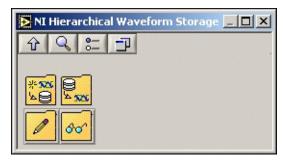
## **NI-HWS LabVIEW Reference Help**

February 2007, 370780G-01

This help file contains information about the VIs for the National Instruments Hierarchical Waveform Storage (NI-HWS) API.

Use the VIs on the NI-HWS palette to build the block diagram.

#### Click the icons for VI descriptions.



To comment on National Instruments documentation, refer to the <u>National Instruments Web site</u>.

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### niHWS Store Waveform

Creates a new file for storing a waveform. The instances of this polymorphic VI correspond to the type of analog or digital data you are storing.

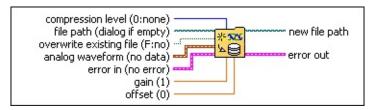
This VI is intended for storing a single waveform in a file. To store multiple waveforms in a file, you must use the <u>Low Level Write VIs</u>.

Use the pull-down menu to select an instance of this VI.



#### **Store Analog WDT**

Creates a new file for storing an analog waveform.



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

analog waveform is the array containing the data for the waveform.

**gain** is intended for waveforms that are to be generated by hardware that supports a gain control that is applied to the downloaded waveform. For example, this parameter can be used for the **gain** parameter in NI-FGEN.

NI-HWS does not apply this gain when writing the data.

**offset** is intended for waveforms that are to be generated by hardware that supports an offset control that is applied to the downloaded waveform. This parameter can be used for the **offset** parameter in NI-FGEN, for example.

NI-HWS does not apply this offset when writing the data.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

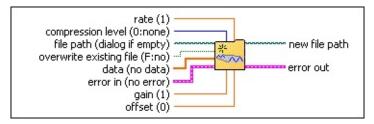
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### **Store Analog DBL**

Creates a new file for storing an analog waveform as double-precision floating-point data (DBL).



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

overwrite existing file? allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the array containing the data for the waveform.

**gain** is intended for waveforms that are to be generated by hardware that supports a gain control that is applied to the downloaded waveform. For example, this parameter can be used for the **gain** parameter in NI-FGEN.

NI-HWS does not apply this gain when writing the data.

**offset** is intended for waveforms that are to be generated by hardware that supports an offset control that is applied to the downloaded waveform. This parameter can be used for the **offset** parameter in NI-FGEN, for example.

NI-HWS does not apply this offset when writing the data.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

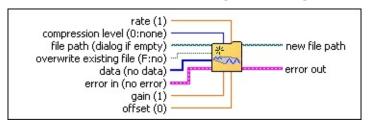
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### **Store Analog I8**

Creates a new file for storing an analog waveform as 8-bit signed integers (I8).



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the array containing the data for the waveform.

**gain** is intended for waveforms that are to be generated by hardware that supports a gain control that is applied to the downloaded waveform. For example, this parameter can be used for the **gain** parameter in NI-FGEN.

NI-HWS does not apply this gain when writing the data.

**offset** is intended for waveforms that are to be generated by hardware that supports an offset control that is applied to the downloaded waveform. This parameter can be used for the **offset** parameter in NI-FGEN, for example.

NI-HWS does not apply this offset when writing the data.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

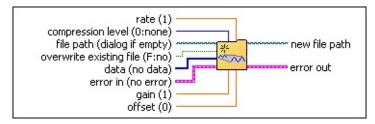
**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives

#### **Store Analog I16**

Creates a new file for storing an analog waveform as 16-bit signed integers (I16).



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the array containing the data for the waveform.

**gain** is intended for waveforms that are to be generated by hardware that supports a gain control that is applied to the downloaded waveform. For example, this parameter can be used for the **gain** parameter in NI-FGEN.

NI-HWS does not apply this gain when writing the data.

**offset** is intended for waveforms that are to be generated by hardware that supports an offset control that is applied to the downloaded waveform. This parameter can be used for the **offset** parameter in NI-FGEN, for example.

NI-HWS does not apply this offset when writing the data.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

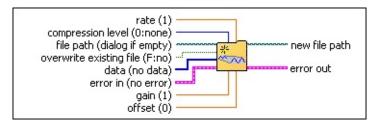
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### **Store Analog I32**

Creates a new file for storing an analog waveform as 32-bit signed integers (I32).



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**[132] data** is the array containing the data for the waveform.

**gain** is intended for waveforms that are to be generated by hardware that supports a gain control that is applied to the downloaded waveform. For example, this parameter can be used for the **gain** parameter in NI-FGEN.

NI-HWS does not apply this gain when writing the data.

**offset** is intended for waveforms that are to be generated by hardware that supports an offset control that is applied to the downloaded waveform. This parameter can be used for the **offset** parameter in NI-FGEN, for example.

NI-HWS does not apply this offset when writing the data.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

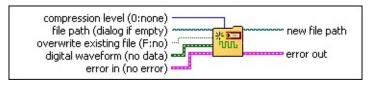
**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### **Store Digital WDT**

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Creates a new file for storing a digital waveform.



**file path** specifies the path and file name of the HWS file to create.

The .hws extension is typically used for HWS files, although using this extension is optional.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**digital waveform** contains the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

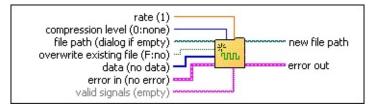
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Store Digital 1D U8**

Creates a new file for storing a digital waveform as an array of 8-bit unsigned integers (U8).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the array containing the data for the waveform.

valid signals is the list of signals (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U8 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 7. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example, "2-5" is equivalent to "2,3,4,5".

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option Explain Error (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

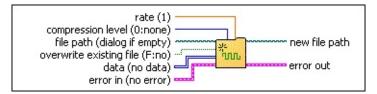
**new file path** passes the path to the file where the data was stored.

error out passes error or warning information out of a VI to be used by other VIs.

#### **Store Digital 2D U8**

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Creates a new file for storing a digital waveform as a two-dimensional array of 8-bit unsigned integers (U8).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

data is the two-dimensional array containing the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

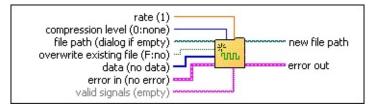
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Store Digital 1D U16**

Creates a new file for storing a digital waveform as an array of 16-bit unsigned integers (U16).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the array containing the data for the waveform.

**valid signals** is the list of signals (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U16 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 15. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example, "2-5" is equivalent to "2,3,4,5".

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

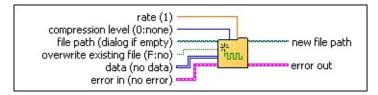
**new file path** passes the path to the file where the data was stored.

**error out** passes error or warning information out of a VI to be used by other VIs.

#### Store Digital 2D U16

200

Creates a new file for storing a digital waveform as a two-dimensional array of 16-bit unsigned integers (U16).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** is the two-dimensional array containing the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

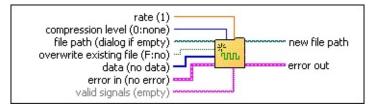
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### Store Digital 1D U32

Creates a new file for storing a digital waveform as an array of 32-bit unsigned integers (U32).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select No to prevent overwriting an existing file.

[U32] data contains the data for the waveform.

**valid signals** is the list of signals (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U32 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 31. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example, "2-5" is equivalent to "2,3,4,5".

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

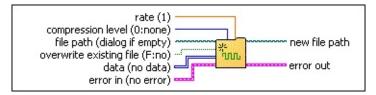
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

error out passes error or warning information out of a VI to be used by other VIs.

#### Store Digital 2D U32

Creates a new file for storing digital waveform data as a two-dimensional array of 32-bit unsigned integers (U32).



**file path** specifies the path and file name of the HWS file to create. The .hws extension is typically used for HWS files, although using this extension is optional.

**rate** is the rate of the Sample clock used to capture the waveform.

**compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**overwrite existing file?** allows this VI to overwrite the file if it exists.

Select **Yes** to overwrite the existing file and create a new file.

Select **No** to prevent overwriting an existing file.

**data** contains the data for the waveform.

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**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

## niHWS Retrieve Waveform

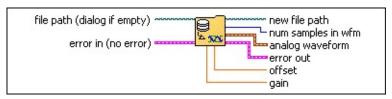
Retrieves the waveform from the file specified. The instances of this polymorphic VI correspond to the type of analog or digital data you are retrieving.

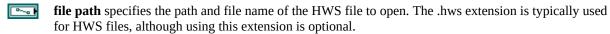
Use the pull-down menu to select an instance of this VI.

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|   |

#### **Retrieve Analog WDT**

Retrieves the analog waveform data from the file specified.





**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**analog waveform** contains the data for the waveform.

PDBL

**offset** is equivalent to element 0 of the scaling **coefficient array**.

**Note** If a waveform stored as integers is retrieved by this VI, NI-HWS scales the integers to floating point numbers using the scaling **coefficient array** and sets the **offset** parameter to 0.

**gain** is equivalent to element 1 of the scaling **coefficient array**.

**Note** If a waveform stored as integers is retrieved by this VI, NI-HWS scales the integers to floating point numbers using the scaling **coefficient array** and sets the **gain** parameter to 1.

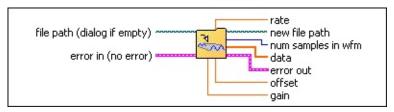
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Retrieve Analog DBL**

Retrieves the analog waveform from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**[DBL] data** contains the data for the waveform.

DBL

**offset** is equivalent to element 0 of the scaling **coefficient array**.

**Note** If a waveform stored as integers is retrieved by this VI, NI-HWS scales the integers to floating point numbers using the scaling **coefficient array** and sets the **offset** parameter to 0.

**gain** is equivalent to element 1 of the scaling **coefficient array**.

**Note** If a waveform stored as integers is retrieved by this VI, NI-HWS scales the integers to floating point numbers using the scaling **coefficient array** and sets the **gain** parameter to 1.

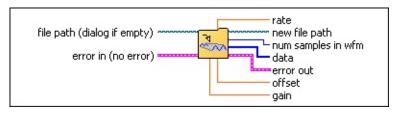
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

status is either TRUE (X) for an error or EAUSE (checkmark)

#### **Retrieve Analog I8**

Retrieves the analog waveform samples as 8-bit signed integers (I8) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**[18] data** contains the data for the waveform.

**offset** is equivalent to element 0 of the scaling **coefficient array**.

**gain** is equivalent to element 1 of the scaling **coefficient array**.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

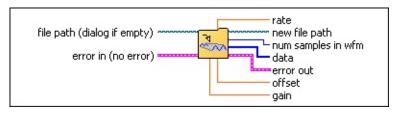
**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

#### **Retrieve Analog I16**

Retrieves the analog waveform samples as 16-bit integers (I16) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**[116] data** contains the data for the waveform.

**offset** is equivalent to element 0 of the scaling **coefficient array**.

**pdbl gain** is equivalent to element 1 of the scaling **coefficient array**.

**new file path** passes the path to the file where the data was stored.

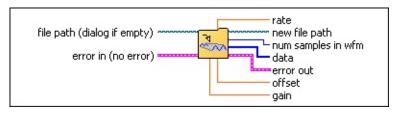
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Retrieve Analog I32**

Retrieves the analog waveform samples as an array of 32-bit signed integers (I32) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**[132] data** contains the data for the waveform.

**offset** is equivalent to element 0 of the scaling **coefficient array**.

**gain** is equivalent to element 1 of the scaling **coefficient array**.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

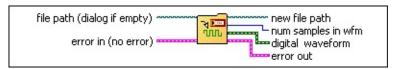
**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

#### **Retrieve Digital WDT**

Retrieves the digital waveform from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**digital waveform** contains the data for the waveform.

1944

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

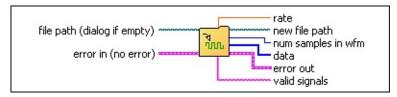
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### **Retrieve Digital 1D U8**

Retrieves the digital waveform samples as an array of 8-bit unsigned integers (U8) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

[ **u8** ] **data** contains the data for the waveform.

labc

**valid signals** lists the lines (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U8 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 7. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example,"2-5" is equivalent to "2,3,4,5".

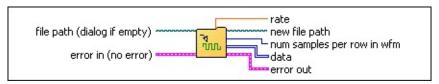
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Retrieve Digital 2D U8**

Retrieves the digital waveform samples as a two-dimensional array of 8-bit unsigned integers (U8) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

num samples per row in wfm returns the number of samples per row in the waveform data array.

[U8] data contains the data for the waveform.

1966

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

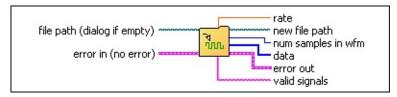
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

course describes the origin of the error or warning

#### **Retrieve Digital 1D U16**

Retrieves the digital waveform samples as an array of 16-bit unsigned integers (U16) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

**[U16] data** contains the data for the waveform.

labc

TF

**valid signals** lists the lines (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U16 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 15. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example, "2-5" is equivalent to "2,3,4,5".

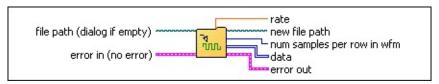
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### **Retrieve Digital 2D U16**

Retrieves the digital waveform samples as a two-dimensional array of 16-bit integers (U16) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

num samples per row in wfm returns the number of samples per row in the waveform data array.

**[U16] data** contains the data for the waveform.

1966

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

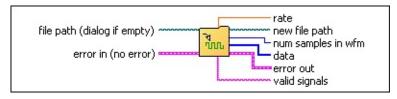
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

course describes the origin of the error or warning

#### Retrieve Digital 1D U32

Retrieves the digital waveform samples as an array of 32-bit unsigned integers (U32) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

**num samples in wfm** reports the total number of samples in the waveform.

[U32] data contains the data for the waveform.

labc

**valid signals** lists the lines (or bits) in the digital samples that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each U32 digital sample contain valid digital data.

The values in the string can receive any integer value between 0 and 31. Individual lines are separated by commas. You can use a hyphen to denote an inclusive range of lines. For example, "2-5" is equivalent to "2,3,4,5".

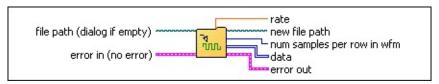
**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### Retrieve Digital 2D U32

Retrieves the digital waveform samples as a two-dimensional array of 32-bit integers (U32) from the file specified.



**file path** specifies the path and file name of the HWS file to open. The .hws extension is typically used for HWS files, although using this extension is optional.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**rate** is the rate of the Sample clock used to capture the waveform.

**new file path** passes the path to the file where the data was stored.

num samples per row in wfm returns the number of samples per row in the waveform data array.

**[U32]** data contains the data for the waveform.

1966

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

course describes the origin of the error or warning

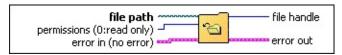
# **Low-Level Write Subpalette**

Click the icons for VI descriptions.



## niHWS Open File

Opens or creates an HWS waveform file. The file must be closed with the niHWS Close File VI.



**file path** specifies the path and file name of the HWS file to create or open. The .hws extension is typically used for HWS files, although using this extension is optional.

**permissions** specifies file access options.

| Read Only              | Opens an existing file for reading. An error is returned if the file specified does not exist. An error is returned if an attempt is made to write to the file. |
|------------------------|---|
| Read/Write<br>Existing | Opens an existing file for both reading and writing. An error is returned if the file specified does not exist.   |
|                        | Creates a new file for both reading and writing. An error is returned if the file specified already exists.   |
|                        | Creates a new file for both reading and writing. If the file specified already exists its contents are lost.  |

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives

more information about the error displayed.

**file handle** is used to refer to an opened HWS file.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

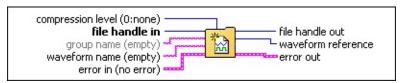
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

#### niHWS New Wfm Reference

Creates a new waveform in the specified group and returns a reference to it.

Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.



- **1321 file handle in** refers to an open HWS file.
- **compression level** provides control over the amount of compression applied to the waveform samples as they are written to the HWS file.

A value of 0 means no compression. A value of 9 means maximum compression. Values between zero and nine indicate increasing levels of compression.

**group name** identifies the group that the new waveform is created in.

If the group referred to by **group name** does not exist, then a new group is created and given the name assigned to the **group name** parameter.

group name can be the empty string under the following conditions:

- 1. The file is new and without groups. A new group is created, and the new waveform is created in that group.
- 2. Only one group is in the file. The new waveform is created in that group.
- waveform name is the name of the waveform. If this waveform is the only one in the group, then the name is optional (can be the empty string). Otherwise, you must supply a name when creating a new waveform.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.

waveform reference references the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and for reading and writing data.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

## niHWS Write

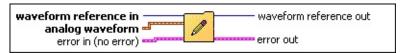
A write moves the read/write position so that it points to the next sample ready to be written. Thus a sequence of writes concatenates the data to a waveform. The instances of this polymorphic VI correspond to the type of waveform data you are writing.

Use the pull-down menu to select an instance of this VI.

| Select an instance | - |
|--------------------|---|
|                    |   |

#### Write Analog WDT

Writes analog waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**analog waveform** is the array containing the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

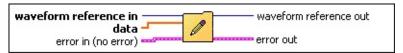
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### Write Analog DBL

Writes double-precision floating-point (DBL) analog waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

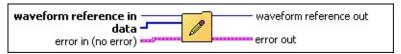
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### Write Analog I8

Writes 8-bit signed integer (I8) analog waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

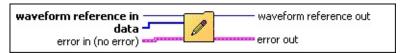
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Analog I16

Writes 16-bit signed integer (I16) analog waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** is the array containing the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

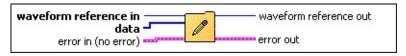
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Analog I32

Writes 32-bit signed integer (I32) analog waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

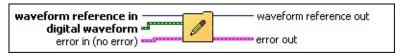
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital WDT

Writes digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**digital waveform** contains the data for the waveform to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

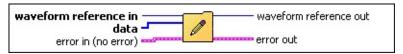
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 1D U8

Writes 8-bit unsigned integer (U8) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

[U8] data contains the data for the waveform to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

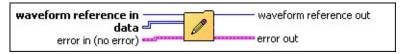
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 2D U8

Writes a two-dimensional array of 8-bit unsigned integer (U8) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

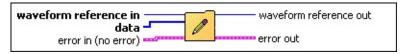
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 1D U16

Writes an array of 16-bit unsigned integer (U16) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

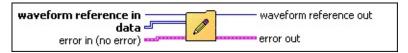
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 2D U16

Writes a two-dimensional array of 16-bit unsigned integer (U16) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

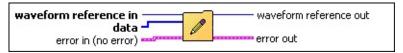
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 1D U32

Writes an array of 32-bit unsigned integer (U32) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform to be written.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

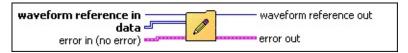
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# Write Digital 2D U32

Writes a two-dimensional array of 32-bit unsigned integer (U32) digital waveform data into the file beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**data** contains the data for the waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

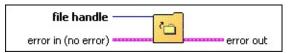
code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

# niHWS Close File

Closes the HWS file specified by **file handle**.



**file handle** is used to refer to an opened HWS file.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

# **Low-Level Write Utility Subpalette**

Click the icons for VI descriptions.



# niHWS Set Scaling Coefficients

Establishes an *n*th degree polynomial scaling function.

When an analog waveform stored as integer data is retrieved by a floating-point Read or Retrieve VI, NI-HWS scales the data according to this polynomial scaling function.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**coefficient array** is the array of polynomial scaling coefficients. The coefficient for the *n*th term of the polynomial is contained in the *n*th index of the **coefficient array**.

For example, the coefficients for a 2nd degree polynomial:

$$y = ax^2 + bx + c$$

would be

coefficient array [0] = c

coefficient array [1] = b

coefficient array [2] = a

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

TF

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

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**code** identifies the error or warning.

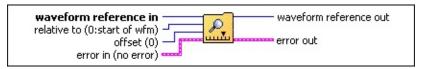
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

abc

**source** describes the origin of the error or warning.

# niHWS Seek

There is a single position within each waveform for both reading and writing. This VI moves this position. First, the position is moved to the place in the waveform specified by **relative to**, then **offset** is added.



- **waveform reference in** is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- relative to specifies the initial placement of the read/write position prior to adding offset.

| Start of Waveform       | Before the first sample in the waveform. |
|-------------------------|--|
| End of Waveform         | After the last sample in the waveform.   |
| <b>Current Position</b> | Where the read/write position is now.    |

- **offset** is added to determine the final read/write position after the read/write position is moved according to the value of **relative to**. **offset** can be negative. Having **offset** as negative is useful when **relative to** is set to **End of Waveform**.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

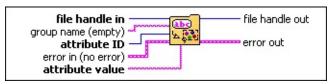
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

# niHWS Set Group String Attribute

Sets the value of text attributes that apply to all the waveforms within a group.



**file handle in** is used to refer to an opened HWS file.

**group name** is the name of the group. Groups are identified by name for purposes of setting and getting group attributes.

If only one group is in the file, this parameter can be the empty string.

**attribute ID** selects the attribute to set.

| Note       | A general-purpose text field for any comment that applies to all the waveforms stored in this group.  |
|------------|---|
| Technician | A general-purpose text field intended for the name of the technician who acquired or generated the waveforms in this group.   |
| Project    | A general-purpose text field intended for any information about the project for which the waveforms in this group were created.   |
| Timestamp  | A string of the form <i>hour:minutes:seconds.fractional seconds</i> followed by <i>AM</i> or <i>PM MM/DD/YYYY</i> . This string is intended to refer to all the waveforms in the group. |

**attribute value** is the new text for the **attribute ID** being set.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives

more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

# niHWS Set Wfm Attribute

Sets a particular attribute of a waveform. The instances of this polymorphic VI correspond to the type of attribute you want to set.

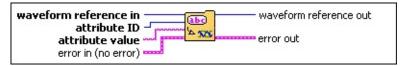
Use the pull-down menu to select an instance of this VI.

Select an instance

# **Set String**

-

Sets the value of text attributes that apply to the waveform specified by the waveform reference.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**us21 attribute ID** selects the attribute to retrieve.

| Note             | A general-purpose text field for any information pertaining to the waveform.  |
|------------------|---|
| X Axis<br>Label  | A general-purpose text field intended for labeling the x-axis of a waveform data plot.  |
| Y Axis<br>Label  | A general-purpose text field intended for labeling the yaxis of a waveform data plot.   |
| X Axis<br>Units  | A general-purpose text field intended for denoting the units of the x-axis.   |
| Y Axis<br>Units  | A general-purpose text field intended for denoting the units of the waveform data.  |
| Valid<br>Signals | The list of bits, or signals, in the samples of a digital waveform that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each unsigned long digital sample contain valid digital data. A hyphen may be used to denote an inclusive range of consecutive signals. For example, "2-5" is equivalent to "2, 3, 4, 5". A semicolon may be used to specify valid signals on multiple devices in a 2D waveform. For example, "0-3;0,6,2" would mean bits 0 through 3 on the first row, and bits 0, 6, and 2 on the second row. |
| Timestamp        | A string in the form <i>hour:minutes:seconds.fractional seconds</i> , followed by <i>AM</i> or <i>PM MM/DD/YYYY</i> . This string is intended to serve as the time the waveform was originally acquired.  |

**attribute value** specifies the new setting of the attribute specified by **attribute ID**.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

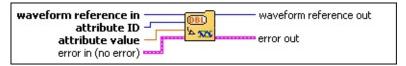
**status** is either TRUE (X) for an error, or FALSE (checkmark)

#### Set DBL

-

200

Sets floating point attributes that apply to the waveform specified by the waveform reference.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**attribute ID** specifies the waveform attribute to retrieve.

| X Axis<br>Start     | The X value for the first point in the waveform. The Scope Soft Front Panel stores <b>relativeInitialX</b> in this attribute, for example.               |
|---------------------|--|
| X Axis<br>Increment | The period between samples in the waveform. The rate of the Sample clock used to capture the waveform is the reciprocal of the <b>X Axis Increment</b> . |
| Y Axis<br>Minimum   | The minimum value of the y-axis.   |
| Y Axis<br>Maximum   | The maximum value of the y-axis.   |

**attribute value** specifies the new setting of the attribute specified by **attribute ID**.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.

**error out** passes error or warning information out of a VI to be used by other VIs.

# **Low-Level Read Subpalette**

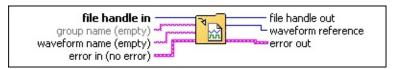
Click the icons for VI descriptions.



# niHWS Get Wfm Reference

Returns a reference to an existing waveform.

Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.



- **file handle in** is used to refer to an opened HWS file.
- **group name** is the name of the group. Groups are identified by name for purposes of setting and getting group attributes.

If only one group is in the file, this parameter can be the empty string.

- **waveform name** is the name of the waveform. If there is but one waveform in the group the waveform name is optional (this parameter can be the empty string).
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.
- **waveform reference** is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- error out passes error or warning information out of a VI to be used by other VIs.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

# niHWS Read

A read moves the read/write position so that it points to the next unread sample in the waveform. The instances of this polymorphic VI allow you to read in analog or digital waveform samples and return them as a specified data type.

Use the pull-down menu to select an instance of this VI.



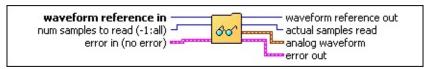
# **Read Analog WDT**

132

Returns analog waveform samples beginning at the current read/write position.

Analog waveform data stored as DBL returns unaltered.

Analog waveform data stored as integers (I8, I16, or I32) is scaled to DBL using the stored scaling coefficients.



- U32 waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- **number of samples to read** specifies how many samples to read into the **data** array. The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the actual samples read parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

TF **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- abc **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- U32 waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- 132 **actual samples read** reports the number of samples read.

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual** samples read parameter.

- analog waveform contains the data for the waveform. ▶ ^
- P-11 **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

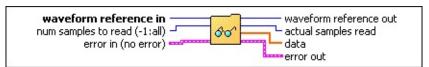
# Read Analog DBL

132

Returns analog waveform samples as double-precision floating-point data (DBL) beginning at the current read/write position.

Analog waveform data stored as DBL returns unaltered.

Analog waveform data stored as integers (I8, I16, or I32) is scaled to DBL using the stored scaling coefficients.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **actual samples read** reports the number of samples read.

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.

- **[DBL] data** contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

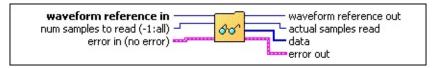
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark)

# **Read Analog I8**

132

Returns analog waveform samples as 8-bit signed integers (I8) beginning at the current read/write position. Only I8 data can be read with this VI.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **actual samples read** reports the number of samples read.

  If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual**

samples read parameter.

- data contains the data for the waveform.
- error out passes error or warning information out of a VI to be used by other VIs.

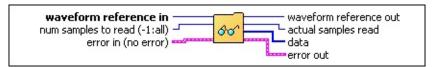
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

# **Read Analog I16**

I32

Returns analog waveform samples as 16-bit signed integers (I16) beginning at the current read/write position. Only I8 or I16 data can be read with this VI. I8 data is sign-extended to 16 bits when read with this VI.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **waveform reference out** is the copy of **waveform reference in** you use for input into the next NI-HWS VI in your program.
- actual samples read reports the number of samples read.

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.

- **[116] data** contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

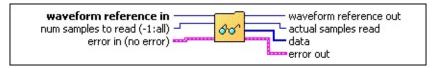
**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives

# Read Analog I32

I32

Returns analog waveform samples as 32-bit signed integers (I32) beginning at the current read/write position. I8 or I16 data is sign-extended to 32 bits when read with this VI.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **waveform reference out** is the copy of **waveform reference in** you use for input into the next NI-HWS VI in your program.
- **actual samples read** reports the number of samples read.

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.

- [132] data contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

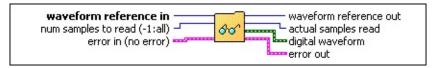
**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives

# **Read Digital WDT**

132

Returns digital waveform samples in the digital waveform data type format, beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **actual samples read** reports the number of samples read.

  If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual**

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actua samples read** parameter.

- **digital waveform** contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

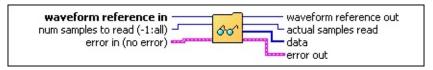
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

# Read Digital 1D U8

actual samples read parameter.

Returns digital waveform samples as an array of 8-bit unsigned integers (U8) beginning at the current read/write position.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- number of samples to read specifies how many samples to read into the data array.

  The default value for number of samples to read is -1, which specifies that the entire waveform is read. If number of samples to read is 0, the number of samples in the waveform is returned in the
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- actual samples read reports the number of samples read.

  If number of samples to read is 0, the number of samples in the waveform is returned in the actual samples read parameter.
- data contains the data for the waveform.
- error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

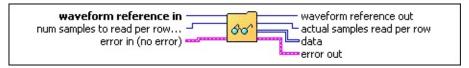
**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

# Read Digital 2D U8

132

132

Returns digital waveform samples as a two-dimensional array of 8-bit unsigned integers (U8) beginning at the current read/write position.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- The default value for **number of samples to read per row** is -1, which specifies that the entire waveform is read. If **number of samples to read per row** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.

**number of samples to read per row** specifies how many samples to read into the **data** array.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- If **number of samples to read per row** is 0, the number of samples in the waveform is returned in the **actual samples read per row** parameter.
- **(U8)** data contains the data for the waveform.
- error out passes error or warning information out of a VI to be used by other VIs.

**actual samples read per row** reports the number of samples read.

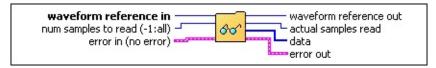
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

# Read Digital 1D U16

132

Returns digital waveform samples as an array of 16-bit unsigned integers (U16) beginning at the current read/write position.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**number of samples to read** specifies how many samples to read into the **data** array.

- The default value for **number of samples to read** is -1, which specifies that the entire waveform is read. If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **actual samples read** reports the number of samples read.

  If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual**
- samples read parameter.
- **[U16]** data contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

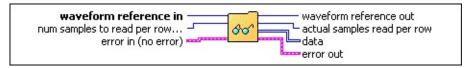
- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

# Read Digital 2D U16

132

132

Returns digital waveform samples as a two-dimensional array of 16-bit unsigned integers (U16) beginning at the current read/write position.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- The default value for **number of samples to read per row** is -1, which specifies that the entire waveform is read. If **number of samples to read per row** is 0, the number of samples in the waveform is returned in the **actual samples read per row** parameter.

**number of samples to read per row** specifies how many samples to read into the **data** array.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.
  - The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **code** identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.
- **[U16] data** contains the data for the waveform.
- error out passes error or warning information out of a VI to be used by other VIs.

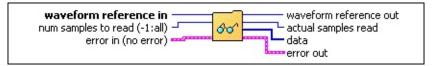
**actual samples read per row** reports the number of samples read.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

# Read Digital 1D U32

Returns digital waveform samples as an array of 32-bit unsigned integers (U32) beginning at the current read/write position.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- number of samples to read specifies how many samples to read into the data array. The default value for number of samples to read is -1, which specifies that the entire waveform is read. If number of samples to read is 0, the number of samples in the waveform is returned in the actual samples read parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- actual samples read reports the number of samples read.

If **number of samples to read** is 0, the number of samples in the waveform is returned in the **actual samples read** parameter.

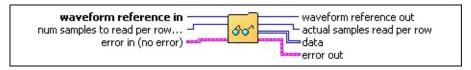
- **[U32] data** contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

#### Read Digital 2D U32

Returns digital waveform samples as a two-dimensional array of 32-bit integers (U32) beginning at the current read/write position.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- number of samples to read per row specifies how many samples to read into the data array. The default value for number of samples to read per row is -1, which specifies that the entire waveform is read. If number of samples to read per row is 0, the number of samples in the waveform is returned in the actual samples read per row parameter.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.
- **source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- waveform reference out is the copy of waveform reference in you use for input into the next NI-HWS VI in your program.
- **actual samples read per row** reports the number of samples read.
- **[U32] data** contains the data for the waveform.
- **error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives

# **Low-Level Read Utility Subpalette**

Click the icons for VI descriptions.



### niHWS Get Number Of Groups

Reports the number of waveform groups contained in the HWS file.



file handle in refers to an open HWS file.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.

**number of groups** is the number of waveform groups in the HWS file.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

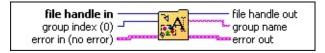
The pop-up option **Explain Error** (or Explain Warning) gives

more information about the error displayed.

**source** describes the origin of the error or warning.

### niHWS Get Group Name

Returns the name of a group in an HWS file. Groups are identified by name for purposes of setting and getting group attributes.



- **file handle in** is used to refer to an opened HWS file.
- **group index** is number such that  $0 \le \text{group index} < \text{number of groups}$ , where **number of groups** is obtained using the <u>Get Number of Groups VI</u>. If five groups are in a file, their group indices are 0 through 4.

The only use for the **group index** parameter is to obtain the name of a group. Groups are identified by name for purposes of setting and getting group attributes.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.
- **group name** is the name of the group specified by **group index**. Groups are identified by name for purposes of setting and getting group attributes.
- error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

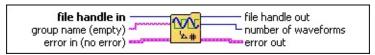
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### niHWS Get Number Of Wfms

Reports the number of waveforms in the group specified by **group name**.

If there is only one group in the HWS file, the **group name** parameter can be the empty string.



- **file handle in** is used to refer to an opened HWS file.
- **group name** is the name of the group. Groups are identified by name for purposes of setting and getting group attributes. If only one group is in the file, this parameter can be the empty string.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.
- **number of waveforms** returns the number of waveforms in the group specified by **group name**.
- error out passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option Explain Error (or Explain Warning) gives

more information about the error displayed.

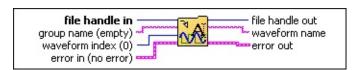
**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

#### niHWS Get Wfm Name

Returns the name of a waveform in a group. The **waveform name** is necessary for getting a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.



- **file handle in** is used to refer to an opened HWS file.
- **group name** is the name of the group. Groups are identified by name for purposes of setting and getting group attributes.

If only one group is in the file, this parameter can be the empty string.

waveform index is a number such that  $0 \le$  waveform index < number of waveforms, where number of waveforms is obtained using the <u>niHWS Get Number of Wfms VI</u>. If five waveforms are in a group, their waveform indices are 0 through 4.

The only use for the **waveform index** parameter is to obtain the name of a waveform.

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

source describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.
- waveform name is the name of the waveform specified by waveform index.

The name of a waveform is necessary for getting a reference to the waveform. Waveforms are identified

by reference for purposes of setting and getting waveform attributes and reading and writing data.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

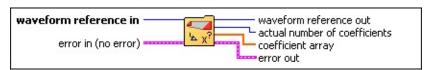
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

### niHWS Get Scaling Coefficients

Retrieves the coefficients of an *n*th degree polynomial scaling function.

When an analog waveform stored as integer data is retrieved by a floating-point Read or Retrieve VI, the data is scaled according to this polynomial scaling function.



- waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.
- **error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

- **waveform reference out** is the copy of **waveform reference in** you use for input into the next NI-HWS VI in your program.
- **actual number of coefficients** is the actual number of coefficients returned in **coefficient array**.
- **coefficient array** is the array of polynomial scaling coefficients. The coefficient for the *n*th term of the polynomial is returned in the *n*th index of the **coefficient array**.

For example, the coefficients for a 2nd-degree polynomial:

$$y = ax^2 + bx + c$$
  
would be  
coefficient array[0] = c  
coefficient array[1] = b

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

TF

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

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**code** identifies the error or warning.

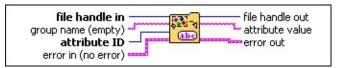
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

Pabc

**source** describes the origin of the error or warning.

### niHWS Get Group String Attribute

Retrieves text attributes that apply to all the waveforms within a group.



**file handle in** is used to refer to an opened HWS file.

**group name** is the name of the group. Groups are identified by name for purposes of setting and getting group attributes.

If only one group is in the file this parameter can be the empty string.

**attribute ID** selects the attribute to retrieve.

| Note       | A general-purpose text field for any comment that applies to all the waveforms stored in this group.  |
|------------|---|
| Technician | A general-purpose text field intended for the name of the technician who acquired or generated the waveforms in this group.   |
| Project    | A general-purpose text field intended for any information about the project for which the waveforms in this group were created.   |
| Timestamp  | A string of the form <i>hour:minutes:seconds.fractional seconds</i> followed by <i>AM</i> or <i>PM MM/DD/YYYY</i> . This string is intended to refer to all the waveforms in the group. |

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**code** identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

abc

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**file handle out** is the copy of **file handle in** you use for input into the next NI-HWS VI in your program.

**attribute value** is the current setting of the attribute specified by **attribute ID**.

**error out** passes error or warning information out of a VI to be used by other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

### niHWS Get Wfm Attribute

Retrieves a particular attribute of a waveform. The instances of this polymorphic VI correspond to the type of attribute you want to retrieve.

Use the pull-down menu to select an instance of this VI.

Select an instance

#### **Get String**

Retrieves text attributes that apply to the waveform specified by the waveform reference.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**attribute ID** specifies the waveform attribute to retrieve.

|                  | Т   |
|------------------|---|
| Note             | A general-purpose text field for any information pertaining to the waveform.  |
| X Axis<br>Label  | A general-purpose text field intended for labeling the x-axis of a waveform data plot.  |
| Y Axis<br>Label  | A general-purpose text field intended for labeling the yaxis of a waveform data plot.   |
| X Axis<br>Units  | A general-purpose text field intended for denoting the units of the x-axis.   |
| Y Axis<br>Units  | A general-purpose text field intended for denoting the units of the y-axis.   |
| Waveform<br>Name | A read-only attribute that is the same as that returned by the <u>niHWS Get Wfm Name VI</u> .   |
| Valid<br>Signals | The list of bits, or signals, in the samples of a digital waveform that are valid. For example, "0,3,6" means that only bits 0, 3, and 6 of each unsigned long digital sample contain valid digital data. A hyphen may be used to denote an inclusive range of consecutive signals. For example, "2-5" is equivalent to "2, 3, 4, 5". A semicolon may be used to specify valid signals on multiple devices in a 2D waveform. For example, "0-3;0,6,2" would mean bits 0 through 3 on the first row, and bits 0, 6, and 2 on the second row. |
| Timestamp        | A string in the form <i>hour:minutes:seconds:fractional seconds</i> followed by <i>AM</i> or <i>PM MM/DD/YYYY</i> . Intended to serve as the time the waveform was originally acquired.   |

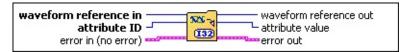
**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning

#### Get I32

Retrieves integer attributes that apply to the waveform specified by the waveform reference.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**attribute ID** specifies the waveform attribute to retrieve.

| Y Axis<br>Datatype   | A read-only attribute that returns the type of integer or floating-point data that the waveform is stored as.  Defined Values:  I8 = 0  I16 = 1  I32 = 2  DBL = 3  U32 = 4  WDT = 5  U8 = 6  U16 = 7 |
|----------------------|--|
| IO Type              | A read-only attribute that returns the type of the waveform as either analog (0), digital (1), or unknown (2).   |
| Scaling<br>Type      | A read-only attribute that returns the only currently supported scaling type of polynomial (0).  |
| Waveform<br>Size     | A read-only attribute that returns the total number of samples in a waveform. For digital 2D files with multiple rows, this attribute refers to the number of samples per row.                       |
| Number of Rows       | A read-only attribute that returns the number of rows in the waveform.   |
| Number<br>of Signals | A read-only attribute that returns the number of signals in the waveform.  |

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

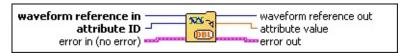
The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop up option Explain Exper (or Explain Warning) gives

#### Get DBL

Retrieves floating point attributes that apply to the waveform specified by the waveform reference.



waveform reference in is a reference to the waveform. Waveforms are identified by reference for purposes of setting and getting waveform attributes and reading and writing data.

**attribute ID** specifies the waveform attribute to retrieve.

| X Axis<br>Start   | The X value for the first point in the waveform. The Scope Soft Front Panel stores <b>relativeInitialX</b> in this attribute, for example.               |
|-------------------|--|
| Increment         | The period between samples in the waveform. The rate of the Sample clock used to capture the waveform is the reciprocal of the <b>X Axis Increment</b> . |
| Y Axis<br>Minimum | The minimum value of the y-axis.   |
| Y Axis<br>Maximum | The maximum value of the y-axis.   |

**error in (no error)** can accept error information wired from VIs previously called. Use this information to decide if any functionality should be bypassed in the event of errors from other VIs.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**status** is either TRUE (X) for an error, or FALSE (checkmark) for no error or a warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

code identifies the error or warning. The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**source** describes the origin of the error or warning.

The pop-up option **Explain Error** (or Explain Warning) gives more information about the error displayed.

**waveform reference out** is the copy of **waveform reference in** you use for input into the next NI-HWS VI in your program.

**attribute value** is the current setting of the attribute specified by **attribute ID**.

**error out** passes error or warning information out of a VI to be used by other VIs.

## NI-HWS Save Express VI

Saves data to an HWS file. This VI supports both analog and digital waveforms.

**Dialog Box Options** 

**Block Diagram Inputs** 

**Block Diagram Outputs** 

## **Dialog Box Options**

| Parameter                    | Description   |
|------------------------------|---|
| Input signal type            | Specifies the type of signal (analog or digital) that will be saved to file.  |
| File path                    | Specifies the location where you want to save the file. You can specify an absolute or relative path to the file. If you specify a relative path, this VI assumes the path is relative to the <b>My Documents</b> folder. |
| If file<br>already<br>exists | Specifies how SignalExpress saves data to an existing file. Contains the following options:  • Overwrite—Replaces data in the existing file.  • Append to file—Appends data to the existing file.                         |
| Use compression              | Specifies whether to apply compression when saving the data to file.  |

## **Block Diagram Inputs**

| Parameter | Description  |
|-----------|--|
| file path | Specifies the location where you want to save the file.  |
| signal    | Specifies the data you want to save to the file.   |
|           | Specifies whether to close the file after the data has been written. Use this input when placing the VI in a loop to prevent the file from being opened and closed each iteration. |
| error in  | Describes error conditions that occurred prior to running this Express VI.   |

## **Block Diagram Outputs**

| Parameter | Description   |
|-----------|---|
|           | Contains error information. If <b>error in</b> indicates that an error occurred before this Express VI, <b>error out</b> contains the same error information. Otherwise, it describes the error status that this Express VI produces. |

# NI-HWS Load Express VI

Imports data from an HWS file. This VI supports both analog and digital waveforms.

**Dialog Box Options** 

**Block Diagram Inputs** 

**Block Diagram Outputs** 

## **Dialog Box Options**

| Parameter | Description  |
|-----------|--|
|           | Specifies the location of the file you want to import. You can specify an absolute or relative path to the file. If you specify a relative path, this VI assumes the path is relative to the <b>My Documents</b> folder. |
| File type | Specifies whether the file contains analog waveform data or digital waveform data.   |

## **Block Diagram Inputs**

| Parameter | Description  |
|-----------|--|
| file path | Specifies the location of the file you want to import.                     |
| error in  | Describes error conditions that occurred prior to running this Express VI. |

# **Block Diagram Outputs**

| Parameter | Description   |
|-----------|---|
| signal    | Contains the signal imported from the HWS file.   |
|           | Contains error information. If <b>error in</b> indicates that an error occurred before this Express VI, <b>error out</b> contains the same error information. Otherwise, it describes the error status that this Express VI produces. |