NI-SCOPE Express VI Control Help

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NI-SCOPE Express

Acquires an analog voltage waveform from National Instruments highspeed digitizers.

Note The NI PCI-5911 is not supported.

Acquire

Specifies the acquisition mode of the Express VI. The following modes are available:

N Samples—Every time the VI is called, it returns a finite number of samples. This set of samples is not phase continuous with the previous acquisition.

Continuously—The first time the VI is called, it initiates a continuous acquisition on the digitizer. Subsequent calls fetch the next set of data, phase continuous with the previous set, from the digitizer. The maximum rate at which acquisition can be accomplished without error depends on the hardware/software configuration. Maximum rate is accomplished by tuning the **Read length** for most efficient transfer (typically 100,000 to 500,000 points).

Autoscale graph

Specifies whether to autoscale the Y scale of the graph.

Checked—The Y scale of the graph is autoscaled every time the graph is updated.

Unchecked—The Y scale of the graph maintains its settings.

Auto Setup

Click **Auto Setup** to automatically set the digitizer parameters to acquire a signal.

Bandwidth (Hz)

Specifies the bandwidth of the channel expressed as the frequency at which the input circuitry attenuates the input signal by 3 dB.

Valid Values—Any positive number or zero. Positive numbers are coerced to the next highest valid value.

Default—0, use the default value of the digitizer.

Refer to the *NI High-Speed Digitizers Help* for other bandwidths supported by the digitizer.

Coupling

Specifies how the digitizer couples the input signal for the selected channel(s).

Note A certain amount of delay is required for the coupling capacitor to charge after changing vertical coupling from DC to AC. This delay is typically as follows:

Low Impedance Source—150 ms 10X Probe—1.5 s 100X Probe—15 s

Channels

Select—Select or multi-select channel(s) by highlighting. The channel configurations for selected channels are diplayed.

Enable—Place a checkmark next to the channel(s) you want to enable. Only enabled channels will acquire data.

Enable TIS

Enables time interleaved sampling (TIS), which extends the maximum sample rate on the specified channel for devices that support TIS.

Input impedance

Specifies the input impedance for the channel.

Offset (V)

Specifies the location of the center of the range that you specify with **Range (V)**. Express the value with respect to ground. For example, to acquire a sine wave that spans from -5.0 to 5.0 volts, set the value to 0. For a sine wave that spans from 0.0 to 10.0 volts, set the value to 5.0 and set **Range (V)** to 10.0.

Refer to the *NI High-Speed Digitizers Help* for a list of vertical offsets supported by the digitizer.

Probe attenuation

Specifies the scaling factor by which the probe you attach to the channel attenuates the input. For example, when you use a 10:1 or 10X probe, set this parameter to 10.0.

Valid Values—Any positive real number. Typical values are 1, 10, and 100.

Range (V)

Specifies the value of the input range the digitizer uses for the channel. For example, to acquire a sine wave that spans from -5.0 to 5.0 volts, set this parameter to 10.0.

Refer to the *NI High-Speed Digitizers Help* for a list of vertical ranges supported by the digitizer. If the specified range is not supported, the value is coerced up to the next valid range.

Coupling

Specifies the coupling type for the digitizer to use for triggering.

Refer to the *NI-SCOPE LabVIEW Reference Help* for descriptions of the defined values.

DC restore

Enabling **DC restore** places the zero-volt reference of the video signal to 0 V. Because video signals typically contain large DC offsets, the signals are measured using AC coupling, which places the average value of the signal at 0.

Default—Disabled

Delay (s)

Specifies the length of time the digitizer waits after it detects the trigger before it marks the **Ref position (%)**.

Device

Specifies which digitizer is used by the Express VI. This ring control lists all NI digitizers installed on this computer that can be used by this Express VI. If you re-open the VI and the selected digitizer is grayed out, it is no longer available.

Event

Specifies which video event to trigger on.

Refer to the *NI-SCOPE LabVIEW Reference Help* for descriptions of the defined values.

High level (V)

Specifies the upper voltage threshold for the digitizer to use for window triggering. The digitizer triggers when the trigger signal enters or leaves the window you specify with **Low level (V)** and **High level (V)**.

Valid Range—The values of **Range (V)** and **Offset (V)** determine the valid range for **High level (V)** on the channel you specify with **Source**. The value you pass for this parameter must meet the following conditions:

 $\begin{array}{l} \text{High level (V)} \leq \text{Range (V)} / 2 + \text{Offset (V)} \\ \text{High level (V)} > \text{Low level (V)} \\ \end{array}$

Holdoff (s)

Specifies the length of time for the digitizer to wait after it acquires a waveform until the digitizer enables the trigger system to detect another trigger. **Holdoff** affects instrument operation only when the digitizer acquires multiple records.

Hysteresis (V)

Specifies the size of the hysteresis window on either side of the trigger level. The digitizer triggers when the trigger signal passes through the threshold you specify with **Level (V)**, has the slope you specify with **Slope**, and passes through the hysteresis window that you specify.

Valid Values—Min Value—0

Max Value for positive trigger slope:

(Hysteresis (V) – Level (V)) \geq (–Range (V)/2) + Offset (V) Max value for negative trigger slope:

 $(Hysteresis (V) + Level (V)) \le Range (V)/2 + Offset (V)$

Level (V)

Specifies the voltage threshold for the digitizer to use for edge triggering. The digitizer triggers when the trigger signal passes through the threshold you specify with this parameter and the trigger signal has the slope you specify with **Slope**.

Valid Range—The values of **Range (V)** and **Offset (V)** determine the valid range for the **Level (V)** on the channel you use as the **Source**. The value you pass for this parameter must meet the following conditions:

Level (V) \leq (Range (V)/2) + Offset (V) Level (V) \geq (-Range (V)/2) + Offset (V)

Level (V)

Specifies the voltage threshold for the digitizer to use for hysteresis triggering. The digitizer triggers when the trigger signal passes through the threshold you specify with this parameter and the trigger signal has the slope you specify with **Slope**.

Valid Range—The values of **Range (V)** and **Offset (V)** determine the valid range for the **Level (V)** on the channel you use as the **Source**. The value you pass for this parameter must meet the following conditions:

Level (V) \leq (Range (V)/2) + Offset (V) Level (V) \geq (-Range (V)/2) + Offset (V)

Line number

Specifies the line number to trigger on. An absolute line number system is used, meaning that the lines from field 1 are numbered $1 \longrightarrow x$, and the lines from field 2 are labeled $x+1 \longrightarrow y$.

The number of lines available depends on the format. For NTSC, the valid range is 1 to 525. For PAL and SECAM, the valid range is 1 to 625.

Low level (V)

Specifies the lower voltage threshold for the digitizer to use for window triggering. The digitizer triggers when the trigger signal enters or leaves the window you specify with **Low level (V)** and **High level (V)**.

The values of **Range (V)** and **Offset (V)** determine the valid range for the **Low level (V)** on the channel you specify with **Source**.

The value you pass for this parameter must meet the following conditions:

Low level (V) < High level (V) Low level (V) > (–Range (V)/2) + Offset (V)

Max time (s)

Specifies the hardware timeout value in seconds.

Output:

Specifies the signal name used by the rest of the application.

Per Div Mode

A Boolean that enables or disables per division views. When enabled, Range (V/Div) and Time/Division are visible.

Polarity

Specifies the polarity of video signal used to trigger an acquisition.

Post-execution delay (ms)

Specifies the amount of time to wait after the step executes.

Pre-execution delay (ms)

Specifies the amount of time to wait before the step executes. If you configure the step to start after another step, the delay represents the amount of time to wait after the **Step to wait for** has started.

Range (V/Div)

When **Per Div Mode** is enabled, sets the vertical range in volts per division.

Record length

Specifies the number of points acquired at each run.

Valid Values—1 to 75 million

Note System memory considerations may limit the maximum number of points to approximately 5 million.

Read length

Specifies the number of points fetched every time the digitizer reads data. This value is typically in the 100,000 to 500,000 range for efficient continuous acquisition.

Valid Values—1 to 75 million

Reference clock source

Specifies the source for the clock to which the sample clock is phase-locked.

Refer to the *NI High-Speed Digitizers Help* to determine which sources are valid for each digitizer.

Ref position (%)

When the digitizer detects a trigger, it waits the length of time you specify with **Delay** and marks this spot as the Reference. This parameter determines where the Reference is positioned in a record as a percentage of the total record. For example, a value of 25.0 means 25% of the acquired data are pretrigger samples and 75% are posttrigger samples.

Valid Range: 0.0 - 100.0

RIS enabled

Specifies whether random interleaved sampling (RIS) is enabled.

On—RIS is enabled because the **Sample rate (S/s)** is higher than the maximum real-time rate of the digitizer.

Off—RIS is disabled.

Sample rate (S/s)

Specifies the sampling rate for the acquisition.

Refer to the *NI High-Speed Digitizers Help* for a list of acquisition rates supported by the digitizer.

Signal format

Specifies which video format to use.

Slope

Specifies whether a rising edge or a falling edge passes through the **Level (V)** to trigger the digitizer.

Source

Specifies the **Source** for the digitizer to monitor for a trigger. The valid values change depending upon the **Type**.

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Start this step after

Use this control to make the step wait until another step has started before executing. You can make this step wait on any other hardware step in the project by using the **Step to wait for** ring control. You can use this control to force an acquisition device to start after a generation device has started. You can also use this control to ensure that a device generating a trigger signal starts after the device receiving the signal, to avoid sending the signal before the receiver is ready.

Step to wait for

Lists the possible hardware steps for which this step can wait.

Output:

Specifies the signal name used by the rest of the application.

Time/Division

When **Per Div Mode** is enabled, specifies the digitizing rate in seconds per division.

Use relative initial time

Specifies the meaning of the t0 parameter in the output waveforms.

Checked—The t0 parameter represents the time from the initial data point to the trigger position.

Unchecked—The t0 parameter represents the absolute time the data was collected.

Туре

Specifies the trigger type used to initiate an acquisition.

Wait on Previous

Wait Type

Acquired Signals

Displays the waveforms from the digitizer.

The dashed red lines on the graph indicate the hardware limits for the channel selected for configuration. The channel selected for configuration is determined by which channel configuration tab is currently selected. The hardware limits are set by **Range (V)** and **Offset (V)**.

Window mode

Specifies whether a trigger should occur when the signal enters or leaves the window specified by **Low level (V)** and **High level (V)**.

Refer to the *NI-SCOPE VI Reference Help* for descriptions of the defined values.