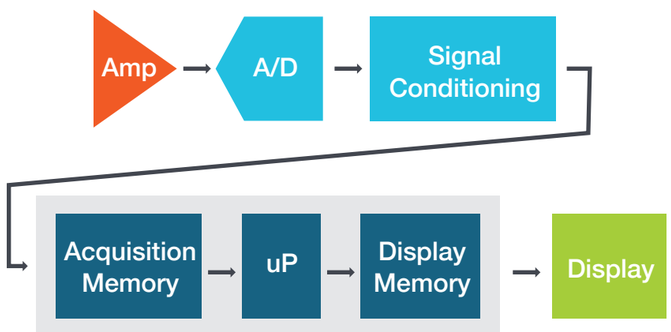
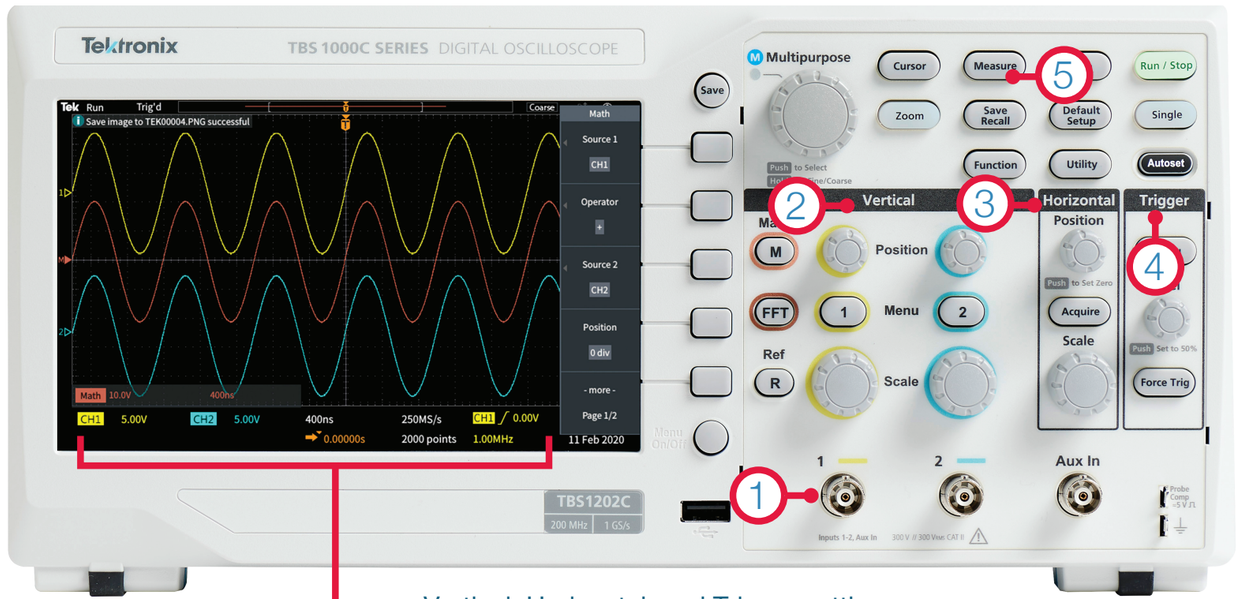
Oscilloscope Fundamentals | Capturing Your Signal

Tektronix®

What is an oscilloscope anyway ?

An oscilloscope is a diagnostic instrument that plots the amplitude of an electrical signal as it changes over time. Picture below shows the block diagram of an oscilloscope.





Avoiding Pitfalls

- **No Signal:**
  a. Is the channel / DUT turned on?
  b. Is the waveform off the screen? Try adjusting the vertical position / scale.
  c. Is the instrument waiting for trigger? (Is it displaying "Ready"?) Verify trigger source; try adjusting the trigger level, forcing a trigger or switching to auto mode.
- **Aliasing:** If the frequency of the signal on the screen seems too low, or it is difficult to get a stable waveform on the screen, adjust horizontal scale to increase the sample rate.
- **Unexpected measurement results:** Verify that probe is compensated, verify measurement settings such as ref levels and gating, verify the probe attenuation.
- **No stable signal:** Verify trigger source, trigger level.

Step 1: Probing

Connect the instrument to circuit

1.	Connect the probe to the input channel of the instrument.
2.	Check probe compensation: Attach the probe tip to the probe compensation test point on the instrument. Adjust the probe compensation until you see a clean square wave on the screen.
3.	Connect probe ground to the circuit ground and probe tip to the signal you want to view / measure.

Step 2: Set Vertical Scale

Set the total amplitude to be displayed on the screen

Scale	Adjusts the size of the waveform on the screen per channel, a larger waveform gives better measurement resolution.
Position	Moves the waveform up and down on the screen.
Attenuation	Sets the maximum voltage that can be displayed; scope attenuation setting needs to match probe attenuation.
Input Coupling	Use DC coupling to see all the input signal. Use AC coupling to see only the AC signal riding on top of a DC offset.

Step 3: Set Horizontal Scale

Set the total time to be displayed on the screen

Scale	Sets the amount of time displayed on the screen for all channels.
Position	Moves the waveform left or right on the screen.

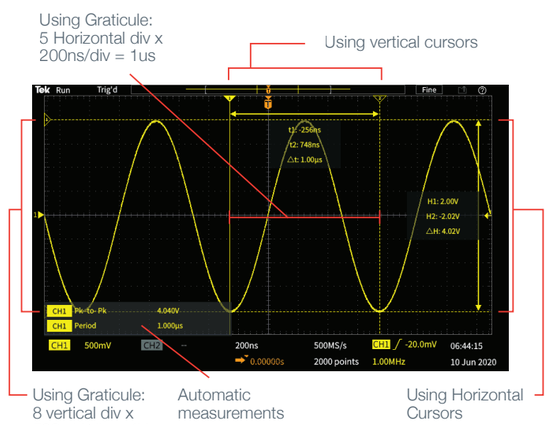
Step 4: Trigger Settings

Stabilize the waveform on the display

Source	Select which input signal is compared to the trigger settings.
Type	Edge trigger is the most commonly used trigger type; trigger on rising or falling edge, pulse width and runt are other trigger types available.
Level	Determines the voltage level on the input signal at which the trigger occurs.

Step 5: Measurements

Measure voltage and time characteristics of signals



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