

## 1004: Multiple Cable Segments

Cable assemblies are sometimes made up from different types of cables in series, each of which may be chosen for unique characteristics such as high-temperature operation or radiation resistance. Such cables frequently have different velocities of propagation ( $V_p$ ) making Distance-to-Fault (DTF) measurements difficult. If the average  $V_p$  of the assembly or the  $V_p$  of any one cable assembly is used, it will result in inaccurate distance measurements along the length of the compound cable.

The CT100B includes multi-segment cable measurement capability designed to improved cable measurement accuracy for multi-segment cables with differing  $V_p$  values. The CT100B allows the operator to break a TDR waveform into sections, each of which can have its own  $V_p$ . The distance-to-fault calculated from the compound waveform correctly uses the various  $V_p$  values.

This application note will show you how to define multiple segments with unique  $V_p$  values.

### Set the First $V_p$

After your cable has been connected to the CT100B, we'll set the scanning resolution to Normal, choose a Cable Length and use Autofit.<sup>1</sup>

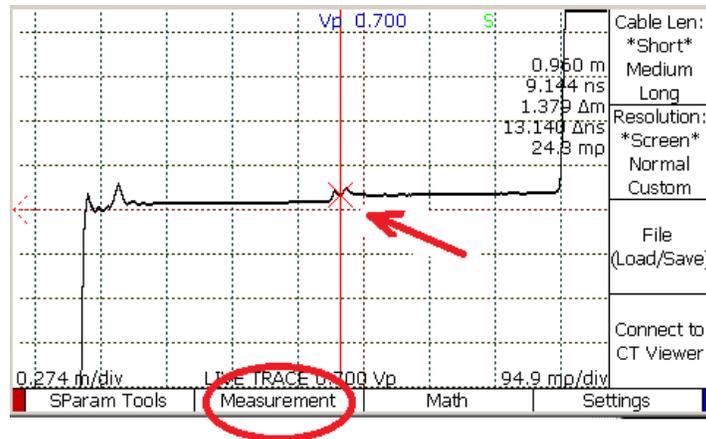
Start by setting the  $V_p$  of the first segment of cable. The number is displayed in the top-center of the screen (press the M-FUNC button until it is shown) and is adjusted by turning the M-FUNCTION knob. In our example, we've set the  $V_p$  to 0.700.



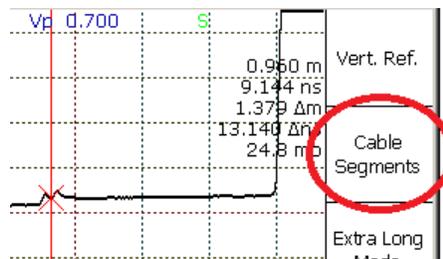
<sup>1</sup> These steps were all covered in earlier CT100B App. Notes.

## Define Next Segment

Now move the cursor to the location of the connector between the first and second segments of the cable. Increase the VERTICAL SCALE to make it easier to identify the correct location.



Now press the Measurement menu item and then press the Cable Segments menu item.

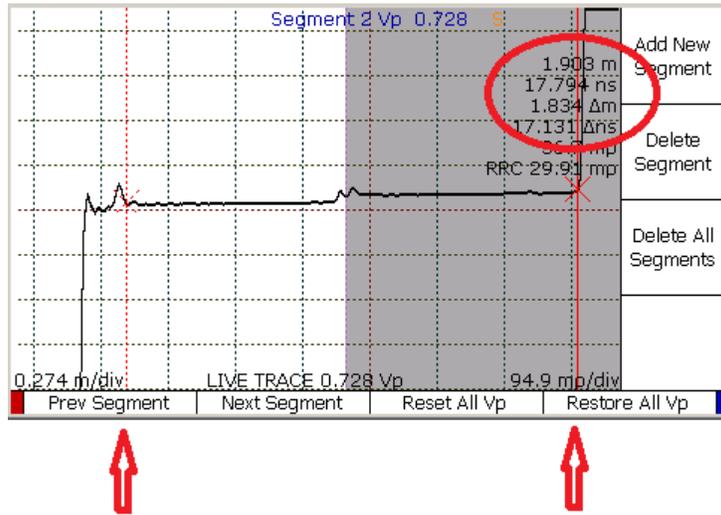


Press the Add New Segment menu item to divide the cable at the cursor location. Note that the Vp for the new segment starts with the same value that was previously defined.



Now use the M-FUNCTION knob to set the Vp of the new segment. Note that as you turn the knob the trace is redrawn on the screen to reflect the new value. You can define additional segments as needed by positioning the cursor at the next joint and pressing Add New Segment again.

As you move the cursors on the trace, the distance measurements displayed at the top-right of the screen are calculated using the Vp values that you have entered.



After defining your segments, you can use the Prev Segment and Next Segment menu items to select different segments of the cable so you can edit the Vp if needed. In the next figure, note that we edited the Vp of the first segment, but did not move the cursors. The distance measurement shown has been updated to reflect the change.

