

TWENTY THIRD ANNUAL



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Archive

Introduction of Unique Coaxial Socket with the Use of Flexible Printed Circuit (FPC)

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Introduction of Unique Coaxial Socket with the Use of Flexible Printed Circuit (FPC)

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Background

- Coaxial socket has been around for years
- This technology is known to be the best solution for high-speed test, but with high cost
- Trend of IC package will be larger outside dimension and higher pin count
- Easy operation, reduced socket damage, and total cost of ownership will be key design features for coaxial socket when looking at future package trend



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Design Goals for Unique Coaxial Solution

- Robust design which meets the demands of the test floor environment and protects contact pins from damage, reducing the need for delicate handling practices
- Eliminate shorting risk between the PCB and the metal housing
- Exceed all relevant electrical requirements to ensure consistent performance over the socket life
- Reduce total cost of ownership and deliver competitive pricing



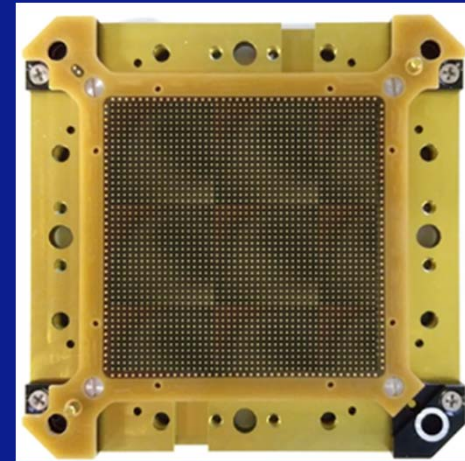
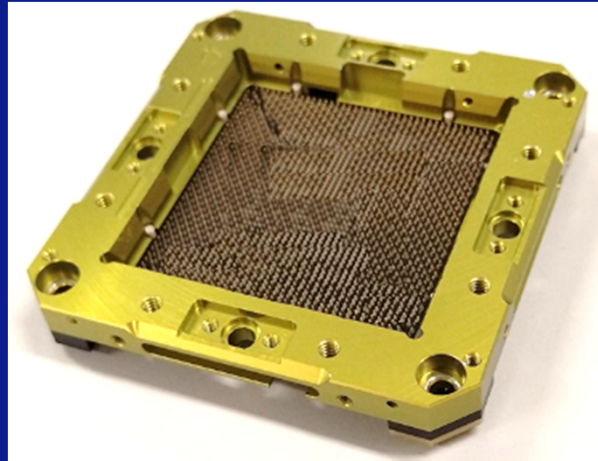
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The Result – Unique Coaxial Socket

- Innovative new socket. Simple, Robust, Better

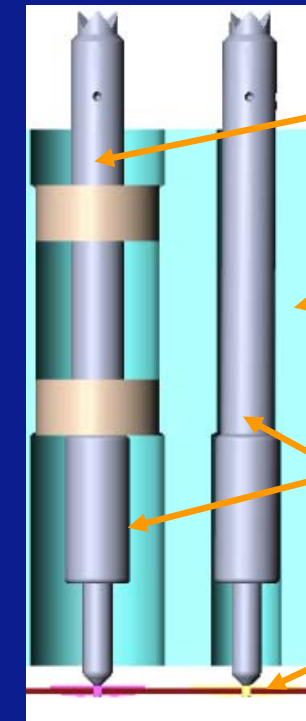
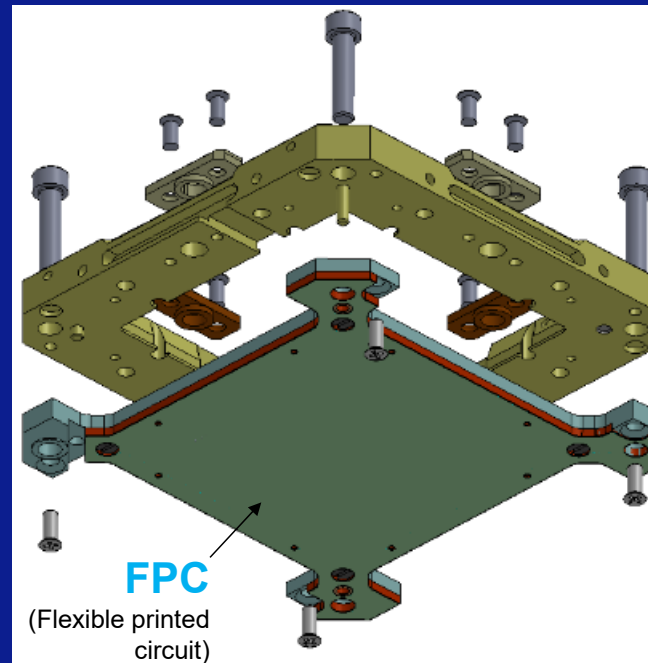
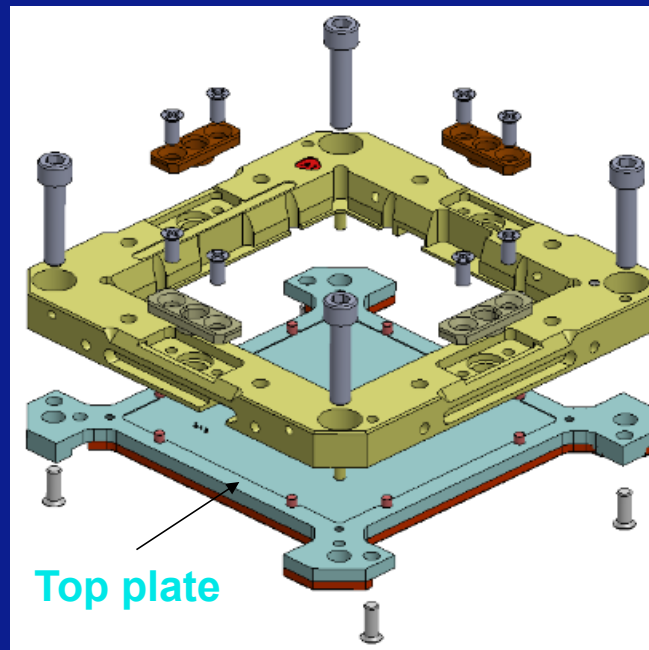


2k Pin Reference Socket

Introduction - Unique Coaxial Socket

Patent pending

- Concept: Robust and user friendly



Impedance controlled structure

Top plate
(Metal)

One pin for
Signal/PWR/
GND

FPC

Pin Cross section



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Innovative Features

- Simplified contact module design minimizes impedance mismatch variation and removes costly machined metal plate, now only one required
- Contact pins are protected during loading and maintenance by the FPC layer
- Only one pin is used for signal, power and ground

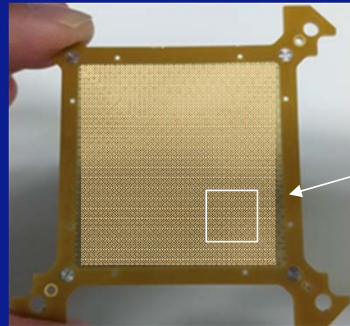


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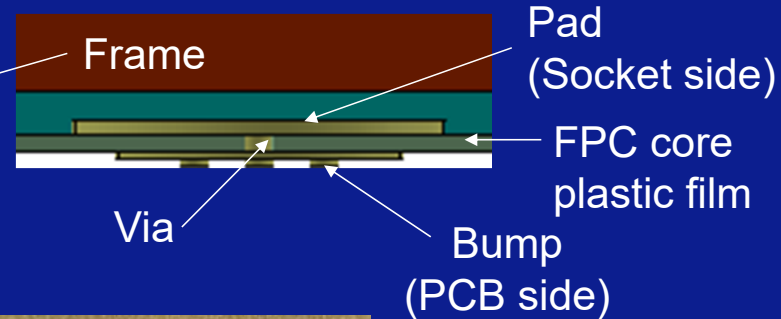
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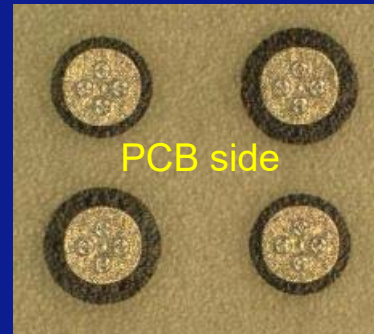
Innovative FPC Design Features



Cross section (FPC with frame)



Socket side



PCB side

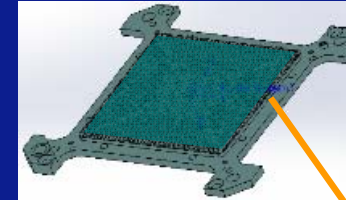


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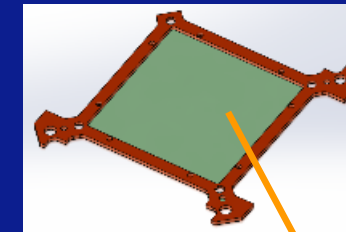
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Top plate



+

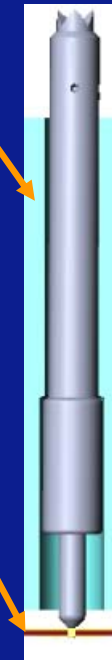
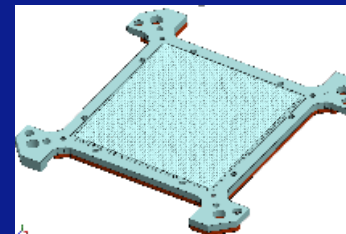
FPC



Assembly



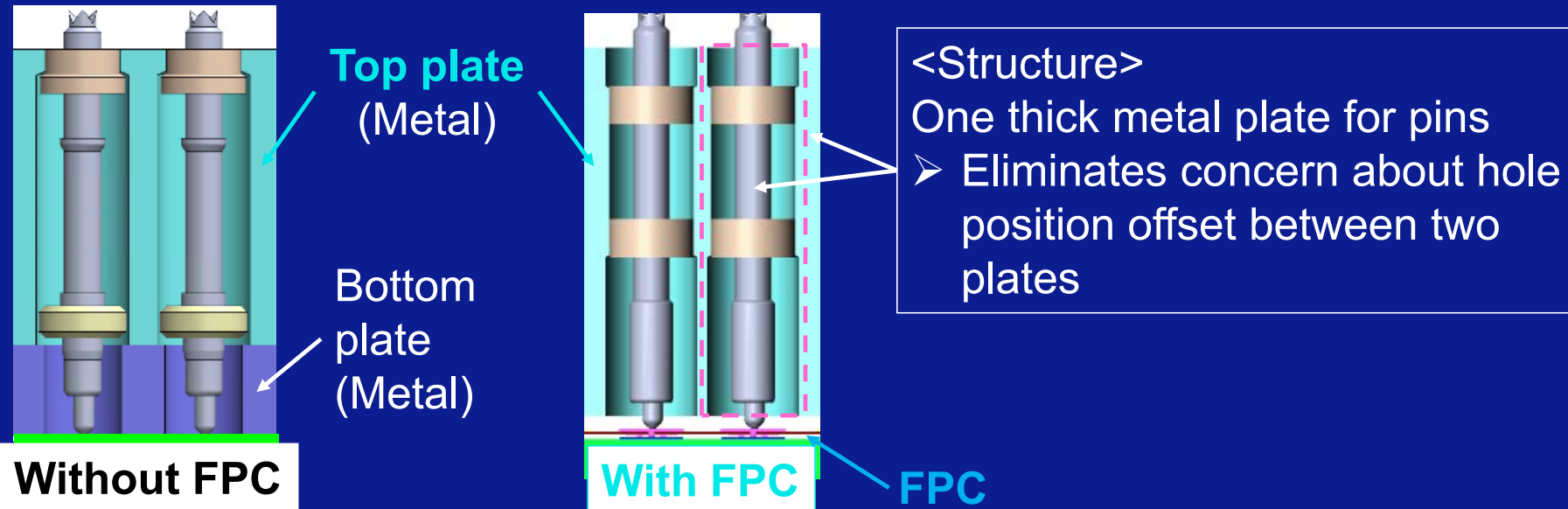
Contact Module



Advantage of FPC (1)

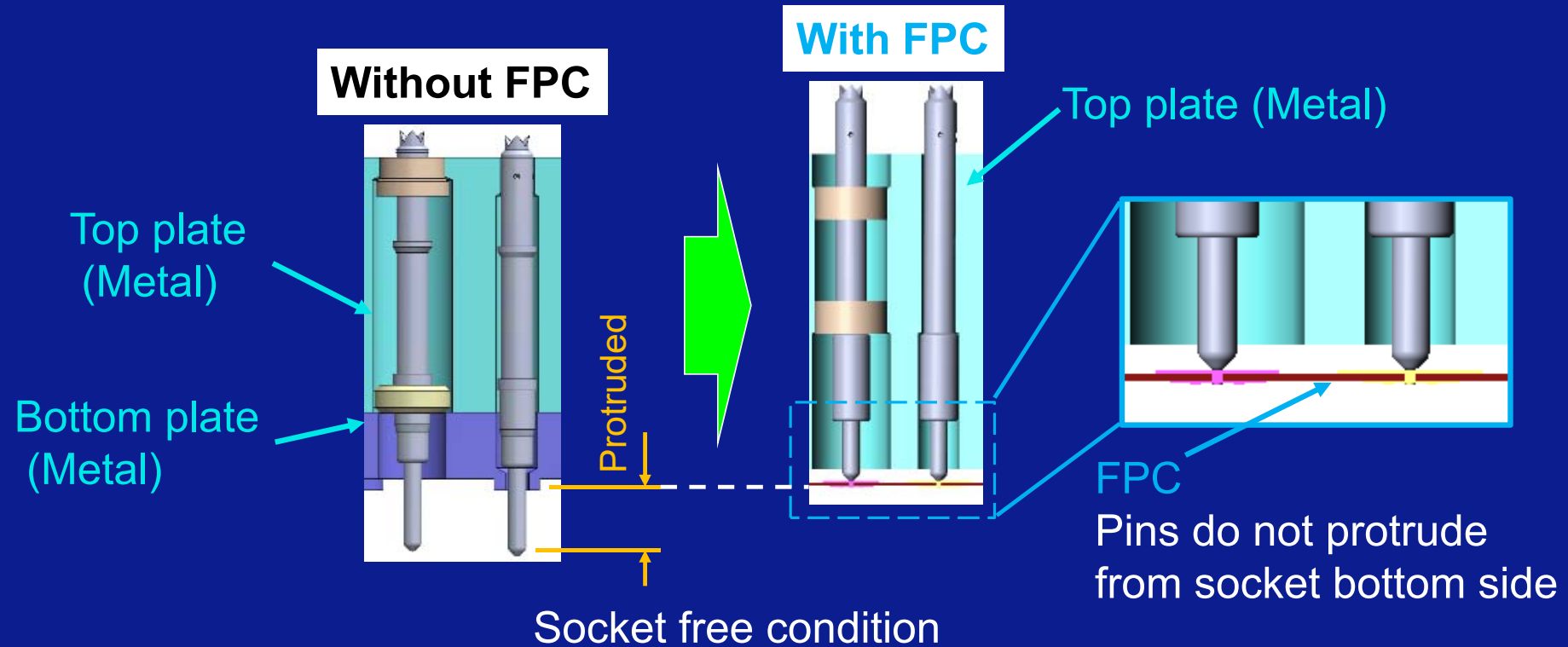
Optimized impedance control

Single plate structure improves impedance control and minimizes impedance mismatch



Pin Protection Structure

FPC retains Plunger B to avoid broken pin tip



Current Issue without FPC

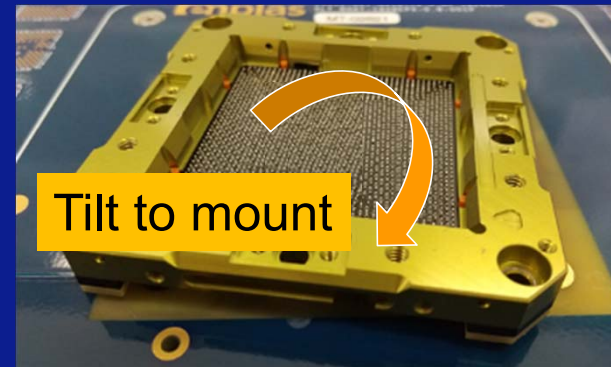
Support PCB side **pin tip protection and ease of socket mounting**

Without FPC



Large protrusion of probe
High risk of damage for Probe
and PCB

+



Tilt to mount



Create
pin bent,
damage

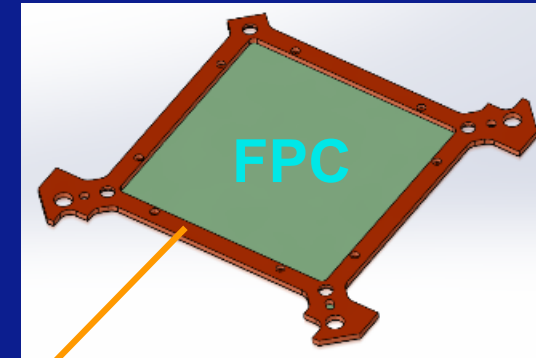
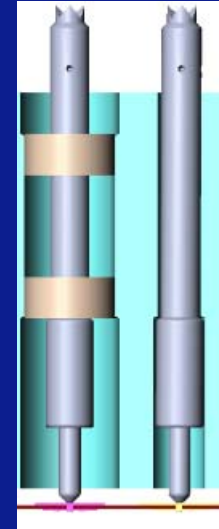
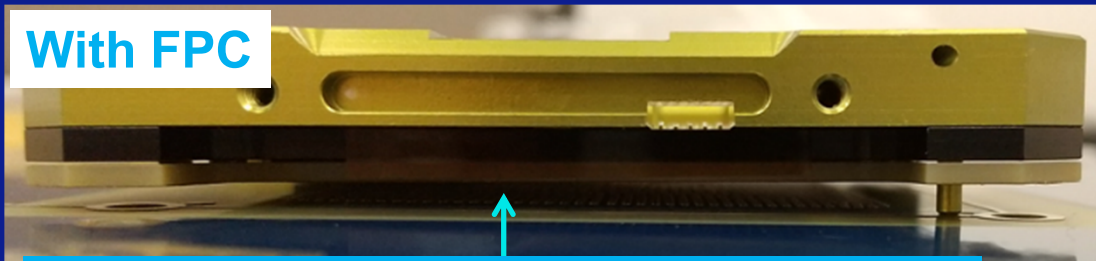


Advantage of FPC (2)

Support PCB side **pin tip protection and ease of socket mounting**

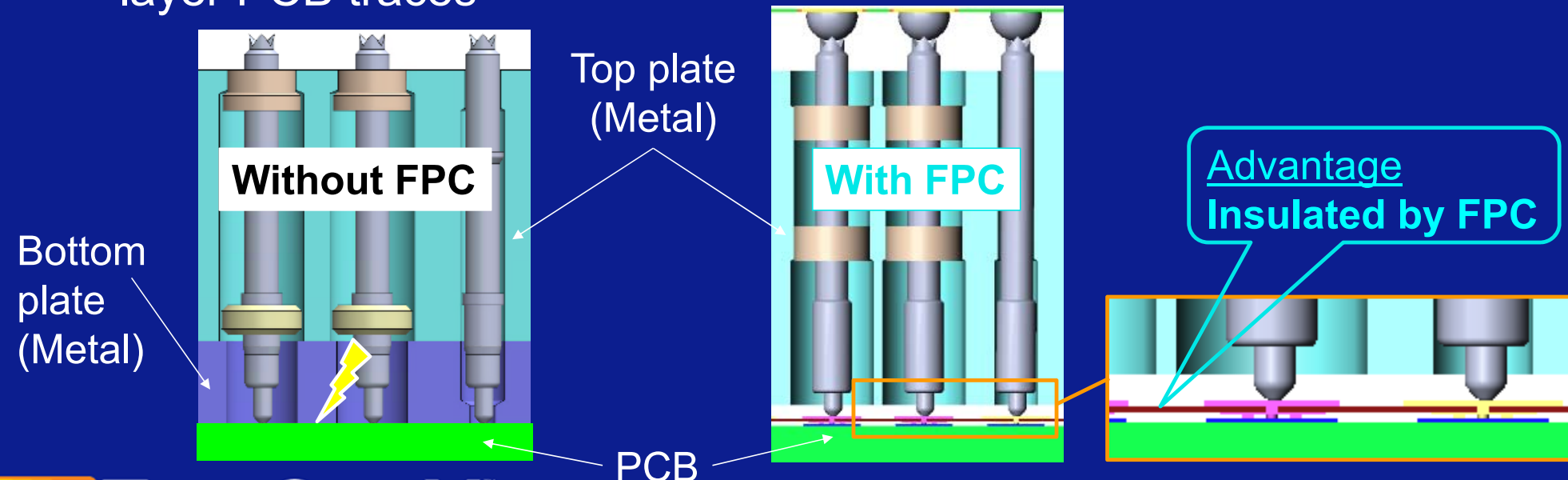
With FPC

No protrusion of probe. It's very safe



Advantage of FPC (3)

- Insulates between metal body and PCB surface **to prevent a risk of electrical short**
- **Reduces coupling** between grounded metal pin block and top layer PCB traces



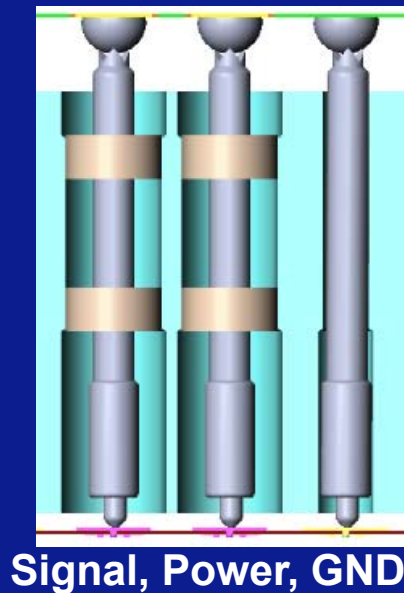
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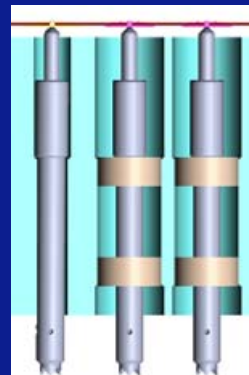
One Pin for all Signal, Power, and Ground

Improve total cost of ownership by one pin with "idiot proof" design

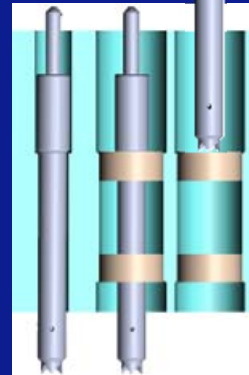


Easy operation

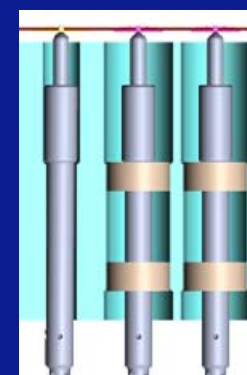
Remove
FPC



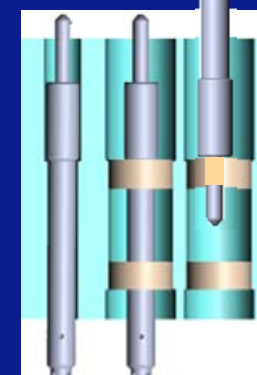
Replace
pin



Return
FPC



Ex)
Wrong
insertion



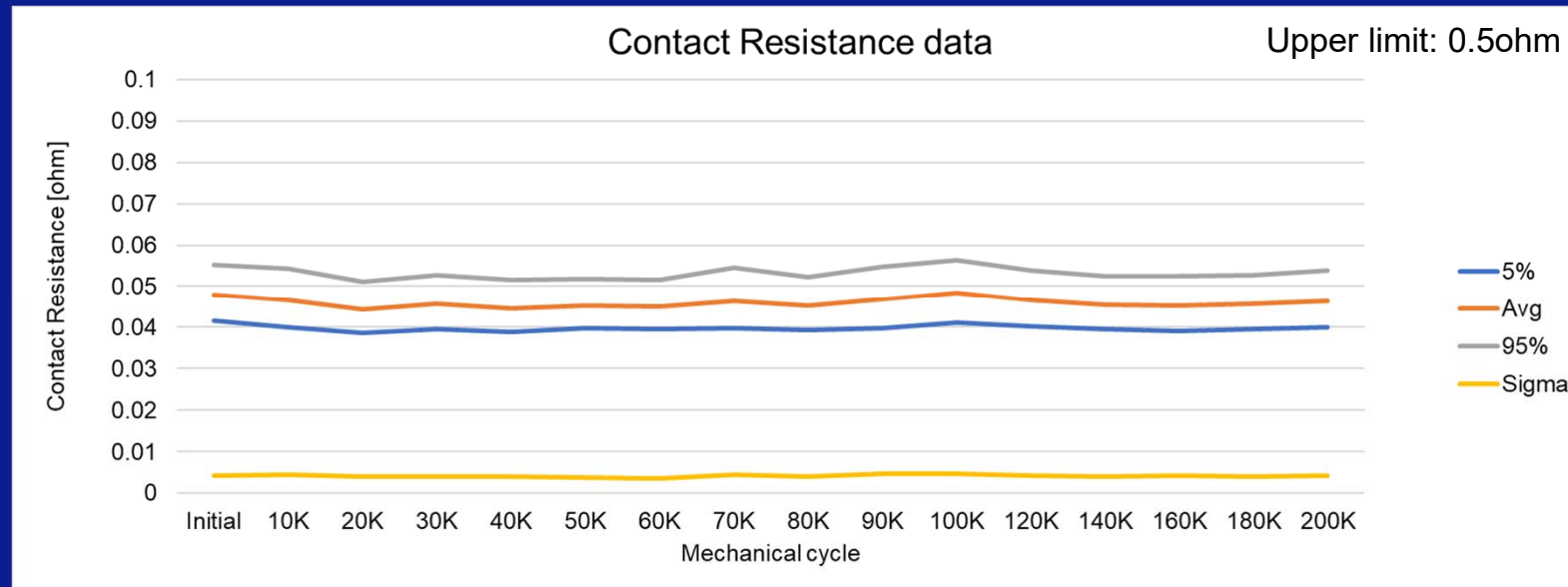
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Internal Evaluation Result Contact resistance data

- Very stable contact resistance



Test condition

- Mechanical cycle test to 200K at room temperature
- Socket pin count 2,000



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Internal Evaluation Result FPC pad condition check

- Normal witness mark observed

Contact position check



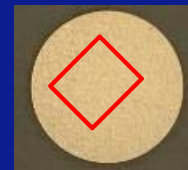
FPC pad to pin
(Plunger B)



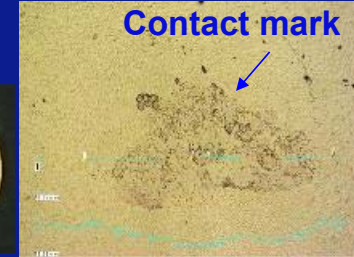
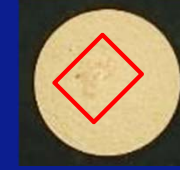
FPC pad to PCB pad

FPC pad after 200K cycle

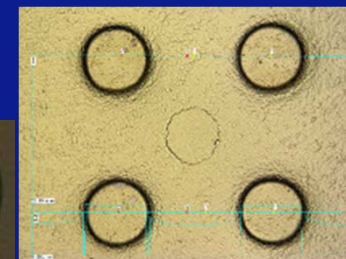
Pin
side



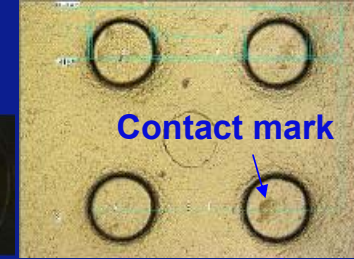
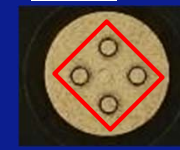
Pin
side



PCB
side



PCB
side



Initial

After 200K



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Summary

Unique innovation, a new Coaxial socket with many improvements over the current standard

- **Eliminates impedance disconnect between drilled metal plates**
- **Reduces coupling to top layer high speed PCB traces**
- **Significant reduction of shorting risk**
- **A simple, more robust contact module with FPC**
- **One pin for signal, power, and ground**
- **Easier installation and maintenance**
- **Lower total cost of ownership / competitive price**



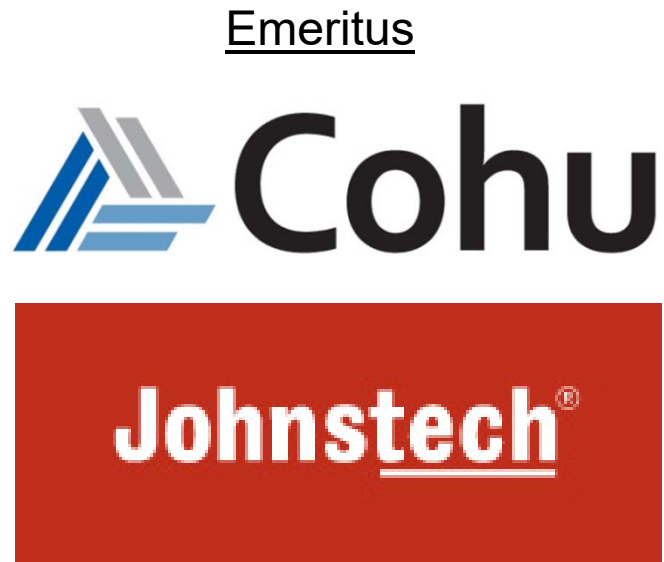
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