# AN221
# Poor Splice in Twisted Pair Cables

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## Abstract

Poor splices have distinct characteristics that show better on a step TDR's display than any pulse TDR. This application note highlights those characteristics and their trace appearances.

## General

Splices in twisted pair cables exhibit two distinct types of faults and in many cases both faults can be present in the same splice; resistive connection and too much untwist.

### Resistive Connection

One or both wires having poor contact in a splice constitutes a resistive connection. The most common cause for this type of fault is corrosion on the wires or splice connector due to moisture intrusion. The result is generally a noisy telephone connection or modem line. When 20/20 TDR is attached to the line and the splice is displayed, both the resistive jump at the splice will show and the far side pair will show and increased impedance. Figure 1 is the depiction of the display for a resistive splice. Note the elevated trace after the splice at 19 ft 10 inches to the end of the pair at about 35 feet

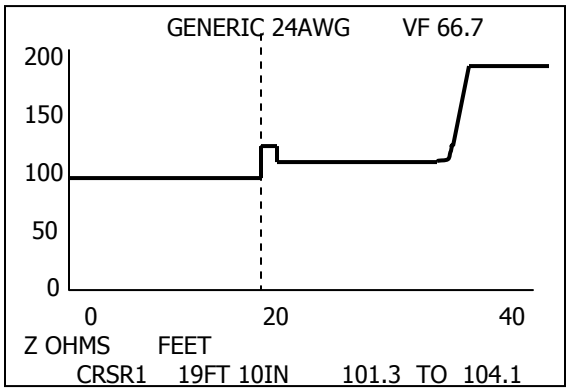


Figure 1


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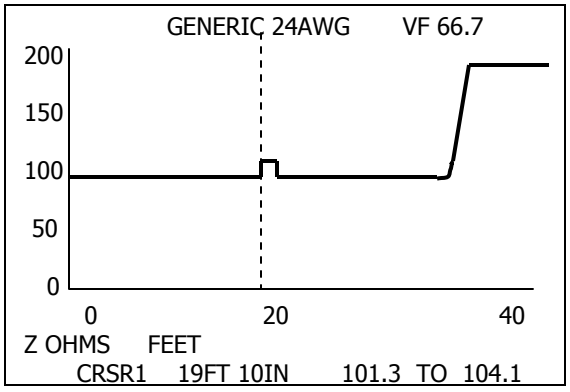
**Too Much Untwist**

Splices in twisted pair cables require some amount of untwisting of the pair to accomplish the splice. Since the pair's impedance is dependent on the constant contact of both wire's insulation jackets, any untwist will raise the impedance over that section of the pair. Too much untwist of the pairs creates an impedance mismatch noticeably long on step TDR's. Figure 2 depicts what a good splice on a twisted pair should look like and what a poor splice with too much wire separation looks like.

## Good Splice




## Poor Splice

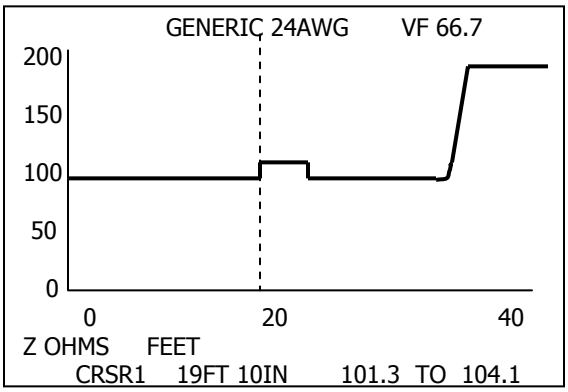



Figure 2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## Combination Splice Fault

If a splice were to contain both a resistive connection(s) and too much untwist, it would show elements of both faults in the trace as depicted in Figure 3.

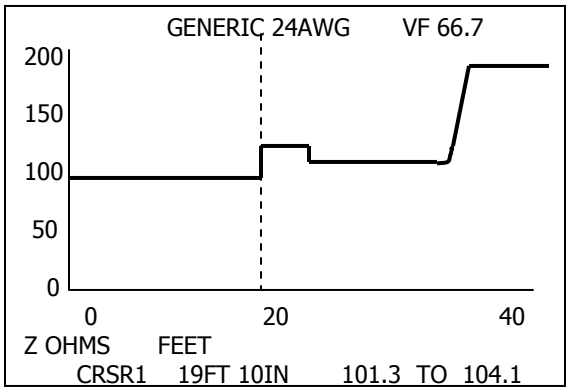


Figure 3

**Keywords:** Measuring TWP cable splice, TWP cable splice resistance, TWP cable splice impedance, measuring TWP cable splice with TDR, twisted wire pair splice


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