

D-Probe

Rugged 40/20 GHz differential probe (signal-signal only)



Overview

D-Probe series is designed for signal integrity and RF testing. Its strong beryllium copper (BeCu) tips are perfect for direct probing of test pads on uneven surfaces, such as solder bumps. With only two signal pins, D-Probe can perform accurate measurements without the need of nearby ground pads. For example, many DDR chips do not have enough ground pins around their differential signals. In this case, typical GSSG probes cannot be used.

Recent advancement in 2X-Thru de-embedding methodology makes the D-Probe ideal for signal-integrity measurements. There is no need to perform the 4-port probe-tip calibration that is laborious and time-consuming. A 4-port electronic calibration at the cable connectors can be done in minutes.

The user experience of D-Probe is similar to that of the microprobe. TP250 Precision Positioner allows an engineer to switch between the D-Probe and microprobe easily.

Specifications

- **Bandwidth:** 40/20 GHz
- **Insertion Loss:** less than 3 dB @ 40/20 GHz
- **Impedance:** 100±3 Ohm
- **Connector Type:** 2.92mm/SMA Female
- **Size:** 51 x 38 x 12 mm (2 x 1.5 x 0.5 in)
- **Weight:** 10 gm
- **Probe force:** 80 gm (typical)
350 gm (max w/o damage)

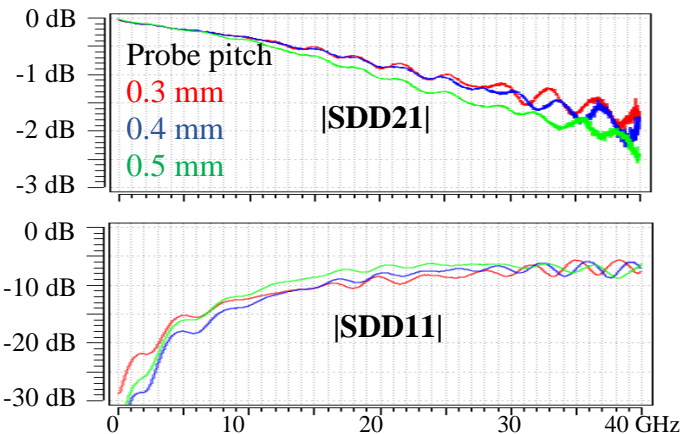
20 GHz D-Probe Part Number:

- **DP-SS-201503** – 20 GHz, 0.3 mm/12 mil pitch
- **DP-SS-201504** – 20 GHz, 0.4 mm/16 mil pitch
- **DP-SS-201505** – 20 GHz, 0.5 mm/20 mil pitch
- **DP-SS-201508** – 20 GHz, 0.8 mm/32 mil pitch
- **DP-SS-201510** – 20 GHz, 1.0 mm/40 mil pitch
- **DP-SS-201512** – 20 GHz, 1.2 mm/48 mil pitch

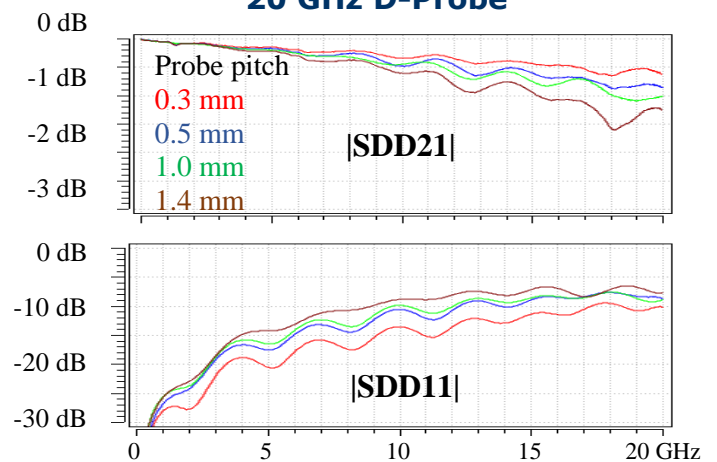
Features:

- **High Bandwidth:** DC to 40/20 GHz
- **Low Insertion Loss:** < 3 dB @ 40/20 GHz
- **Signal-Signal Only:** Accurate S-parameter and TDR measurements without the need of nearby ground pads
- **Ruggedness:** Strong enough for direct probing of uneven solder bumps
- **High Repeatability:** No moving parts
- **Applications:** Measurements for Delta-L+ PCB, DDR memory, PCIe, USB, HDMI, Display Port, and 100 Gigabit Ethernet boards

40 GHz D-Probe



20 GHz D-Probe



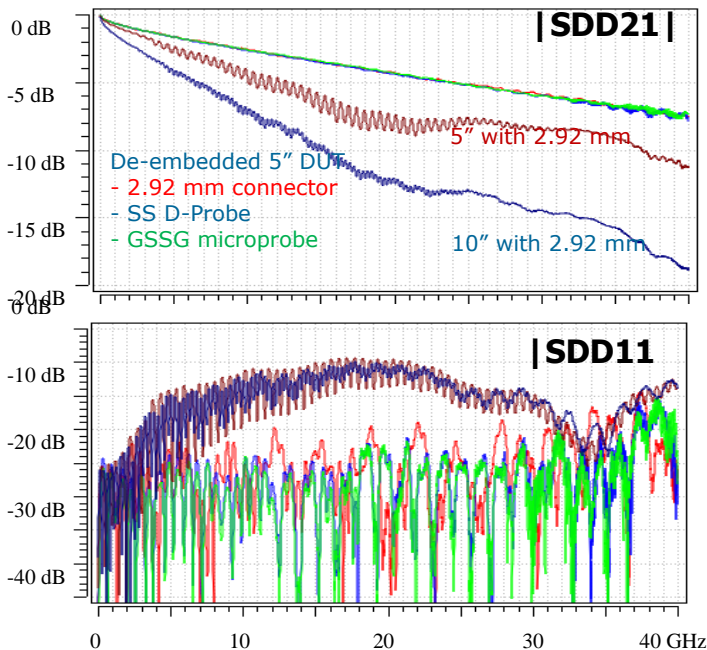
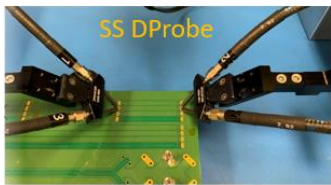
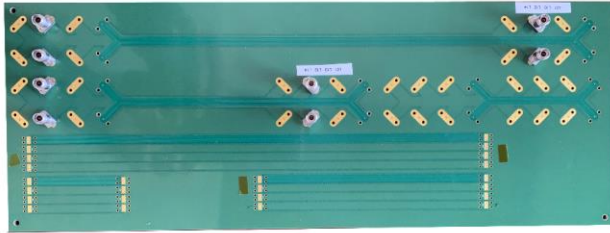
40 GHz D-Probe Part Number:

- **DP-SS-401503** – 40 GHz, 0.3 mm/12 mil pitch
- **DP-SS-401504** – 40 GHz, 0.4 mm/16 mil pitch
- **DP-SS-401505** – 40 GHz, 0.5 mm/20 mil pitch

S-Parameter Measurement

With de-embedding tools, such as AITT-SFD, SS-only D-Probes, GSSG microprobes, and connectors provide comparable accuracy. Measurement data of a Delta-L 4.0 PCB with various differential striplines and via stubs are used for the comparison among the D-Probes, GSSG microprobes, and 40-GHz 2.92 mm connectors. Delta-L 4.0 unified probe launch allows both SS D-Probes and GSSG microprobes to probe the identical traces.

40 GHz Delta-L 4.0 Test Board

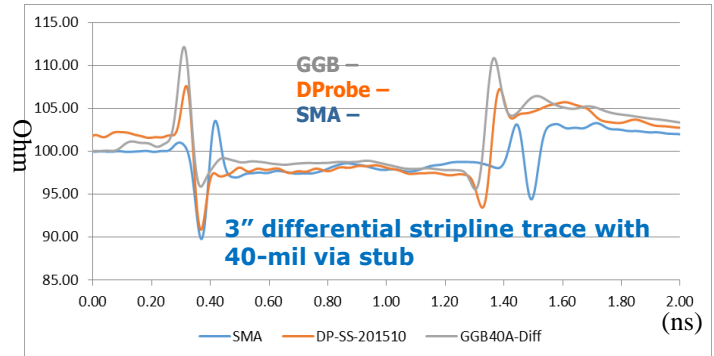


Comparison of S-Parameter Measurements

By using the 5" trace as the 2X Thru, the Sdd21 and Sdd11 of the de-embedded 5" trace show that 2.92 mm connector, SS only D-Probe, and GSSG microprobe provide the comparable accuracy up to 40 GHz. The 2X Thru method removes the effects caused by the via and probe contact.

TDR Measurement

D-Probe is also ideal for TDR measurements that are essential to the development of high-speed CPU, FPGA, and Flex printed circuit boards.



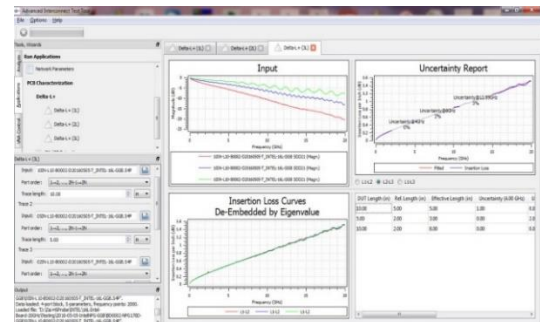
Comparison of TDR measurements

Delta-L+ PCB Test Solution

This 40/20 GHz solution includes two DP-SS-401505DL/201510DL handheld probes, and AITT-DLP tool for Intel Delta-L+ PCB test method.



40/20 GHz Delta-L+ Handheld Probes



AITT-DLP Delta-L+ Software Tool (40 GHz)

Accessories

- AITT-DLP (Delta-L+ software tool, 40 GHz)
- DP-SS-201510DL (20 GHz Delta-L 3.0 hand probe)
- DP-SS-401505DL (40 GHz Delta-L 4.0 hand probe)
- DP-SS-2015xxHL (20 GHz hand probe)
- D-Probe Hand-probe kit (DP-SS-2015xx-Kit)



D-Probe on TP250



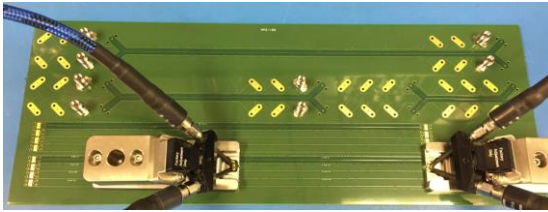
DP-SS-2015xxHL



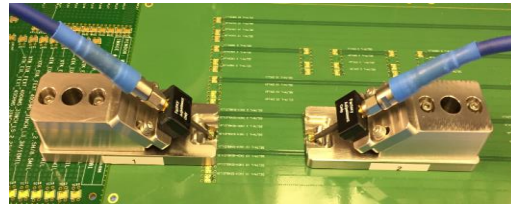
DP-SS-2015xx-Kit

Handheld Probes for Delta-L 4.0 and Delta-L 3.0

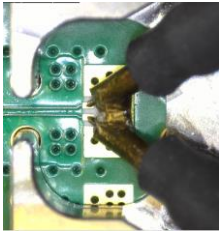
PacketMicro offers three different handheld probes for PCB characterization based on Delta-L 4.0/3.0 methodology that enables accurate PCB trace loss measurements and material extraction by removing the via effect.



Differential Signal-Signal Probes

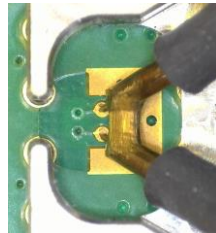


Single-ended Signal-GND Probe



Delta-L 4.0

(40GHz 0.5 mm D-Probe)



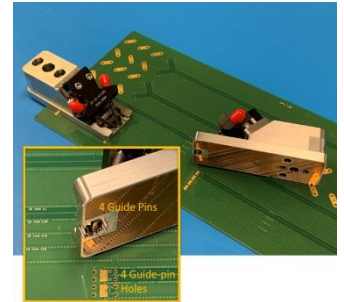
Delta-L 3.0

(20 GHz 1.0mm D-Probe)



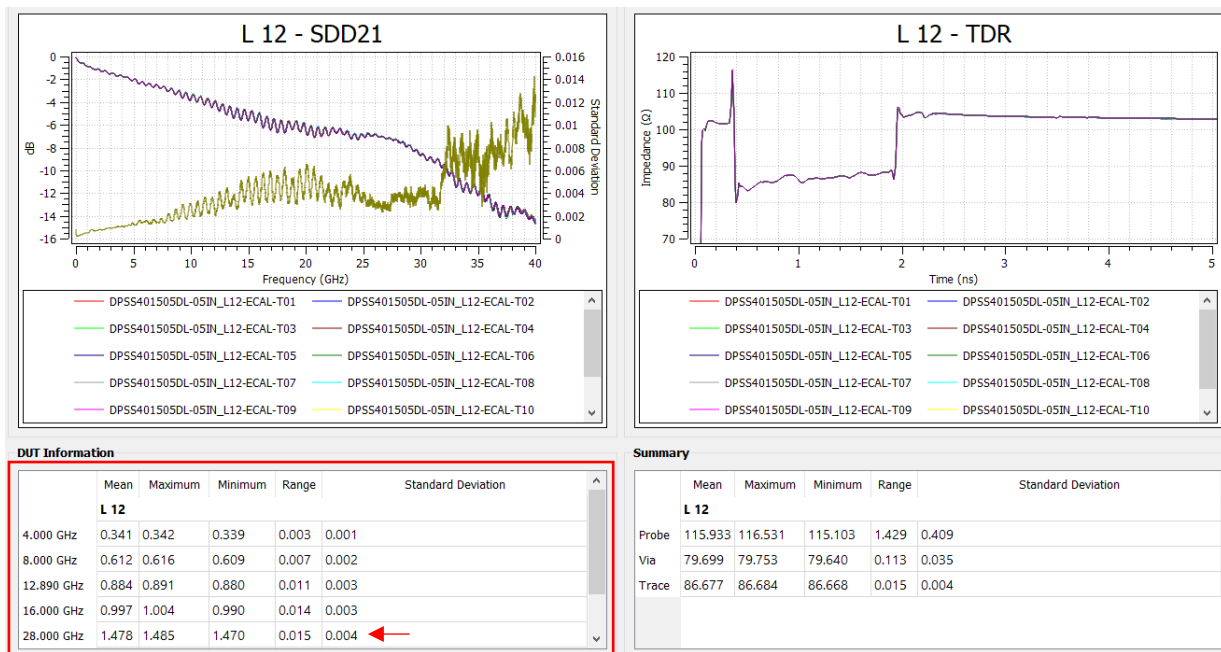
Delta-L 3.0

(18 GHz 1.0mm S-Probe)



Excellent Probing Repeatability

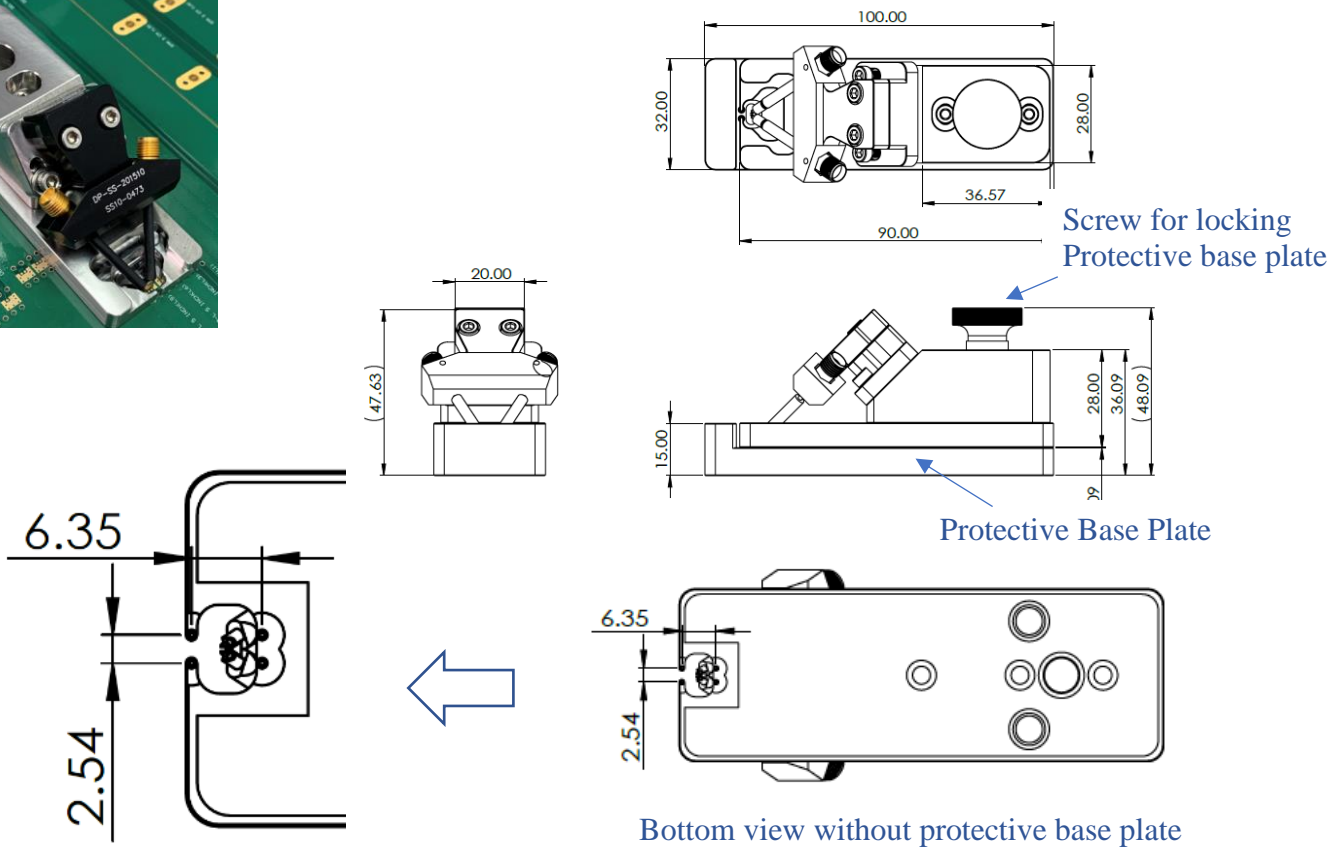
In addition to the probe bandwidth requirement, the probing repeatability is essential. PacketMicro handheld probes are specifically designed for Intel Delta-L+ methodology and has excellent repeatability due to its constant probe force and launch angle. The following report, generated by AITT-DLP tool, shows that 12 different measurements were performed on the same differential trace. The standard deviation is 0.004 dB @ 28 GHz.



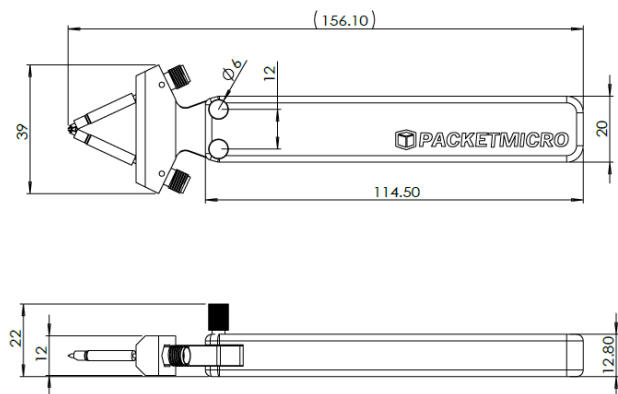
Notes:

- DP-SS-401505DL/DP-SS-201510DL handheld probe is specifically designed for Intel Delta-L+ methodology. User should refer to the Intel document for the detail probing pad footprint in PCB layout design.
- Any adjustment of the DP-SS-401505DL/DP-SS-201510DL should be sent back to PacketMicro or its authorized distributors for services. Please do not remove the DProbe from its DP-hand02 fixture.

DP-SS-401505DL/DP-SS-201510DL Dimensions (mm)



DP-SS-2015xxHL Dimensions (mm)



About PacketMicro

PacketMicro, headquartered in Silicon Valley, provides one-stop shopping for your needs in PCB probing and signal-integrity analysis. Its product offering includes a wide range of rugged RF probes up to 40 GHz, patented probe positioners, DIY bench-top probe stations, flexible phase-stable RF cables, digital microscopes, and AITT signal-integrity analysis tools for interconnect de-embedding and PCB material extraction. PacketMicro customers include many Fortune 100 companies in 30+ countries. For more information, please visit www.packetmicro.com.