Graphs, Charts, XY Graphs

One of LabVIEW's biggest advantages is being able to easily display charts and graphs.

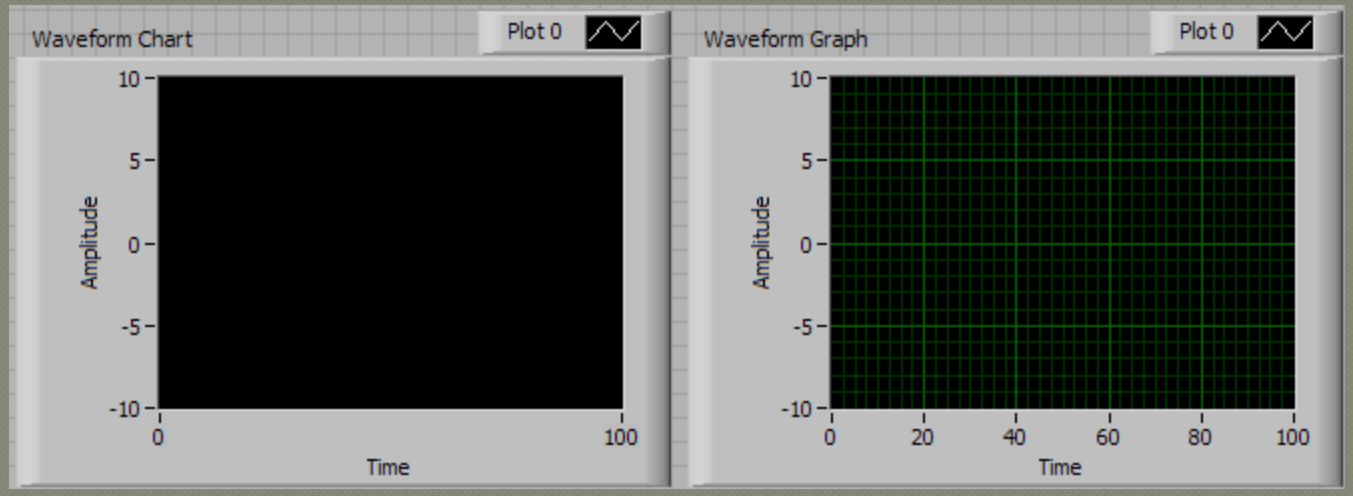
However, creating charts or graphs can sometimes be difficult and frustrating if you don't use the correct settings and icons, etc.

Read Ch. 8 from the text for supplemental material to this lecture.

Charts vs. Graphs

Charts are different than graphs because

- Charts can be updated in real-time.
- Graphs require that all the data be present before presenting the data.



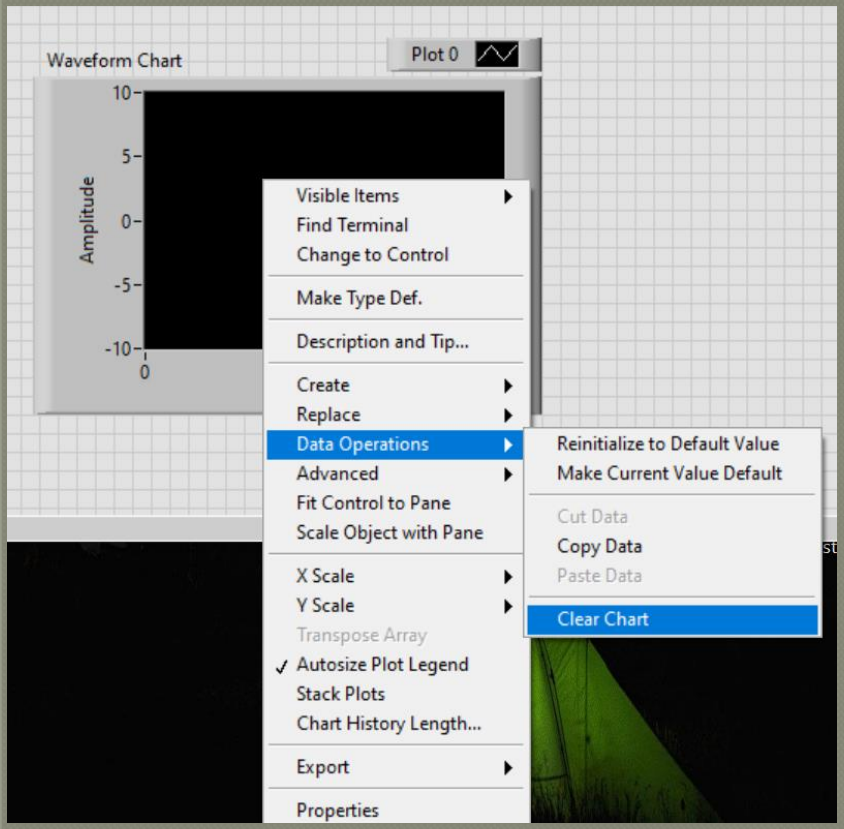
They look almost identical on the front panel.

Charts vs. Graphs

Charts also do not clear automatically. If you run your program multiple times, then the chart will continue adding to the old data. So charts can take up more memory if you are not careful! Typically, one would clear the chart at the beginning of the program to avoid this.

Graphs clear automatically every time data is written to them.

Easiest Way to Clear a Chart



First, clear any data on the chart manually by Data Operations > Clear Chart (shown in image).

CLAD Question

Q11: Unlike graphs, which display an entire waveform that _____ the data already displayed, charts update periodically and _____ the data previously displayed.

A Maintains a history of; overwrite
B Overwrites; maintain a history of
C Appends to; overwrite
D None of the above

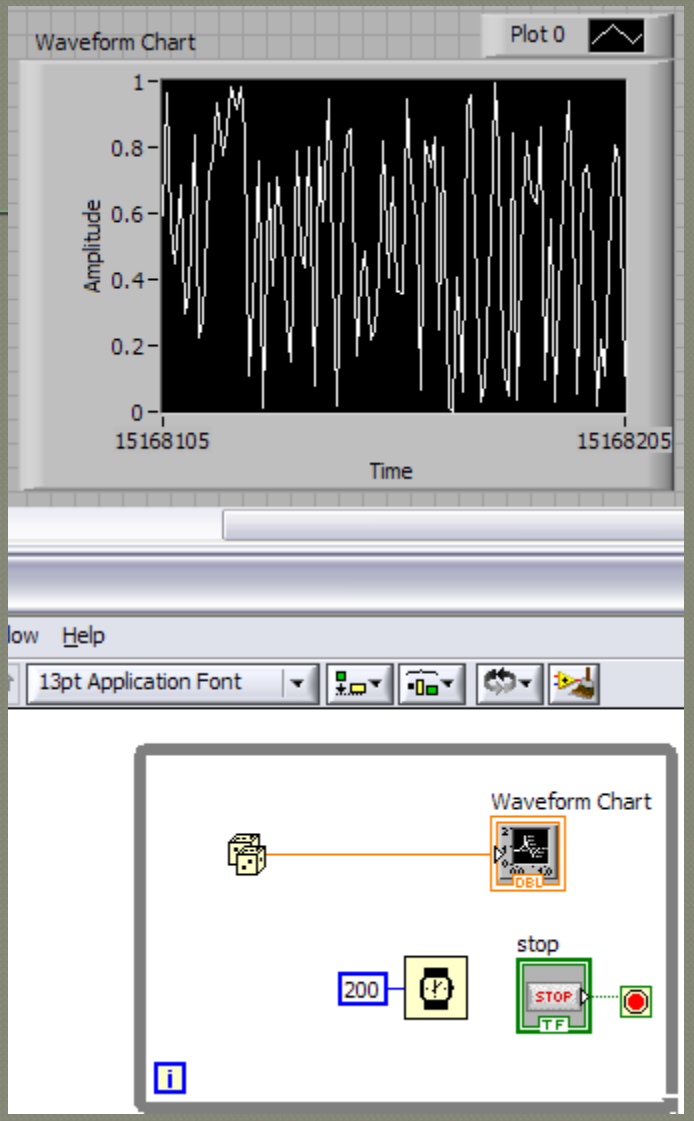
CLAD Question

Q11: Unlike graphs, which display an entire waveform that _____ the data already displayed, charts update periodically and _____ the data previously displayed.

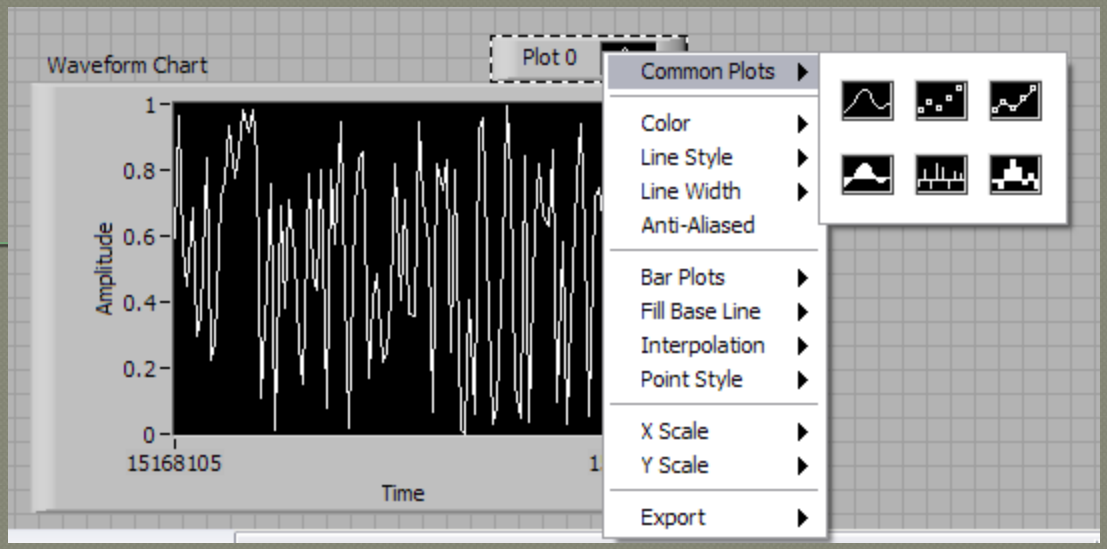
A	Maintains a history of; overwrite
B	Overwrites; maintain a history of
C	Appends to; overwrite
D	None of the above

Charts

This example charts random numbers.



Charts



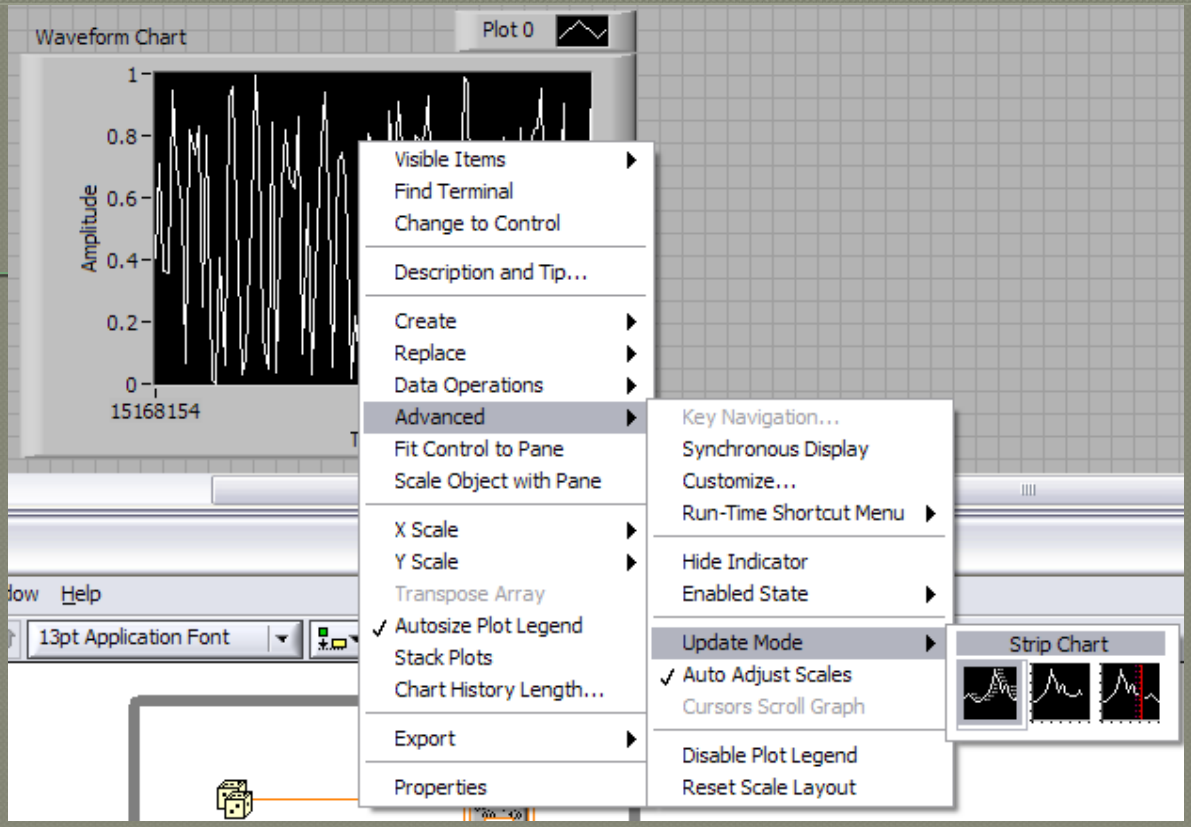
By right-clicking on the legend > Common Plots, you can choose different styles of graphs.

Notice you can also change the color, line style (dotted, etc.), line width. Anti-aliased just smoothes out the lines.

You should play around to see the different options!

Charts

You can also change the update mode (strip chart, scope chart, or sweep chart)



Strip chart moves like a seismometer moves when measuring for tectonic activity. Scope chart charts from left to right and clears screen each time it reaches the right side of the chart (like an oscilloscope). Sweep chart moves a vertical line across and charts (like a electrocardiogram).

CLAD Question

Which chart update mode plots new data from left to right, then clears the chart and plots the newer data ?

a. Strip Chart
b. Scope Chart
c. Sweep Chart
d. Step Chart

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CLAD Question

Which chart update mode should be used to show running data continuously scrolling from left to right across the chart?

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CLAD Question

Which chart update mode should be used to compare old and new data separated by a vertical line? This chart will display similar to an electro-cardiogram (EKG).

a. Strip Chart
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Which chart update mode should be used to compare old and new data separated by a vertical line? This chart will display similar to an electro-cardiogram (EKG).

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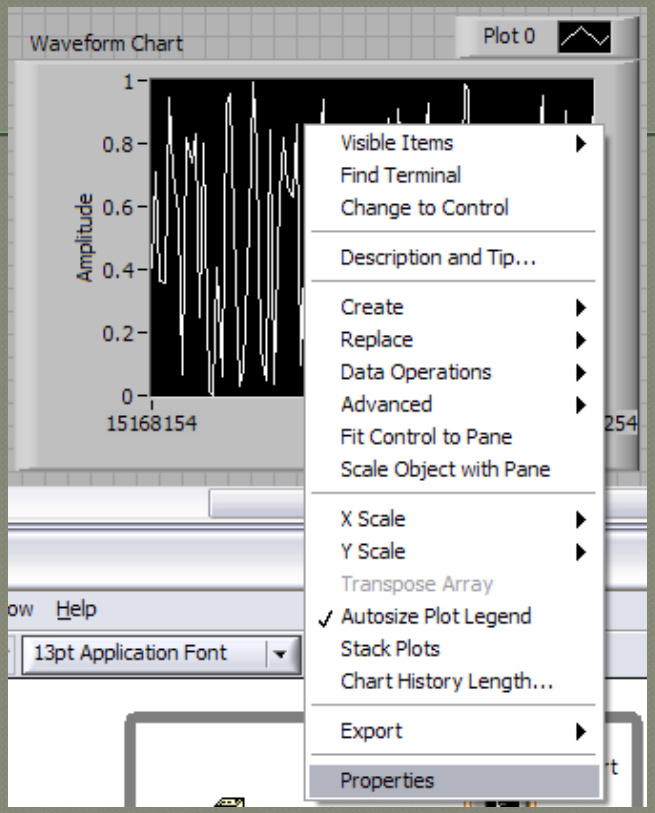
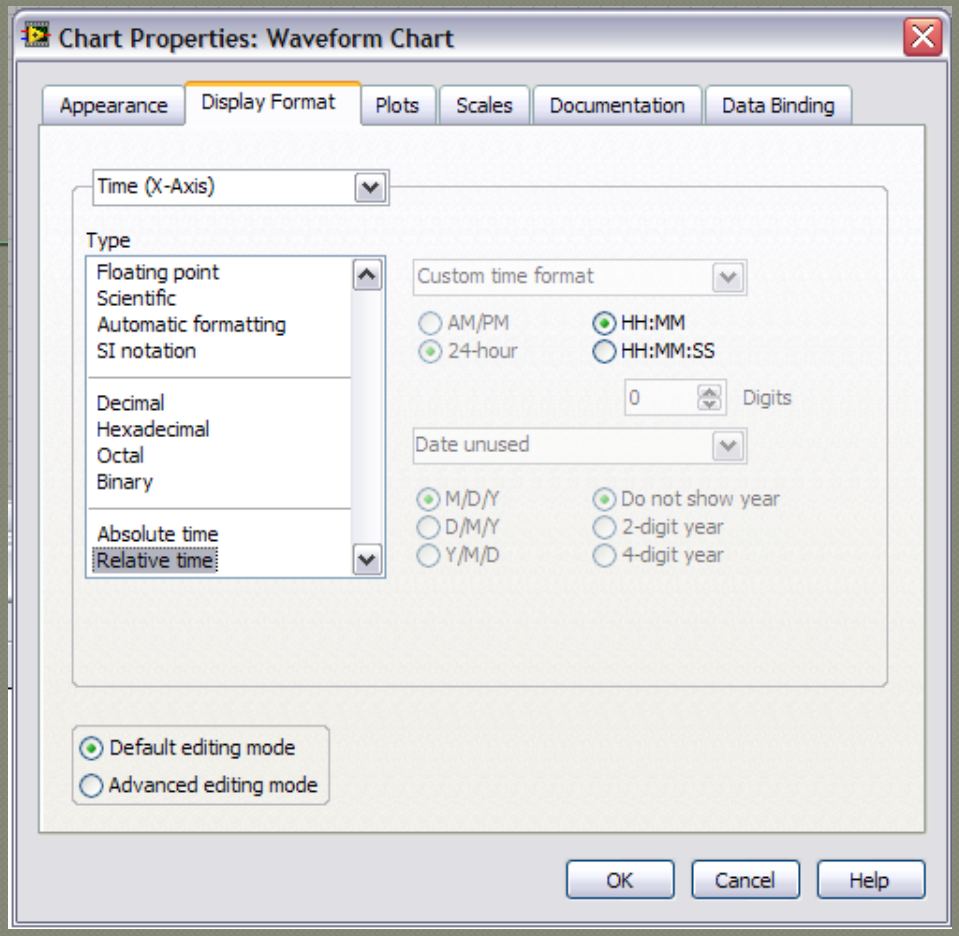
Charts

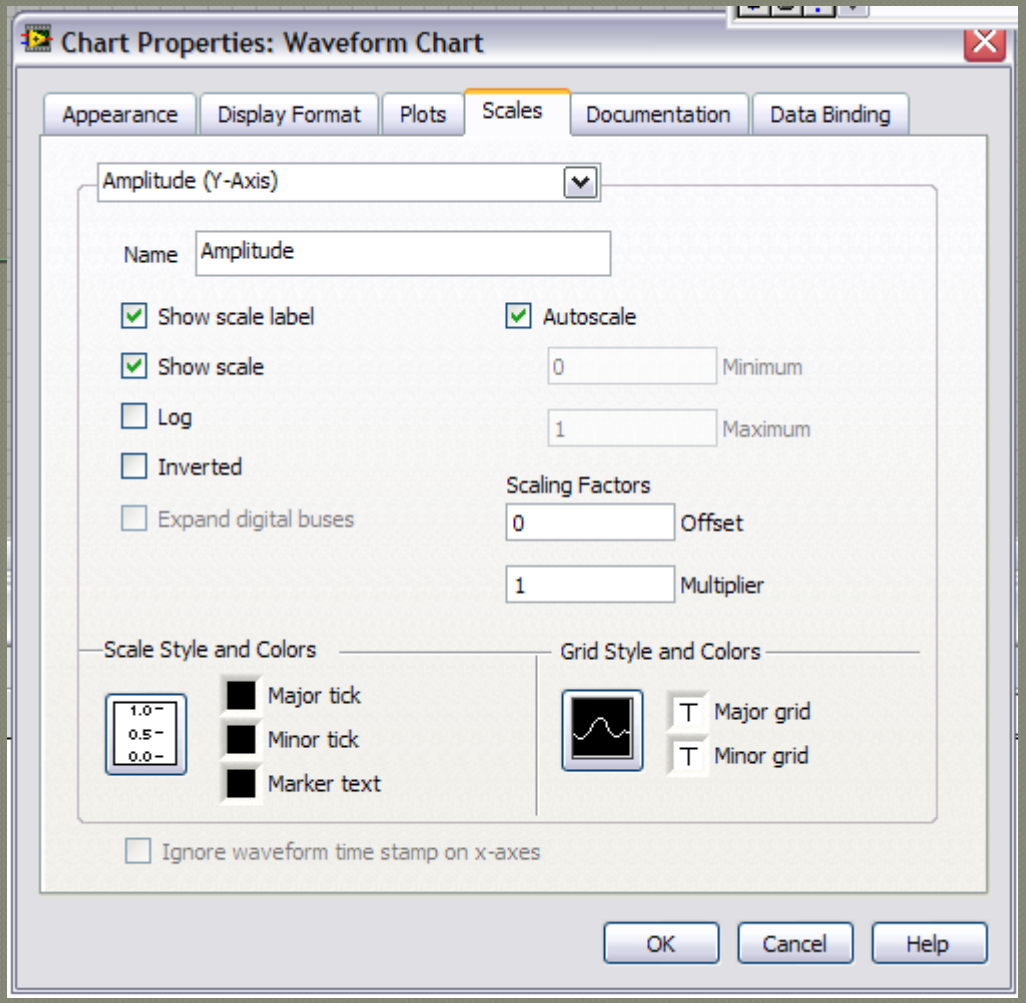




You can also change how the x and y scale display data. It can display time, etc. I like "SI notation" for the y scale!

SI notation displays items like 350m (0.350) or 7M (7000000).

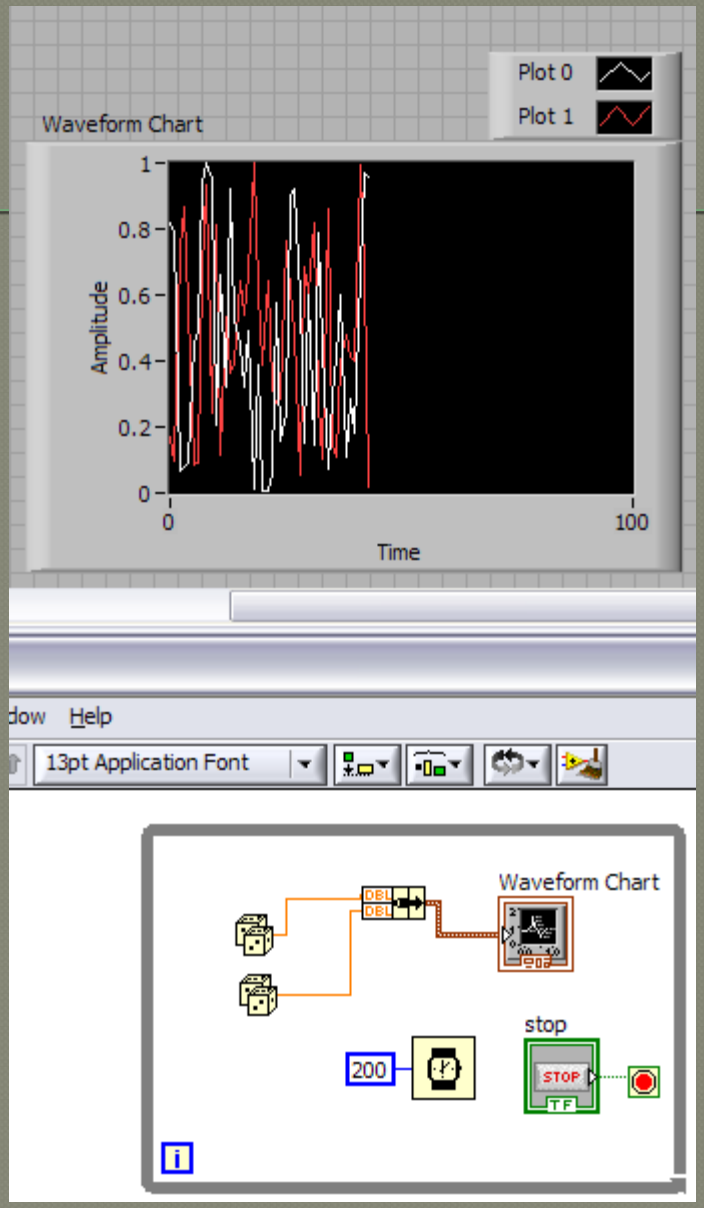
Charts



You can make the scales logarithmic or inverted. You can also manually change the scale instead of using autoscale.

Multiple Charts

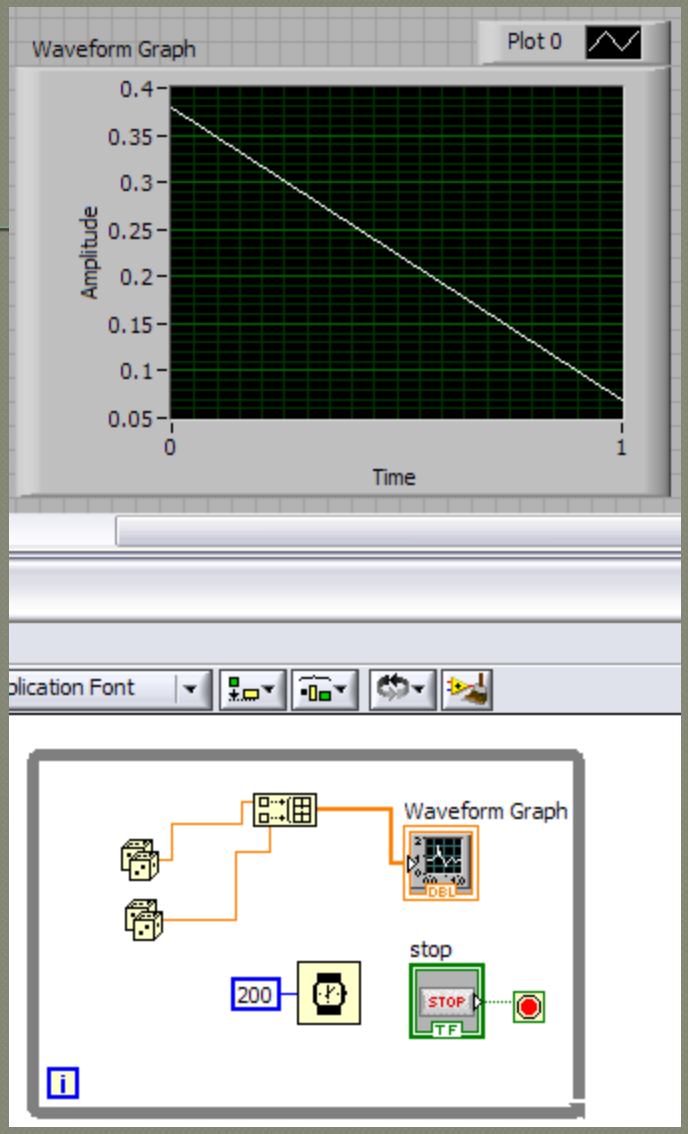
Use "Bundle" vi to display two charts on the same chart. This is different from a graph where you usually "Build Array."



Multiple Graphs

Notice with Graphs I had to change "Bundle" to "Build Array." Also notice that trying to graph in real-time like we did before failed with graphs.

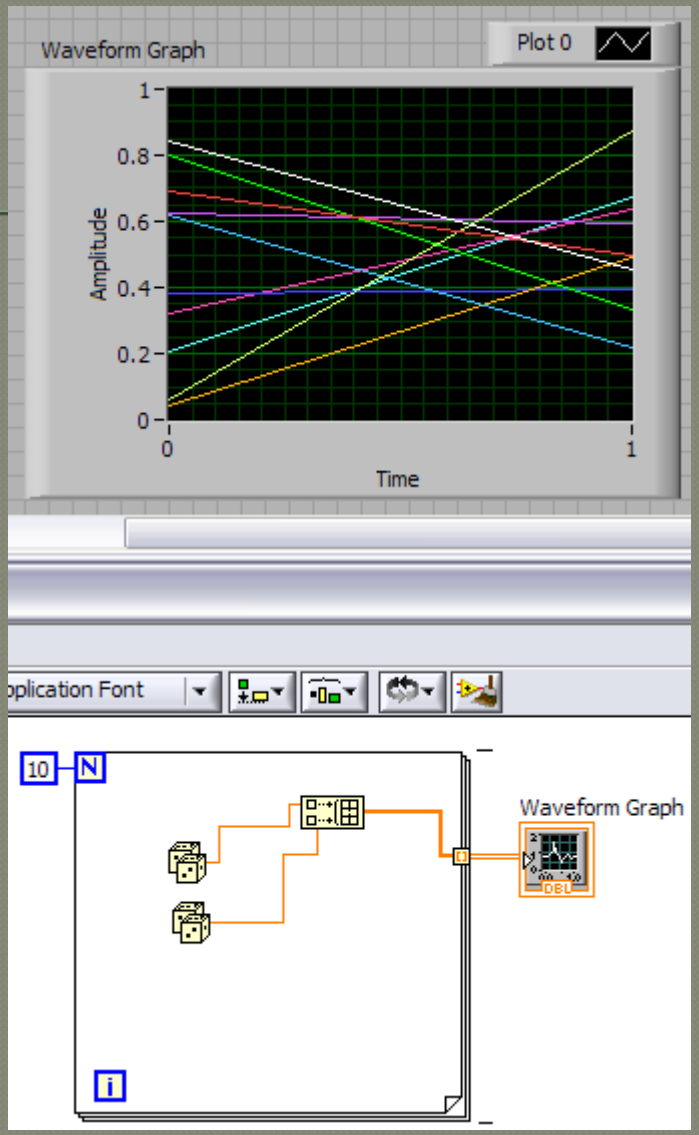
We need to collect all the data first, then send it out to the graph. Let's use a For loop.



Graphs

This is still not correct. I wanted to get 10 data points, not 10 different graphs!

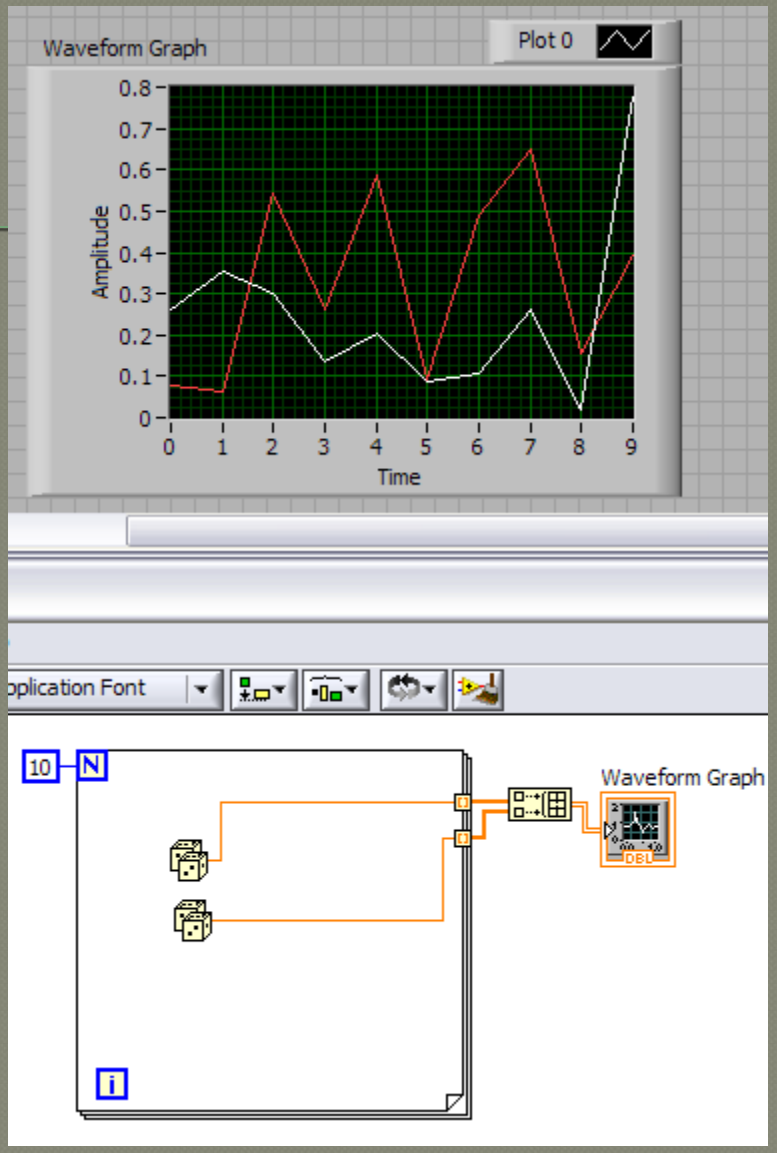
Let's try to make an array of data points, then use the "Build Array."



Graphs

This worked!

I wanted to show in this lecture that the right settings need to be in place to graph correctly. This is why it can be frustrating to use graphs and charts.



Graphs

One last thing . . .

The options you had for Charts (plot styles, line widths, etc.) are very similar to Graphs so I didn't mention them in this lecture.

XY Graphs

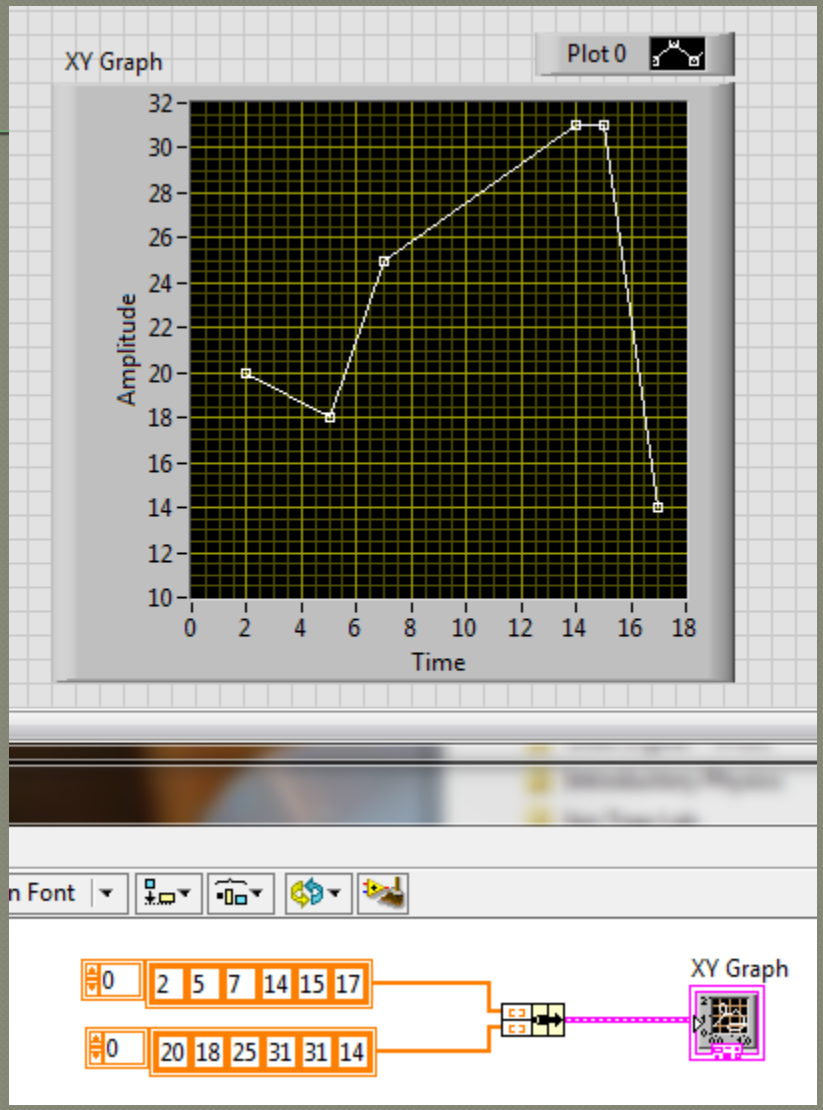
XY Graphs are good to use when the independent variable is not evenly spaced. For example, if you wanted to create a Current vs. Voltage graph for a diode, then XY Graph would be the way to do it.

If you are taking data at even intervals, then you could use a graph. So an XY graph is kind of like graphing in Excel where you have your x and y values.

XY Graphs

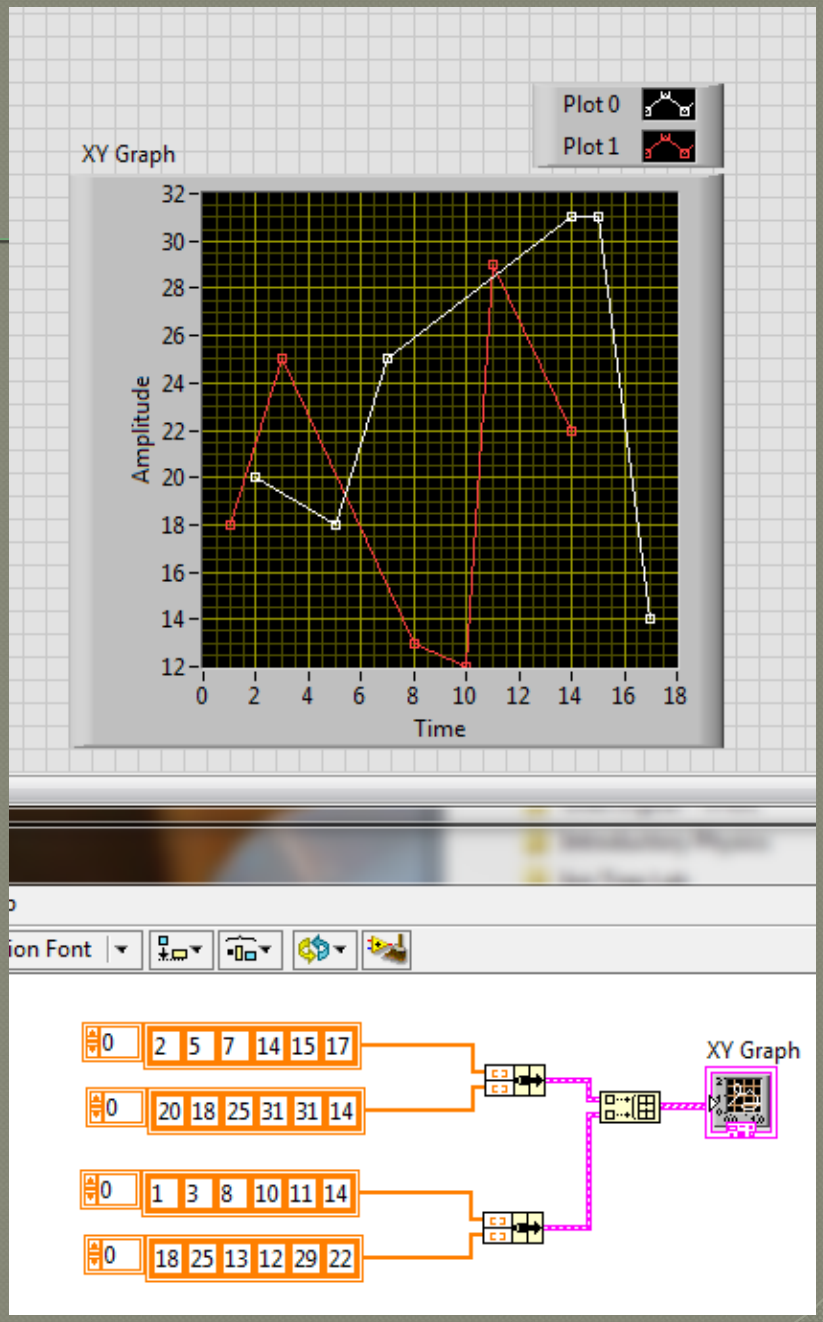
Here is an example of using an XY Graph. Notice that the independent variable *(top values that are feeding into the bundle)* are not at even intervals.

Notice that you have to use "Bundle" for XYGraph (like you had to do for Charts).



XY Graphs

If you want to graph multiple plots, then you "Bundle" first then "Build Array."



CLAD Question

Which of the following methods will create an XY Graph with two plots?

a. Create a single cluster from two arrays of X values and two arrays of Y values in an X,Y, X,Y pattern.
b. Bundle the X and Y array pairs together into two clusters and then create an array of these two clusters.
c. Bundle the X and Y array pairs together into two clusters and create a cluster of these two clusters.
d. Create a single array of each of the X arrays and Y arrays in an X,Y,X,Y pattern.

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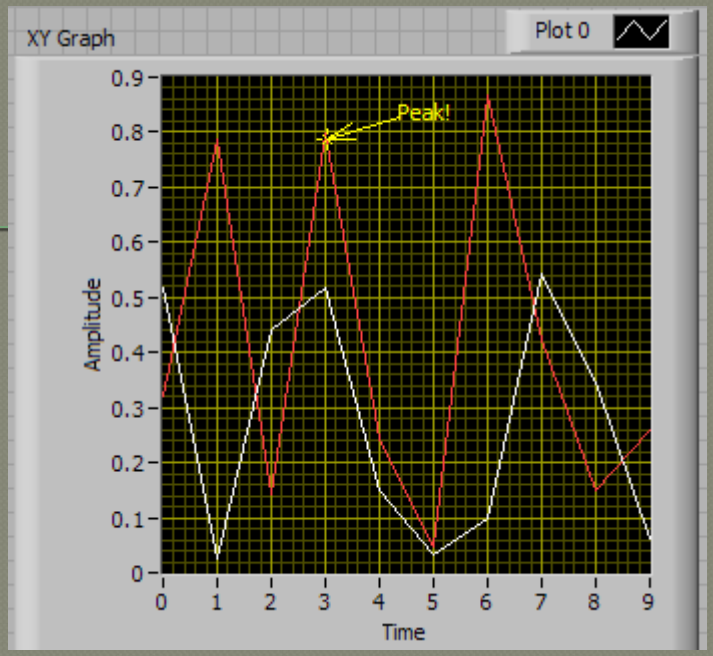
XY Graphs

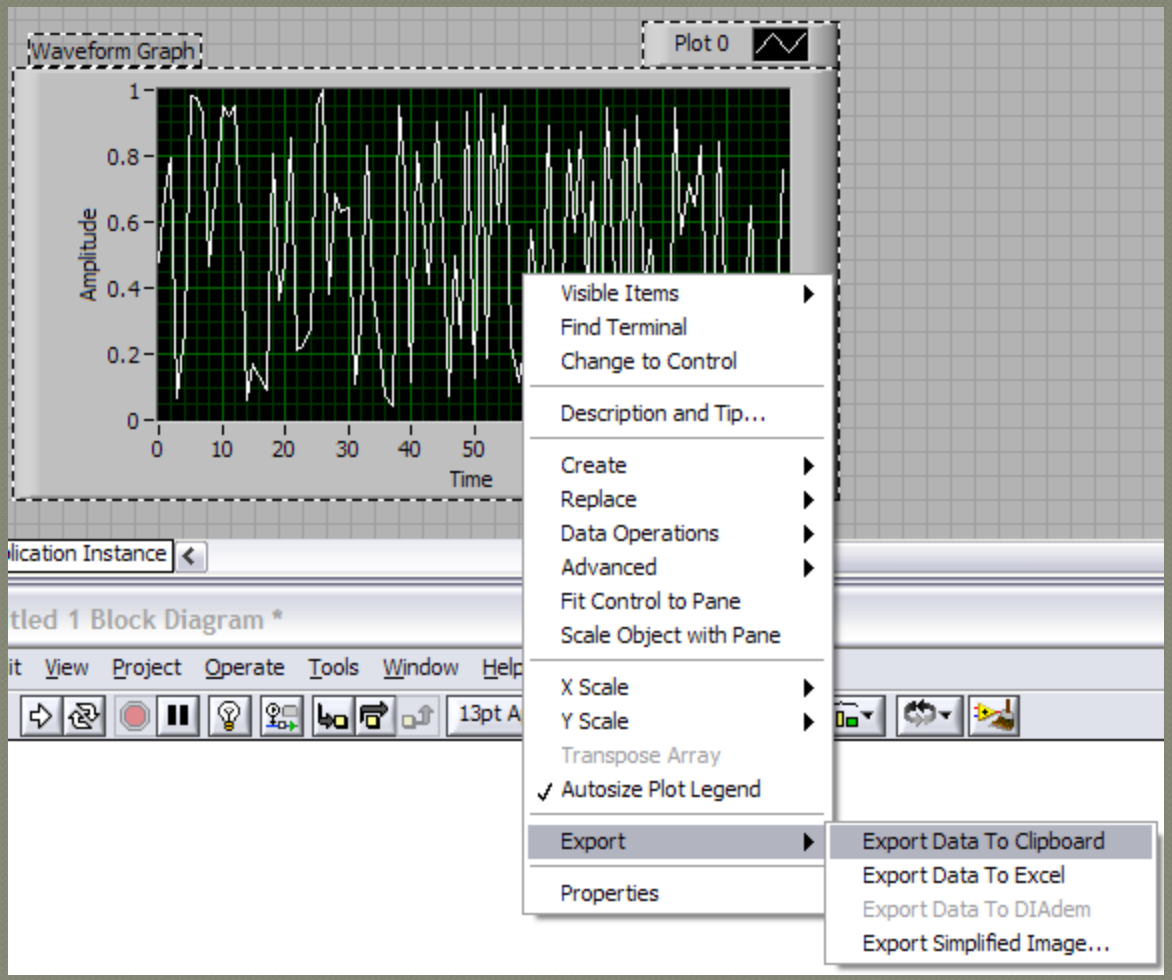


You can also create an annotation on your graph by right-clicking where you want the annotation > Data Operations > Create Annotation . . .

Note: This doesn't detect the peak automatically.

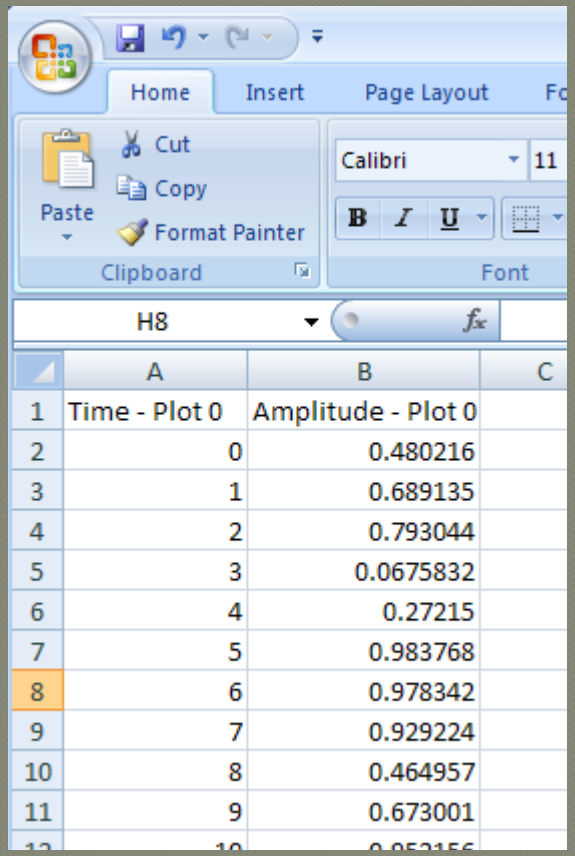
Other Options with Graphs

You can export the data from a graph to Excel or clipboard.



Other Options with Graphs

You can paste this data in Excel.

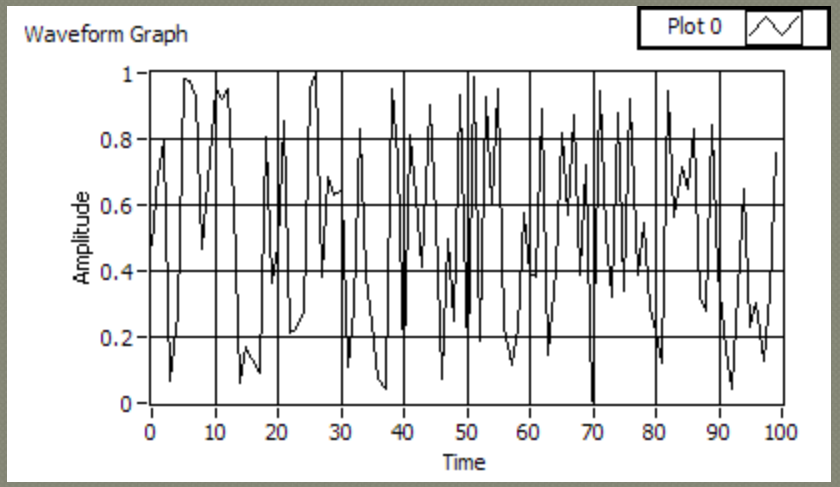


	A	B	C
1	Time - Plot 0	Amplitude - Plot 0	
2	0	0.480216	
3	1	0.689135	
4	2	0.793044	
5	3	0.0675832	
6	4	0.27215	
7	5	0.983768	
8	6	0.978342	
9	7	0.929224	
10	8	0.464957	
11	9	0.673001	

Other Options with Graphs

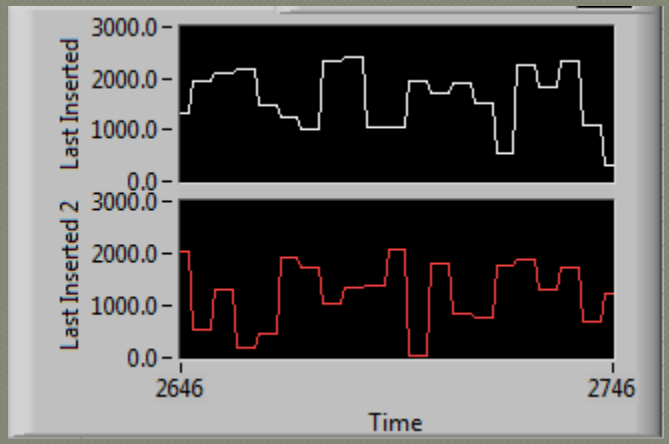
Or you can choose Export Simplified Image and you can paste the data in Word or some other program.

This is a really quick way to display data in a report or email.

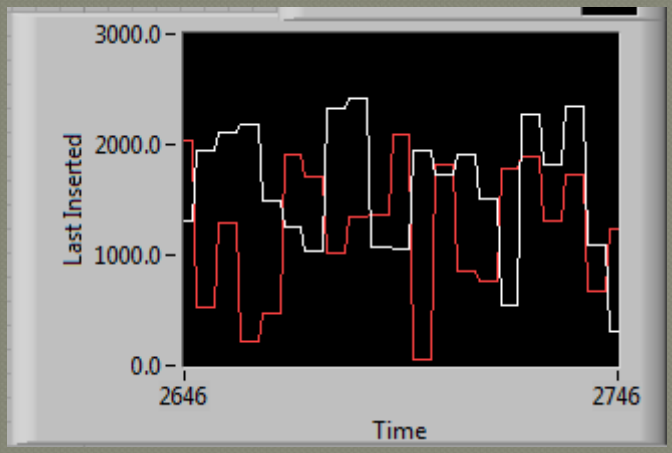


Other Options with Graphs

You can also stack the graphs

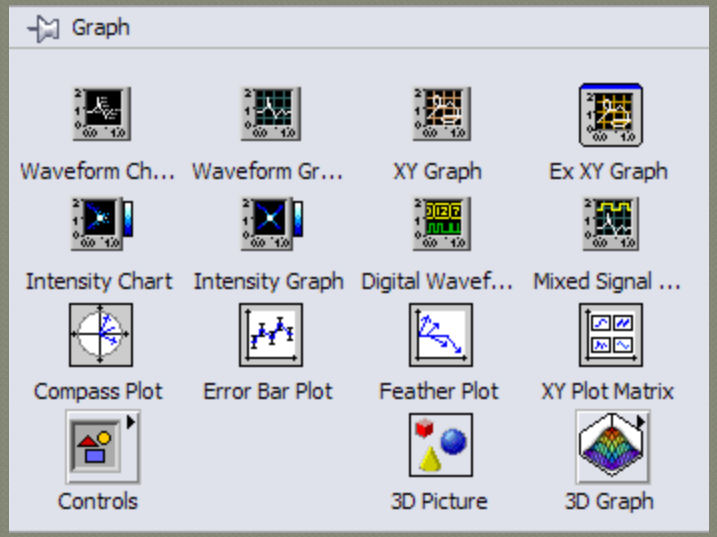


or overlay



just right-click on the graph for this option

Other Graphs



CLAD Question

Which of the following allows you to plot any set of points, evenly distributed or not?

a. Waveform Graph
b. Waveform Chart
c. XY Graph
d. Both A. and C.

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