# User Manual

for

Keysight DSO X3012T Oscilloscope

Bode Plots

This scope can make Bode plots. The internal function generator on the scope (BNC connector below and to the left of the screen) and both Ch1 and Ch2 are used. (Do not use the laboratory bench function generator.) Both the internal function generator and Ch1 are connected to the input of the circuit for which the Bode plot is desired. Ch2 is connected to the output.

Press the Default Setup button (just below the green illuminated Run/Stop button.) Connect the output of the internal function generator) [BNC to the left and below the display] to the input of the circuit. Also connect the Ch1 input to the input of the circuit. Connect Ch2 to the output of the circuit. Press the Analysis buttton on the scope (located to the right of the display next to the illuminated button). Press the Features button below the display. Rotate the Press to Select button until it is on FRA (Frequency Response Analysis [Keysight's term for Bode Plot]. Press the Press to Select button. Press the Open Dialog button below the screen on the left. (These scope are touch screen. The next steps can be done by touching the screen or if a USB mouse is available insert it into the USB connector on the front of the scope and the selection can be done with the mouse.) Set the Start and Stop frequenies to values that will adequately display the Bode plot of the circuit. Next, press Run Analysis and wait while the scope sweeps the frequency. There are cursors on the plot located are the start frequency. Use the mouse or finger to position the cursor so frequencies of interest.(drag to the desired frequency). Plot the display using the lab software and include it in the lab report.

Below is a typical Bode Plot made by this scope. Note that the blue trace is the magnitude in dB and the pink is the phase in degrees.
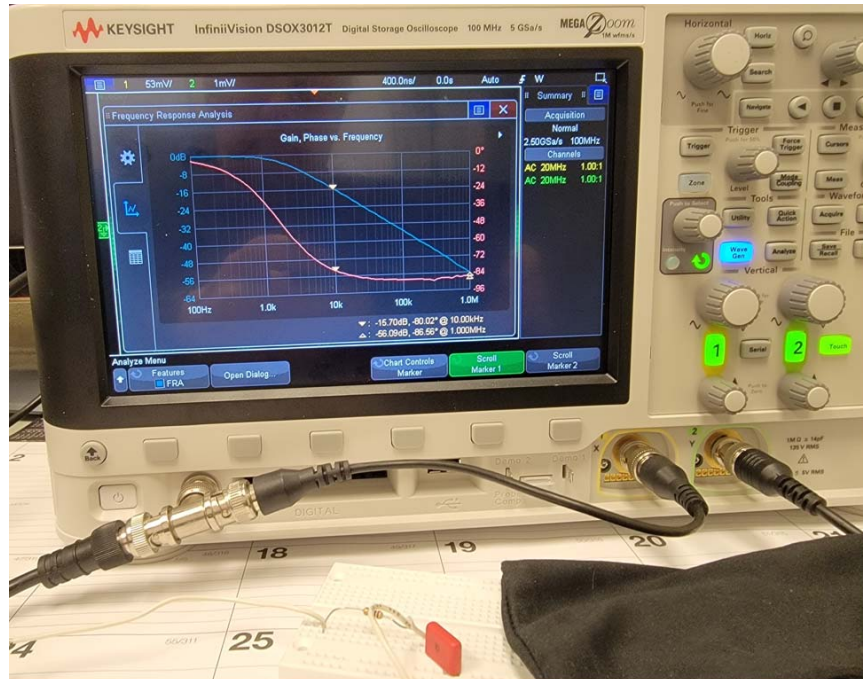
The Function Generator and the Ch1 input have been connected together with a T connector. If no T connector is available use seperate BNC to gator connectors. Connect the internal Function Generator output of the scope to the input of the circuit and the Ch 1 input to the input of the circuit. Also connect Ch2 of the scope to the output of the circuit. The Bode Plot shown is for a first order passive low pass filter. The cursons have been move to the - 3dB filter.