

1008: Velocity of Propagation (Vp)

This application note will walk you through finding an accurate Vp.

Overview

The CT100B works by sending an electrical pulse into the cable and then at varying times after that measuring the impedance. By measuring at many time delays after the pulse, a plot can be made of the impedance vs delta time.

To convert the delta time into a distance measurement, we need to know how fast electricity can travel in the cable. This Velocity of Propagation (Vp) is expressed as a fraction of the speed of light in a vacuum. Typical values for cables range from 0.6 to 0.8.

We can determine the Vp of a short sample cable by physically measuring it with a ruler and then electrically measuring it with the CT100B. We can vary the Vp in the CT100B measurement until we get the right answer. The Vp we measure for our sample can then be stored in the CT100B's Cable Type library and used for future measurements of actual cables.

Physically Measure a Sample Piece of Cable

The first step is to physically measure the length of a sample piece of your cable.



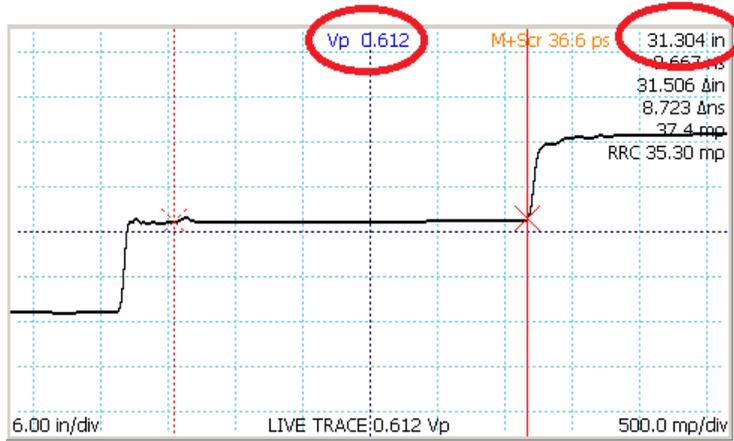
The sample above measures exactly 36 inches when pulled straight.

Adjust the CT100B Vp Setting

Now connect it to the CT100B. Use the Measurement menu (BLUE button, then the 2nd soft menu on the bottom, then the 2nd soft menu again) to set the units you'd like to measure in (to inches, for example).

Use the Autofit command (first press the AUTOFIT/HELP button, then press the Autofit soft menu) to make sure the entire cable is drawn on the screen. Press the CURSOR button to make the cursor by the end of the cable the active one. Use the HORIZONTAL POSITION knob to move the cursor to the place where the trace bends sharply upwards. This CT100B thinks the cable is 31.304 inches in length.

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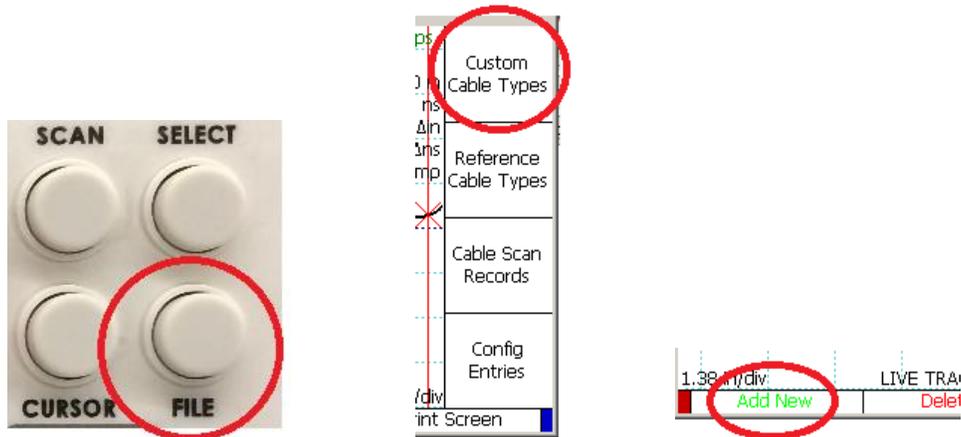
This value is less than our known correct length of 36 inches. The Vp that the CT100B is using must be too small. Turn the M-FUNCTION knob clockwise to increase the Vp value until the cable length is as close as possible to 36 inches. You can use the HORIZONTAL SCALE knob to zoom in on the cursor location to more precisely set it at the end of the cable.

The correct Vp is now displayed on the screen.

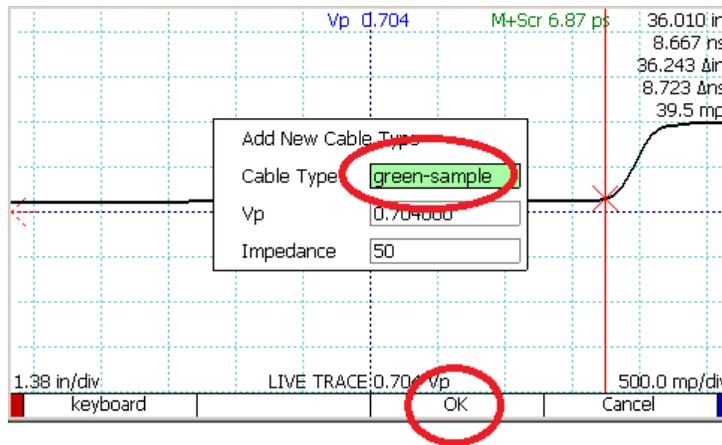


Save the Value as a Cable Type

We can save this value as a custom cable type. First, press the File button, then choose the Custom Cable Types soft menu, and finally the Add New soft menu to add a new cable type to CT100B's cable type library.



Give the new cable type a name and press the OK soft menu.



Load a Saved Cable Type

In the future when measuring cables of this type, use the File button and Custom Cable Types soft menu to Select this cable type to set the Vp correctly.

