

Exercise 8-2: Examining the Waveform Data Type

Goal

- Recognize the components and visualization of the waveform data type.

Instructions

1. Open `C:\Exercises\LabVIEW Core 1\Waveform Data Type\Waveform Data Type.lvproj`.
2. Open the Examine Waveform Data Type VI from the **Project Explorer** window.
3. Examine the VI.
 - Examine the front panel, which consists of a waveform control and waveform chart indicator.
 - Examine the block diagram. Notice that the waveform control passes its data directly to the chart indicator.
 - Examine the waveform control, which has a waveform data type. Take notes of the following information contained in the waveform data type.

Initial Time (t0)	
Interval Time (dt)	
Data Values (Y)	
Index 0	
Index 1	
Index 2	
Index 3	
Index 4	
Index 5	
Index 6	
Index 7	
Index 8	
Index 9	
Index 10	

- Based on the number of data values and the interval time, what do you think is the total duration, in seconds, of this waveform.

4. Run the VI.

- The waveform data type contains both data values and timing information. The x-axis of the waveform chart indicator is in units of Time (seconds).

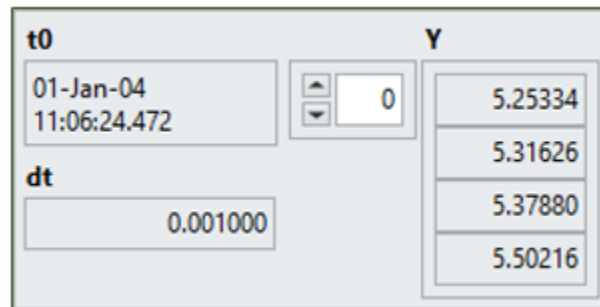
5. Modify the interval time (dt).

- Change the interval time from 0.1 seconds to 0.2 seconds. What effect do you think this change will have on the waveform chart indicator.
- Run the VI.
- Notice that the data values have remained the same. However, the amount of time between each point on the chart is now 0.2 seconds, and the total duration of the waveform on the chart has increased to 2 seconds.

1. Modify the initial time (t0).

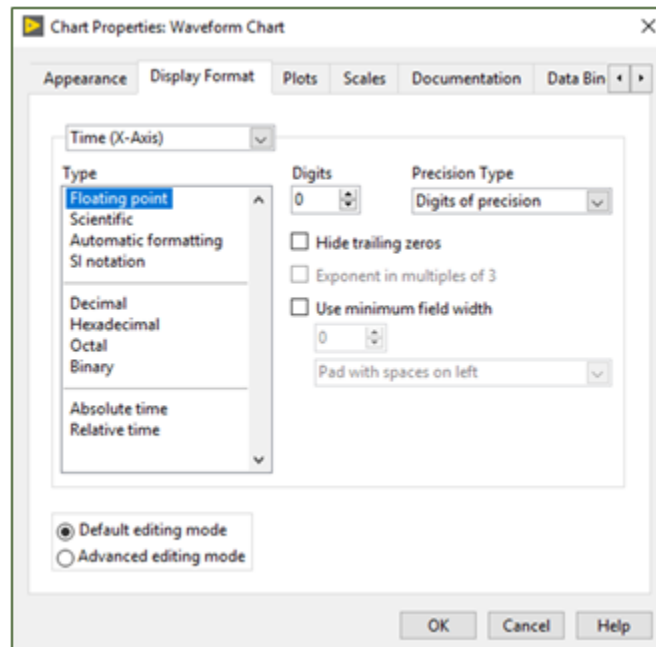
Currently the x-axis of the waveform chart indicator shows relative time in units of seconds, where the initial time is always displayed as 0.

- View the initial time (t0) in units of absolute date/time on the chart indicator.

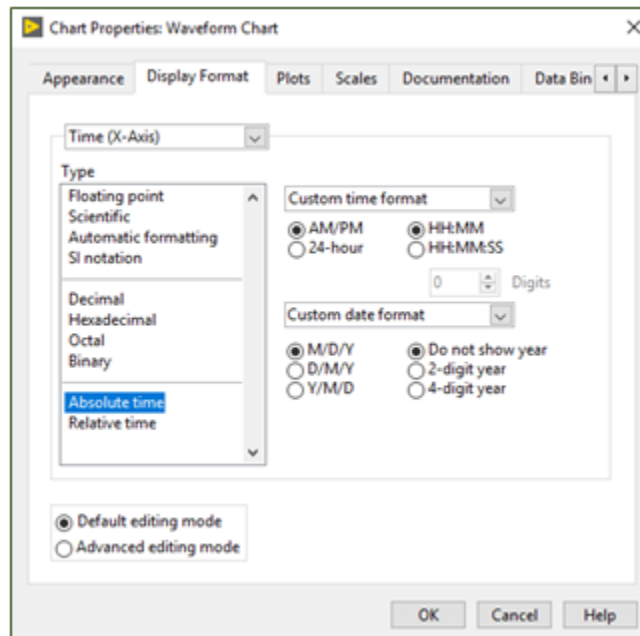


- Right-click the **Waveform Chart** indicator and select **Properties**.

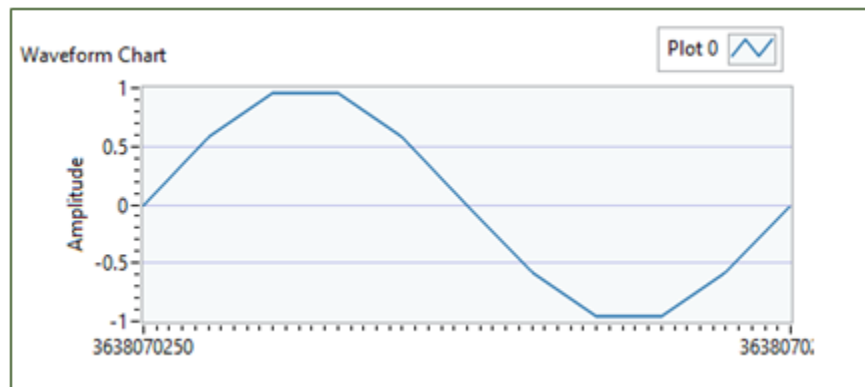
- In the **Display Format** tab select **Default editing mode**.



- Set Type to Absolute time.



- Notice that the Time axis now displays units of absolute date and time.

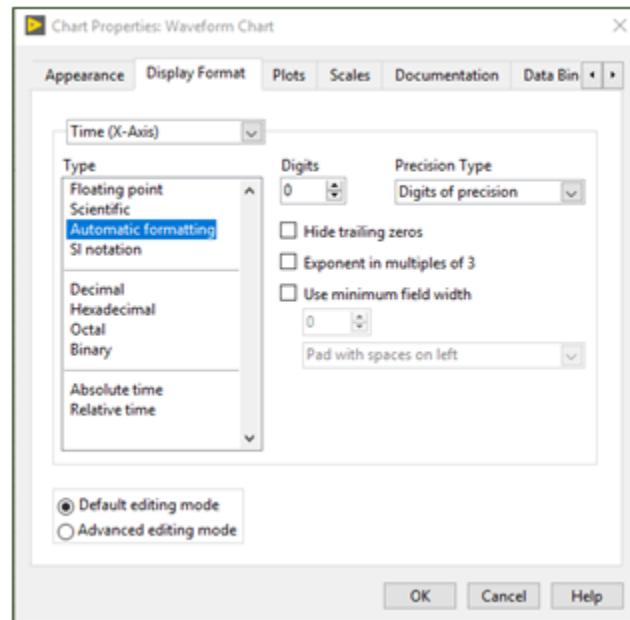


- Modify the date and time in the initial time element of the waveform control. What effect do you think this change will have on the waveform chart indicator?

- Run the VI. Notice that the initial time on the left side of the Time axis now shows the new initial time.



Note: To go back to displaying the time in seconds, right-click the **waveform chart indicator**, select **Properties**, and set the type back to **Automatic formatting** in the **Display Format** tab. You can also try experimenting with the other **Display Format Type** options.

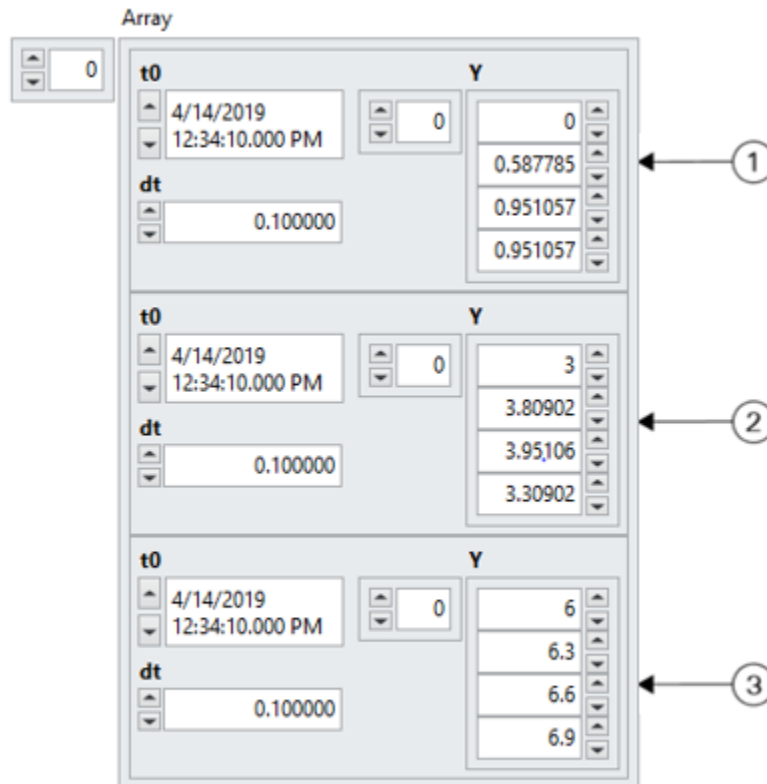


2. Try making additional modifications to t_0 , dt , and Y array, and examine the effects on the chart indicator.

1D Array of Waveform

1. Open the Examine 1D Array (Waveform) Data Type VI from the **Project Explorer** window.
2. Examine the 1D Array (Waveform) control on the front panel.

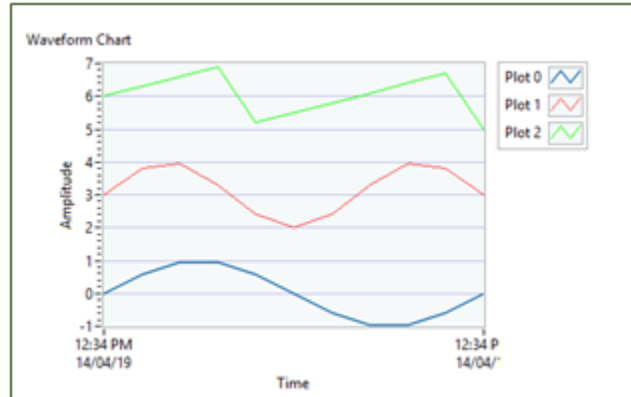
Notice that this 1D array contains three waveform elements. All three waveform elements contain the same initial time (**t0**) and interval time (**dt**).



1. The waveform at index 0 contains data values representing 1 sine wave.
 2. The waveform at index 1 contains data values representing 1.5 sine waves with an amplitude offset of 3.
 3. The waveform at index 2 contains data values representing 1.5 sawtooth waves with an amplitude offset of 6.
-
3. Examine the block diagram. The **1D Array (Waveform)** control passes its data directly to the **Waveform Chart** indicator.

4. Observe the behavior of the VI.

- Run the VI.
- Notice that when you pass a 1D array of waveforms to a chart, the chart displays each waveform in the array as a separate plot.



5. Observe the effects of modifying the waveforms in the **1D Array (Waveform)** control.

- Change the **dt** of one of the waveforms from 0.1 to 0.2. Run the VI to observe the effect.
- Change the **t0** of one of the waveforms, e.g. from 6:05:10.000 to 6:05:11.000.
- Run the VI to observe the effect.

End of Exercise 8-2