

DG291: Creative Electronics

Workshop introducing equipment and measurement techniques

Learning how to use the oscilloscope and function generator by observing and measuring waveforms.

Assignment 1:

Connect the 'main' output of the function generator to the 'A/yellow' input of the scope, the generator's 'sync/aux' output to the 'B/blue' input of the scope. Use two so-called 'BNC' cables. For a start let the generator's main output produce a symmetrical (referred to zero Volt) sine wave of 2V top-top / 1 kHz.



Now carefully study the operation of the control functions (of the scope and generator) indicated hereafter **one by one**. Try to perform some measurements on the waveforms. Check the scope tutorials published in the assignment's Wiki page. **Be aware that some controls may have slightly different names or appear not to be present on the scope or the generator you're working with. Don't hesitate to ask for help if anything is unclear to you.**

oscilloscope

Vertical sensitivity (Scale or Volt/DIV)

Vertical position (Position)

Input coupling (AC/DC/Ground)

Horizontal control (Scale or Time/DIV)

Horizontal position (Position)

What is 'triggering'?

Triggering: on which input: (A or B)

External triggering (ext)

Triggering on the pos. or neg. edge (+/-)

Triggering: level adjustment (Level)

Auto triggering (Auto/force)

Zoom controls

Acquire: acquisition modes

Run/stop and Single

Performing measurements

function generator

Amplitude mains output (AMPLITUDE)

Adding a DC level (DC OFFSET)

Range frequency control (RANGE)

Fine control frequency (FREQUENCY)

Waveform type control (FUNCTION)

Range control mains output voltage (VOLTS OUT)

Waveform invert (INVERT)

Frequency modulation (SWEEP int/ext)

Speed of modulation (SWEEP RATE)

Modulation depth (SWEEP WIDTH)

Duty cycle waveform (DUTY)

TTL level defined output (SYNC)

Assignment 2:

Connect the 'main' output of the function generator to one of the inputs of the scope and to the input of your multi-meter as well. If available use a BNC T-piece, BNC cable and BNC-to-Banana cable and/or a BNC-to-Banana adapter.



Let the generator's main output produce a symmetrical (referred to zero Volt) sine wave of 2V top-top / 1 kHz measured by using the oscilloscope.

1. Now write down what the multi-meter (AC volt position) is reading. Compare oscilloscope and multi-meter's readings. Explain !!!
2. Increase and decrease the frequency (roughly between 100Hz and 10000Hz) of the waveform and keep comparing oscilloscope's reading with the multi-meter one. Explain !!!
3. Again adjust the output to 2V top-top / 1 kHz. Next connect a 47 Ohm resistor in parallel to the generator's output. Notice how this resistor affects the level of reading. Explain !!!

Assignment 3:

Start working on the CE reader's practical assignments 1 and 2 : 'analyzing resistive networks' and 'calculating, building and testing filters'. Ask if you need any help.