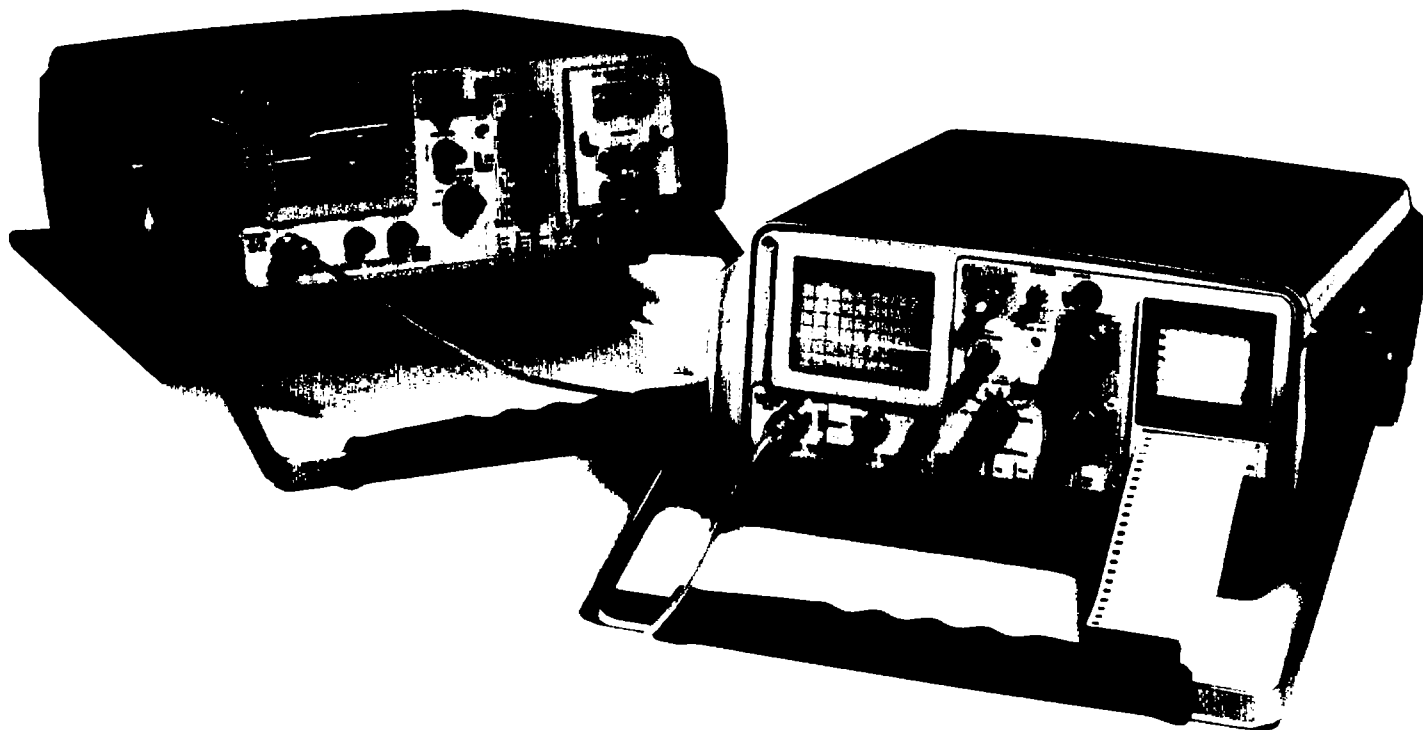


METALLIC TDR CABLE TESTERS



Portable — Battery Powered, Self Contained, Lightweight

Rugged — Meets MIL-T-28800, Type III, Class 3, Style A

Versatile — Test Any Type Paired Conductor and Coax Cable

Easy to Use — Produces Results with Minimal Operator Training

Time Domain Reflectometry

TDR*

The portable, rugged 1502 and 1503 TDR Cable Testers are field maintenance tools that are simple to operate and will test any transmission cable under virtually any conditions. The 1502 is appropriate for testing coax and other cables in aircraft, ships, radar sites, etc. The 1503 tests long runs of coax or twisted pair cables in telephone and other communications applications.

These units use a technique called Time Domain Reflectometry (TDR) to identify and locate cable faults. When connected to a line in the cable, the unit sends out an electrical pulse that is reflected back to the unit by a

fault in the cable. Fault type is identified by the shape of the display, and fault distance is determined by the displayed interval from the test pulse to the fault pulse.

For easy carrying and operating in tight spaces, these units are lightweight and small and will operate at least five hours on the internal, rechargeable batteries.

Since permanent records are useful in cable maintenance, an optional, plug-in chart recorder is available for paper recording of the test. The standard plug-in X-Y output module can drive an external X-Y Recorder.

1502

This unit is directly calibrated in reflection coefficient (ρ) and distance. The 1502 uses a step-pulse and provides fault resolution to 0.6 inch on short cables. The 1502 performs to a maximum of 2000 feet, but with decreasing resolution as the fault distance increases. The unit is matched to 50-ohm cables, but may be used on others by adjusting the front panel GAIN control or using optional impedance adaptors.

1503

For long cables, the 1503 provides high-energy, $\frac{1}{2}$ -sine-shaped pulses. Range of the 1503, dependent upon cable type, is up to 50,000 feet. Resolution capability provides for resolving faults as close together as three feet on short cables. Impedance levels of 50, 75, 93 and 125 ohms are selectable.

1503 Option 01

1503 Option 01 has Distance Cal switches that make it more convenient for fault location in a variety of cables including coax. When the 1503 Option 01 has been calibrated for each cable before trouble occurs, and the records are kept, the Distance Cal switches can be set exactly and damage location can begin immediately.

Metric Instruments (1502, 1503)

For distance measurements in meters, instead of feet, Option 05 is available for both the 1502 and 1503. These instruments are fully metric versions of the 1502 and 1503 with no conversion from feet to meters involved.

The 1502 Option 05 has a distance resolution of 15 mm and measures 500 meters.

The 1503 Option 05 has a resolution of 0.9 meter and measures 10 000 meters.

* Also known as cable radar.

1502 Short Range TDR Cable Tester

CHARACTERISTICS

TEST SIGNAL

Shape — Step rise Amplitude — 225 mV nominal (into 50 Ω load), dc coupled.Aberrations — Within $\pm 5\%$ during 1st 10 ft after rise. Within $\pm 0.5\%$ peak beyond 10 ft Noise Filter "Out."System Reflected Rise — ≤ 0.07 ft (≤ 140 ps)Jitter — ≤ 0.02 ft (≤ 40 ps) for X.1. ≤ 0.1 ft (≤ 200 ps) for X.1.

Test Connector — BNC.

Termination — 50 Ω , within $\pm 2\%$.

Maximum Input — DO NOT APPLY EXTERNAL VOLTAGE.

VERTICAL SYSTEM

Display Range — ± 4 div.Accuracy — Within $\pm 3\%$.Calibration Point — 2 div $\rightarrow 1 \mu$.

Deflection Factor — 5 m/div to 500 m/div, 7 steps, 1-2-5 sequence.

Variable — $\geq 3.5:1$ from calibration point.Displayed Noise — Noise Filter Switch "Out": ± 5 mV or less.Noise Filter Switch "In": ± 2 mV or less.

HORIZONTAL SYSTEM

Distance Controls

Distance Dial — Range: 0 ft to 100 ft for X.1. 0 ft to 1000 ft for X.1. Accuracy: Within $\pm 2\%$ of reading ± 0.05 ft for X.1. Within $\pm 2\%$ of reading ± 0.5 ft for X.1.

Feet/Div Control — Range: 0.1 ft to 20 ft/div for X.1. 1 ft to 200 ft/div for X.1. Accuracy: Within 2% of full CRT screen.

Cable Dielectric Scales (Vp/Vair) — Solid Poly, 0.66; Solid PTFE, 0.70. Other Var, 0.55 to 1.0. Var is calibrated for air when turned fully cw.

Sweep Repetition — 40 Hz within ± 0 Hz, ± 10 Hz with Noise Filter Switch "Out." 4 Hz within $\pm 20\%$ with Noise Filter Switch "In." 20 s/sweep nominal in chart recorder mode (dependent upon chart recorder).

UNIQUE CHARACTERISTICS (1502 OPTION 05)

TEST SIGNAL

Aberrations — Within $\pm 5\%$ during 1st 300 cm after rise. Within $\pm 0.5\%$ peak beyond 300 cm Noise Filter "Out."System Reflected Rise — ≤ 2.1 cm (≤ 140 ps).Jitter — ≤ 0.6 cm (≤ 40 ps) for X.1. ≤ 3 cm (≤ 200 ps) for X.1.

HORIZONTAL SYSTEM

Distance Controls


Distance Dial — Range: 0 m to 25 m for X.1. 0 m to 250 m for X.1. Accuracy: Within $\pm 2\%$ of reading ± 0.02 m for X.1. Within $\pm 2\%$ of reading ± 0.2 m for X.1.

Meters/Div Control — Range: 0.025 m/div to 5 m/div for X.1. 0.25 m/div to 50 m/div for X.1.

1503 Long Range TDR Cable Tester

CHARACTERISTICS

SINEWAVE TEST SIGNAL

Shape — $\frac{1}{2}$ sine within $\pm 20\%$ Amplitude — 10 V $\pm 20\%$ unterminated. 5 V $\pm 20\%$, terminated, ac coupled.Aberrations — 30 dB p-p. (Equivalent to $\pm 1.6\%$).Duration — ≤ 10 ft (10 ns), ≤ 100 ft (100 ns), ≤ 1000 ft (1000 ns).^{**}^{**} Duration times are within $\pm 20\%$ at half amplitude.Jitter — ≤ 1 ft for X10 (≤ 2 ns). ≤ 10 ft for X100 (≤ 20 ns).

Test Connector — BNC.

Termination — 50 Ω , 75 Ω , and 93 Ω , within 1%; 125 Ω within 3%.Maximum Input — ± 400 V (dc \rightarrow peak ac at maximum frequency of 440 Hz).

VERTICAL SYSTEM

Display Range — ± 4 div.Accuracy — Within ± 0.25 dB (within $\pm 3\%$).Calibration Point — 2 div $\rightarrow 0$ dB.

Deflection Factor — 0 dB to 60 dB, 7 steps, 10 dB per step.

Variable — 0 dB to 18 dB additive to steps.

Displayed Noise — Noise Filter Switch "Out": 80 dB RMS, random. Noise Filter Switch "In": 86 dB RMS, random.

HORIZONTAL SYSTEM

Distance Controls

Distance Dial — Range: 0 ft to 2,500 ft at X10. 0 ft to 25,000 ft at X100. Accuracy: Within 2% of reading ± 2 ft for X10. Within 2% of reading ± 20 ft for X100.

Feet/Div Control — Range: 5 ft/div to 500 ft/div at X10. 50 ft/div to 5000 ft/div at X100. Accuracy: Within 2% of full CRT screen.

Cable Dielectric Scales (Vp/Vair) — Solid Poly: 0.66. Foam Poly: 0.81. Var: 0.31 to 1.0. Var is calibrated for air when turned fully cw.

Distance Cal Scales, Option 01 Only (Vp/Vair) — Selectable from 0.2 to 1.0 in 0.01 increments.

Sweep Repetition — 40 Hz within ± 0 Hz, ± 10 Hz with Noise Filter Switch "Out." 20 s/sweep nominal in chart recorder mode (dependent upon chart recorder). 4 Hz within $\pm 20\%$ with Noise Filter Switch "In."

UNIQUE CHARACTERISTICS (1503 OPTION 05)

TEST SIGNAL

Duration^{**} — ≤ 3 m (10 ns). ≤ 30 m (100 ns). ≤ 300 m (1000 ns).Jitter — ≤ 0.2 m for X1 (≤ 2 ns). ≤ 2 m for X10 (≤ 20 ns).^{**} Duration times are within $\pm 20\%$ at half amplitude.

HORIZONTAL SYSTEM

Distance Controls

Distance Dial — Range: 0 m to 500 m at X1. 0 m to 5,000 m at X10. Accuracy: Within 2% of reading ± 0.2 m for X1. Within 2% of reading ± 2 m for X10.

Meters/Div Control — Range: 1 m/div to 100 m/div at X1. 10 m/div to 1000 m/div at X10.

COMMON CHARACTERISTICS (1502 & 1503)

POWER REQUIREMENTS

Ac Power — Line Voltage: 117 V ac $\pm 20\%$ and 234 V ac $\pm 20\%$. Line Frequency: 48 Hz to 410 Hz.

Dc Power

Battery Pack Operation: At least 5 hours ($\pm 20^\circ\text{C}$ to $\pm 25^\circ\text{C}$ charge and discharge temperature) including 20 chart recordings.

Full Charge Time — 16 hours.

Typical Charge Capacity

Charge Temperature	Discharge Temperature		
	-15°C	$+20^\circ\text{C}$ to $+25^\circ\text{C}$	$+55^\circ\text{C}$
0°C	40%	60%	50%
$+20^\circ\text{C}$ to $+25^\circ\text{C}$	65%	100%	85%
$+40^\circ\text{C}$	40%	65%	55%

EXTERNAL RECORDER INTERFACE

(STANDARD X-Y MODULE)

Horizontal — 0.1 V/div, source impedance is 10 k Ω .Vertical — 0.09 V/div to 0.13 V/div (adjustable), source impedance is 10 k Ω .

PHYSICAL CHARACTERISTICS

Dimensions	mm	in
Width (with handle)	315	12.4
Width (without handle)	300	11.8
Height	127	5.0
Depth (handle extended)	475	18.7
Depth (handle not extended)	419	16.5
Weights	kg	lb
Net (with front cover and accessories)	8.2	18.0
Net (without front cover or accessories)	7.3	16.0
Domestic Shipping (complete) \approx	11.1	24.4
Export Shipping (complete) \approx	16.3	36.0

INCLUDED ACCESSORIES

Watertight front cover (200-1759-00); TDR slide rule for 1502 only (003-0700-00); 50 Ω BNC terminator (011-0123-00); precision 50 Ω cable for 1502 only (012-0482-00); viewing hood (016-0297-00); X-Y output module (016-0606-00); 110 V ac replacement fuses (for front panel) for 1502 only (159-0032-00) or 220 V ac (159-0029-01); power cord (161-0066-00); mesh filter (CRT) (378-0055-00); BNC female-to-female adaptor for 1502 only (103-0028-00); 9 ft BNC-to-clip-lead cable (012-0671-02); operator's manual.

ORDERING INFORMATION

1502 Short Range TDR Cable Tester . \$6,200

1503 Short Range TDR Cable Tester . \$5,200

Option 01 — (Distance Cal for 1503 only) +\$375

Option 04 — With Cable Tester Recorder +\$1,050

Option 05 — With Cable Tester Metric Version) NC

Option 78 — GM (P7) Phosphor +\$35

INTERNATIONAL POWER CORD AND PLUG OPTIONS

Option A1 — Universal Euro 220 V/16 A, 50 Hz

Option A2 — UK 240 V/13 A, 50 Hz

Option A3 — Australian 240 V/10 A, 50 Hz

Option A4 — North American 240 V/15 A, 60 Hz

OPTIONAL ACCESSORIES (1502)

Chart Recorder — Order 016-0506-04 \$1,100

Chart Paper — One Roll. Order 006-1658-01 \$7.50

Chart Paper — 100 Roll Case. Order 006-1658-02 \$550

Accessory Pouch — Order 016-0351-00 \$25

Static Suppressor — (Helps protect front end from damage). Order 011-0132-00 \$50

Impedance Adaptor —

50/75 Ω . Order 017-0091-00*1 \$15050/93 Ω . Order 017-0092-00*1 \$15050/125 Ω . Order 017-0090-00*1 \$150^{**}Should be purchased with following two parts:

Connector, BNC Female-to-GR — Order 017-0063-00 .. \$43

Connector, BNC Male-to-GR — Order 017-0064-00 \$75

OPTIONAL ACCESSORIES (1503)

Chart Recorder — Order 016-0506-04 \$1,100

Chart Paper — One Roll. Order 006-1658-01 \$7.50

Chart Paper — 100 Roll Case. Order 006-1658-02 \$550

Isolation Network — (For balanced line). Order 013-0169-00 \$225

Adaptor Cables (BNC-to-Clips) —

Nine foot. Order 012-0671-02 \$80

30 foot. Order 012-0671-03 \$70

Accessory Pouch — Order 016-0351-00 \$25

Direct Current Adaptor with Filter — 25 foot cord (for use with standard 12 V automobile lighter plug with negative ground). Order 015-0327-00 \$200

LOGISTICS INFORMATION

For logistics data, see Tektronix Logistics Data Book.