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

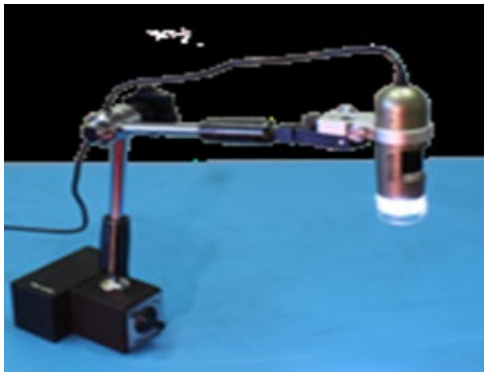

Fig 2. DVT-CS-3 USB Dino-lite microscope system

Camera image

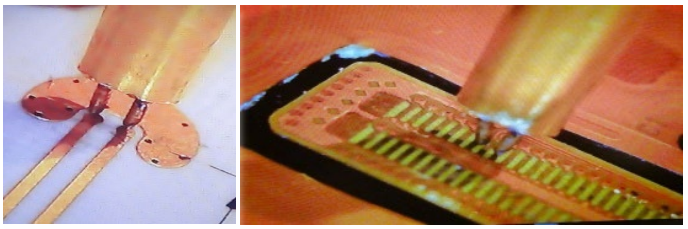

Fig 3. Camera view on PC monitor from the DVT-CS-3 USB Dino-light microscope system, probing 1mm test pad (on left) and 350um flex test pad (on right) .

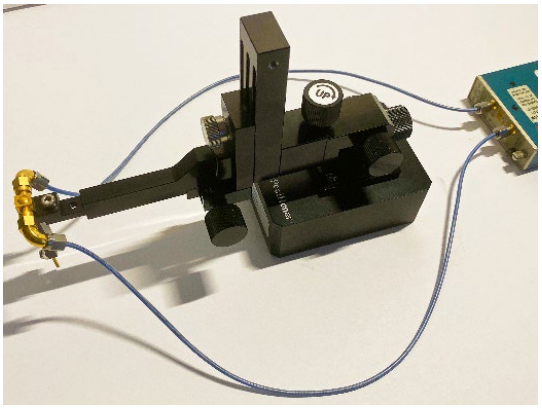

Fig 4. DVT30 shown installed in GPPMA adapters and connected to DVT-FP60 straight arm. Thread the right-angle adapters onto the probe connectors and attach the cables, keeping the connectors loose. Allow the cables to relax, then tighten adapters to the DVT30 connectors.

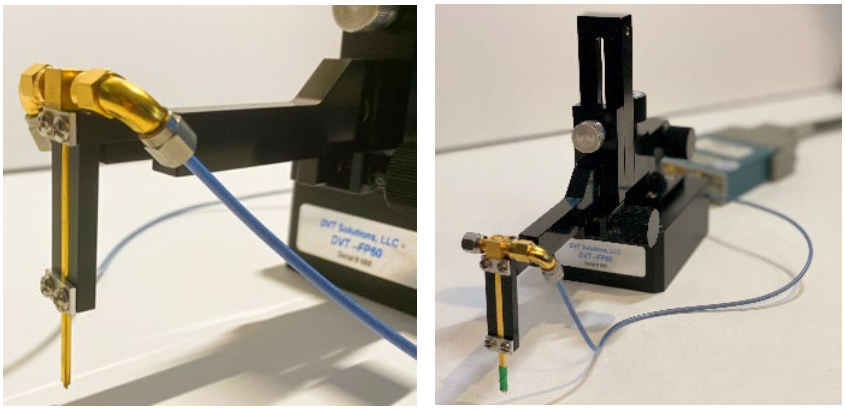

Fig 5. (Above left) DVT30 probe shown mounted in our GPMMA adapter and cables laying loosely on the table. (Above right) shows the DVT30 converted to a single ended probe. An SE conversion kit and instructions for conversion are included in the DVT30-1mm kit.

This datasheet describes the components that makeup 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).

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The **DVT30-1MM** Probe kit (*Figure 1*) contains two DVT30 variable pitch probe tips plated with conductive diamonds that cuts though 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 positions 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 though 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: ±10° with 2.5°/turn and 0.025° 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.

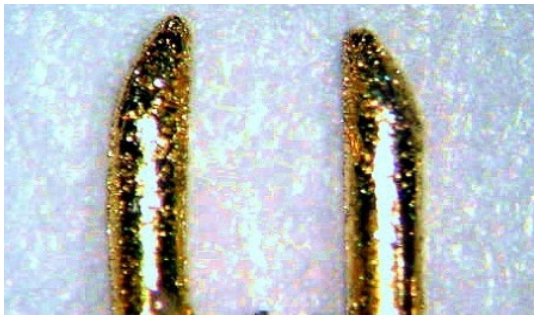

***Fig 6**. DVT30 probe tips plated with 4/6µm conductive diamond that cuts though surface oxide for reliably repeatable measurements.*

***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/zIwIsRVTBZQ
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.