

Quick Reference Guide: Using the Digitizing Scope to Make TDR Measurements

The HP 54120B digitizing oscilloscope in the lab can be used as a time-domain reflectometer. This guide takes you through the calibration and introduces some of the basic features of the scope.

As with other equipment in the lab, the HP 54124A (sampling head) is static-sensitive, so be sure to ground yourself to the chassis before connecting or removing your circuits.

Note: The softkeys at the bottom of the display are referred to as “menu keys,” and the softkeys along the right side of the display are “function keys.”

Calibration:

1. Put the scope in the *persist* mode

Select **Display** from the bottom menu keys (you may need to press **More** to see all the options).

Press the **Display Mode** function key until the setting reads **Persist**.

Ensure the persist setting is 300ms.

2. Perform Calibration Sequence

Select **(More)** **Network** from the bottom menu.

Select **Cal** on the top function key.

Press **Preset Reflect Channel**.

Press **Reflect Cal**.

Connect the short from the BNC calibration kit.

Press **Reflect Cal**.

Connect the load termination from the BNC cal kit.

Press **Reflect Cal**.

Make measurements:

1. (Optional) Adjustments to the display

To stretch the time axis, select **Timebase** from the menu keys. Then use **↑⇒** to stretch the axis.

To adjust the vertical position, select **Channels** from the menu keys, **Offset** from the function keys.

2. Use the cursor to read the display

Go back to the network mode (select **Network** from the menu keys).

This time, select **Reflect** on the top function key.

Hit the **Cursor** function key.

Turn the dial to the desired point in the waveform to make measurements of reflection coefficient (ρ), characteristic impedance (Z), time (Δt), and distance (d). *Be sure that the measurements make sense.*

Plot:

1. Generate plot

Select **Plot** from the menu keys.

Make sure **Auto Pen** reads on.

Make sure **Pen Speed** reads Fast.

Generate your plot in three steps by pressing the keys labeled **Plot Waveforms**, **Plot Graticule**, and **Plot Factors**.

2. Abort plot

Press **Pause**, **Continue**, then **Abort**.

Other tips:

Don't set anything heavy (or valuable!) on the front ledge of the cart—it is not very sturdy.