

smiths interconnect



# Corporate

Overview

CUTTING-EDGE  
CONNECTIVITY

# About Smiths Interconnect



## We Offer



Smiths Interconnect is a leading provider of high reliability connectivity products and solutions serving segments of aerospace and defense, medical, semiconductor test, and industrial markets. It designs and manufactures technically differentiated electronic components, microwave, optical and radio frequency products and multi-functional systems that connect, protect and control critical applications.

A comprehensive product portfolio providing customers with a single point of supply across multiple markets.

Our technology brands (EMC, Hypertac, IDI, Lorch, Plastronics, Reflex Photonics, RF Labs, Sabritec and HSI) are synonymous with exceptional performance in technologically advanced, high quality solutions required for a high degree of safety and durability. Our extensive product portfolio includes high reliability electrical connectors and cable assemblies, rugged embedded transceivers and a wide range of innovative RF and microwave solutions.



## Defense & Aerospace



## Communications



## Industrial



Your partner  
of choice for  
cutting-edge  
connectivity  
solutions

**80+**

Years  
Experience

### Technology

Broad Range of Advanced Interconnect Technologies

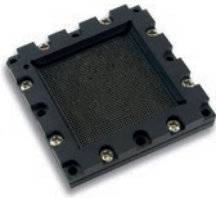
### Flexibility

High Volume Product Platforms & Complete Tailored Solutions

### Service

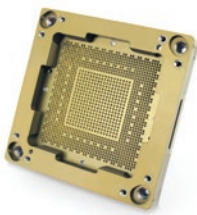
Global Reach with Local Support

# Technology Brands



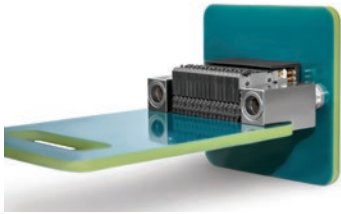
## PLASTRONICS

A leading supplier of burn-in test socket solutions for all the latest packaged devices. With the most comprehensive QFN catalog in the world, in addition to a large portfolio of sockets for burn-in, HAST, failure analysis and other test requirements for Leaded, LGA and BGA devices.



## 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.

Connectors

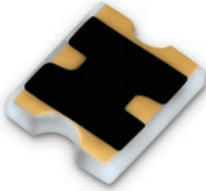
Fiber Optics & RF Components

Semiconductor Test

Connectors

Fiber Optics &amp; RF Components

Semiconductor Test



## 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 printed 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.

**Synonymous with High Performance,  
Reliability and Safety.**

# Our Markets

Aerospace & Defense



## Commercial Aerospace

Our relentless pursuit of innovative high performance connectivity solutions enables us to provide high density, high power handling, EMI/EMP protection, RF and high speed capabilities focused on the next generation of airframe applications.

- Avionics Equipment
- Engine Systems
- Power Distribution



Communications

## Wireless Infrastructure

Our solutions help evolution to 5G, while maximizing the use of existing infrastructure. Our components and optical transceivers help ensure reliability in mission critical wireless communications.

- 4/5G Networks
- Remote Radio
- Installations
- Distributed Antenna Systems
- Data Centers



## Semiconductor Test

We develop sockets and probe card products that ensure superior quality and reliability in testing applications. Our solutions support the finest micron pitches while meeting requirements for higher bandwidths.

- Area Array Test
- Package-on-Package Test
- Wafer Level Packaging Test
- Peripheral Package Test

Industrial



## Transportation

We offer multiple interconnect technologies able to withstand harsh environments of extreme temperatures, pressure, shock and vibration, ensuring system quality and reliability.

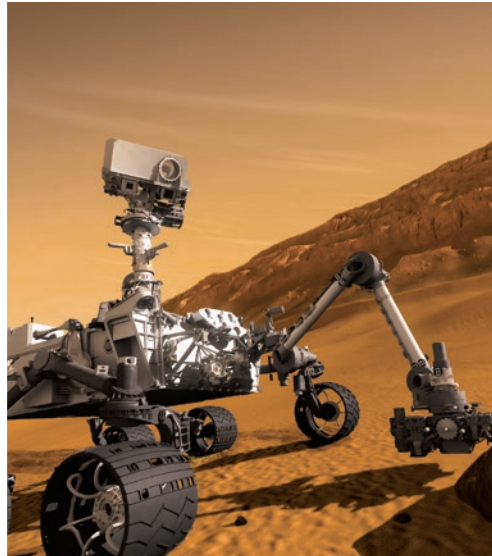
- Rolling Stock
- Signaling
- Infrastructures
- Vehicles
- Automotive
- Unmanned Vehicles



## Defense

We partner with our customers to design and manufacture products and solutions including connectors, cable assemblies, multi-function RF systems, SATCOM terminals and datalinks to achieve optimal system performance in the most demanding end-user environments.

- Radar
- Electronic Warfare
- Integrated Vehicle Systems
- Intelligence, Surveillance, Reconnaissance (ISR)



## Space

We engineer superior NASA and ESA-certified solutions to ensure continuous connectivity within environments where shock and vibration, corrosive atmosphere, and thermal deviations are prevalent.

- GEO/MEO Satellites
- LEO Satellites
- Launchers
- Ground Support Equipment



## Test & Measurement

We create high quality connector and cable assemblies that deliver increased phase stability, decreased insertion loss, and design flexibility for long lasting performance in lab and production test environments.

- Electronics Testing
- Automotive Testing
- Telecommunications
- RF and Microwave Testing



## Medical

We provide solutions that protect, connect, and control critical medical devices which meet requirements for invasive procedures, disposable components, embedded electronics, high cycle life, and sterilization.

- Surgical Systems
- Patient Monitoring
- Imaging Systems
- Disposables



## Industrial

We design durable and robust platform products and customized solutions combining rugged backshells with high reliability contact technologies for easy assembly.

- Heavy Equipment/Machinery
- Industrial Automation
- Utilities

# Product Overview

**80** + Years  
Experience

## Technology

Broad Range of Advanced  
Interconnect Technologies

## Flexibility

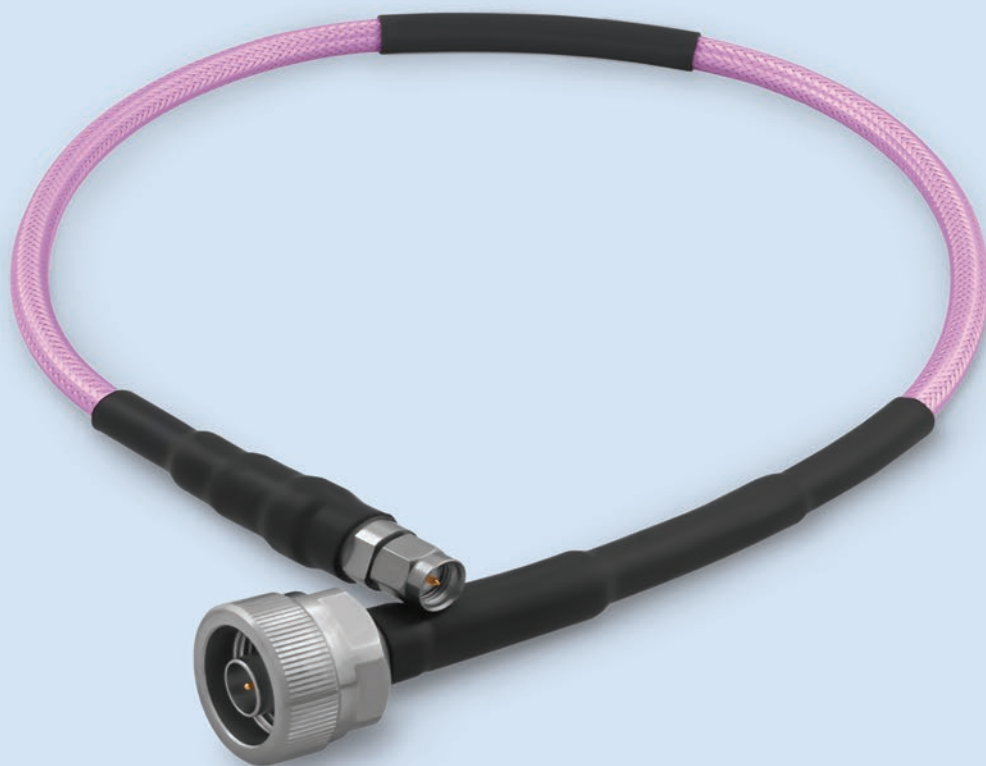
High Volume Product Platforms &  
Complete Tailored Solutions

## Service

Global Reach with  
Local Support



# Cable Assemblies



## Premium Interconnects

High performance microwave cable assemblies and coaxial components supporting critical operations with application-specific premium interconnects for high durability. Embedded with RF Florida Lab technology, our cables are available with customized option packages and are especially well-suited for precision testing applications and harsh environments in aircraft, marine, space and ground applications.

**Well-suited for  
precision testing  
applications  
and harsh  
environments**

## ASR Precision Test

- High performance VNA test cables for precision testing applications
- Maintains mechanical configuration for consistent, repeatable test results
- Available with a wide range of connectors including 2.4 mm and 2.92 mm NMD connectors
- Individual or phase matched pairs



## Lab-Flex®

- Field-proven up to 50 GHz
- 40% lower insertion loss than solid dielectrics
- Solder sleeve cable-connector termination delivers superior electrical performance and pull retention
- Shielding: <90 dB
- Stranded center conductors available (Lab-Flex® S)
- Phase stable (Lab-Flex® T) and phase matched options available



## Semi-Rigid, Conformable & Flexible

- High frequency
- Mode free operation DC to 110 GHz
- Copper, Aluminum and Tin filled composite jackets
- Range of protective coverings available
- Low loss options available in Silver and Tin plated outer conductors



## SpaceNXT™ QT Series

- Space qualified flexible cable assemblies
- Mode-free performance up to 110 GHz - for high-frequency applications
- Radiation resistant jacket materials tested up to 100Mrad total dosage (~15 years flight life)
- Available with wide range of connectors and add-on testing packages for configurable products to meet all design and schedule constraints
- Flight heritage and qualification reports available upon request

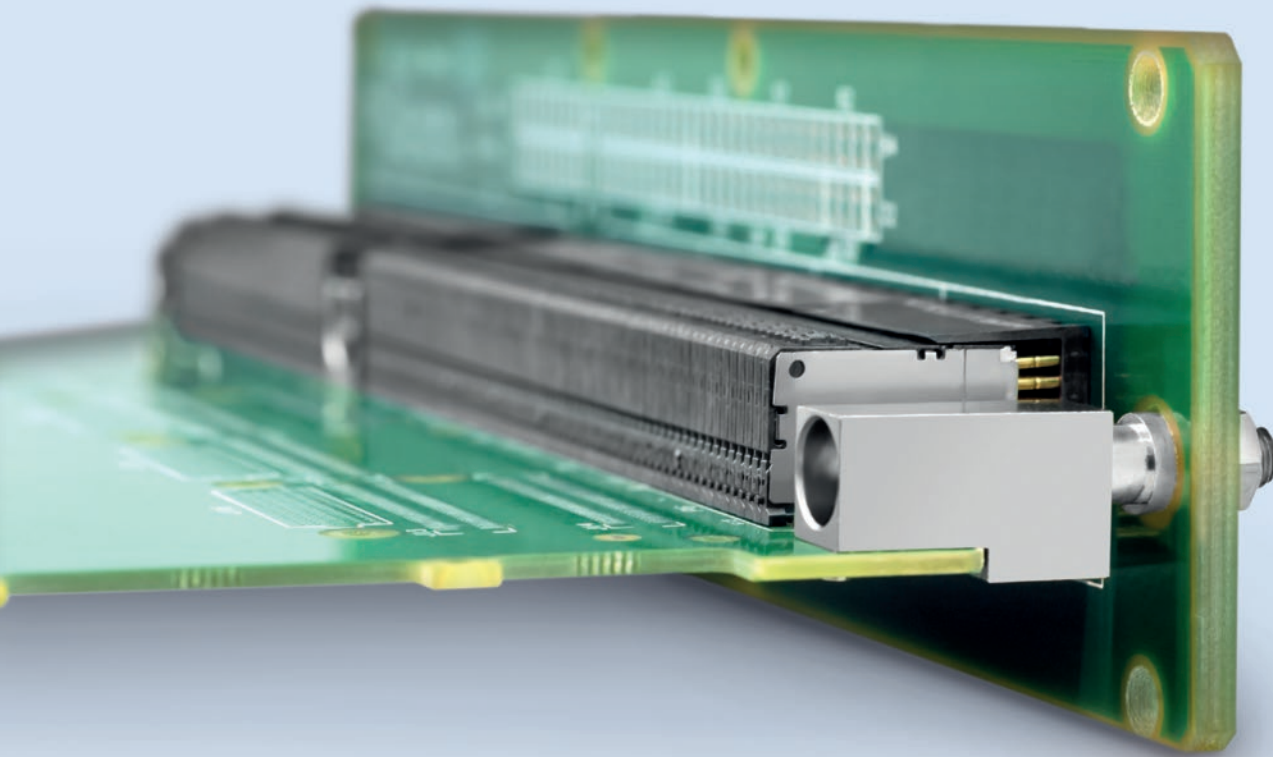


## Titan-Flex®

- Robust solder termination
- Crush-resistant and durable
- Superior electrical performance over comparable products
- Optimized braiding construction for excellent shielding to 18 GHz



# Connectors



## Reliability and Safety

Through our Hypertac, HSI, IDI, RF Labs and Sabritec technology brands, we supply application-specific, high-reliability electrical interconnect solutions from highly integrated assemblies to microminiature connectors and spring probe contacts. The core of our advanced interconnect solutions is our contact technologies: Hyperboloid, Spring Probe, High Speed, Fiber Optic, High Power and High Temperature.

**Providing  
exceptional  
performance  
in critical  
applications**

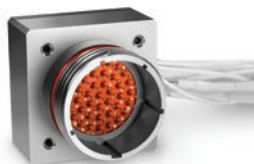
## Circular

- Available in metal and plastic shells
- Crimp and solder terminations
- Push-pull and color-coded options



## EMI/EMP Filter

- Intermateable and interchangeable with standard non-filter connectors
- C, L, and Pi style EMI filter
- TVS protection meeting the requirements of RTCA D160, Section 22, up to Level 5



## High Power

- Standard 100 and 150 ohm split pair quadrax, quadrax, and twinax contacts
- Excellent power performance up to 700 Amps
- Suitable for harsh environmental conditions
- High number of mating cycles



## High Speed

- Standard 100 and 150  $\Omega$  quadrax and twinax contacts
- Formats MIL-DTL-38999, ARINC 600, MIL-DTL-83527, and D-Subminiature
- Manufacturing to Fiber Channel, Ethernet, Firewire, USB, and DVI protocols



## Modular/Rectangular

- Configurable with signal, power, RF, twinax, triax, quadrax, and fiber optic contacts into a single connector
- Guided hardware for blind mating



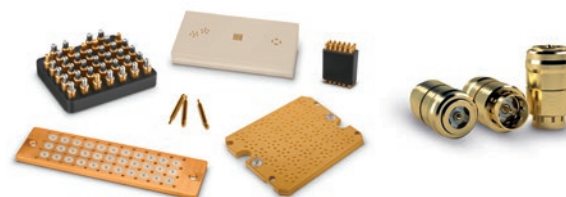
## PCB

- Low, medium, and high density connectors with long life cycle
- Signal, power, coaxial, and high speed configurations
- Board-to-board, cable-to-cable, cable-to-board, and stacking



## Spring Probe Interposers

- High insertion life
- Suited for blind mate connections
- Low profile, high compliance ratio
- Ideal for high shock and vibration environments

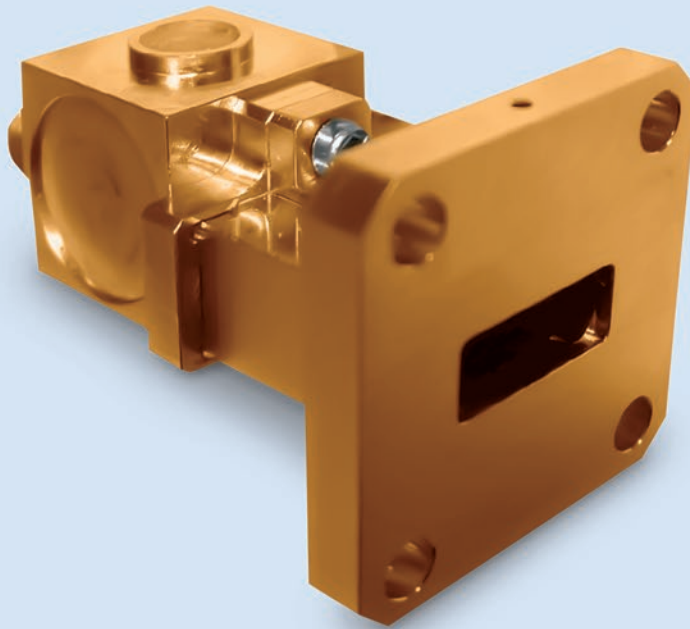


## High Frequency

- Small lightweight connectors
- High frequency up to 110 GHz
- Single-piece spring probe coax for interposer solutions up to 40 GHz
- Micro-D coax connectors up to 40 GHz



# Ferrites & Related Passive Components



## High Performance Components

Smiths Interconnect offers a wide range of ferrite devices and waveguide products featuring technology that is ideal for a variety of space, defense & commercial applications. Our product range includes isolators and circulators, combiners, transitions, terminations, iso-adapters and integrated assemblies.

**Ideal for a  
variety of space,  
defense and  
commercial  
applications**

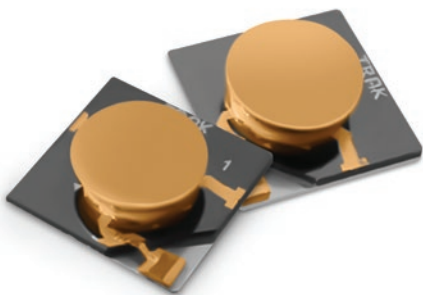
## Coaxial

- Wide range of isolators, circulators, loads, terminations and attenuators
- Designed to operate from 300 MHz to 26 GHz
- Unique solid connectors (male/female connector barrel machined to be integrated in housing) with female and male orientations, in SMA and TNC styles
- All products are optimized for thermal and dynamic operational environments



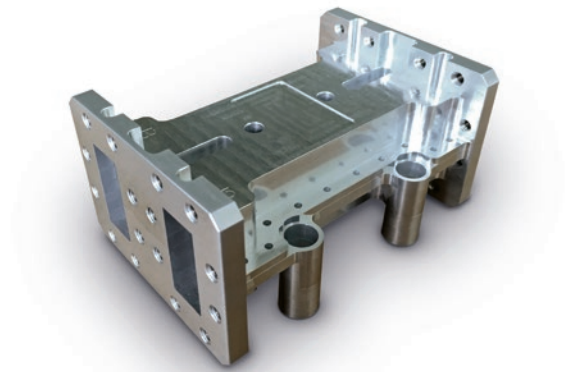
## Microstrip, Surface Mount & Stripline

- Isolators and circulators
- Stripline devices operating in assigned bands from 0.4-18 GHz
- SMT devices in S, C & X-bands suitable for pick and place and re-flow soldering
- Microstrip offers a unique blend of broad band operation, low mass and low profile with devices available in assigned bands from 2.2 to 32GHz



## Passive Sub-Assemblies

- Full waveguide band isolators and circulators
- High power waveguide circulators for protecting TWTs
- Standard models from 18 to 260 GHz
- Low-pass, band-pass, and high-pass waveguide filters
- Waveguide diplexers and triplexers
- Metrology grade lab assets

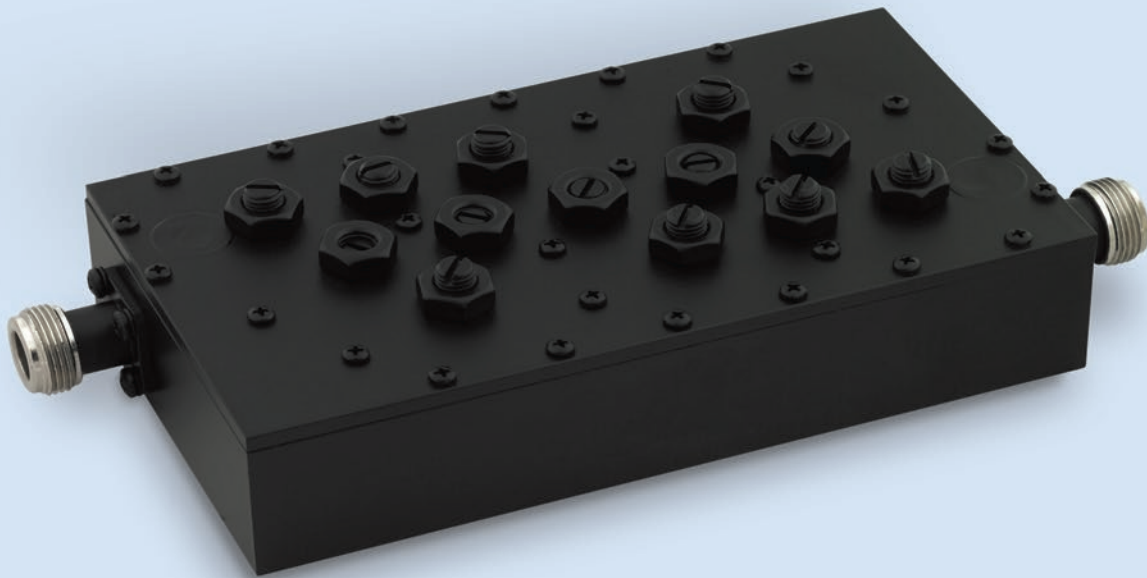


## Waveguide

- Isolators, circulators, combiners, couplers, loads, transitions, terminations, and multi-function assemblies
- High power waveguide circulators/isolators for protecting TWTs up to 32GHz
- All products are optimized for thermal and dynamic operational environments
- High power devices are supplied as junction or differential phase shift types
- Where appropriate, devices are supplied with cooling/thermal management systems and additional functionalities as required



# Filters



## Advanced Quality

Smiths Interconnect provides technically advanced, high quality Lorch technology RF Filters, Multiplexers, Switched Filter Banks and Integrated Assemblies, from 100 KHz to 90 GHz. Our rigorous design, manufacturing & inspection criteria processes and procedures ensure products that are fully compliant to each application's unique specifications.

**Rigorous design,  
manufacturing  
and inspection  
criteria**

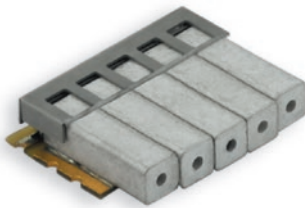
## Cavity

- Frequency range: 30 MHz to 40 GHz
- Bandwidth: 3 dB from 0.5 to 66%
- High "Q", low loss
- High power
- Helical, combline, inter-digital and coaxial



## Ceramic

- Frequency range: 400 MHz to 6,000 MHz
- Bandwidth: 0.5 to 10%
- Surface mount, PC mount, connectorized options
- Stand-alone or diplexed



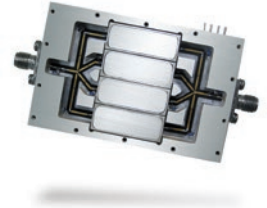
## Discrete

- Frequency range: 5 MHz to 10 GHz
- Bandwidth: 3 db to >100%
- Band-pass, low-pass, high-pass, or notch
- Surface mounts, pins or connectors



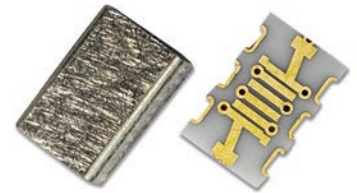
## Integrated Assemblies

- Frequency range: 500 MHz to 18 GHz
- 2 to 9 channels available
- Use of both MIMIC and solid state switching
- Connector or RF pin launch
- Hermetic seal available



## Planar X

- Compact size
- Light weight
- Excellent rejection characteristics
- Low insertion loss



## Tunable

- Frequency range: 24 MHz to 4,000 MHz
- Direct readout
- Octave tuning
- High power

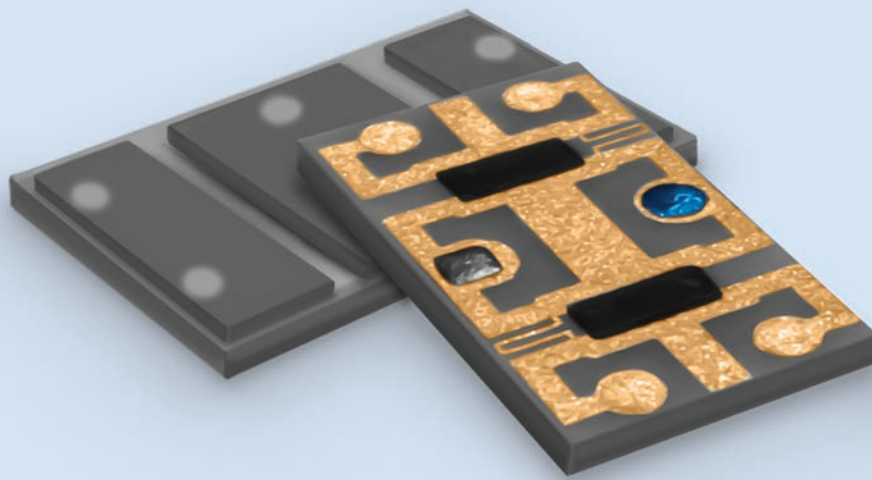


## Waveguide

- Frequency range: 2 GHz to 90 GHz
- 2 through 20 sections
- W/G flange, or connectorized
- Stand-alone filters, filter banks, diplexer and multiplexers
- WR-159 to WR-19
- Band-pass, low-pass, high-pass, and notch filters



# Radio Frequency Components



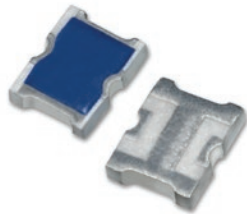
## Advanced Technologies

Our high-performance board-level components featuring EMC technology incorporate advanced resistive and signal distribution technologies for a broad range of frequency spectrum applications. Our extensive portfolio of RF devices is used to attenuate, level, or terminate signals available in a variety of packages and footprints for demanding high reliability environments.

**Available  
in a variety of  
packages and  
footprints**

## Attenuators

- Operating frequencies up to 50 GHz
- Superior broadband performance
- Space and military qualified
- Wide range of attenuation values
- Surface mount and wire bondable packages



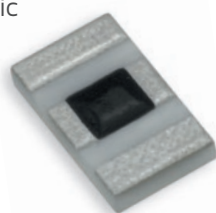
## Diamond RF Resistives®

- Highest power to size ratio resistive components available
- Extremely low parasitic capacitance resulting in broadband performance
- Standard footprints available from 0402 (20 watts) up to 2010 (300 watts)
- Substantial size and weight reduction for space and high reliability applications
- Easy to implement packages; solderable & wire-bondable chips or tabbed and flange options are available



## Resistors

- Wide range of resistance values: 1-1K ohms
- Power handling up to 1500 watts
- Operating frequencies up to 30 GHz
- Tight tolerances are available:  $\pm 5$ ,  $\pm 2$  or  $\pm 1$
- Various finishes available: Tin/Lead, Silver & non-magnetic
- SMT & wire-bondable chips, tabbed and flange options or rod



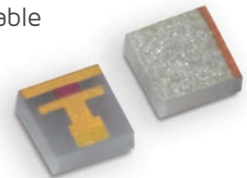
## Signal Distribution

- Resistive power dividers, Wilkinson power dividers and power samplers
- 2, 3 & 4 way power splits options available
- Operating frequencies up to 50 GHz
- Surface mountable packages



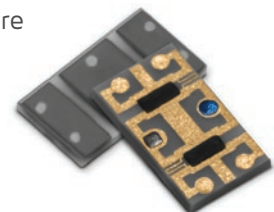
## Terminations

- Optimized impedance matching and Low VSWR
- Power handling up to 2.2 kilowatts
- Operating frequencies up to 67 GHz
- Multiple substrate options: Alumina, Beryllium Oxide & Aluminum Nitride
- Large selection of mounting styles: solderable SMT & wire-bondable chips or tabbed and flange options are available

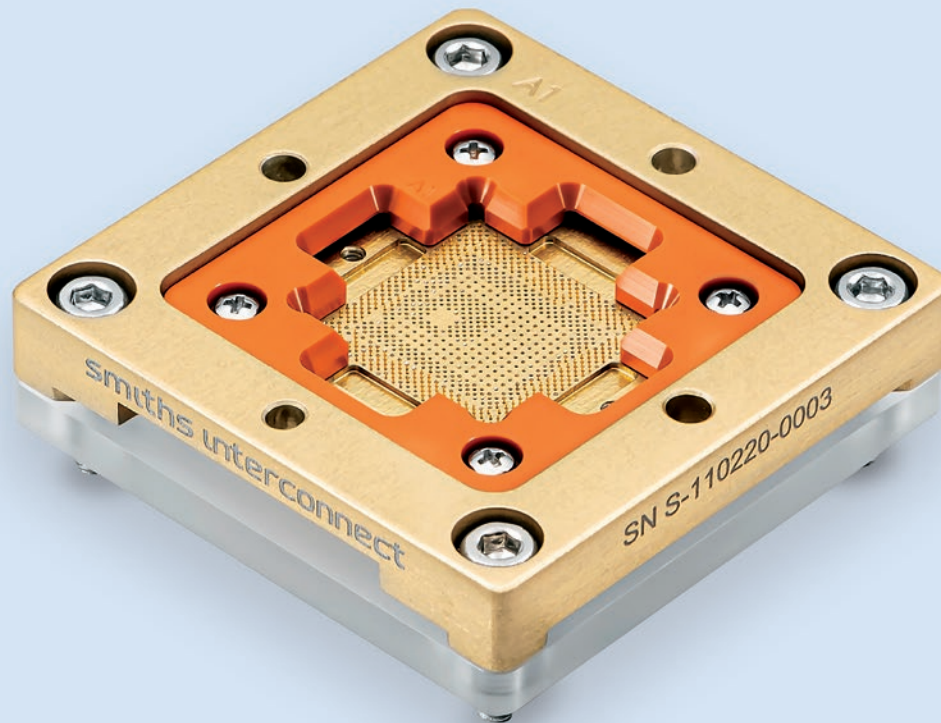


## Thermopad®

- Passive solution for gain variation over temperature
- Operating frequencies up to 36 GHz
- Multiple attenuation and temperature shift values
- Footprint compatible with fixed attenuator series
- Standard HR (High Reliability) tested options available
- Surface mount and wire bondable packages



# Semiconductor Test



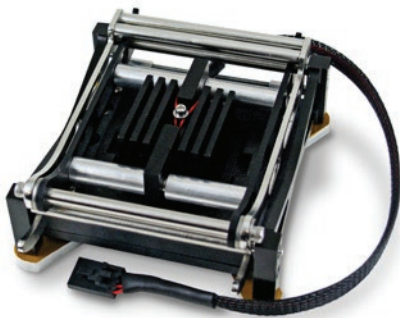
## Best-in-Class

Smiths Interconnect's test socket and probe card solutions utilize IDI contact technology to ensure superior quality and reliability in semiconductor test applications. The acquisition of Plastronics expands Smiths Interconnect's product portfolio for the reliability test segment. Our best-in-class engineering, development and technical expertise ensure support of automated, system level, burn-in and development test platforms.

**Superior quality  
and reliability in  
semiconductor test  
applications**

## Burn-In Sockets

- Extensive portfolio of socket design solutions for all IC packages
- H-Pin<sup>®</sup> technology for unmatched electrical performance
- Tri-Temperature testing capability with H-Pin<sup>®</sup> contact technology
- High speed signal integrity solutions supporting all IC packages
- Thermal optimization for advanced IC Burn-In requirements
- Variety of verification tools and design standards to ensure out of the box performance



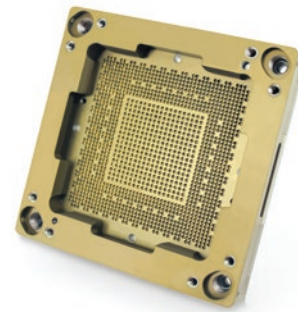
## Replacement Spring Probes

- Available to support all Interconnect Test Sockets including DaVinci, Volta, Array and Celsius
- Long life cycle
- Manufactured with superior engineered materials
- Low and stable contact resistance
- High compliance
- Superior signal integrity



## Test Sockets

- Extensive portfolio of spring probe, scrubbing and other contact technologies
- Variety of verification tools and design standards to ensure simultaneous engagement and alignment to both package sides
- DaVinci technology for high speed coaxial test
- High performance elastomeric contact technology
- Tri-Temperature testing capability with Celsius scrubbing contact technology
- High speed signal integrity solutions supporting most IC packages

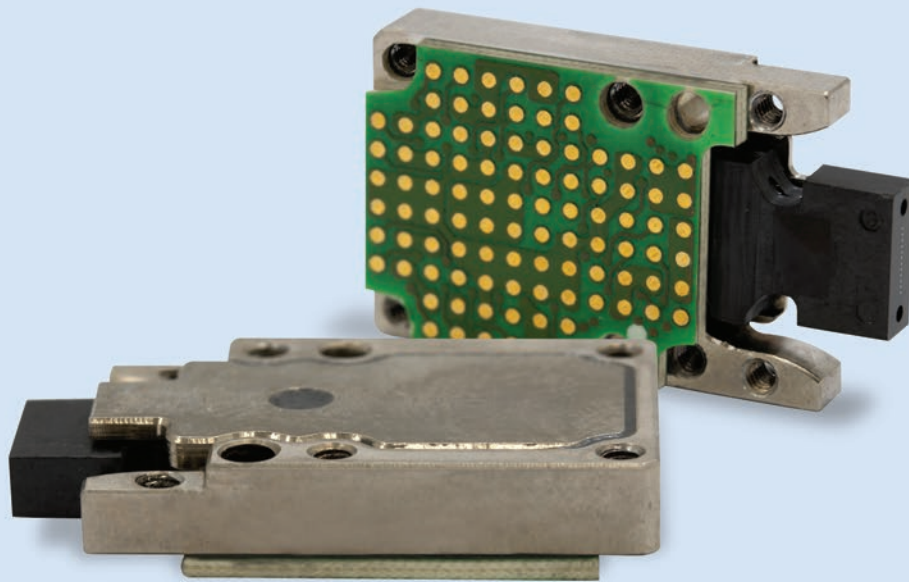


## WLCSP Probe Head

- Utilizing spring probe and other contact technologies
- Capable of testing pitches from 130µm and higher
- High site-to-site test parallelism
- Superior signal integrity and high speed / RF testing capabilities
- Low and stable contact resistance
- Increased test throughput



# Optical Transceivers



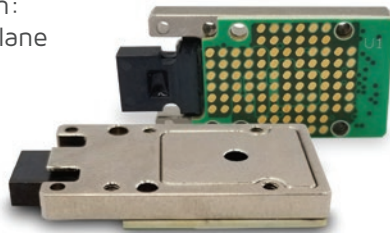
## Advanced Solutions

Embedded optical transceivers modules with Reflex Photonics technology for advanced interconnect based solutions. Targeting high-reliability interconnects where high data rate communication links with low SWaP are required. Space-qualified versions are also radiation resistant.

**Rugged  
embedded  
transceivers for  
harsh environment  
interconnect**

## Mid-Board Space-Qualified Optical Transceivers

- Space heritage (TRL 9) since 2021
- Small: Height as low as 5.5mm with interposer
- Space qualified for radiation, shock and vibration, TVAC, and outgassing
- Expected life: Up to 20 years
- Cold start temperature:  $-55^{\circ}\text{C}$
- 10 and 25 Gbps data rates on 4-lane transceivers and 12-channel transmitters/receivers
- Operating temperature: From  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Sensitivity: Up to  $-9\text{dBm}$  @ BER  $10^{-12}$
- Power consumption: As low as 85 mW/lane ( $<10$  pJ per bit)
- LGA interposer interface



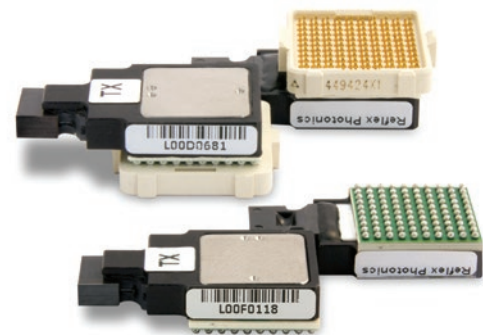
## Rugged Backplane Optical Modules

- Compliant with VITA 66.5-defined backplane connectors
- Performance: 1 Gbps up to 28 Gbps/lane
- Operating temperature: From  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Low power consumption: As low as 100 mW/lane
- Ultra-high port bandwidth density of up to 720 Gbps full-duplex in a half-width slot
- Rugged: MIL-STD 883 shock and vibration qualified
- Sensitivity: Up to  $-12$  dBm @ BER  $10^{-12}$
- Ingress protection: Moisture, thermal and shock resistant
- Maximizes board space on 3U and 6U high-speed switch and payload VPX boards



## Rugged Mid-Board Optical Transceivers

- Proven: Used in many defense applications
- Small: Height as low as 5.5mm with interposer
- Rugged: MIL-STD 883 shock and vibration qualified
- Sealed: Moisture and thermal shock resistant
- Storage temperature:  $-57^{\circ}\text{C}$  to  $125^{\circ}\text{C}$
- Performance: Up to 28 Gbps/lane
- Operating temperature: From  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Sensitivity: Up to  $-12\text{dBm}$  @ BER  $10^{-12}$
- Low power consumption: As low as 100 mW/lane
- Channel configurations: 4TRx, 12TRx (10G only), 12Rx, and 12Tx



High bandwidth,  
low latency and SWaP  
in differentiated  
high reliability  
applications

# 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

# 80+

## Years Experience





## Certifications, Standards & Compliance

- AS9100D
- ISO 9001
- ISO 14001
- ISO 45001
- NF F 61-030
- NF F 61-032
- NF F 16-101
- NF F 16-102
- NF-C 93421
- DIN 41612
- DIN 43652
- EN 50124
- EN 45545-2
- IEEE-1101.2-'92
- IEC 1076-4 101
- IEC 61373
- IEC 61984
- HE 501
- HE 704
- UTE C93-425
- UL94 VO
- RoHS compliance
- IRIS

## Engineering

- 3D EM Modeling
- Advanced RF & System Modeling
- CAD/CAM & Solid Modeling
- Finite Element Analysis
  - Thermal Analysis
  - Shock & Vibration Analysis
- Reliability Analysis

## Prototyping

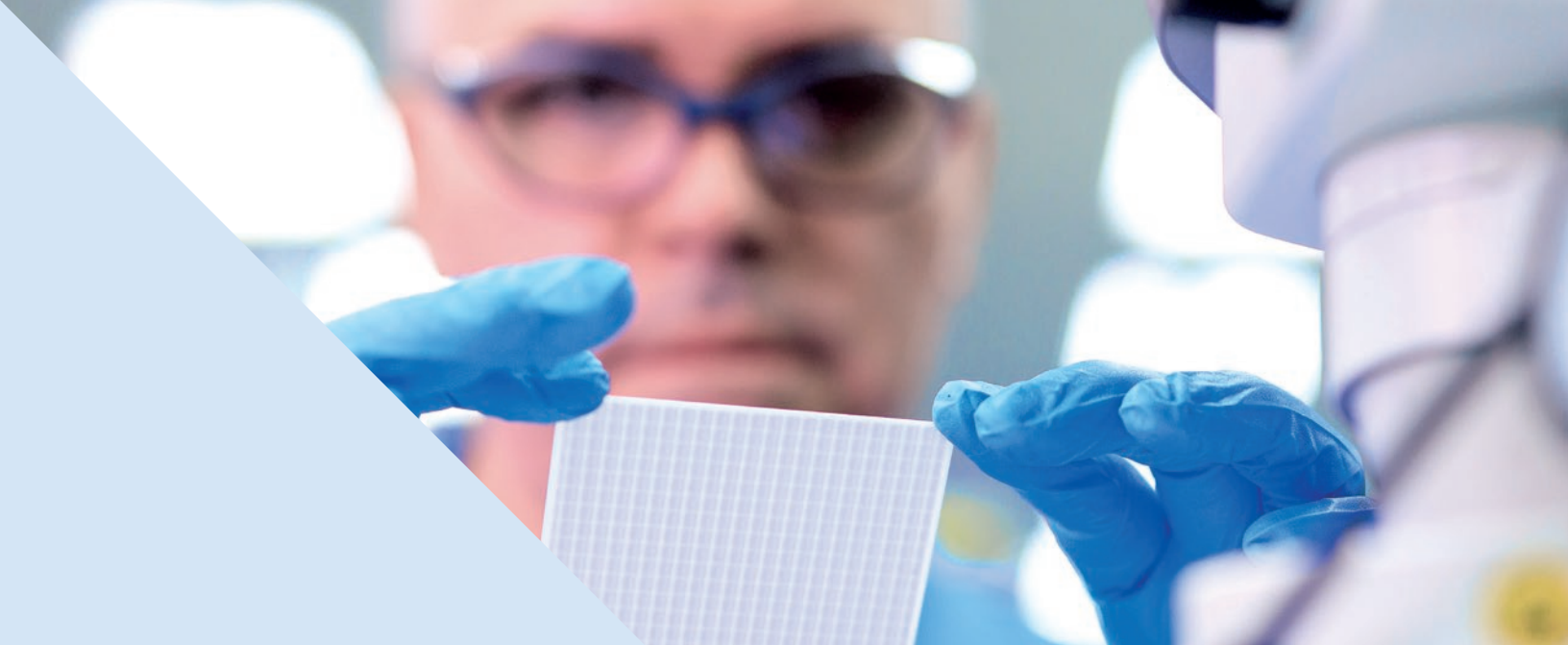
- CNC Turning & Milling Centers
- Cabling / Prototype Assembly
- 3D Printing
- Ceramic Grinding
- EDM
- Circuit Board Routing

## 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
- Thermal Vacuum
- High Power RF Testing
- Optics Lab
- Multi paction, SRS mechanical shock



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## 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

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Fiber Optics &  
RF Components

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Semiconductor  
Test

# Worldwide Support

## Americas

### Sales

connectors.uscsr@smithsinterconnect.com

### Technical Support

connectors.ustechsupport@smithsinterconnect.com

## Europe

### Sales

connectors.emeacsr@smithsinterconnect.com

### Technical Support

connectors.emeatechsupport@smithsinterconnect.com

## Asia

### Sales

asiacsr@smithsinterconnect.com

### Technical Support

asiatechsupport@smithsinterconnect.com

### Sales

focom.uscsr@smithsinterconnect.com

### Technical Support

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### Sales

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### Technical Support

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### Sales

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### Technical Support

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### Technical Support

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semi.techsupport@smithsinterconnect.com

### Sales

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### Technical Support

semi.techsupport@smithsinterconnect.com

# 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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