

TIME DOMAIN REFLECTOMETRY - TDR



WHY USE TDR

Pre-locate fault in minutes with just one or two thumps

Walk to location and continuously thump 20 – 30 times while listening. Pinpoint fault to dig hole or pull cable

Alternative is to thump continuously and walk for hours listening for fault. Wastes time and harms cable with hundreds of thumps

TIME DOMAIN REFLECTOMETRY

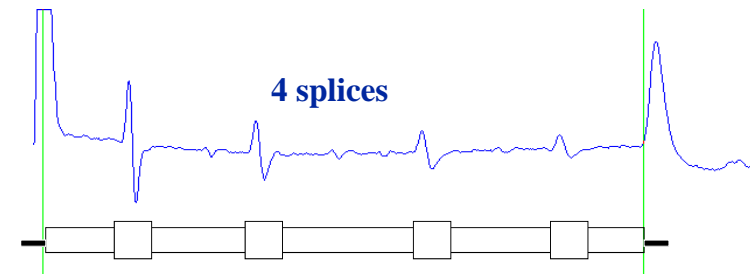
The TDR outputs a low voltage pulse that travels down the cable “looking” at the insulation between the conductor and shield. Any change in resistance reflects some of the signal back to TDR.

TDR produces a “picture” of the cable. It measures distances, find opens or shorts, find transformers, splices, and shows other accessories.

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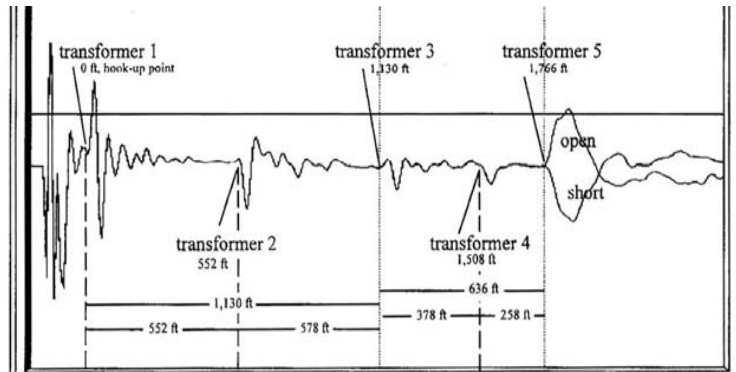
TDR SPLICE TRACE



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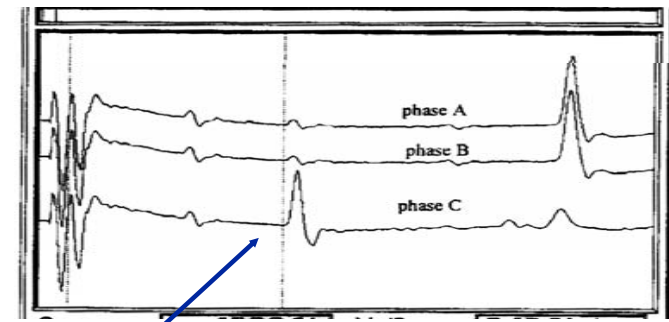
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TDR TRACE



Four transformers shown & cable end open and shorted

TDR TRACE OF THREE PHASES



Second splice of phase C is faulty, shows high resistance, perhaps corroded conductor or neutral

ARC REFLECTION

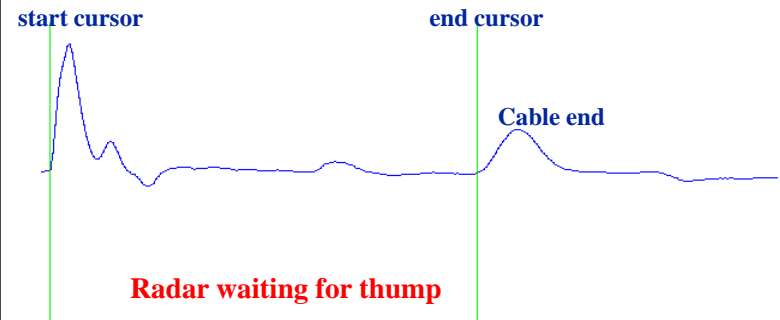
TDR signal alone can only see opens and shorts. Can't break down a fault of more than ~200 ohms

TDR used with thumper in capacitor discharge mode (thump) to reflect signal off of arc to pre-locate the fault

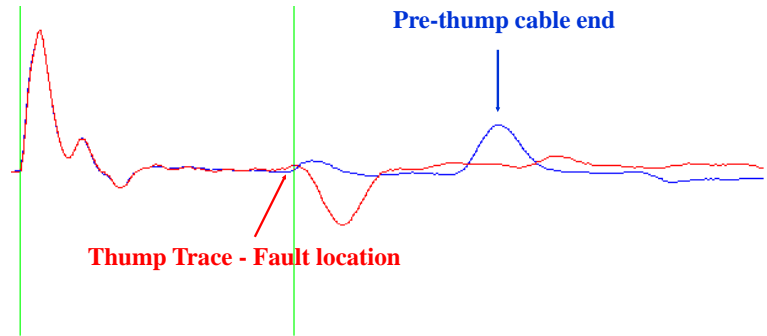
The arc is a momentary short circuit, which TDR can see

Thumper is pulsed once, creating arc at fault, TDR signal bounces off fault back to TDR and indicates the distance

PRE-THUMP TRACE



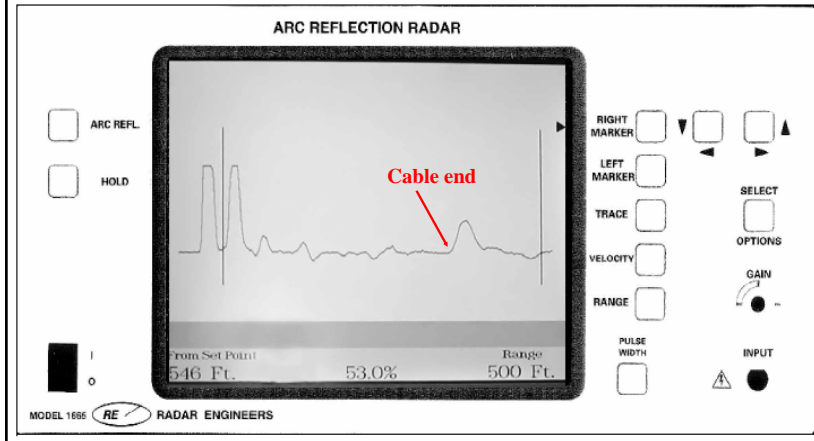
PRE & POST THUMP TRACES



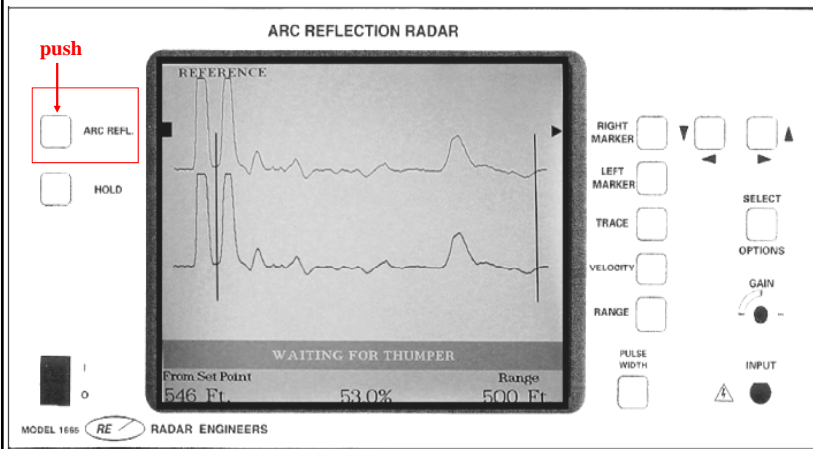
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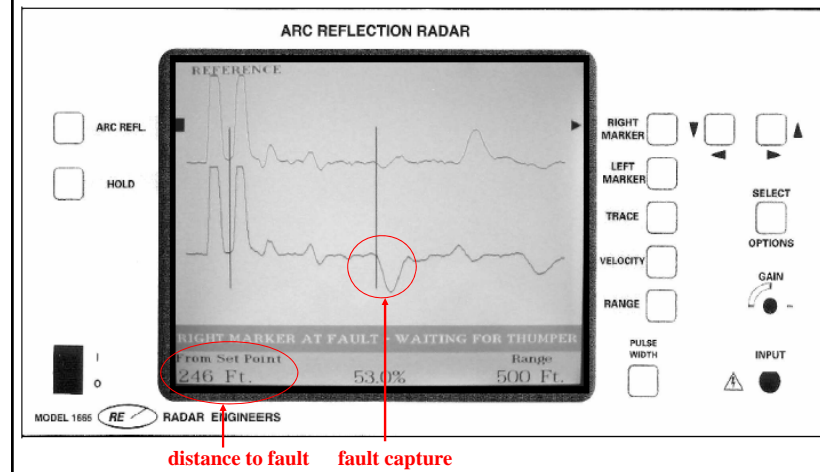
TDR TRACE OF CABLE

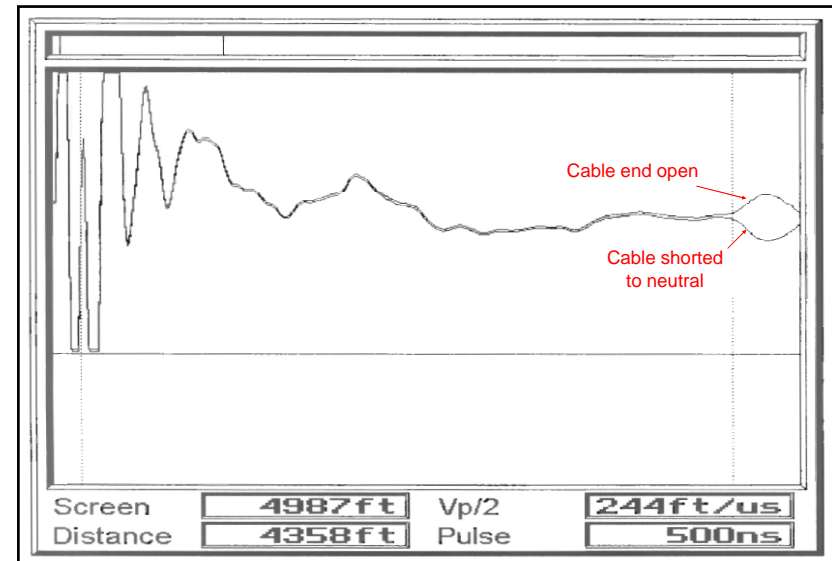
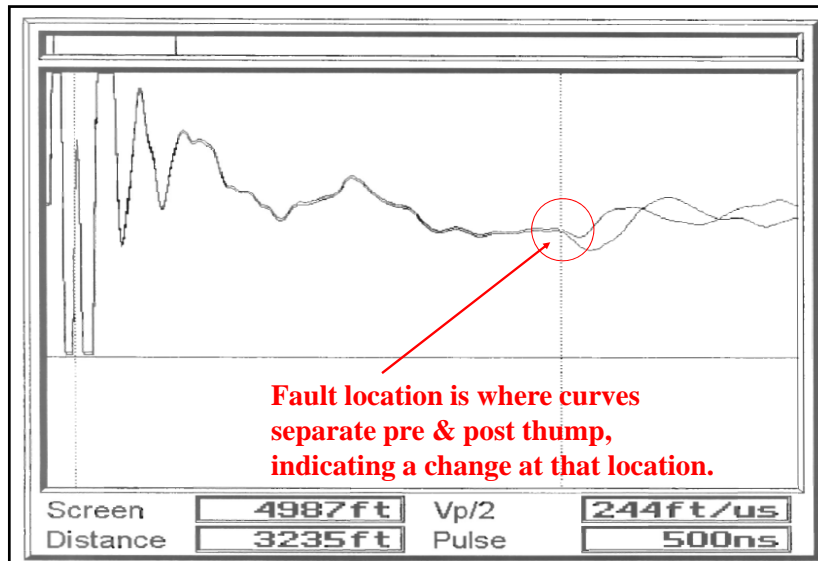


WAITING FOR THUMP



POST THUMP TRACE





TDR USE MADE EASY

Modern TDRs are very easy to use

Once programmed for your cable, turn it on, press *Arc Reflect*, or *Waiting For Thump*, button, pulse thumper and see fault location.

Full feature mode available for those familiar with TDR use

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PROPAGATION RATE or VELOCITY RATE

VR is the speed of the tdr signal in specific cable type

Entered as ft/us or percentage of the speed of light.
(Electromagnetic radiation travels at the speed of light in a vacuum)

If we know how fast the TDR signal travels and how long it took to bounce off the fault, we know how far the fault is.

Shown as V/2. Want to measure the speed of signal from fault only, not the round trip.

SEPARATE TDR BEST

TDR best if not integral to thumper

- Can be used alone without 250lb thumper
- Can be more easily upgraded
- Can change TDR vendors easily
- If TDR or thumper fails, don't lose both for service
- Bring TDR into office to download traces or for training
- More people can view TDR if not part of thumper