

# DVT30 Hands-Free TDR Probing System

## Differential & Single-Ended Impedance Measurements



**Fig 1. DVT30-1MM Dual Multi-Mode TDR kit:** Two Differential (convertible to SE) probes, pitch adjustment tools and four 25GHz RF cables.

### Applications

#### Measure Differential or Single-Ended Impedance

- Device Packages
- Flex Circuits
- Printed Circuit Boards
- Complete passive interconnect systems

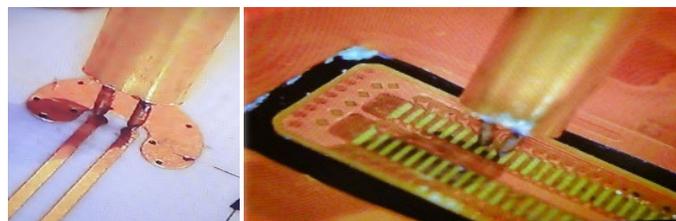
### Benefits

#### Camera and Probe Assisted Probing

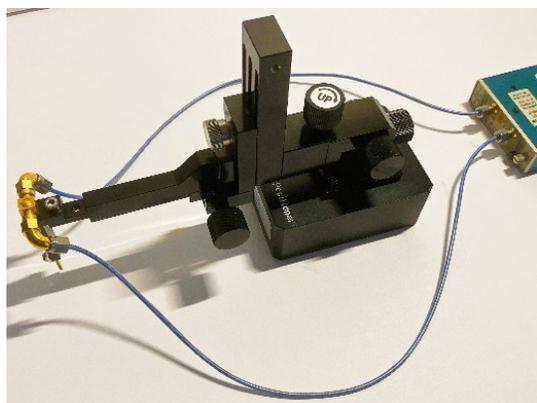
- Accurate and repeatable TDR probing
- Easily probe very small test pads (.4mm)
- Save money by extending probe tip life
- Positioner controls force to probe tips, reducing probe damage
- Increase probing efficiency
- No ground required



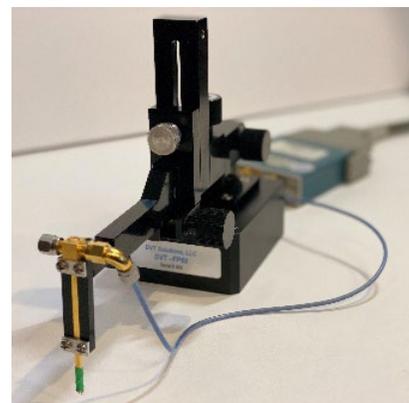
**Fig 2. DVT-CS-3 USB Dino-Lite microscope system**



**Fig 3. Camera view** on PC monitor from the DVT-CS-3 USB Dino-Lite microscope system, probing 1mm test pad (on left) and 350um flex test pad (on right) .



**Fig 4.** DVT30 shown installed in GPPMA adapters and connected to DVT-FP60 straight arm. Thread the right-angle adapters onto the probe connectors and attach the cables, keeping the connectors loose. Allow the cables to relax, then tighten adapters to the DVT30 connectors.



**Fig 5.** (Above left) DVT30 probe shown mounted in our GPPMA adapter and cables laying loosely on the table. (Above right) shows the DVT30 converted to a single ended probe. An SE conversion kit and instructions for conversion are included in the DVT30-1mm kit.

This datasheet describes the components that make up a complete desktop Time Domain Reflectometry (TDR) Hands-Free Probing system. The system includes two DVT30 multi-mode (single ended or differential) TDR GigaProbes®, a USB camera system and a probe manipulator. The components work together to support making hands free differential or single-ended (SE) impedance measurements on FLEX, Packages and PCB test pads down to a probe pitch between 350 um and 1.8 mm (SS or SG).

The **DVT30-1MM** Probe kit (*Figure 1*) contains two DVT30 variable pitch probe tips plated with conductive diamonds that cuts through surface oxide (*Figure 6*) for low ohm age repeatable measurements. One probe can be used as a differential probe and the other converted to a Single Ended probe. If one probe is damaged, you have a backup probe that can be sent back for a repair exchange.

The **DVT-CS-3** USB Dino-Lite microscope camera focus control makes it possible to accurately view and probe very small test pads, not possible to do with the human eye and it has a quick disconnect magnetic base & flexible arm (*Figure 2*).

The DVT30 probe is attached to the **DVT-FP60** (*Figures 4 and 5*) straight arm with the included GPMMA probe adapter. Using the DVT-FP60 XYZ, Theta 50 TPI probe arm positioner controls position and places the DVT30 probe tips on very small test pads. The DVT-FP60 has a magnetic base that keeps the positioner from moving while probing.

**How to use the system:** The DVT30 GigaProbes® is mounted on the end of the straight positioner arm via the DVT30 GPMMA adapter. The probe is positioned over the test pads using the Positioner XY controls on the DVT-FP60. Viewing the camera image on a PC of the probe test area (*Figure 3*), zoom in on the test pads and lower the probe tips onto them using the positioner's Z control. If a probe tip is not making contact with the test pads, the planarization control on the arm aligns the test probe to the test pads. The Z axis controls force to safely place the probe tips down onto the test pads to prevent them from being overdriven and potentially damaged.

## System Components

### Standard System Components

- DVT30-1MM **Dual** Probe Multi-Mode Probe Kit
- DVT-CS-3 USB Dino-Lite Microscope system
- DVT-FP60 Probe Positioner

### Options

- DVT30-1MM-1 **Single** Probe Multi-Mode Probe Kit (replaces DVT30-1MM)

### DVT30-1MM Dual- Probe Kit (*Fig. 1*)

- 2 - 20 GHz/27ps Multi-Mode Probes** convertible to Single Ended or Differential, with gold plated conductive diamond-plated probe tips to cut through surface oxide for repeatable high-bandwidth TDR measurements when probing at ANY angle.
- 2 - GPMMA** accessories for attaching probes to the DVT-FP60 Manipulator for hand free probing.
- 1 - Stainless Steel 110mm tweezers** for fine pitch probe adjustments and converting probe to single ended mode.
- 1 -Desk-Top 5X Macro-Lens Inspection Station.**
- 1 - Model 10 SMA Wrench** for quick probe tip pitch adjustment. Sets the probe pitch to 0.8 mm, 1.0 mm, or 1.27 mm and sets the probe tips on the same plane.
- 2 - Hand Held Probe Sleeve Adapters:** Easy to grasp Ultem Polyetherimide sleeve, an amorphous, amber-to-transparent thermoplastic.
- 4 - 24GHz SMA cables** for connecting DVT30 probes to TDR modules.
- 4 - Right Angle SMA Elbows** for routing SMA cables and reducing crimping to extend cable life.
- 1 - Single Ended conversion kit:** Consists of 2 SMA shorting caps, a ground strap and shrink wrap.
- 1 - Durable and attractive Wooden Box** for storage. Also contains probe tip pitch adjustment and support accessories.

### DVT-CS-3 Microscope System (Fig. 2)

**Video Camera Digital:** 1.3MP

**USB Microscope:** AM4113ZTL

**Imaging:** 1280 X 1024 Magnifier Camera

**Camera controller:** DVT-FP80 Manipulator  
12 axis arm, on screw lockdown, XYZ 40  
TPI controls, quick release magnetic base

**Camera Holder Adapter:** DVT-HDM1

### DVT-FP60 Probe Positioner (Fig. 4/5)

**XYZ-axis travel:** 16 mm with 500 um/turn (50 TPI)

**Θ control:**  $\pm 10^\circ$  with  $2.5^\circ$ /turn and  $0.025^\circ$  resolution

**Length:** 260 mm/6.1 in

**Width:** 76 mm/3.0 in

**Height:** 155 mm/6.1 in

**Weight:** 2702 grams/5 lb. 15.4 oz

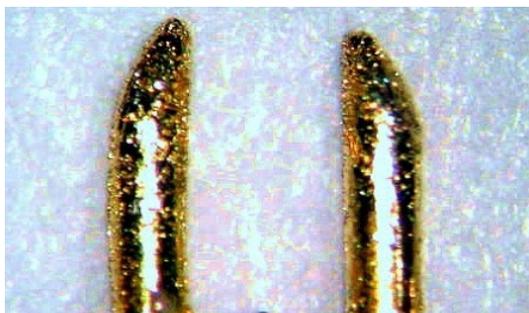
**Base:** Steel with magnets at bottom

**Probe Holder:** Removable/reversible RF/TDR

**Height coarse adjustment:** 4.8 mm/step (14 steps)

### DVT30 Multi-Mode Probe Specifications

- 30 GHz TDR Bandwidth (Not recommended for VNA measurements. Use DVT40 GigaProbes®)
- True Odd Mode Differential Input Impedance
- Measure Fully Balanced Differential Signals without Ground Contact.
- Probe can be converted to common mode Single Ended input impedance.
- Adjustable Probe Pitch from 0.35 mm to 1.8 mm.
- TDR Launch Discontinuity: <20 mv.
- TDR pulse Rise Time Degradation: 20ps (optimized for 20GHz TDR modules).
- Probe Tip diameter: 0.254 mm, 90um probe tip end width.
- Probe plated with 4-6um Conductive Diamonds: (Figure 6) for non-oxidizing probe tips for improving repeatable measurements with a probe force <10 grams.
- 2 - Cable Routing Sleeves: Used to combine SMA cables for easy cable management.



**Fig 6.** DVT30 probe tips plated with 4/6 $\mu$ m conductive diamond that cuts through surface oxide for reliably repeatable measurements.



**Figure 7.** DVT30 probing the bottom of a device package to measure internal trace impedance.

### Demo Videos on You Tube

Click on the links below or copy and paste them into your web browser to play the selected video.

DVT30-1MM probe kit demo: <https://youtu.be/zlwlsRVTBZQ>

Converting the DVT30 to a Single Ended impedance measurement probe: <https://youtu.be/obHCLaX7ViE>

DVT-CS-3 Low-cost flexible video camera stand for Dynalite camera: <https://youtu.be/DIQ3IjQ0rME>

**Note:** Some components in the videos may have been upgraded to newer components.