
- **NEAR**—Returns topics that contain both terms within eight words of each other.

Search Options

Use the following checkboxes on the **Search** tab to customize a search:

- **Search previous results**—Narrows the results from a search that returned too many topics. You must remove the checkmark from this checkbox to search all topics.
- **Match similar words**—Broadens a search to return topics that contain words similar to the search terms. For example, a search for "program" lists topics that include the words "programs," "programming," and so on.
- **Search titles only**—Searches only in the titles of topics.

Printing Help File Topics (Windows Only)

Complete the following steps to print an entire book from the **Contents** tab:

1. Right-click the book.
2. Select **Print** from the shortcut menu to display the **Print Topics** dialog box.
3. Select the **Print the selected heading and all subtopics** option.

   Note Select **Print the selected topic** if you want to print the single topic you have selected in the **Contents** tab.

4. Click the **OK** button.

Printing PDF Documents

This help file may contain links to PDF documents. To print PDF documents, click the print button located on the Adobe Acrobat Viewer toolbar.

NI Spy Overview

NI Spy is an application that monitors, records, and displays National Instruments API calls made by applications. Use NI Spy to quickly locate and analyze any erroneous National Instruments API calls that your application makes, and to verify that the communication with your instrument is correct.

Getting Help with NI Spy

To access API help on a function displayed in the capture window, select **Help»Help on Function** or right-click on the function call and select **Help on Function**. The function help describes a function's purpose, syntax, parameters, and return values.

To access the properties of a function displayed in the capture window, right-click on the function call and select **Properties**.

To access context-sensitive help for any UI item, click on the Help button , and then hover over the item for which you need help.

Performance Considerations

NI Spy can slow down the performance of your application and the entire system. Certain configurations of NI Spy have a larger impact on performance than others. For example, configuring NI Spy to keep a file log or to record full buffer information might have a significant negative effect on the performance of both your application and the system. You should use NI Spy only while you are debugging your application or when performance is not critical.

To improve performance when capturing calls, NI Spy double buffers call information, up to the history depth size you have specified. Making the history depth very small also has a significant negative impact on performance.

Saving Captured Data as a .spy File

To save the information displayed in the NI Spy capture window, select
File»Save As. In the dialog box that appears, select a name for the
capture file.

Note A .spy extension is usually used for saving NI Spy capture information. If you want the NI Spy information to be saved automatically, as soon as the API call is recorded, use file logging. Alternately, you can also export data as a .txt or .csv file. But unlike a .spy file, you cannot import an exported NI Spy file at a later time.

Logging Captured Data to File

To save the captured NI Spy information automatically as soon as it is recorded, use file logging. If you enable file logging, the NI Spy log file is written as soon as each call is recorded. This option is useful in debugging an application that causes the system to crash before you can save current captures, because you can open the log file after restarting the system to see which call caused the error.

Note To guarantee that the captured log file is complete during a crash, log a Spy Capture file with **Write to file as soon as possible** selected.

To enable NI Spy file logging, follow these steps:

1. Select **Spy»Options** when capture is stopped.
2. In the **File Logging** box, check the **Log to File** checkbox.

   In the edit box, either type the path and name for the log file, or use the **Browse** button to select a location for the NI Spy log file.
3. Select the type of file to log.

   For most applications, a Spy Capture file is the best option. A Spy Capture file is a binary format that is the quickest to create, and it can be logged in a fail-safe manner if you select **Write to file as soon as possible**. Only NI Spy can open and display Spy Capture files, but you can export them to other formats after logging is completed.

   If other applications need the log output while NI Spy is logging, log to a plain text file or comma-separated variable (CSV) file. These files are slower to create and lack much of the information stored in a Spy Capture file. But they are logged during NI Spy operation, and other applications processing the output can use them. However, NI Spy cannot load these files.
4. Select the method of file logging.

   If you select **Allow NI Spy to schedule writing** (the default), the log file is written with each recorded API call and closed only when capture is stopped. This method of file logging is more

efficient than selecting **Write to file as soon as possible**, but may not be secure during system crashes. Consequently, you should use this option only if the problem you are trying to debug does not cause a system crash.

If you select **Write to file as soon as possible**, the log file is opened, written, and flushed with each recorded API call. When logging to a Spy Capture file, this method of file logging is secure during system crashes, but is somewhat slow because of the overhead caused by repeatedly opening and closing the log file.

Note Using file logging is likely to slow down all applications. In addition, if you are low on disk space, choosing this option could cause you to run out of disk space. To turn off file logging, uncheck the **Log to File** checkbox.

Exporting Captured Data as a .txt or .csv File

To save abbreviated information about the captured API calls, you can save the captured API calls as a text file or comma-delimited spreadsheet file. Select **File»Export...** and choose either the **Text Files (*.txt)** or **Comma Delimited (*.csv)** option. A .txt file contains only basic information about the captured API calls and can be viewed in any text editor. A .csv file also contains only basic information and can be viewed in any spreadsheet application. However, NI Spy export files cannot subsequently be imported into NI Spy. You can generate an NI Spy export file from a previously saved NI Spy file by opening the saved .spy file in NI Spy and then exporting it. To aid in debugging, save the data as a .spy file.

The **Extended** export setting does not apply to .csv files because the comma-delimited files would be too large. All exported .csv files use the **Summary** export mode.

Printing NI Spy Data

To print the information displayed in the NI Spy capture window, select **File»Print...** or click on the **Print** button ⎙ on the toolbar.

📝   **Note** You can print the information only when capture is stopped.

To print information previously saved in a .spy file, first open the file in NI Spy and then print the file.

You can print exported NI Spy .txt or .csv files from within some application besides NI Spy, such as a text-based editor or spreadsheet; NI Spy cannot import NI Spy .txt or .csv files.

You can print the entire list of calls, or you can print a range of calls by choosing **Lines** and specifying the first and last call numbers in the **Print range** area of the print dialog box.

📝   **Note** NI Spy includes two options for printing captured call data: Summary, which includes only the call description, and Extended, which includes buffer data details. To select the Summary or Extended option, select **Spy»Options**. In the **Print/Export Settings** box, select **Summary (Call description only)** or **Extended (Buffer data details)**.

Print/Export Settings

NI Spy includes two options for printing and exporting captured call data: **Summary**, which includes only the call description, and **Extended**, which includes buffer data details.

To select the **Summary** or **Extended** option, select **Spy»Options**. In the **Print/Export Settings** box, select **Summary (Call description only)** or **Extended (Buffer data details)**.

The **Extended** export setting does not apply to .csv files because the comma-delimited files would be too large. All exported .csv files use the **Summary** export mode.

Viewing Captured Driver Calls

You can view API calls as they are captured by NI Spy in the main NI Spy window. The captured API calls are displayed in the order in which they occur. A line of information is displayed for each captured call, including the call number, a C-style function prototype, start time for the call, Process ID, and Thread ID. Other information may be displayed based on your column header selections. Refer to Selecting Column Headers for more information about column headers. Detailed call information is displayed in the **Properties** dialog box.

Viewing Detailed Call Information

You can see detailed call information for every captured API call in NI Spy using the **Properties** dialog box. The **Properties** dialog box includes one to four pages of detailed information on the captured call. All captured calls have a **General** page, most captured calls have **Input** and **Output** pages, and some captured calls have a **Buffer** page. The **General** page displays information about the application that made the API call and time statistics for the API call. The **Input** page displays the API call's input parameters. The **Output** page displays the API call's return parameters upon call completion. The **Buffer** page is present only for calls that involve the transfer of a buffer of data; this page displays the contents of the data buffer.

For help on the characteristics of the **General**, **Input**, **Output**, and **Buffer** pages, look at the context-sensitive help in the NI Spy application by using the question mark button on the title bar of the **Properties** dialog box .

To see the **Properties** of a specific call, double-click on the call in the capture window, select **View»Properties**, or right-click on the call and select **Properties**.

Note If no input, output, or buffer information exists for a particular call, that page is not displayed in that call's **Properties** dialog box.

Opening a Previously Saved Capture File

To open a previously saved NI Spy capture file, select **File»Open**.

Note In Windows, You can also open a .spy file directly from the Windows shell or Explorer by double-clicking on it.

Note Any data that was exported as a .txt or .csv file cannot subsequently be reopened from NI Spy. Instead, the file must be opened from a text-based editor or spreadsheet application.

Clearing NI Spy Captured Data

To permanently delete the captured calls from the NI Spy capture window, select **Edit»Clear All**.

Finding Captured Calls

To search through captured calls to find a specific string (API function names, parameter values, or any other string) select **Edit»Find** or press <Ctrl-F> in Windows, <Meta-F> in Linux, or <Command-F> in Mac OS X.

Enter the search text in the **Find what** box and click **Find Next** to find the next captured call containing the specified string (the search is limited to the **Call Description** column). Use the drop-down menu over the **Find what** box to change the type of string used to search the calls. Backslash codes and hexadecimal are especially useful when searching buffers, as opposed to normal strings.

Use the **Match errors only** to limit the search to captured calls that have an error. If you do not specify a search string, the search locates the next captured call that failed. If you do specify a search string, the search for the specified string is limited to those calls that failed.

You can further qualify the search parameters by selecting **Match case** and by specifying a search direction of **Up** or **Down**.

Search buffer data includes call buffers in the search.

To repeat the search, click **Find Next** in the dialog box, select **Edit»Find Next**, or press <Ctrl-F3> in Windows, <Meta-F3> in Linux, or <Command-F3> in Mac OS X.

Capture Options

To view or modify your NI Spy capture options, select **Spy»Options**. By default, NI Spy displays 1000 calls in the capture window, displays buffers in Small buffer mode, and does not enable file logging.

Note You can modify NI Spy options only when capture is stopped.

Call History Depth

The **Call history depth** reflects the maximum number of API calls that NI Spy can display. When the number of captured API calls exceeds the **Call history depth**, only the most recent calls are kept. If your computer runs out of memory, NI Spy stops capture and displays a message box saying it is out of memory.

Start NI Spy with Capture On

Select the **Start NI Spy with capture on** checkbox to start NI Spy capture automatically. By default, this option is not selected, and NI Spy starts with capture off.

Buffer Limit Per Parameter

When NI Spy records an API call that includes a buffer, the buffer contents are displayed in NI Spy. You can specify how much of the buffer to record and save by choosing **Small buffer** or **Large buffer** mode. Small buffer mode displays up to 64 bytes of data. If there are more than 64 bytes of data, NI Spy displays only the first and last 32 bytes of data. Large buffer mode displays up to 64 KB of data, but may significantly slow down your application. If there are more than 64 KB of data, NI Spy displays only the first and last 32 KB of data. Both buffer modes use an entire row of dashes to signify omitted data.

File Logging

If file logging is enabled, NI Spy writes all recorded calls to the specified log file. NI Spy can save calls in three formats: a binary Spy Capture format, a plain text file, and a comma-separated variable (CSV) file. Only NI Spy can open a Spy Capture file, which is much more efficient to create. Using the plain text file and CSV formats creates logs that a wide variety of editors can read, but the logs contain less information and are much slower to create while logging.

To log calls, you must specify the name of a file to store the logged calls. Calls can either allow NI Spy to schedule writing or write to file as soon as possible.

By default, **Allow NI Spy to schedule writing** is selected. Selecting **Allow NI Spy to schedule writing** writes to the logfile for each captured call, but does not flush the logfile until capture is halted. This mode of file logging is much faster than specifying **Write to file as soon as possible**, but if your system crashes, at least some of the logfile likely will be lost.

> **Note** The use of file logging slows down the performance of all running applications, and if you are low on disk space, you are likely to run out of disk space.

Selecting **Write to file as soon as possible** ensures that the call is logged quickly. In a Spy Capture file, the call is written to file before returning control to the calling application, ensuring that the logfile is complete even if the system crashes. When writing to a plain text file or CSV file, the file is written when NI Spy displays it, and the call may not be logged if there is a crash.

File logging is useful in debugging an application that causes the system to crash. If you use file logging to log a Spy Capture file with **Write to file as soon as possible** selected, you can open the saved .spy file after your system has restarted to examine the API calls captured up to the point where the system crashed. If file logging is used in tandem with a plain text file or CSV file and **Write to file as soon as possible** is selected, other applications can use the output without having to stop logging.

Capturing Data

By default, capture is off when you open NI Spy. You can change the default through the **Spy»Options** dialog box.

When capture is off, the title bar of the capture window reads "NI Spy – [capture off]", and the blue arrow (start button:) is enabled. When capture is on, the title of the capture window is "NI Spy – [capture on]", and the red X (stop button:) is enabled.

For help on the toolbar buttons, use the context-sensitive help in the NI Spy application. Once you turn capture on, you can run your application and then return to NI Spy to <u>view the captured calls to National Instruments drivers</u>.

To turn capture on, select **Spy»Start Capture**, press <Ctrl-F8> in Windows, <Meta-F8> in Linux, or <Command-F8> in Mac OS X, or click on the blue arrow button on the toolbar:

Note If **Spy»Start Capture** is grayed out, capture is already on.

To turn capture off, select **Spy»Stop Capture**, press <Ctrl-Break> in Windows, <Meta-Break> in Linux, or <Command-Break> in Mac OS X, or click on the red button on the toolbar:

Actions on API Errors

NI Spy includes several options for capturing API errors. To access these options, select **Spy»Options** and select the **Error Action** tab.

Action to Take on API Error

Select **Continue capturing and ignore error** to continue capturing when an API error occurs. Select **Stop capturing** to capture the error and then stop capturing. Select **Pause and display a dialog** to capture the error, pause capturing, and display a dialog. The dialog gives you the option of continuing or stopping the capture.

When to Take Action

If you select **Stop capturing** or **Pause and display a dialog**, select **Immediately** to stop capturing immediately after the API error or select **Specific number of calls after error** to stop capturing after a specified number of calls.

Limit Error Criteria

If you select **Stop capturing** or **Pause and display a dialog**, you have several options for limiting the error criteria.

Select **Any API** to stop capturing after errors in all APIs. Select **Specific API** and choose the API from the drop-down list to stop capturing only after errors in the specified API.

If you select **Specific API**, select **Any function** to stop capturing after all errors, or select **Specific function** and enter the function name to stop capturing after the specified function. (The function name is case sensitive.)

Select **Any error code** to stop capturing after any API error. Select **Specific error code** and enter the error code to stop capturing after the specified error code. You can enter this number in either decimal format (for example, 6) or hexadecimal format (for example, 0xBFFF0015). For NI-488 users, you can enter either an ibsta or iberr value.

Selecting Column Headers

You can specify which API call data is displayed in the main NI Spy window by selecting various column headers. To select the column headers, select **Spy»Options**, select the **View Selections** tab, and select the headers you want to display under **Column Headers**.

Note You can modify NI Spy options only when capture is stopped.

Number

This column displays the number of each National Instruments API call.

Description

This column displays the names of the API calls that NI Spy captures.

Status

This column displays each API call's output status value. (For calls made to the NI-488.2 API, this is equivalent to ibsta.)

iberr

This column shows the API call's output error (iberr) value. (This data is available only for calls made to the NI-488.2 API.)

ibcntl

This column shows the API call's output count (ibcntl) value. (This data is available only for calls made to the NI-488.2 API.)

Time

This column displays the API call's start time. The time is in the format
hours : minutes : seconds : milliseconds.

Process ID

This column displays the process ID (in hexadecimal format) of the process that made each API call.

Thread ID

This column displays the thread ID (in hexadecimal format) of the thread that made each API call.

Selecting which APIs to View

If you have more than one National Instruments driver installed on your computer, you can specify which APIs you want to spy on at any time. By default, all installed APIs are enabled. To select the APIs to spy on, select **Spy»Options**, select the **View Selections** tab, and select the APIs under **Installed API Choices**.

Note You can modify NI Spy options only when capture is stopped.

Selecting which Process/Thread to View

When capturing multiple threads and processes, select **View All Processes and Threads** to display all threads and processes in the capture window. To view only a specific process, select a function within the process and select **View Only this Process**. To view only a specific thread, select a function within the thread and select **View Only this Thread**.

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- System Integration—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit ni.com/alliance.

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Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Branch Offices

Office	Telephone Number
Australia	1800 300 800
Austria	43 662 457990-0
Belgium	32 (0) 2 757 0020
Brazil	55 11 3262 3599
Canada	800 433 3488
China	86 21 5050 9800
Czech Republic	420 224 235 774
Denmark	45 45 76 26 00
Finland	358 (0) 9 725 72511
France	33 (0) 1 57 66 24 24
Germany	49 89 7413130
India	91 80 41190000
Israel	972 0 3 6393737
Italy	39 02 41309277
Japan	0120-527196 / 81 3 5472 2970
Korea	82 02 3451 3400
Lebanon	961 (0) 1 33 28 28
Malaysia	1800 887710
Mexico	01 800 010 0793
Netherlands	31 (0) 348 433 466
New Zealand	0800 553 322
Norway	47 (0) 66 90 76 60
Poland	48 22 3390150
Portugal	351 210 311 210
Russia	7 495 783 6851
Singapore	1800 226 5886
Slovenia	386 3 425 42 00

South Africa	27 0 11 805 8197
Spain	34 91 640 0085
Sweden	46 (0) 8 587 895 00
Switzerland	41 56 2005151
Taiwan	886 02 2377 2222
Thailand	662 278 6777
Turkey	90 212 279 3031
United Kingdom	44 (0) 1635 523545
United States (Corporate)	512 683 0100