D-Probe
Rugged 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 and Flex PCB do not have enough ground pins around their differential signals. In this case, typical GSSG type 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 ECal at the SMA connectors can be done in minutes.

The user experience of D-Probe is similar to that of the microprobe. Precision Positioners TP250 or TP300 allow an engineer to switch between the D-Probe and microprobe easily.

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

D-Probe Part No. Information
- **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 20 GHz
- **Low Insertion Loss:** < 3 dB @ 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 DDR memory, Flex PCB, and PCB characterization

Advanced Interconnect Test Tool (AITT-SFD) is used to extract the single D-Probe SDD21 and SDD11 from the total S4P of two D-Probes touching at their signal-signal tips.
S-Parameter Measurement

With de-embedding tools, such as AITT-SFD, SS-only D-Probes and GSSG microprobes provide comparable accuracy. Measurement data of a Megtron-6 PCB with various differential striplines and via stubs are used for the comparison among the D-Probes, GGB40A-GSSG probes, and 26-GHz SMA connectors. Special probe launch is designed to allow both D-Probes and GGB microprobes to probe the identical traces.

TDR Measurement

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

PCB Transmission Line Measurements

SS D-Probe and GSSG microprobe have comparable accuracy up to 20 GHz

Accessories

- D-Probe Handle (DP-Hand01) for hand probing
- D-Probe Hand Fixture for Delta-L (DP-Hand02)
- TP250 4D (xyzθ) Precision Positioner
- FP160 4D (xyzθ) Flex Positioner
- Dino-Lite Digital Microscope
- Flex Probe Station
**Excellent Repeatability of DP-SS-201510DL for Delta-L+ Probe Launch**

![Image of probe launch]

**Excellent Repeatability**

DP-SS-201510DL handheld probe is specifically designed for Intel Delta-L+ methodology and has excellent repeatability due to its constant probe force and launch angle. The left table shows that 10 different tests are performed on the same differential trace. The standard deviation is less than 0.005 dB @ 12.89 GHz.

<table>
<thead>
<tr>
<th></th>
<th>4 GHz</th>
<th>8 GHz</th>
<th>12.89 GHz</th>
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<tbody>
<tr>
<td>T1</td>
<td>0.402</td>
<td>0.691</td>
<td>1.029</td>
</tr>
<tr>
<td>T2</td>
<td>0.404</td>
<td>0.694</td>
<td>1.034</td>
</tr>
<tr>
<td>T3</td>
<td>0.403</td>
<td>0.693</td>
<td>1.038</td>
</tr>
<tr>
<td>T4</td>
<td>0.401</td>
<td>0.693</td>
<td>1.035</td>
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<td>T5</td>
<td>0.404</td>
<td>0.698</td>
<td>1.045</td>
</tr>
<tr>
<td>T6</td>
<td>0.402</td>
<td>0.692</td>
<td>1.032</td>
</tr>
<tr>
<td>T7</td>
<td>0.404</td>
<td>0.694</td>
<td>1.036</td>
</tr>
<tr>
<td>T8</td>
<td>0.404</td>
<td>0.695</td>
<td>1.037</td>
</tr>
<tr>
<td>T9</td>
<td>0.404</td>
<td>0.696</td>
<td>1.037</td>
</tr>
<tr>
<td>T10</td>
<td>0.402</td>
<td>0.692</td>
<td>1.026</td>
</tr>
<tr>
<td>Average</td>
<td>0.403</td>
<td>0.694</td>
<td>1.035</td>
</tr>
<tr>
<td>Max</td>
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<tr>
<td>Min</td>
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<tr>
<td>Range</td>
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<tr>
<td>σ</td>
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<tr>
<td>Average+σ</td>
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<td>0.700</td>
<td>1.051</td>
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</tbody>
</table>

**About PacketMicro**

PacketMicro, based in Silicon Valley, provides a wide range of rugged gigahertz probes, probe positioners and stations, flexible RF cables, and microscopes for bench-top testing. PacketMicro customers include many Fortune 100 companies. For more information, please visit www.packetmicro.com.

**DP-Hand01 Dimensions (mm)**

![Image of DP-Hand01 Dimensions]
DP-SS-201510DL Dimensions (mm)

Notes:
- 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-201510DL should be sent back to PacketMicro or its authorized distributors for services. Please do not remove the DProbe from its DP-hand02 fixture.