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# Experiment 2

## Introduction to Electronic Test Equipment

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### 1.0 Objective

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In this experiment, you will become familiar with the rest of the test equipment in the laboratory and will become reasonably adept at using the HP 54615B oscilloscope to perform DC and transient measurements.

### 2.0 Procedure

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#### 2.1 Oscilloscope and Signal Generator

1. Use "PROBE ADJUST" signal (under the "beam find" button) to insert a 1 kHz, 5 V p-p (peak to peak) square wave into the first input, Ch1. Set that channel for AC coupling. The waveform should be 5 divisions high on the 1V/div scale. If the waveform looks very distorted, adjust the probe using a screwdriver.

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#### Lab Tip

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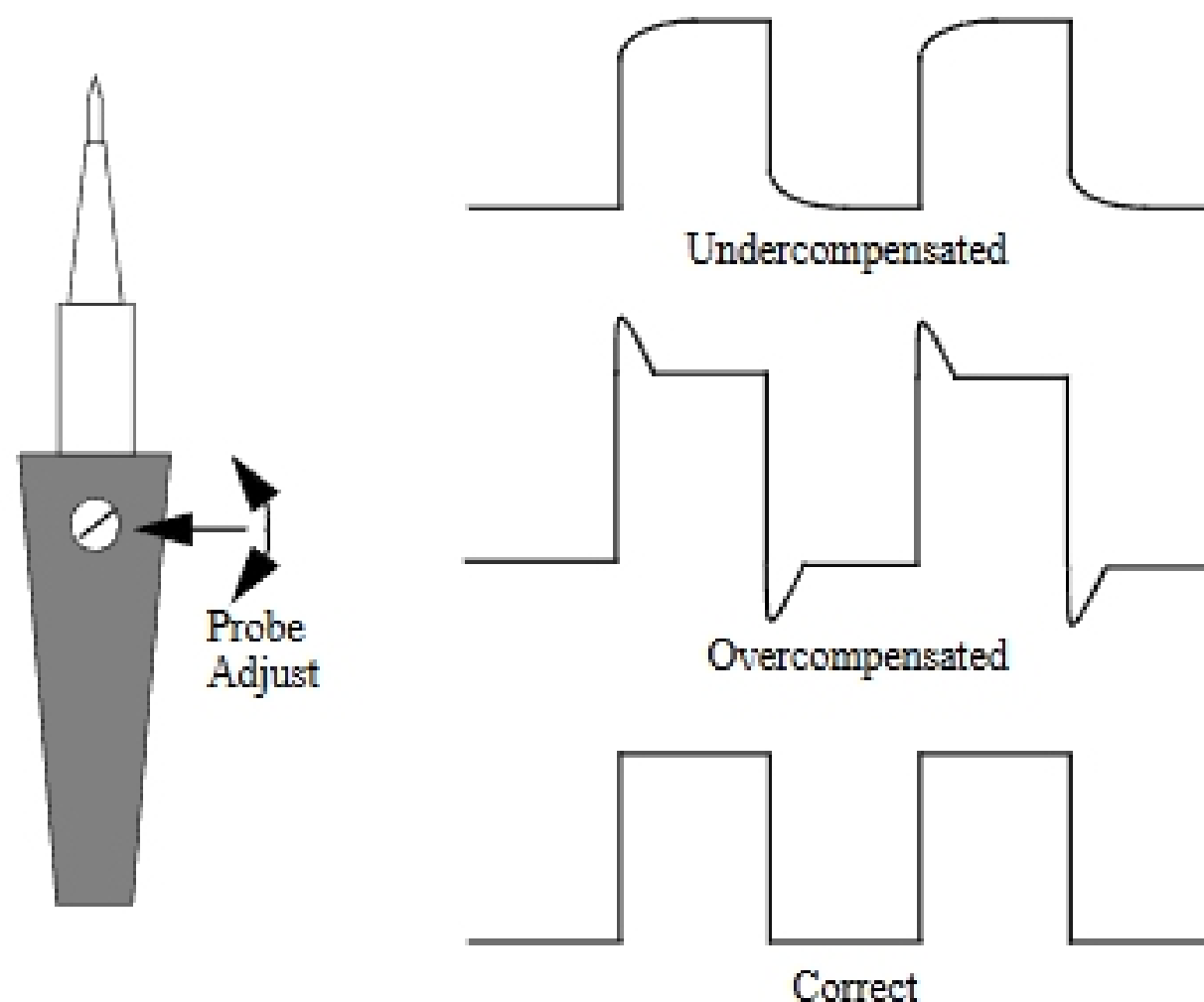
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The probes that come attached to the oscilloscopes are 10x probes. Readings should be read from the 10x markings. All other cables are 1x cables and results should be read using the 1x markings.

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FIGURE 1.

Effects of adjusting the Probe Adjust screw on test waveform. (Note that adjustment is not normally necessary.)



2. Repeat these steps for the second channel, Ch2.
3. Now connect a DC power supply to the vertical input and vary its voltage. Check the accuracy of the panel meter on the power supply using the scope readings. What is the maximum voltage the supply will produce? How accurate is the power supply's panel? Can this experiment be done with the vertical input on AC mode? why or why not? What is the difference between DC and AC coupling?
4. Now connect the HP 8116A signal generator to the vertical input. Set the generator to an arbitrary frequency and determine the accuracy of the generator's display by comparing the period of the sinusoid on the scope with the period of the sinusoid on the display. Play around with different frequencies and amplitudes. How closely do the two measurements agree? What is the maximum peak-to-peak amplitude available from the generator? The minimum? Vary the *TRIGGER LEVEL* control and note the effect on the waveform. What is happening?
5. Set the generator to output a pulse. Compare the period and frequency readings on the generator controls to those actually observed on the scope. What is the shortest pulse width (in seconds) that you can generate? The longest? (Note that this may depend on the frequency.)

## 2.2 Triggering

Unless specified otherwise, set the triggering source to the input you are examining, and use “auto” triggering.

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### Lab Tip

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You will always be using the HP 8116A in *Normal Mode*. The unit saves the settings each time it is turned off. To ensure that the signal generator is operating properly make sure:

- The following lights are **OFF**: [AUTO], [LIMIT], [COMPL] and [DISABLE].
- Always operate the generator with the **AMP** and **OFS** instead of **HIL** and **LOL**.
- **DTY** setting should be 50

All other lights should be off, for further explanation, see the HP 8116A manual.

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