A Simple Frequency Response Program using LabVIEW

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LabVIEW is an icon-based software allowing control of processes and instrumentation, and creation of virtual instruments (VI’s) on the PC. The LabVIEW programming language is generally easier to write and understand than traditional text-based programming languages.

This project uses the capabilities of LabVIEW to control bench-top test equipment (instruments), for the purpose of making frequency response measurements. These measurements are used in creating a Bode plot on the screen.

Instrument control is achieved through the General Purpose Interface Bus (GPIB). LabVIEW has facilities that interface to instruments through GPIB. The instrument driver in LabVIEW is really just a set of programs which allow the programmer to access the hardware in a functional manner. For example, to set up the function generator to generate a 2.4 kHz sine wave, the following code might be used:

This VI initializes the function generator set to address 10 on the GPIB bus, tells it to output a 2400 Hz sine wave, and then releases the resources so the program can end properly (should always be done as the very last step in your program).

In this project, LabVIEW sets the function generator frequencies, records the oscilloscope voltages, and then uses this data to plot the circuit response. The user determines the range of frequencies to be tested, the number of data points within this range, and the amplitude of the test signal.

A good starting point for this program is the Frequency Response.vi example found in the Search Examples / I/O Interfaces / GPIB category from the main start page of LabVIEW. This example provides a simulation of this type of program. You may incorporate appropriate sections of this code in your implementation.
A program has been written that uses the auto-scale function of the oscilloscope and the sample framework mentioned above. You should have the same features on your program. The front panel of this program is shown below: