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CANOGA  
PERKINS

## 1401 TIME DOMAIN REFLECTOMETER

### 1.0.0 GENERAL

**1.0.1** This manual contains information to operate the CANOGA-PERKINS 1401 Time Domain Reflectometer (TDR).

### 1.1.0 FEATURES & BENEFITS

**1.1.1** The Time Domain Reflectometer or TDR, is a fault location test instrument that has been available for some years, but due to its complexity and high cost, has generally been limited in use to specialists and engineers. With the advent of low cost TDR's like the Canoga-Perkins 1401, the number of personnel that can be outfitted with a TDR, and the applications in which it may be used, has broadened considerably.

**1.1.2** The 1401 TDR or radar cable test set can be used to not only isolate the location of line impairments, but also to provide indications as to the nature of the fault. The 1401 includes the following features:

- New Improved Software designed for quick and easy operation
- Single & Dual Trace capability with Crosstalk Testing
- Eight Memory Locations for saving Single & Dual Traces

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- Propagation Tables stored in memory for quick access
- Serial Printer Port with New "Print All" Memories feature
- SuperTwist Liquid Crystal Display for high contrast and ruggedness
- Multiple Trace Comparison
- Measures in either Feet or Meters

### 1.2.0 OPERATION

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1.2.1 The TDR is generally used to locate faults in any type of dual conductor cable and has the ability to not only indicate the nature of the trouble, but to pinpoint its location in a quick and easy manner. Some of the impairments that the TDR can locate include:

SHORTS - OPENS - CROSSES - HIGH RESISTANCE OPENS - SPLITS - LOAD COILS - REPEATERS - BRIDGE TAPS - WET SPLICES - WET SECTIONS

1.2.2 The TDR works on the same principle as conventional radar, and in some cases is referred to as a Wire Radar, or Radar Cable Fault Locator. TDR operation utilizes a high frequency pulse that is emitted from the transmitter to the line, and when changes in the line's electrical characteristics are encountered, will cause a return voltage or reflection of power back into the TDR receiver.

### 3.0.0 FEATURES

**3.0.1** State of the art Microprocessor control and Super Twist LCD technology are utilized in the Canoga-Perkins 1401 Time Domain Reflectometer. This allows the production of a TDR that is light weight and rugged when compared to conventional CRT based TDR's. In addition to its rugged reliability, additional features such as

DUAL TRACE STORAGE	Memory locations 1 and 2 for dual trace storage.
SINGLE TRACE STORAGE	Memory locations 3 through 8 for single trace storage. Note: Memory locations 1 & 2, while intended for dual trace storage, can be used for single trace storage.
BATTERY	Low Battery indicated by battery symbol
TESTS	1 PR Test - Tests a Single Pair of Conductors. 2 PR Test - Tests two Pairs of conductors simultaneously. XT Test - Two Line Crosstalk Test with transmit on one pair and receive on the other
SPEED	Signal Velocity in feet per microsecond where the range equals 20,000 to 500 ft.
PRINTER	Serial Printer Interface port enabling hard copy of traces and associated information.

**Table 3-A Display Parameters and Their Values**

## 10.0.0 Specifications

<b>Measuring Ranges:</b>	500-ft (166.6 m), 1000-ft (333.3 m), 2000-ft (666.6 m), 5000-ft (1.66 km), 10 K-ft (3.33 km), 20 K-ft (6.66 km)
<b>Pulse Widths:</b>	50 ns, 100 ns, 200 ns, 500 ns, 1 $\mu$ s and 2 $\mu$ s. Pulse widths and range are selected simultaneously.
<b>Distance Measurement:</b>	By moving a cursor to the fault echo. The cursor position appears on the display in feet.
<b>Measuring Accuracy:</b>	$\pm 1\%$ typical, and $\pm 2\%$ worst case.
<b>Read-Out:</b>	LCD with graphical trace and alphanumeric read-out of conditions.
<b>Line Circuits:</b>	Balanced, compensation for 100 to 300 ohms (at Pulse frequencies), transformer isolated from instrument circuits.
<b>Amplifier:</b>	Faults of 5% (reflection) at usual line lengths may be displayed with sufficient magnitude.
<b>LCD Screen Size:</b>	5.20 x 2.77 inches
<b>Power Supply:</b>	12 VDC Nicad battery pack charged with external charging unit. Six to eight hours operating time with fully charged batteries.
<b>Timer Cut-Off:</b>	Approximately seven minutes. Internal trace and status data preserved during power off.
<b>Size:</b>	7.5 x 10.5 x 4.5 inches