

1002: Distance to Fault

This application note will walk you through finding the distance to a fault in a cable.

Set Vp

Once your cable has been connected to the CT100B¹, you need to make sure that the CT100B tester is configured for that cable. We'll set the Velocity of Propagation (Vp).

The accuracy of the distance to fault measurement depends on this value being accurate. This is the fraction of the speed of light that electricity travels in this cable. You can get this number from your manufacturer. In the CT100B FILE function, there is a library of standard cable types.



Or you can set the Vp manually. If the Vp value is not displayed in the top-center of the screen, press the M-FUNC button until it is. Now adjust the Vp value by turning the M-FUNCTION knob.



¹ How you connect the test to the cable is very important. High quality, controlled impedance connectors are recommended. Alligator clips and similar adapters should only be used as a last resort.

Set Normal Resolution

Press the BLUE button once to load the main menus. Then press the Resolution menu item until Normal is selected.



Normal resolution allows the CT100B to perform at a relatively high rate of speed while still generating detailed scans over long cable lengths. It is a convenient default setting that you can use except for special circumstances.

Choose Cable Length

The Cable Length is the top-right menu. Generally "Short" is good for cables up to 300 feet² in length, "Medium" is for cables up to 1500 feet, and "Long" can measure up to a mile or so. Setting too short a length will mean that the end of the cable is not scanned. Setting too long a length will unnecessarily slow the CT100B's scanning process.

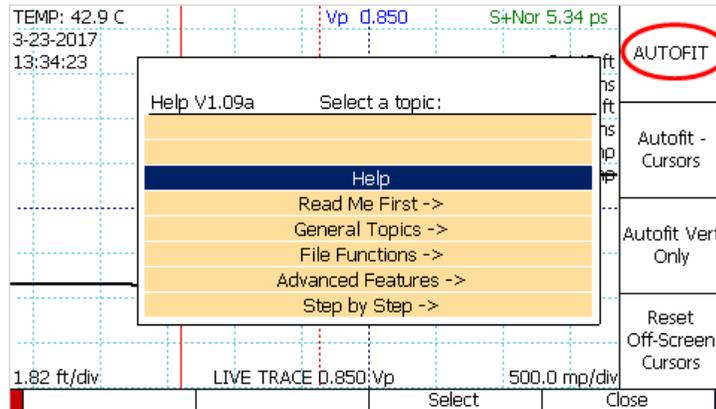


If you are not sure of the length, you can start with the Short setting. Running Autofit (described in the next step) will increase the length setting if necessary.

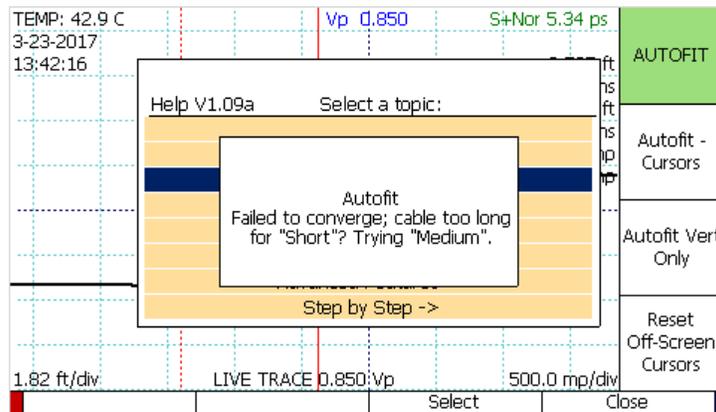
² The actual length depends on the Vp setting. 300 feet is the approximate limit for a Vp of 0.666.

Autofit

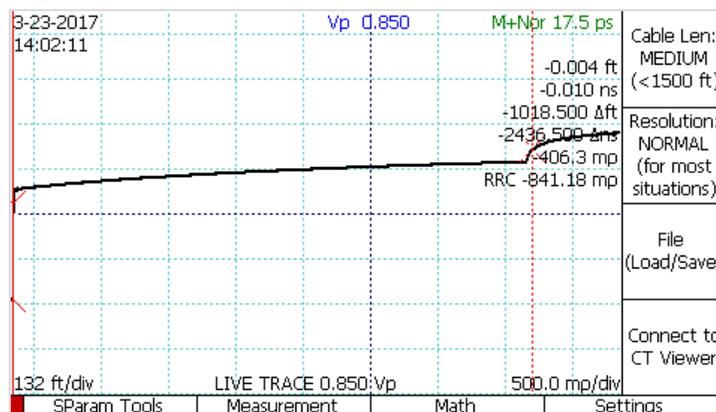
Now press the orange AUTOFIT/HELP button and choose the Autofit menu item.



This will change horizontal scale settings so your cable trace is nicely sized on the screen. If your cable is actually longer than the Short length limit, it will automatically reset to Medium length.



The result is scaling that allows the whole cable trace to be visible. The cursors are positioned at the beginning and end of the cable. The picture below shows a cable that is about 1000 ft long that is "open" at the end.

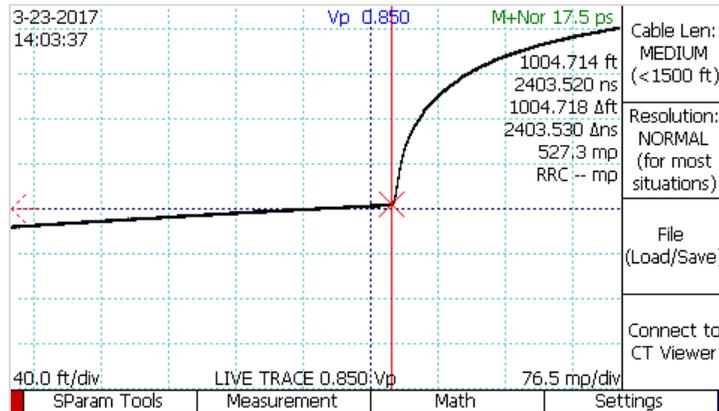


Position Cursors

Press the CURSOR button to select the cursor at the end of the trace. Now use the HORIZONTAL SCALE knob to zoom in on that location. Use the VERTICAL SCALE knob to emphasize the vertical direction as well. You can use the HORIZONTAL SCALE knob to zoom in at either of the cursor locations to allow you to be more precise when setting the cursor locations. Then use the HORIZONTAL POSITION knob to precisely place the cursor at the end of the cable.



For instance, the figure shows a zoomed in view of the end of the cable. The horizontal and vertical units per division have changed as we zoomed in, and the final distance measurement is 1004.714 ft. *Note that this value is only as accurate as the Vp that we entered.*

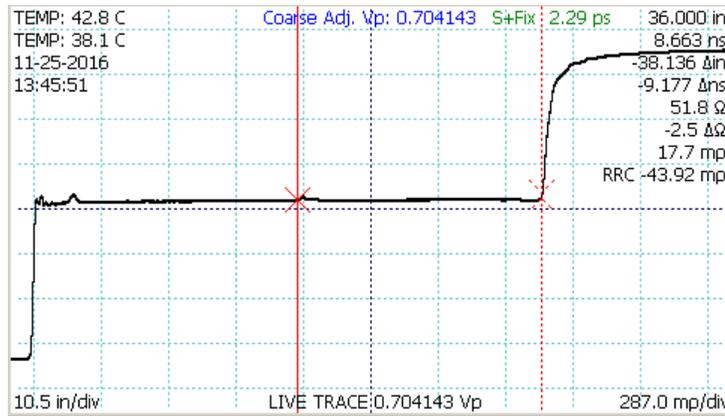


Another Example

Here is another example using a different cable. Note that the Vp is different than the previous example. The measured cable in this case is composed of two short 50 ohm cables, each 36 inches in length, that are joined with a BNC barrel connector and a BNC-SMA adapter.



The active cursor is positioned at the end of the first cable. The distance is shown at the top right as the 36.000 inch distance. The inactive cursor is positioned at the end of the combined cable. The delta distance between the cursors shows 38.136 in; this is the three foot length of the second cable plus the length of the connectors between them.



We can use the VERTICAL and HORIZONTAL SCALE knobs to zoom in on the connector. The three bumps each measure one of the connections: from BNC cable end to BNC barrel, then from BNC barrel to the adapter, and finally from the adapter to the SMA cable.

