

## NI ELVIS Arbitrary Waveform Generator (ARB) Basics

The NI ELVIS Arbitrary Waveform Generator (ARB) plays user-specified waveforms using the AO 0 and AO 1 analog outputs. A waveform data type file can be loaded into either channel. Gain can also be applied. The update rate and trigger mode can be changed while the instrument is running. Waveforms are created in the Waveform Editor.

**Note that the maximum update rate that can be achieved by the ARB is 2.0MS/s.**

The waveform editor may allow you to create a waveform file with a sample rate greater than 2.0MS/s but the ARB will not be able to generate it accurately.

### Sample Rate Control

The sample rate determines the distance in time between points. A high sample rate means the system generates more points for a waveform of fixed length. Choose a sample rate that is at least twice as fast as the highest frequency component for your signal. For example, if you are generating a sine wave of 10 kHz, you must use a sample rate of at least 20 kHz to avoid aliasing problems. A sample rate three to five times the maximum frequency component is best.

### Using the NI Waveform Editor

With the NI Waveform Editor, one can create and edit waveforms that the NI ELVIS-ARB can play. Every waveform consists of one or more segments. A segment can be of any length. The length of the entire waveform equals the sum of the lengths of all its segments. Every segment consists of zero or more components. A segment with no components appears in the NI Waveform Editor as a flat line at zero volts. One may add, subtract, multiply, or divide a new component to the other components in a segment.

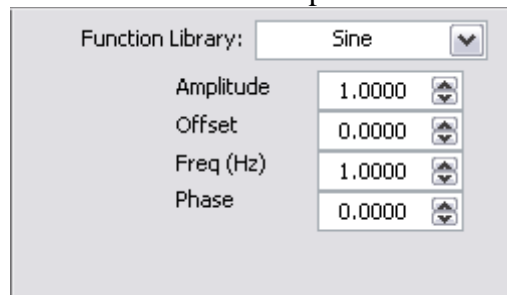
A component can be one of the following three types:

- A library component is a waveform selected from a library of 20 waveform primitives. Each waveform in the library has one or more parameters such as amplitude, offset, frequency, and phase. **To create a pulse with rise and delay times, the Trapezoid library component will be ideal.**
- An expression component is a waveform generated by evaluating a mathematical expression over a certain interval.
- A sketch component consists of a waveform that you draw on the screen.

You can mix each of these component types together to create a unique segment

### Library Component Parameters

The following shows the NI Waveform Editor parameters for a library component:

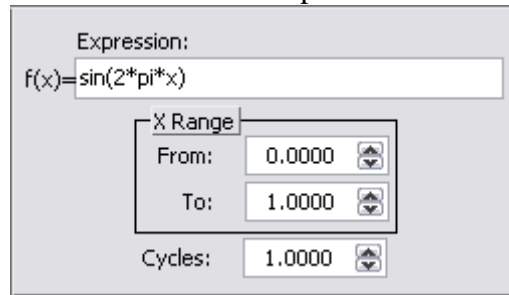


The image shows a dialog box for configuring a library component. It has a title bar and a 'Function Library' dropdown menu set to 'Sine'. Below the dropdown are four parameter labels: 'Amplitude', 'Offset', 'Freq (Hz)', and 'Phase'. Each label is followed by a numerical input field and a small up/down arrow icon. The values in the input fields are: Amplitude: 1.0000, Offset: 0.0000, Freq (Hz): 1.0000, and Phase: 0.0000.

Parameter	Value
Function Library	Sine
Amplitude	1.0000
Offset	0.0000
Freq (Hz)	1.0000
Phase	0.0000

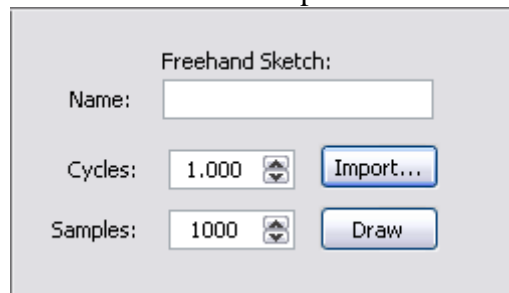
### Expression Component Parameters

The following shows the NI Waveform Editor parameters for an expression component.



### Sketch Component Parameters

The following shows the NI Waveform Editor parameters for a sketch component.



The Freehand and Line buttons appear on the NI Waveform Editor front panel when one edits or adds a sketch component.



### NI Waveform Editor SFP and Menus

The front panel of the NI Waveform Editor has the following aspect:

