**APPLICATION NOTE**

# Plating 30 GHz TDR Test Probes with Gold plated Conductive Diamonds

**Deposits 1000's of very sharp, non-oxidizing, conductive gold plated diamonds on the probe tips**

**BENEFITS**

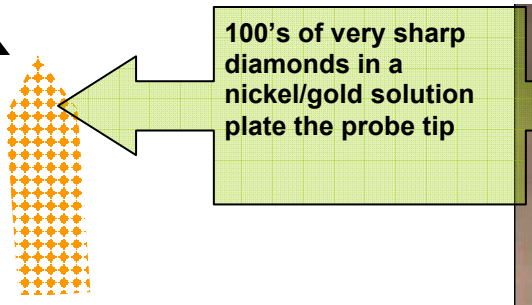
- Easily breaks though surface oxide when probing
- Creates a probe connection as good as solder
- Provides repeatable TDR measurements
- Allows probing at any angle

*"Performance as good a solder"*

*www.gigaconnections.com*

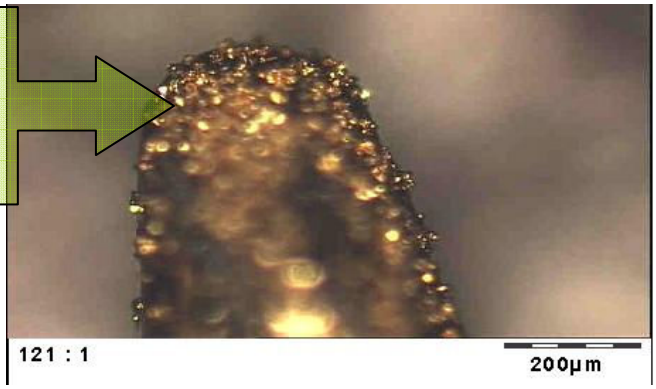
**PROBLEM:** To achieve effective 30 GHz TDR measurements, the probe tip must penetrate with enough force to break though all surface oxides and other contaminants present on PCB traces. Additionally, if the surface is not consistently cleaned, it takes increasing pressure to scrub through the oxide and other contaminants, while potentially damaging the probe tips with excessive probing force. Non-vertical probing is sometimes desired and generally not achievable when maximum downward force is required.

**SOLUTION:** Plate the probe tips with Conductive Diamond Plating (CDP). The CDP process places 100's of very sharp diamonds in a nickel/gold solution on the very tips of the probes, with 1000's on the overall probe surface. These gold-plated, conductive diamonds do not corrode and easily break though surface oxides and contaminants when probing. Probing force can be reduced to as little as 10 grams while creating a temporary connection as good as solder. As a result, the TDR measurements to 30+ GHz are repeatable, and the probes are more effective. Probing at any angle is now possible, because no matter which direction the probing occurs, the CDP makes sufficient electrical contact.

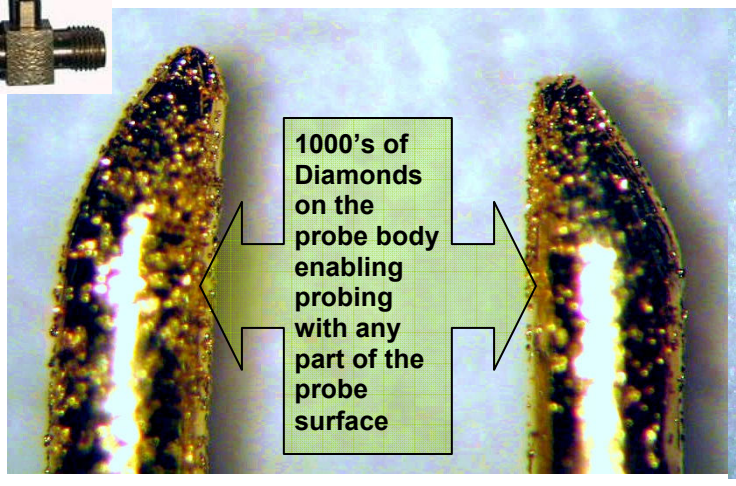


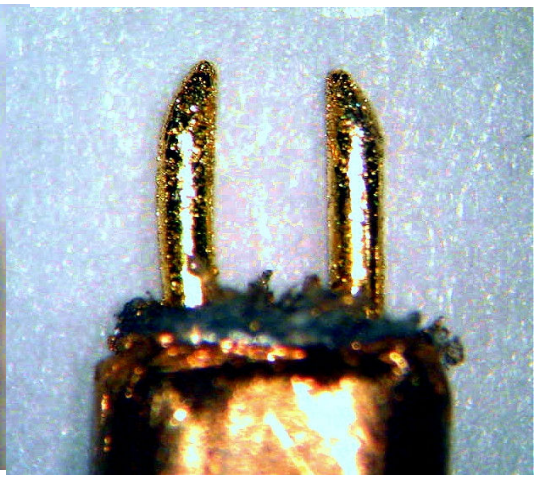

30GHz Differential TDR probe from DVT Solutions, LLC
www.gigaprobes.com

Giga Probes



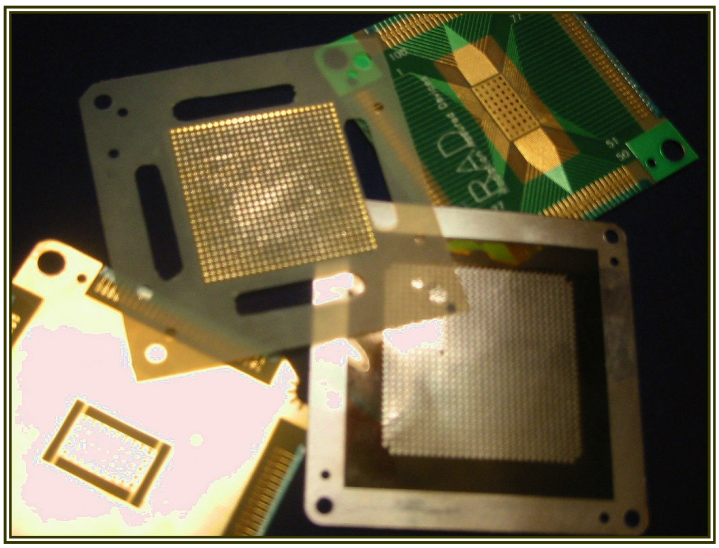

121:1 magnification of GigaProbes probe tip covered with Conductive Diamonds. Each act as little probe tips with no measurable inductance or capacitance



## Conductive Diamond Plating Specifications

- > 40 GHZ bandwidth
- No scrubbing required for electrical connections
- Gold plated 10-20 micro-inches of gold (standard).
- >100,000 mate/de-mate cycles without measurable degradation in signal integrity.
- As little as 10 Grams of force requirement to achieve continuity connection.
- Current handling for 10 mil diameter size pad is ~15amps.
- No inductance, no capacitance, 1 % increase in impedance.
- (CDP) material is not harmed by compression.
- Ability to withstand environmental changes: temperature/humidity/vibration/shock
- Corrosive resistant, and can be exposed to salt.
- (CDP) Material can be custom designed to withhold up to 26 Gs of shock and vibration.
- Temperature dependence is determined by the substrate material:
  - –40C to 150C FR4
  - –60C to 200C for Kapton film
  - 4K to 400 C on crystalline (ceramic or silicon) substrate.
- Contact point size is 5um; 4-mil pitch can be achieved.
- Clean with an ultrasound. Otherwise use an adhesive tape that leaves no residue.
- RoHs compliance - lead free



40GHz Diamond Plated Interposers for any size test socket or device


**Contact Information**

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GIGA CONNECTIONS, INC