



Active versus Passive Probing

By: Hewlett-Packard Company

Purpose:

Compare Active versus Passive probing.

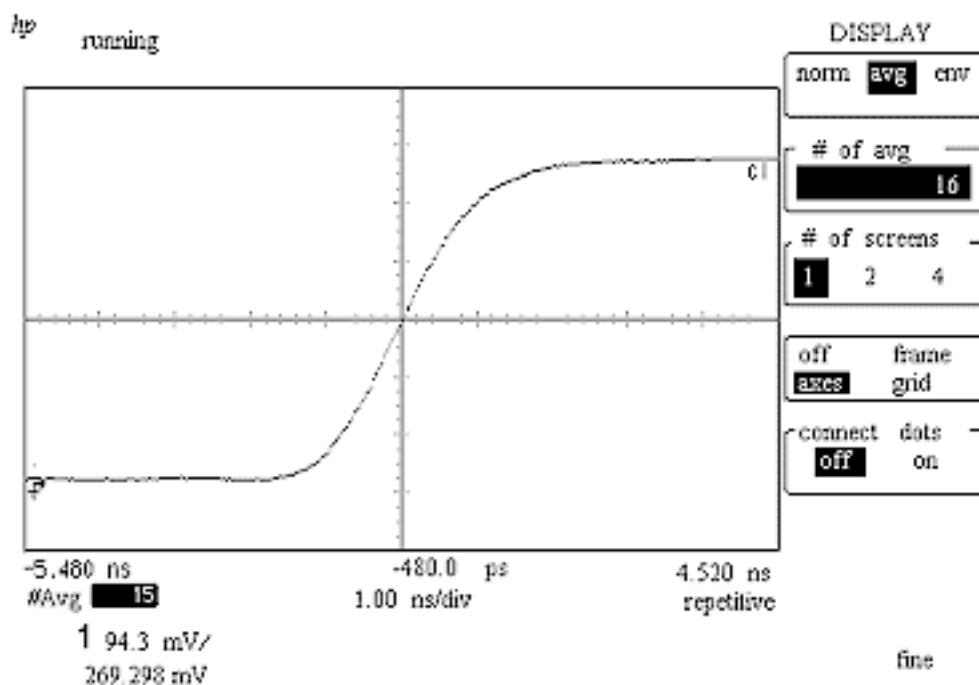
A probe's input capacitance (sometimes called tip capacitance) will slow down the system's pulse response. Usually the least input capacitance possible is best. In this lab, we'll compare the rise time and propagation delay effects of the passive (1 megohm/ 6.5pf) and the HP 1144A active (1 megohm/2pf) probes.

Note! Close switch #2 only of S1 on the HP 54720-66506 Demo board.

Equipment:

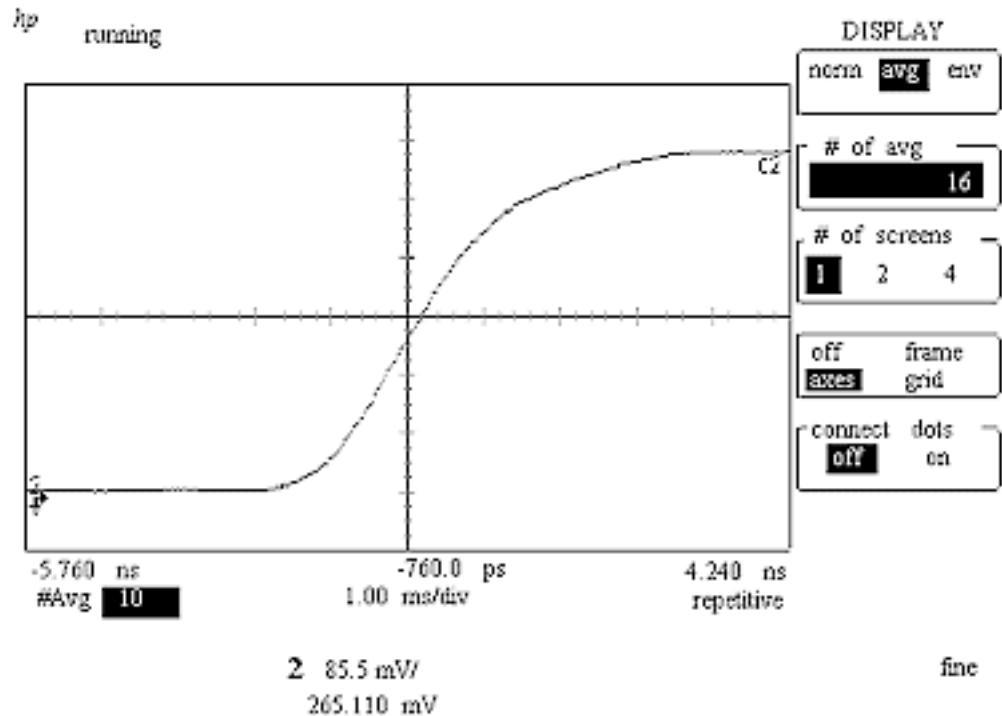
- HP 54520-Series Oscilloscope
- HP 54720-66506 Application Training board

1. Connect the HP 1144A probe to the channel 1 BNC of the scope and connect probe power to rear panel of scope.
 - a. Touch probe tip (without grabber) to pin 11 of U13 on Denali Demo board . Connect the ground alligator clip to TP10.
 - b. Press **Recall** and press **Clr**.
 - c. Select 50 ohm coupling and press **Auto-scale**.
 - d. Adjust **Horizontal** for 1 ns/div sweep speed.
 - e. Press **Horizontal - Setup**, then select the **[repetitive]** softkey.
 - f. Press **Display** and select **[avg]**, then rotate the **General Purpose Entry** knob for 16 averages.
 - g. Press **Wform save** and select: nonvolatile **[m1]**, source **[1]**, and **[store]**.

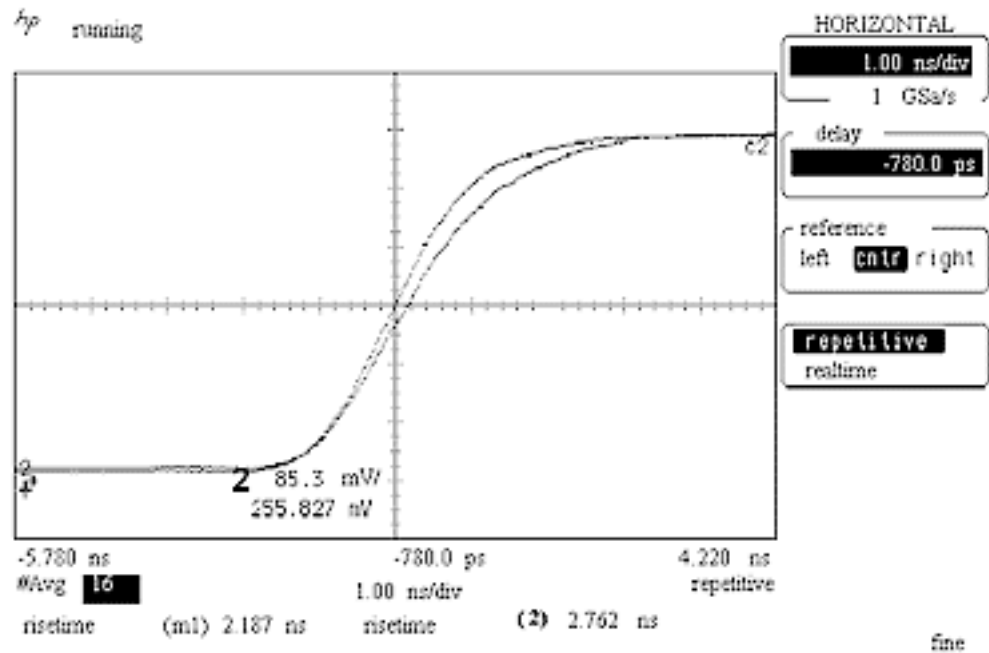




2. Connect the HP 10441A probe to the channel 2 BNC of the oscilloscope.
 - a. Connect probe tip without grabber to pin 11 of U13 on HP 54720-66506 Application Training board. Connect the ground alligator clip to TP18.
 - b. Press **Auto-scale**.
 - c. Adjust **Horizontal** for 1ns/div sweep speed.
 - d. Press **Display** and select **[avg]**, then rotate the **General Purpose Entry** knob for 16 averages.
 - e. Hold the probe in place and move to step 3.



3. Now we'll compare both rising edges by turning on **memory 1**.
 - a. Press **Wvform save**.
 - b. Select the **display on** softkey.
 - c. Adjust **Delay** to overlap both waveforms at the start of their rising edges as shown in screen-shot.
 - d. Note the reduced rise time and increased propagation delay of the waveform using the passive probe.
 - e. Press the **[blue shift key]** then press **rise**, rotate the **General Entry Knob** for **m#** readout in inverse video on screen, then press **1**.
 - f. Press the **[blue shift key]** then press **rise**, rotate the **General Entry Knob** for **c#** readout in inverse video on screen, then press **2**.



4. Note the rise time of the edges. _____
5. Note the rise time of the edge. _____
6. Why is the rise time of the passive probe slower? _____

