

AME 20213 Spring 2013: Function Generator and Oscilloscope Tutorial

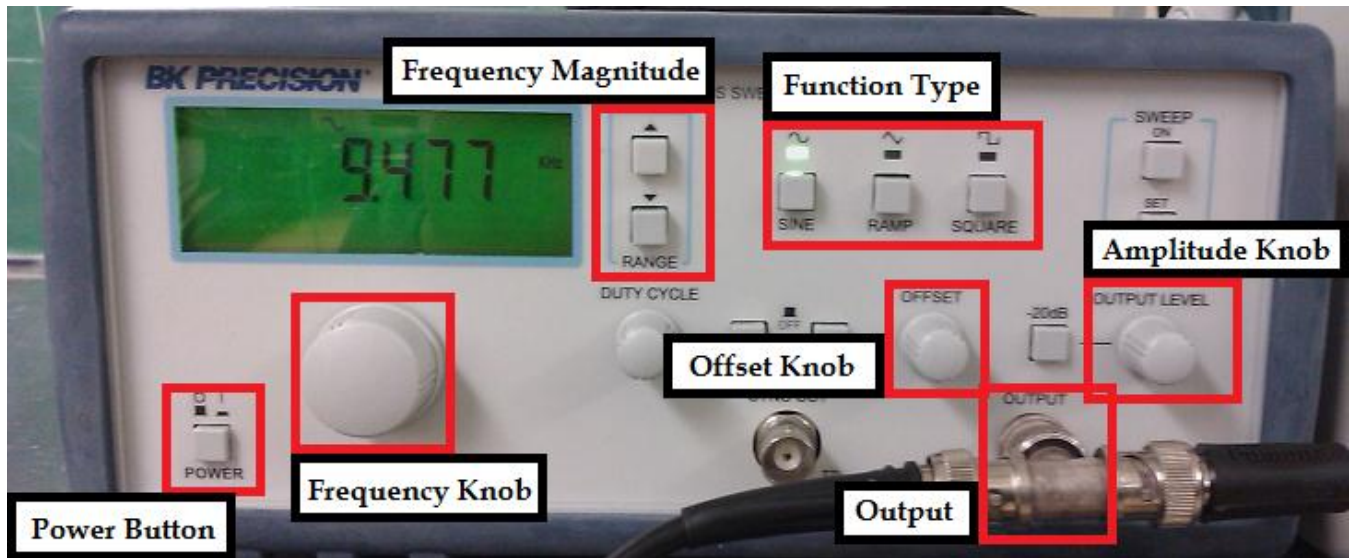


Figure 1. Function Generator Layout

Frequency Knob: Clockwise increases frequency, counterclockwise decreases frequency. The current frequency is displayed above the knob. (The current frequency is 9.477 kHz)

Frequency Magnitude: The two buttons labeled “RANGE” changes the magnitude of frequency by a power of 10.

Function Type: Changes the type of function generated. Push the button labeled “SINE” for sinusoids.

Offset Knob: Clockwise increases offset, counterclockwise decreases offset.

Amplitude Knob: Clockwise increases amplitude, counterclockwise decreases amplitude. The magnitude of the amplitude can be viewed on the oscilloscope.

Output: Output channel for generated signal; connect to input channels of other devices

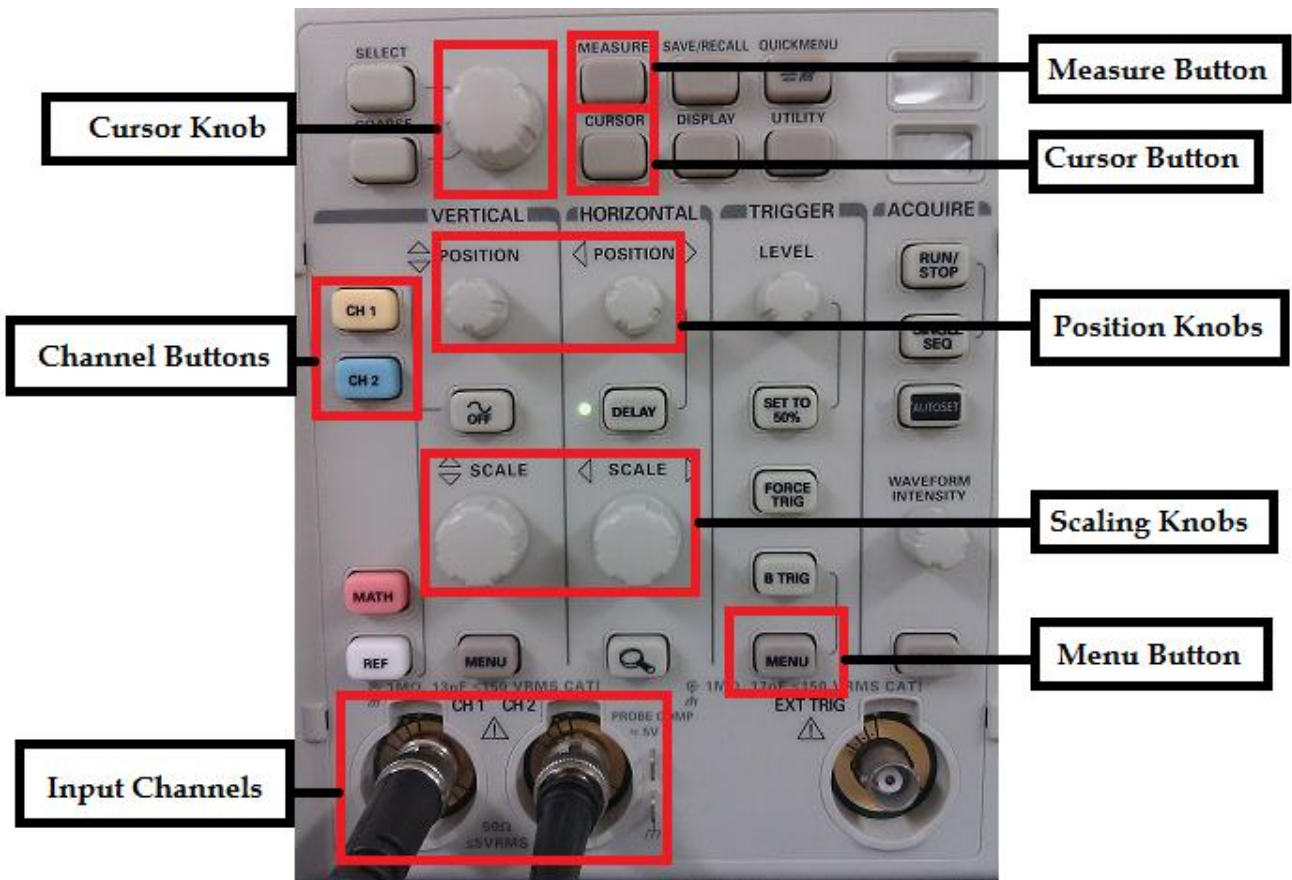


Figure 2. Oscilloscope Layout

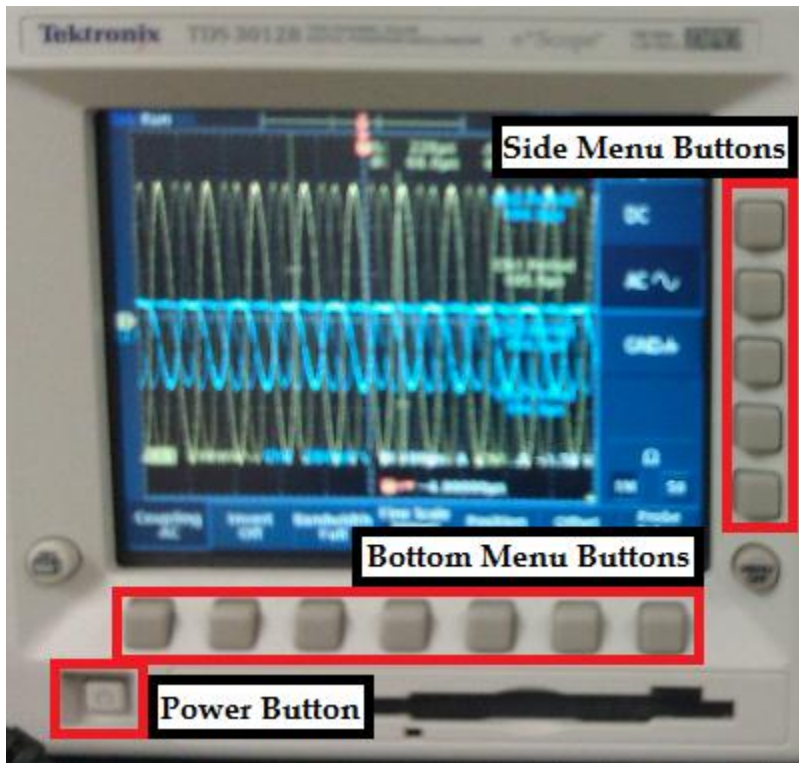


Figure 3. Oscilloscope Screen Layout

Reading Signals with Oscilloscope: The oscilloscope can read 2 channels of input simultaneously. If signals are not visible on screen, push the CH1 and CH2 channel buttons shown in Figure 2. Yellow corresponds to channel 1 input, and blue corresponds to channel 2 input. For clipped inputs from function generators, adjust the offset knob on the function generator.

The scaling knobs can be used to vertically/horizontally expand/compress the signals on screen. The left knob scales vertically; the right knob scales horizontally. Clockwise rotation expands the signal, and counterclockwise rotation compresses the signal.

The position knobs shift the signal. Make sure to select the desired channel with the corresponding channel button before shifting the signals. The left knob shifts vertically; the right knob shifts horizontally. Clockwise corresponds to up and right shifts; counterclockwise corresponds to down and left shifts.

Freezing the Frame: To freeze the frame on the screen, first push the menu button in the “TRIGGER” column of the oscilloscope. There are three buttons labeled “MENU.” Note that the desired menu button is directly below the button labeled “B TRIG.” The following menu should appear along the bottom of the screen.

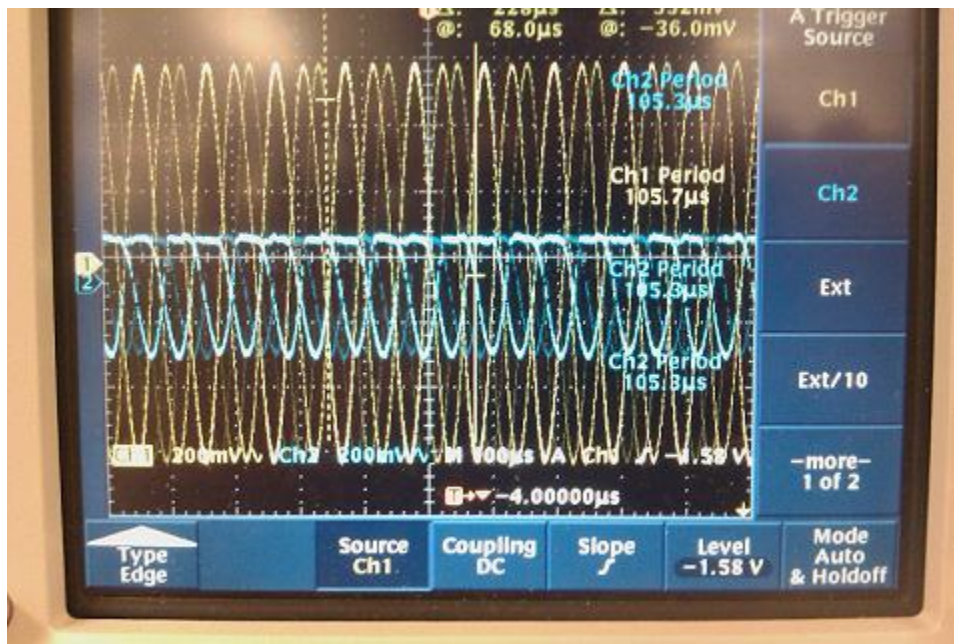


Figure 4. Trigger Section MENU Button Menu.

Use the bottom menu buttons to select “Mode Auto & Holdoff,” and then use the side menu buttons to select “Normal.” To unfreeze the frame, select “Auto (Untriggered Roll)” using the side menu buttons.

Cursors: Cursors can be used to measure the difference between two points of a signal. This may be useful for obtaining information such as period or amplitude. First, scale and shift the signal(s) of interest and then freeze the frame on the screen. Select the desired channel for measurements with the corresponding channel button. Push the cursor button and select “V Bars” from the side menu. Then select “Bring Both Cursors On Screen” from the side menu. Two vertical lines should be visible on the screen, one solid and one dashed. On the bottom menu, select “Mode Ind.” Two modes should appear on the side menu, “Independent” and “Tracking.” Use the tracking mode to move both the dashed and

the solid lines, and use independent mode to move just the solid line. The cursors can be moved with the cursor knob. At the top of the display screen, the difference in time and voltage between the signal measured at the dashed and solid cursors can be read. Horizontal lines can be used by selecting “H Bars” from the cursor menu instead of “V Bars.”

Measurements: An alternative measurement method uses the measure button. For example, to display the period information on the oscilloscope screen, first push the measure button to bring up the measure menu. Select the desired channel with the corresponding channel button and select “Period” on the side menu. If “Period” does not appear on the side menu, select the “Select Measrmt for Ch1” (or Ch2) option on the bottom menu. The information for period should appear on the oscilloscope screen. A handy tool that might come in handy is the “Snapshot All Measurements” option in the measure menu. Select the desired channel before selecting this option on the side menu and after pushing the measure button.



Figure 5. Snap Shot of All Measurements