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Section: H

**Oscilloscope:**

An oscilloscope is an instrument that graphically displays electrical signals and shows how those signals change over time. It tests and display voltage signals as waveforms, visual representations of the variation of voltage over time. The signals are plotted on a graph, which shows how the signal changes. Here, the vertical (Y) axis represents voltage and the horizontal (X) axis represents time. It measures voltage waves. It does this by measuring the voltage drop across a resistor and in the process draws a small current. The voltage drop is amplified and used to deflect an electron beam in either the X (horizontal) or Y (vertical) axis using an electric field. It consists of three different systems – the vertical system, horizontal system, and trigger system. Each system contributes to the oscilloscope's ability to accurately reconstruct a signal. The front panel of an oscilloscope is divided into three sections labeled Vertical, Horizontal, and Trigger. These systems provide information about the electrical signal. The first stage attenuates or amplifies the signal voltage in order to optimize the amplitude of the signal; this is referred to as the vertical system since it depends on the vertical scale control. Then the signal reaches the acquisition block, where the analog-to-digital converter (ADC) is used to sample the signal voltage and convert it in a digital format value. The horizontal system, which contains a sample clock, gives each voltage sample a precise time (horizontal) coordinate. The sample clock drives the ADC and its digital output is stored in the acquisition memory as a record point. The trigger system detects a user-specified condition in the incoming signal stream and applies it as a time reference in the waveform record. The event that met the trigger criteria is displayed, as is the waveform data preceding or following the event. There are two types of oscilloscopes: analog and digital. An analog oscilloscope captures and displays the voltage wave form in its original form, while a digital oscilloscope uses an analog-to-digital converter to capture and store information digitally. Here, the main mechanisms are:

a) we must set the oscilloscope to the display channel 1

b) we must set the vertical volts and position controls to mid-range positions

c) we must turn off the variable voltages

d) we must turn off all magnification settings

e) we must set the channel 1 input coupling to DC

f) we must set the trigger mode to auto

g) we must set the trigger source to channel 1

h) we must set the horizontal time and position controls to mid-range position.

Most oscilloscope have a square wave reference signal available at a terminal on the front panel used to compensate the probe. Here, we follow these instructions:

a) Attach the probe to a vertical channel

b) Connect the probe tip to the probe compensation, i.e., square wave reference signal

c) Attach the ground clip of the probe to ground

d) View the square wave reference signal

e) Make the proper adjustment on the probe so that the corners of the square wave are square.