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ÆA *Technology*

20/20 TDR
version 2.4 and higher
CATV Quick Start Guide

This is a CATV Quick Start Guide and is applicable to versions of the 20/20 TDR ordered with the CATV option.

AEA technology's 20/20 TDR is a "Step" Time Domain Reflectometer. All TDRs transmit signals and listen for reflections. However, a Pulse TDR transmits individual pulses and listens for reflections between the pulses. A Step TDR emits a constant energy, while simultaneously listening for reflections. The advantages of Step technology are zero "blind spots" or "dead zones," more test information (distance, impedance, and loop resistance), and reduced degradation of the received signal that provides a clearer picture of the cable's quality.
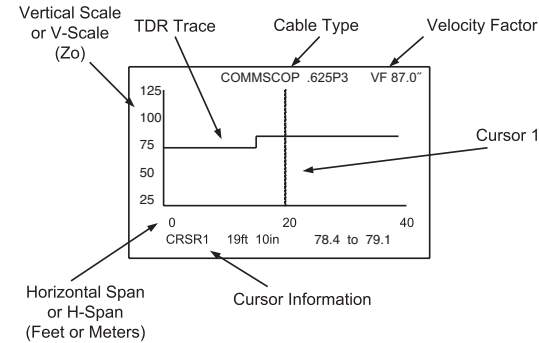
Before You Start
1. Determine whether the 20/20 TDR will be operated using batteries or AC Power. The 20/20 uses 8 "AA" size batteries, alkaline or rechargeable. The battery compartment is accessible by lifting the "meter stand" on the back of the 20/20 TDR and removing the two cover screws.
2. Identify the cable type to be tested.
3. Determine whether test leads and/or extension lead cable is required.
4. Understand as much as possible about the cable/pair under test. See "Sample Cable" section to help resolve unknowns.
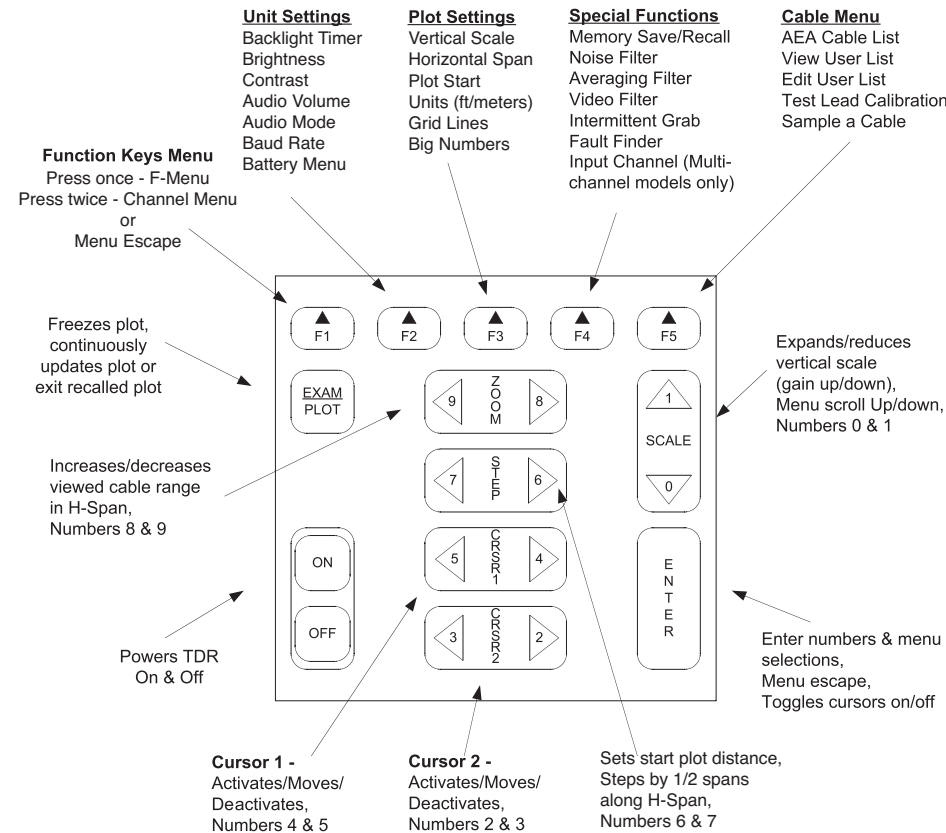
This Quick Start Guide provides the most direct path to using the 20/20 TDR. See the Operating Manual for a more detailed explanation of the functions and features of this TDR. See the Theory and Application Notes for more background on faults.

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20/20TDR Display

Vertical Scale or V-Scale (Zo)
TDR Trace
Cable Type
Velocity Factor

COMMSCOP .625P3 VF 87.0"
125
100
75
50
25
0   20   40
CRSR1   19ft 10in   78.4 to 79.1

Cursor 1

Horizontal Span or H-Span (Feet or Meters)
Cursor Information

20/20TDR Keypad

Unit Settings
Backlight Timer
Brightness
Contrast
Audio Volume
Audio Mode
Baud Rate
Battery Menu

Plot Settings
Vertical Scale
Horizontal Span
Plot Start
Units (ft/meters)
Grid Lines
Big Numbers

Special Functions
Memory Save/Recall
Noise Filter
Averaging Filter
Video Filter
Intermittent Grab
Fault Finder
Input Channel (Multi-channel models only)

Cable Menu
AEA Cable List
View User List
Edit User List
Test Lead Calibration
Sample a Cable

Function Keys Menu
Press once - F-Menu
Press twice - Channel Menu
or
Menu Escape

Freezes plot, continuously updates plot or exit recalled plot

Increases/decreases viewed cable range in H-Span, Numbers 8 & 9

Powers TDR On & Off

F1 F2 F3 F4 F5
EXAM PLOT
9 ZOOM 8
7 STEP 6
5 CRSR1 4
3 CRSR2 2
ON
OFF
1
SCALE
0
ENTER

Expands/reduces vertical scale (gain up/down), Menu scroll Up/down, Numbers 0 & 1

Enter numbers & menu selections, Menu escape, Toggles cursors on/off

Cursor 1 -
Activates/Moves/Deactivates,
Numbers 4 & 5

Cursor 2 -
Activates/Moves/Deactivates,
Numbers 2 & 3

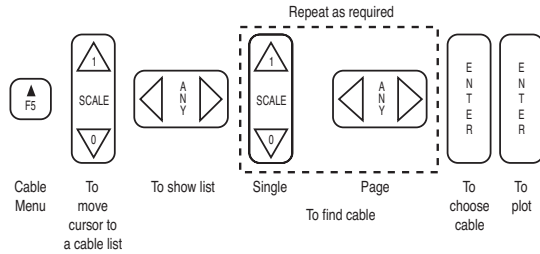Sets start plot distance, Steps by 1/2 spans along H-Span, Numbers 6 & 7

Input Connection Translation Table
(Multi-channel models only)

To select an input channel, press F4 & select Input Channel, use any ◄ ► key to select a test channel. Use test leads supplied or standard patch cables per wire map schemes below.

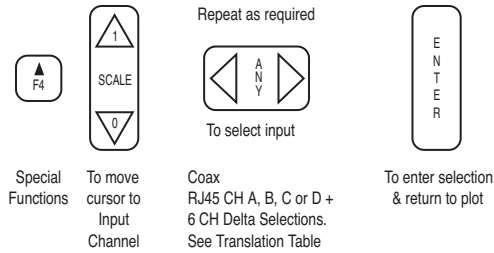| Wire Map Scheme	20/20 TDR Test Channel
*=Supplied Test Lead	
Coaxial Connector	Coax
Red/Black Clips*	RJ45 CH A
Green/Black Clips*	RJ45 CH B
Red/Black & Green/Black Clips*	RJ45 CH A Δ B
T-568A Pair 1	RJ45 CH A
T-568A Pair 2	RJ45 CH B
T-568A Pair 3	RJ45 CH C
T-568A Pair 4	RJ45 CH D
T-568A Δ Pairs 1 & 2	RJ45 CH A Δ B
T-568A Δ Pairs 1 & 3	RJ45 CH A Δ C
T-568A Δ Pairs 1 & 4	RJ45 CH A Δ D
T-568A Δ Pairs 2 & 3	RJ45 CH B Δ C
T-568A Δ Pairs 2 & 4	RJ45 CH B Δ D
T-568A Δ Pairs 3 & 4	RJ45 CH C Δ D
T-568B Pair 1	RJ45 CH A
T-568B Pair 2	RJ45 CH C
T-568B Pair 3	RJ45 CH B
T-568B Pair 4	RJ45 CH D
T-568B Δ Pairs 1 & 3	RJ45 CH A Δ B
T-568B Δ Pairs 1 & 2	RJ45 CH A Δ C
T-568B Δ Pairs 1 & 4	RJ45 CH A Δ D
T-568B Δ Pairs 2 & 3	RJ45 CH B Δ C
T-568B Δ Pairs 3 & 4	RJ45 CH B Δ D
T-568B Δ Pairs 2 & 4	RJ45 CH C Δ D
USOC Pair 1	RJ45 CH A
USOC Pair 2	RJ45 CH B
USOC Pair 3	RJ45 CH D
USOC Pair 4	RJ45 CH C
USOC Δ Pairs 1 & 2	RJ45 CH A Δ B
USOC Δ Pairs 1 & 3	RJ45 CH A Δ D
USOC Δ Pairs 1 & 4	RJ45 CH A Δ C
USOC Δ Pairs 2 & 3	RJ45 CH B Δ D
USOC Δ Pairs 2 & 4	RJ45 CH B Δ C
USOC Δ Pairs 3 & 4	RJ45 CH C Δ D
10BASE-T Tx	RJ45 CH C
10BASE-T Rx	RJ45 CH B
10BASE-T Δ Tx & Rx	RJ45 CH B Δ C
TP-PMD Tx	RJ45 CH C
TP-PMD Rx	RJ45 CH D
TP-PMD Δ Tx & Rx	RJ45 CH C Δ D
Token Ring Tx	RJ45 CH B
Token Ring Rx	RJ45 CH A
Token Ring Δ Tx & Rx	RJ45 CH A Δ B

Ten Steps to Testing

1. Select the **Cable Type** and **Velocity Factor** (VF). The 20/20 TDR has two cable lists, AEA Cable List and User List. It is recommended to start in the User List to find the cable type to be tested.
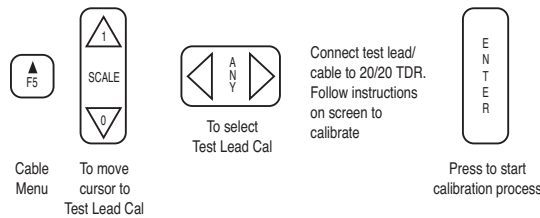
Repeat as required

Cable Menu — To move cursor to a cable list — To show list — Single — Page — To choose cable — To plot

To find cable

"ANY" refers to ZOOM, STEP, CRSR1 or CRSR2 ◀ ▶ keys.

2. Select an **Input Channel** (Multi-channel models only). This allows the Network/Telco users to select the cable connector and/or pair to be tested.

Repeat as required

Special Functions — To move cursor to Input Channel — Coax RJ45 CH A, B, C or D + 6 CH Delta Selections. See Translation Table — To enter selection & return to plot

To select input

3. Test Lead Calibrate. This function will zero out the test leads or the test cable that may be needed to connect the 20/20 TDR to the cable/pair under test. It moves the measurement starting point from the TDR's connector to end of the test lead/cable.
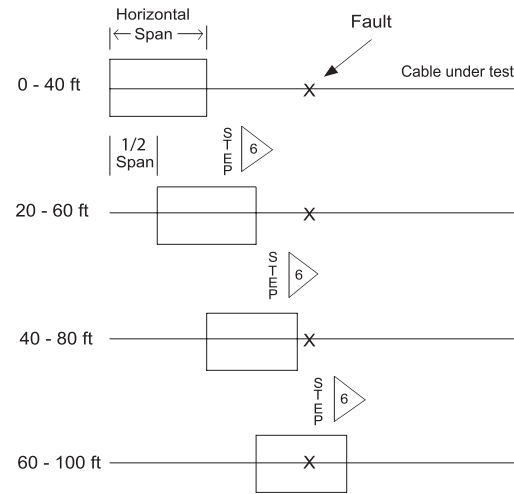
Cable Menu — To move cursor to Test Lead Cal — To select Test Lead Cal — Connect test lead/cable to 20/20 TDR. Follow instructions on screen to calibrate — Press to start calibration process

4. Connect the 20/20 TDR to the cable/pair to be tested.

5. ZOOM sets the Horizontal Span (H-Span), the length of the cable displayed on the screen. The shorter the H-Span, the higher the resolution will be. The Horizontal Span has a list of preset values that are automatically selected when using the ZOOM key.
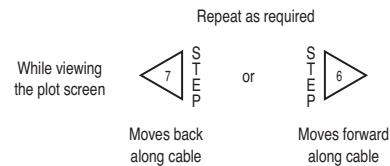
Setting Horizontal Span using ZOOM key.

While viewing the plot screen — ZOOM 9 — or — ZOOM 8

To decrease H-Span — To increase H-Span
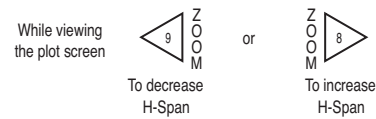
6. STEP moves the Start Distance (plot display window) along the cable in ½ H-Span intervals. If the H-Span is at 40 ft, and Start Distance is at 0, then 0 to 40 feet is displayed. Push the STEP key's right arrow button once, and 20 to 60 feet is now displayed. The display window will move in ½ H-Span steps, left or right, with each press of STEP ◀ ▶ . Start distance can also be set numerically in the F3 menu at Plot Start.
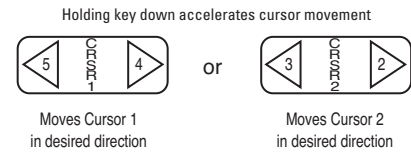
Horizontal ← Span →   Fault

Cable under test

0 - 40 ft

1/2 Span   STEP 6

20 - 60 ft   STEP 6

40 - 80 ft   STEP 6

60 - 100 ft

Setting the Start Distance of the plot using the STEP key.

Repeat as required

While viewing the plot screen — STEP 7 — or — STEP 6
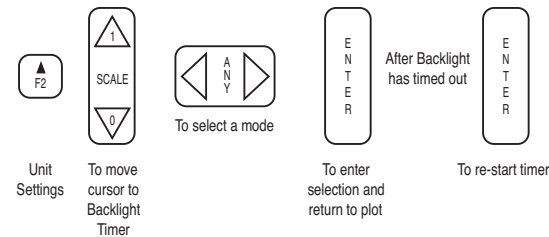
Moves back along cable — Moves forward along cable

7. SCALE changes the vertical scale, and acts a gain control while viewing the plot. The SCALE up key flattens the waveform out. The SCALE down key effectively increases the gain, and allows for greater resolution of the waveform. To change vertical scale/gain use the SCALE key.
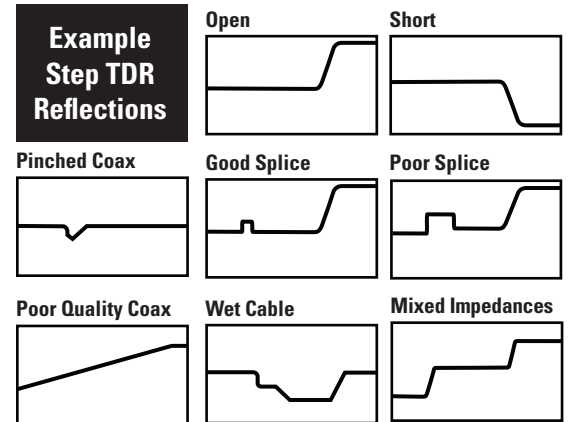
While viewing the plot screen — 1 SCALE — or — SCALE 0

Increases V-Scale — Decreases V-Scale
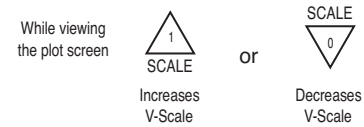
8. Cursor 1 and **Cursor 2** move the cursors displayed on the screen. Distance and impedance measurements are displayed for each cursor plus the delta distance and delta Zo between the two cursors. Cursors activate on first ▶ press and de-activate by moving left off the plot with repeated ◀ presses. When viewing the Plot, pressing the ENTER key will hide or unhide the Cursors.

Holding key down accelerates cursor movement

CRSR1 5 4 — or — CRSR2 3 2

Moves Cursor 1 in desired direction — Moves Cursor 2 in desired direction

9. The **Backlight Timer** has five modes: Off, 10 Sweeps, 20 Sweeps, 50 Sweeps, and Continuous. The 10, 20, and 50 Sweep modes will time out/turn off the backlight in approximately 20 seconds, 45 seconds, and 2 minutes, respectively. The Continuous mode will keep the backlight on until it is switched to a different mode.

Unit Settings — To move cursor to Backlight Timer — To select a mode — To enter selection and return to plot — After Backlight has timed out — To re-start timer

10. OFF will power the 20/20 TDR off. By using this mode the current setup (VF, H-Span, Start Distance, etc.) will be saved. The 20/20 TDR will automatically return to those settings on the next power up.

Example Step TDR Reflections

Open	Short
Pinched Coax	Good Splice	Poor Splice
Poor Quality Coax	Wet Cable	Mixed Impedances

CATV Coax Velocities		
Manufacturer	**Cable Type**	**VoP**
Commscope	Drop F59 series	85.0%
Commscope	Drop F6 Series	85.0%
Commscope	Drop F7 Series	85.0%
Commscope	Drop F11 Series	85.0%
Commscope	Parameter III 0.500	87.0%
Commscope	Parameter III 0.625	87.0%
Commscope	Parameter III 0.750	87.0%
Commscope	Parameter III 0.875	87.0%
Commscope	Parameter III 1.000	87.0%
Commscope	Quant. Reach 0.540	88.0%
Commscope	Quant. Reach 0.715	88.0%
Commscope	Quant. Reach 0.860	88.0%
Commscope	Quant. Reach 1.125	88.0%
Times Fiber	Drop F59 series	85.0%
Times Fiber	Drop F6 Series	85.0%
Times Fiber	Drop F7 Series	85.0%
Times Fiber	Drop F11 Series	85.0%
Times Fiber	T10 Semiflex 0.500	87.0%
Times Fiber	T10 Semiflex 0.625	87.0%
Times Fiber	T10 Semiflex 0.750	87.0%
Times Fiber	T10 Semiflex 0.875	87.0%
Times Fiber	T10 Semiflex 1.000	87.0%
Times Fiber	TX10Semeflex 0.565	89.0%
Times Fiber	TX10Semeflex 0.700	89.0%
Times Fiber	TX10Semeflex 0.840	89.0%
Times Fiber	TX10Semeflex 1.160	89.0%
Trilogy Comm.	Drop F59 series	85.0%
Trilogy Comm.	Drop F6 Series	85.0%
Trilogy Comm.	Drop F7 Series	85.0%
Trilogy Comm.	Drop F11 Series	85.0%
Trilogy Comm.	MC2 0.440	93.0%
Trilogy Comm.	MC2 0.500	93.0%
Trilogy Comm.	MC2 0.650	93.0%
Trilogy Comm.	MC2 0.750	93.0%
Trilogy Comm.	MC2 1.000	93.0%

Recommend reviewing the Theory and Application Notes for a more detailed view of good traces and sample cable faults.