

smiths interconnect



# Semiconductor

Test Connectivity Solutions

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CUTTING-EDGE  
CONNECTIVITY

# About Smiths Interconnect



## We Offer



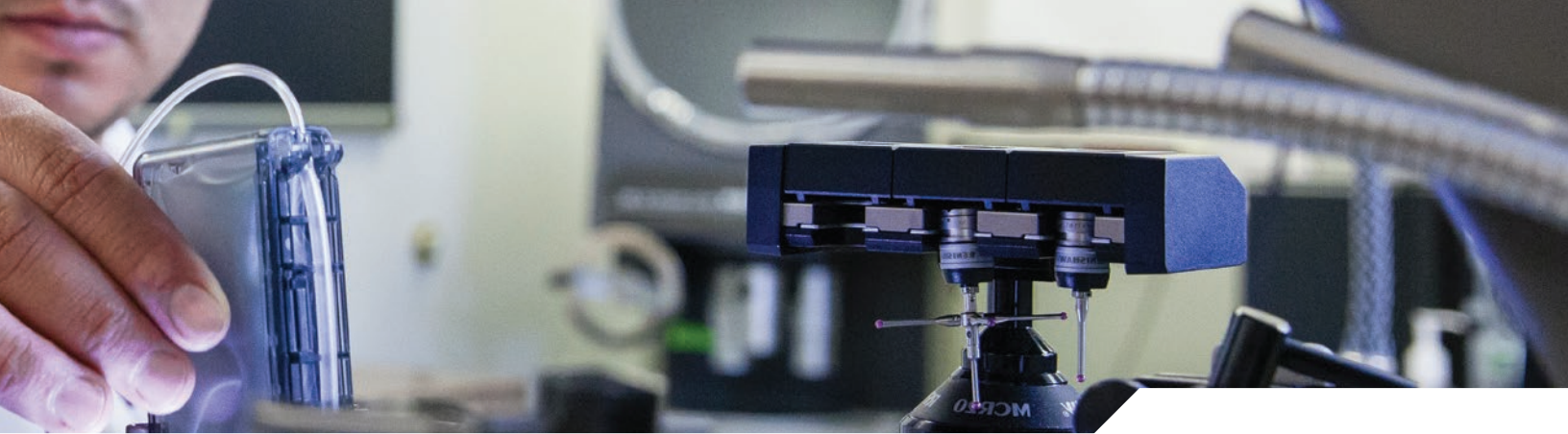
Smiths Interconnect is a leading provider of technically differentiated electronic components, subsystems, microwave, optical and radio frequency products that connect, protect and control critical applications in the Defense and Aerospace, Communications and Industrial markets.

Smiths Interconnect is a leading provider of innovative solutions for critical semiconductor test applications. Smiths Interconnect's test sockets and probe card solutions offer superior quality and reliability, providing customers with a competitive advantage.

Our best-in-class engineering and technical expertise ensure the development of cutting-edge test platforms for area array, peripheral, wafer level and Package on Package (PoP) devices.

Our extensive product portfolio accommodates both devices with finest micro pitches and those with very high bandwidth requirements. Off-the-shelf and custom products are proven to deliver the best solution for the customer's specific needs.





## Defense & Aerospace



## Communications



## Industrial



**Your partner  
of choice for  
cutting-edge  
connectivity  
solutions**

**60+** Years  
Experience

### Technology

Broad Range of Advanced  
Interconnect Technologies

### Flexibility

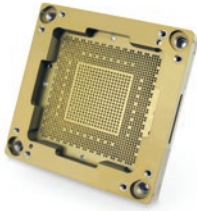
High Volume Product Platforms  
& Complete Tailored Solutions

### Service

Global Reach with  
Local Support

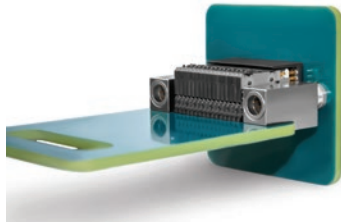
Smiths Interconnect is part of Smiths Group plc, a global leader in applying advanced technologies for markets in threat and contraband detection, energy, communications and engineered components. Smiths Group has a presence in more than 50 countries.

# Technology Brands



## IDI

World's most comprehensive offering of spring probe based solutions, including: contacts, connectors, interposers, semiconductor test sockets, and ATE interfaces. Proven off-the-shelf and custom products deliver the best solution for the customer's specific application.



## HYPERTAC

Premium interconnect solutions for electrical and electronic applications requiring optimized quality, performance, and reliability. Hypertac connectors utilize the original high performance hyperboloid contact technology; ideal for harsh environments and safety critical applications.



## HSI

Joint venture with Sichuan Huafeng Enterprise Group Co. Ltd, one of the major manufacturers of electronic components in China. Industry-leading connectivity solutions for commercial aerospace and railway markets in mainland China.



## SABRITEC

High speed quadrax, twinax, fiber optic, filter, coax and triax connectors, contacts and cable assemblies. Custom multi-pin circular, D-Sub rack and panel connectors and MIL-Spec interface type products.



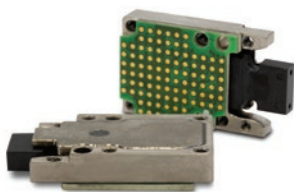
## EMC

Board-level components incorporating advanced resistive and signal distribution technologies for a broad range of frequency spectrum applications. Extensive portfolio of RF devices used to attenuate, level, or terminate signals available in a variety of packages and footprints.



## LORCH

Innovative solutions for the electronics and communications industries. Ranging from high performance wireless and RF products to micro-miniature, cavity, discrete, waveguide, tunable, ceramic, and tubular filters and integrated assemblies.



## REFLEX PHOTONICS

Embedded transceivers and transmit/receive modules for advanced interconnect-based solutions. Targeting high data rate interconnects where ruggedness and radiation resistance are required for defense, space, commercial aerospace and industrial applications.



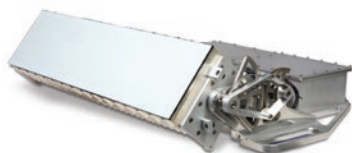
## RF LABS

High performance microwave cable assemblies and coaxial components supporting high performance operations, application-specific premium interconnects for high durability and harsh environments.



## MILLITECH

Specializing in the engineering, manufacturing, and testing of millimeter-wave components, assemblies, and fully integrated subsystems for space, SATCOM, test and measurement, radar, and scientific applications.



## TECOM

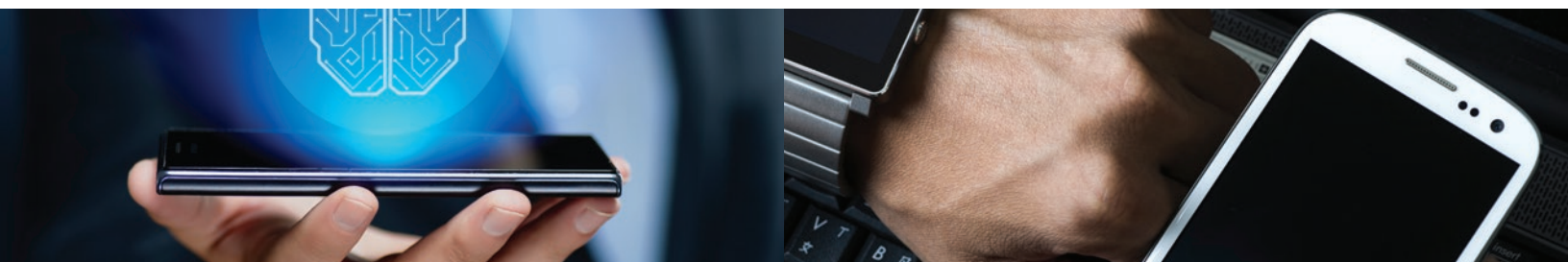
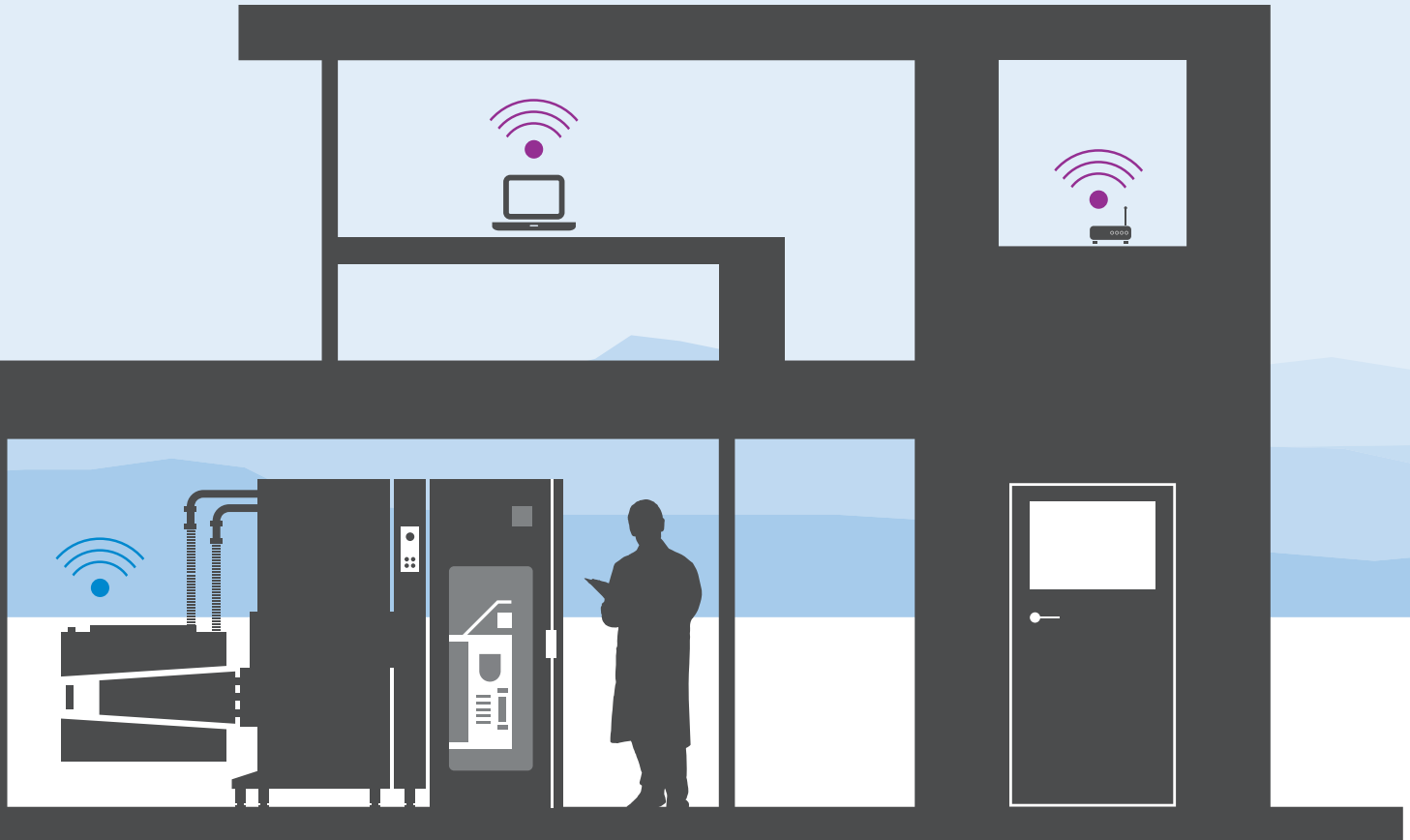
Industry leading innovator of antennas and positioning systems for SATCOM in-flight connectivity, instrumentation, datalink, command & control, and telemetry applications integrated into the world's most advanced commercial and military platforms.



## TRAK

High reliability multi-function RF systems, ferrite microwave products, and precision time & frequency systems for defense, commercial aerospace, space, homeland security, and public safety applications.

# Applications



## Area Array Test

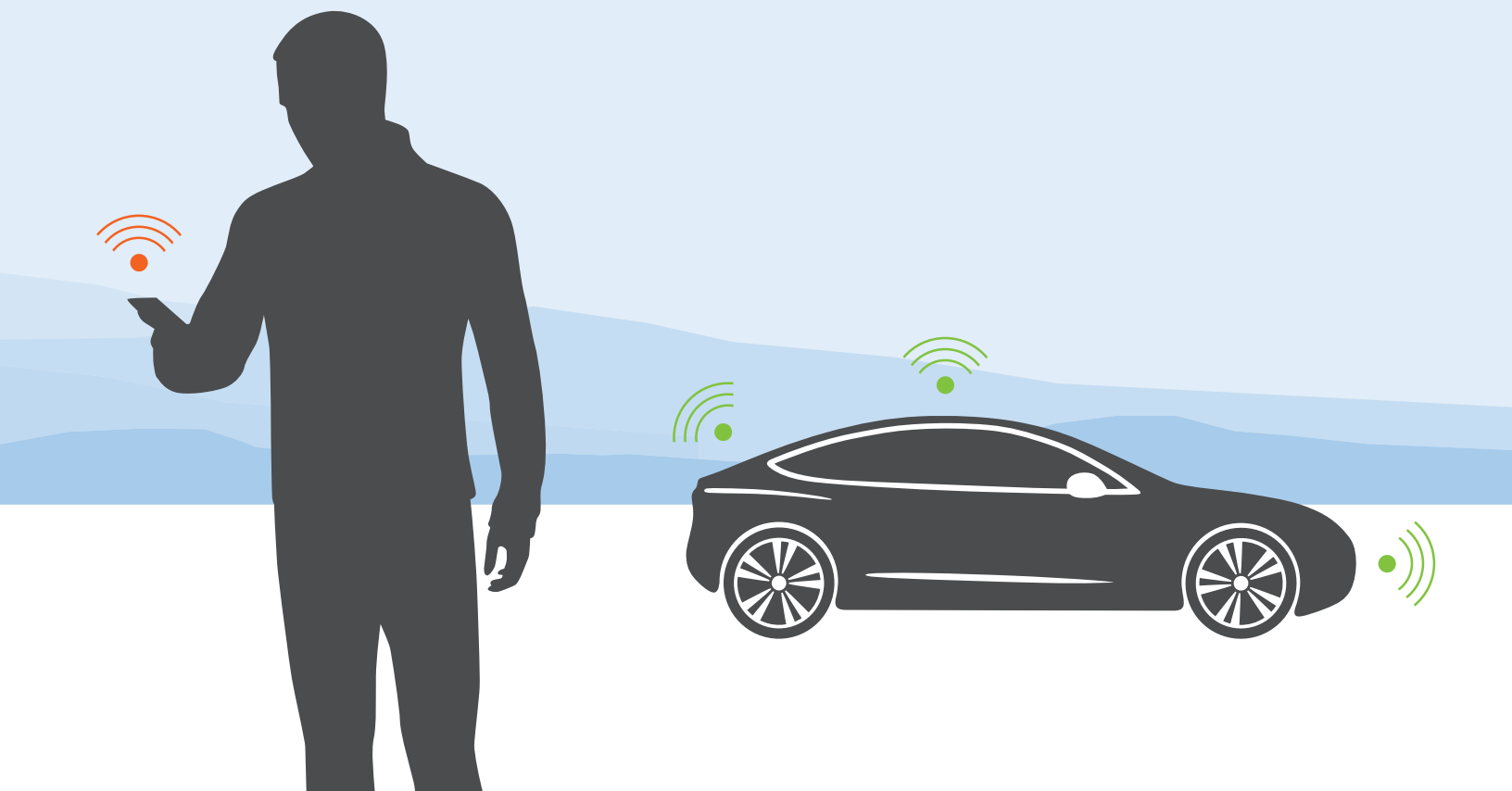
- GPU
- CPU
- Artificial Intelligence
- Deep Learning
- High-speed Memory
- Analog RF

## Package on Package Test

- Smart Phone CPU
- Wearable Technology
- NFC - Near Field Communications

# Providing A Competitive Advantage

Proliferation of data devices and the growth of cloud computing, artificial intelligence and big data is resulting in complex systems and new materials that require rigorous, efficient validation. Smiths Interconnect's test sockets and probe card solutions ensure superior quality and reliability in the semiconductor test applications. Our best-in-class engineering, development and technical expertise ensure support of automated, system level and development test platforms for area array, peripheral, wafer level and Package on Package (PoP) devices as well as high performance spring probe technology and cable assemblies.



## Peripheral Package Test

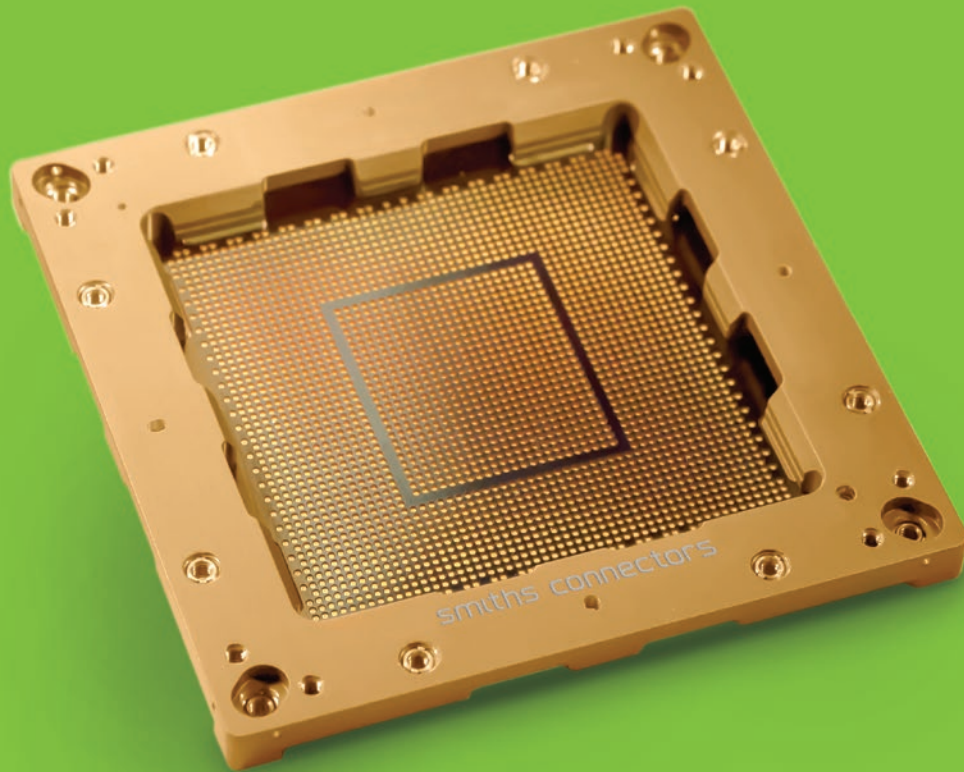
- Wireless Communications
- Infotainment
- Automotive
- Industrial

## Wafer Level Test

- Bluetooth
- Wi-Fi
- Power Management



# Area Array Test



## High Speed Performance

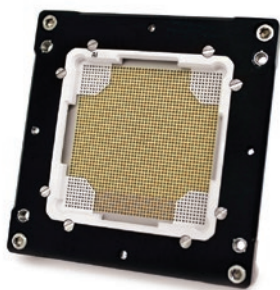
Supporting high pin count and high-speed signal applications. Engineered to meet stringent single ended signal performance (GDDR5), high current carrying capacity and active crosstalk cancellation for testing of GPUs, CPUs and other high speed digital applications.

**High current  
carrying  
capacity and  
active crosstalk  
cancellation**



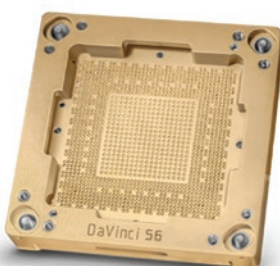
## Standard Array Test Socket

- Innovative design with a wide range of material options
- Proprietary engineered plastic body for larger size BGA / LGA test
- Precision alignment calculation
- Replaceable floating or fixed device alignment guide feature
- Z-axis tolerance stacking analysis
- FEA analysis
- Customization and design flexibility



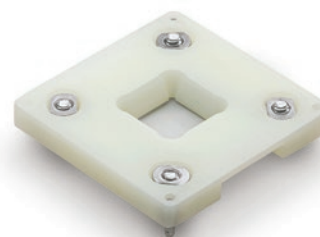
## DaVinci – High Speed Test Socket

- High performance impedance-controlled socket
- Proprietary insulated metal socket
- Spring probe technology
- Entire signal path shielded
- Insensitive to temperature changes and humidity
- Extreme rigidity (very low deflection rate)
- Mixed impedance in same Array
- Low contact resistance
- High current carrying capacity
- High speed: 56 to 112 Gbps



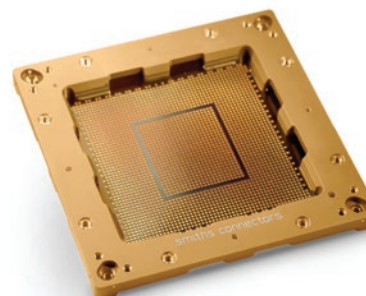
## Galileo Test Socket

- Uncompressed (free) height of 0.40 mm
- Compliant range up to 35% of overall thickness
- For use with all popular package types: BGA, LGA, QFN
- No contact alignment or registration holes required in PCB
- Board-to-Board, Board-to-Flex PCB, DUT-to-Flex PCB application uses
- Due to high thermal conductivity, can be used as a compliant Thermal Interface Material
- 1.25 A CCC per lead for 0.50 mm pitch devices
- Up to 2.50 A per lead for 0.80 mm pitch applications
- 16.6 A /mm<sup>2</sup> steady state @10°C heat rise
- <25 mΩ contact resistance
- Up to 5,000 insertions

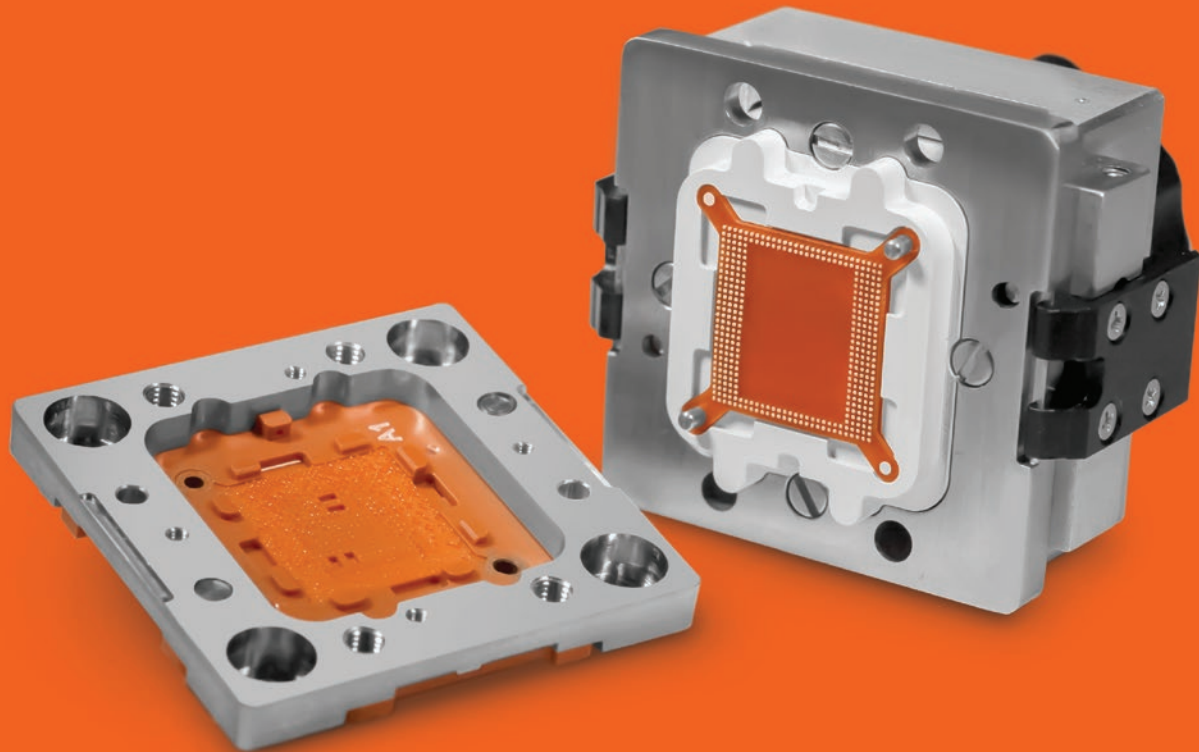


## Silmat® Array Test Socket

- Electrically transparent contact
- Low and stable contact resistance
- High frequency bandwidth > 80 GHz
- Signal path length < 1 mm
- High temperature 155°C



# Package on Package Test



## Cutting-Edge Technology

High-speed, low profile contact technology delivering enhanced performance and competitive edge in testing Package on Package (PoP) devices used in smart phone CPUs and wearable technology. Unique ability to accurately and simultaneously align both the upper and lower device pads increasing fault coverage and reducing cost of test.

**Increased fault coverage and reduced cost of test**

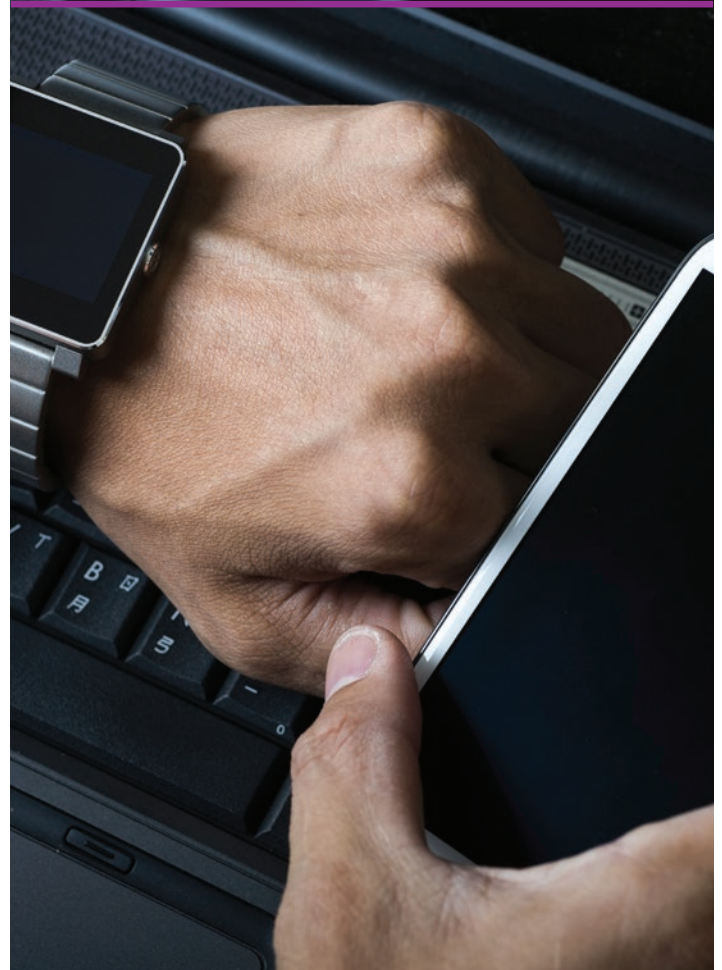
## Euclid PoP Test Socket

- Memory-bearing, memory-less and manual sockets
- Advanced alignment features for both top and bottom devices
- Refined analysis tools ensure production-ready solutions
- Controlled impedance available
- Features optional coaxial interposer for memory-less test
- RF simulation used to validate signal integrity of interface
- 6 Gbps options available
- Tester or socket supplies memory function during test through topside attach features
- Solutions are valid in both manual and automated test environments



## Silmat® PoP Test Socket

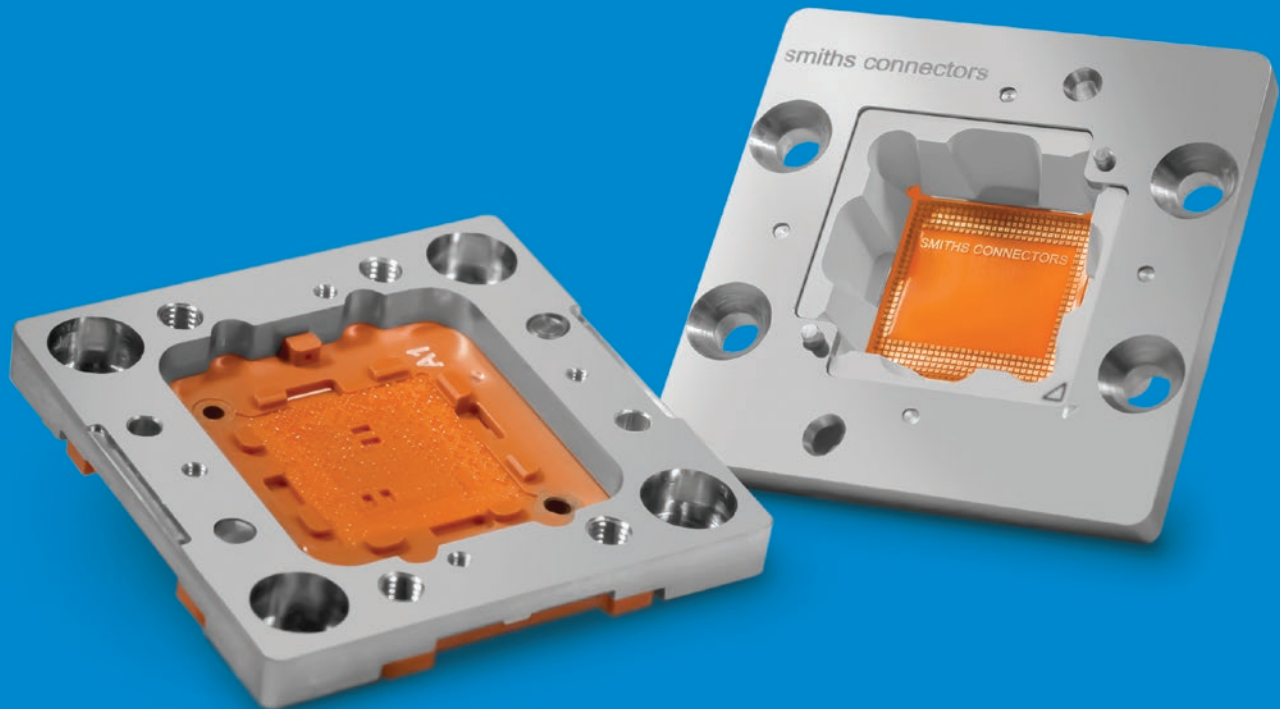
- Electrically transparent contact
- Solderless memory replacement
- Short signal path < 1 mm
- Conformal to recessed LGAs
- High frequency bandwidth > 40 GHz
- Low inductance
- Long cycle life > 500,000 cycles (application dependent)
- No PCB or solder ball damage
- Minimal labor and tester downtime



## Did you know?

The design of Euclid lid can accommodate multiple PoP applications using the same socket base, reducing hardware cost.

# Peripheral Package Test



## Out of the Box Performance

Engineered solutions using vertical spring probe technology, which seamlessly align complex device requirements to deliver out of the box performance, with minimal cleaning and extended mechanical life.

**High production  
throughput  
and reduced  
down time**



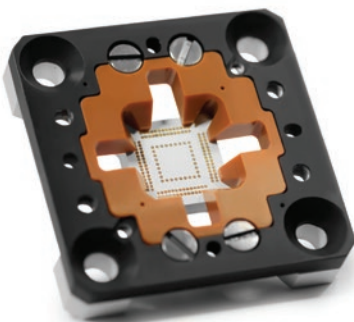
## Celsius Peripheral IC Package Test Socket

- Wiping action ensures good device contact with minimal board side scrub
- Requires minimal cleaning
- Patented technology
- Suited for tri-temp peripheral testing
- Resistance < 20 m
- Bandwidth > 10 GHz @ -1 dB
- Temperature rated: -50°C to 175°C



## Standard Array Peripheral IC Package Test Socket

- Innovative design with a wide range of material selection
- Precision alignment analysis
- Replaceable device alignment guide feature
- Customisation and design flexibility
- HG spring probes



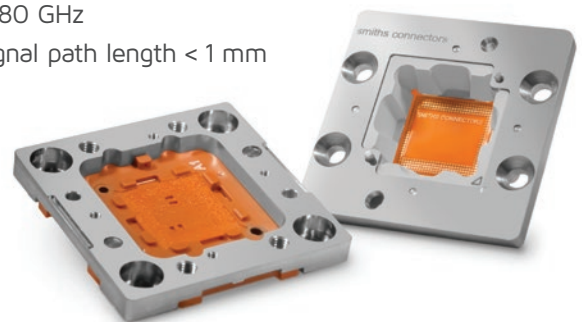
## Peripheral Lead Frame Test Socket

- Excellent co-planarity
- High suitability to auto cleaning
- Up to 32 Sites
- HG contact technology available
- Reduced required overdrive
- Analysis of thermal, alignment and pin travel
- Capable of high parallelism



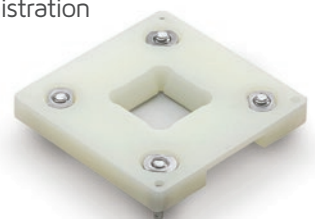
## Silmat® Peripheral IC Package Test Socket

- Electrically transparent contact
- Low, stable contact resistance
- High frequency bandwidth > 80 GHz
- Signal path length < 1 mm

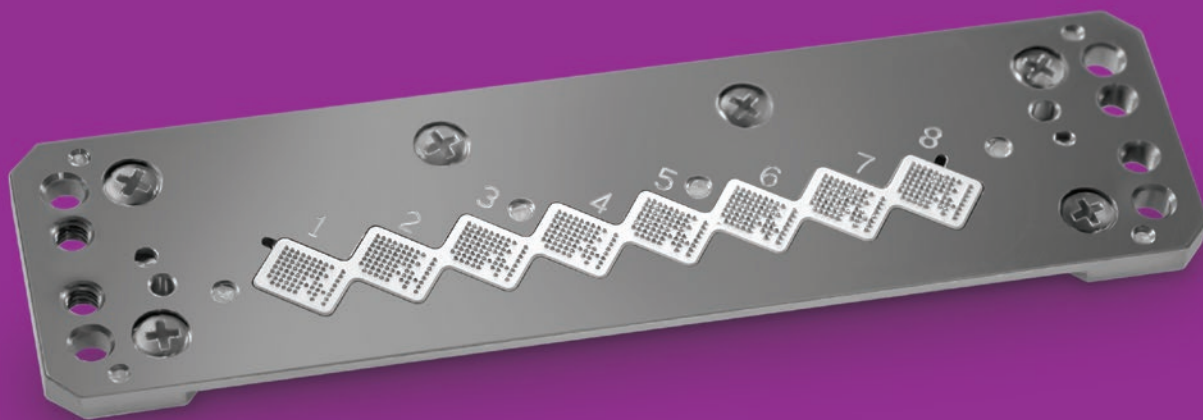


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- No contact alignment or registration holes required in PCB
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# Wafer Level Test



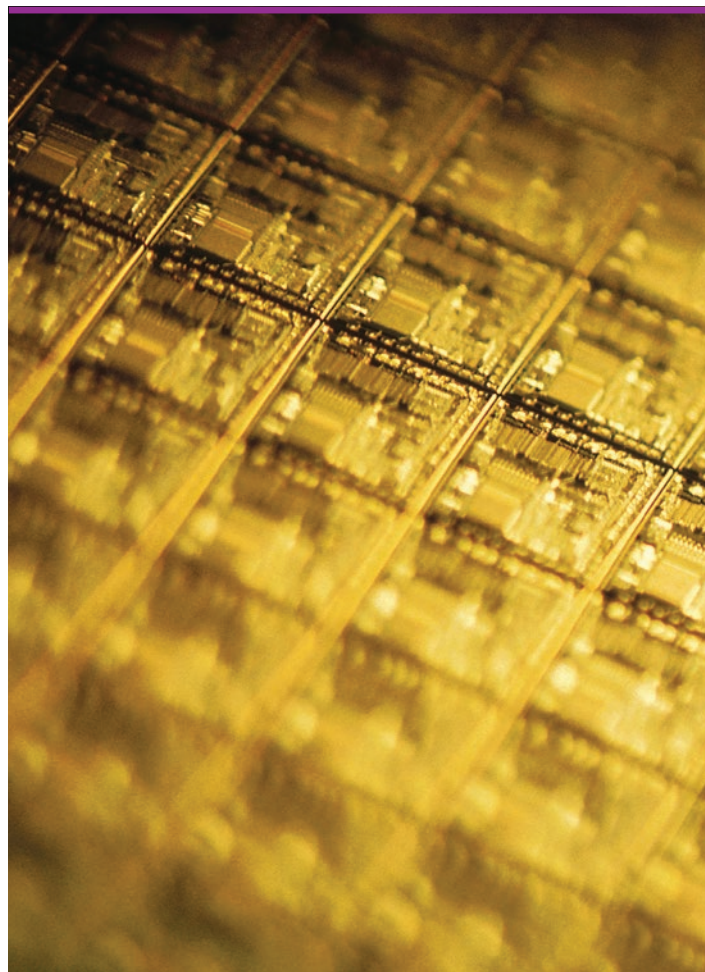
## Excellent Yield

Innovative wafer level package test solutions that help customers deliver higher quality products by ensuring every touchdown is contributing to the highest possible yield. Volta products are plug and play, providing the electrical accuracy and robust mechanical stability needed to reduce the total cost of ownership.

**Exceptional  
mating cycles,  
unrivaled signal  
reliability**

## Volta Probe Head

- Minimal compression force
- Exceptional mating cycles
- Unrivaled signal reliability
- Optimized travel at 500, 400, 350, 300, 250, 200, 180  $\mu\text{m}$  pitch
- Exceptional DC and RF performance
- Floating spring probe designs allow for seamless deployment in test WLCSP
- Replacement for cantilever and traditional vertical probe card technologies
- Easy maintenance
- High performance engineered plastic and ceramic material
- Consistent tip co-planarity



## Did you know?

Volta spring probes can achieve 30  $\mu\text{m}$  tip-to-tip co-planarity in the probe head, providing stable contact to the wafer.

## Kelvin Probes

- Device contact pitch: 0.35 mm pitch and above
- Operating Temperature Range:  $-55^{\circ}\text{C}$  to  $120^{\circ}\text{C}$
- Device packages: BGA, WLCSP, QFN
- Pin-to-pin tip distance is 0.07 mm - 0.14 mm, depending on the pin used
- Insertions: >500,000
- Innovative beveled offset tip allows for tighter centers, down to 0.25 mm on the device pad



# Global Capabilities



## Reliable Solutions

In-house capabilities encompassing design, development, manufacturing and testing to anticipate market needs, respond quickly and accurately to customers, and provide the most reliable connectivity solutions.

Market-leading  
Engineering and  
Technology Solutions

60+

Years  
Experience





## Certifications, Standards & Compliance

- AS9100C
- ISO 9001
- ISO 14001
- ISO 13485
- ISO 45001
- QPL (MIL-DTL-55302)
- MIL-I-45208A

## Engineering

- Advanced RF & System Modeling
- CAD/CAM & Solid Modeling
- Finite Element Analysis
  - Thermal Analysis
  - Shock & Vibration Analysis
- Reliability Analysis

## Prototyping

- CNC Turning & Milling Centers
- Cabling/Prototype Assembly
- 3D Printing
- Ceramic Grinding
- EDM
- Circuit Board Routing

## Manufacturing

- Precision Machine Shops
- Connector, Contact & Cable Assembly
- Automated PCB Assembly & Inspection
- Automated Hybrid Assembly
  - Die Placement
  - Wedge & Wire Bonding
  - Gap Welding
- NASA Certified Soldering
- Automated Test & Tune
- Optical Alignment
- System Integration
- Validation Testing

## Testing/Qualification

- Electrical Acceptance & LOT Test
- RF Test Capability, up to 325 GHz
- High Speed Digital
- Anechoic Chamber Testing
- ESS Environmental Qualification
- ESS Temperature, Shock & Vibration
- Metallurgical
- Real Time X-Ray
- Near Field/Compact Antenna Range
- Thermal Vacuum
- High Power RF Testing
- Optics Lab
- Multi paction, SRS mechanical shock



# Connecting Global Markets

Smiths Interconnect's strong focus on serving international markets and customers is supported by our sales and technical teams across the Americas, Europe and Asia.

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## Business Unit

Connectors

Fiber Optics &  
RF Components

Semiconductor  
Test

RF/MW  
Subsystems

# Worldwide Support

## Americas

### Sales

connectors.uscsr@smithsinterconnect.com

### Technical Support

connectors.ustechsupport@smithsinterconnect.com

### Sales

focom.uscsr@smithsinterconnect.com

### Technical Support

focom.techsupport@smithsinterconnect.com

### Sales

semi.uscsr@smithsinterconnect.com

### Technical Support

semi.techsupport@smithsinterconnect.com

### Sales

subsystems.csr@smithsinterconnect.com

### Technical Support

subsystems.techsupport@smithsinterconnect.com

## Europe

### Sales

connectors.emeacsr@smithsinterconnect.com

### Technical Support

connectors.emeatechsupport@smithsinterconnect.com

### Sales

focom.emeacsr@smithsinterconnect.com

### Technical Support

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### Technical Support

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### Sales

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### Technical Support

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## Asia

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# Pioneers of Progress

## Advancing the world through cutting-edge connectivity

We aim to be the partner of choice for innovative connectivity solutions where reliability, high quality, technical expertise, application knowledge, and a reputation for excellence is vital.



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