

smiths interconnect



# Commercial

Aerospace Capabilities



# About Smiths Interconnect

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

Smiths Interconnect is the supplier of choice for safe, efficient and reliable connectivity in commercial aerospace applications. We offer proven experience in high performance connector solutions, antenna systems, RF components and cable assemblies in line with the next generation of avionics equipment, engine systems, power distribution, SATCOM connectivity and various other airframe applications.

Your global partner  
for innovative  
connectivity solutions

Our technology brands (EMC, Hypertac, IDI, Lorch, Millitech, Reflex Photonics, RF Labs, Sabritec, TECOM, TRAK 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, solutions for antenna systems, and a wide range of innovative RF and microwave solutions.

Smiths Interconnect is part of Smiths Group plc, a global leader in applying advanced technologies for markets in threat and contraband detection, energy, medical devices, communications and engineered components. Smiths Group employs around 22,000 people in more than 50 countries.



DEFENCE  
& AEROSPACE



COMMUNICATIONS

INDUSTRIAL



## We Offer

Technical excellence and broad market experience

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

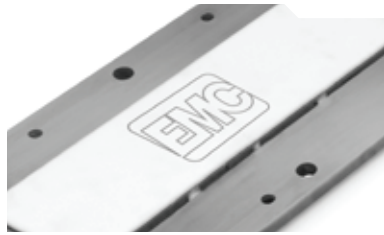
Advanced engineered solutions integrating the combined expertise of our technology brands to create value for our customers

Optimised quality through first-class materials, state-of-the-art development practices, and world class talent

Robust financial pedigree and reputable heritage of Smiths Group

# Technology Brands

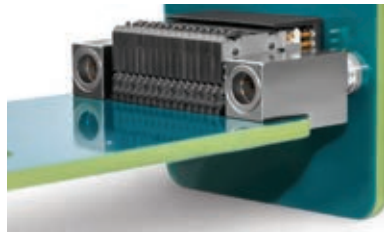
EMC



## High Reliability RF/Microwave Resistive & Signal Distribution Components

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.

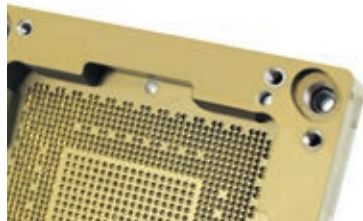
HYPERTAC



## Superior Performing Electrical Connectors for the Most Demanding Applications

Premium interconnect solutions for electrical and electronic applications requiring optimised quality, performance, and reliability. Utilising the original Hypertac hyperboloid contact technology to achieve high performance in harsh environments and safety critical applications.

IDI



## High Density Interconnect & Semiconductor Test Solutions with Spring Probe Technology

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.

LORCH



## RF/Microwave Conditioning Products with High Selectivity Using Multiple Topologies

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.

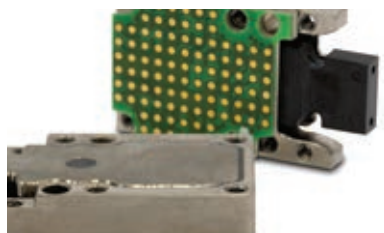
MILLITECH



## Leader in Millimeter-Wave Technology & Product Solutions

Specialising 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.

REFLEX  
PHOTONICS



## Developer of Rugged, High Speed Optical Transceiver Modules & Parallel Embedded Optics Products

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

## RF LABS



### High Frequency Microwave Cable Assemblies & Coaxial Components

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

## SABRITEC



### High Speed Data and Transient Protection Interconnect Solutions

High speed quadrx, twinax, fibre 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.

## TECOM



### Advanced Antenna Systems & Solutions for RF/Microwave Applications

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 RF/Microwave Subsystems & Components

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

## HSI

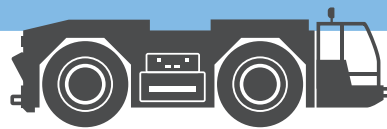
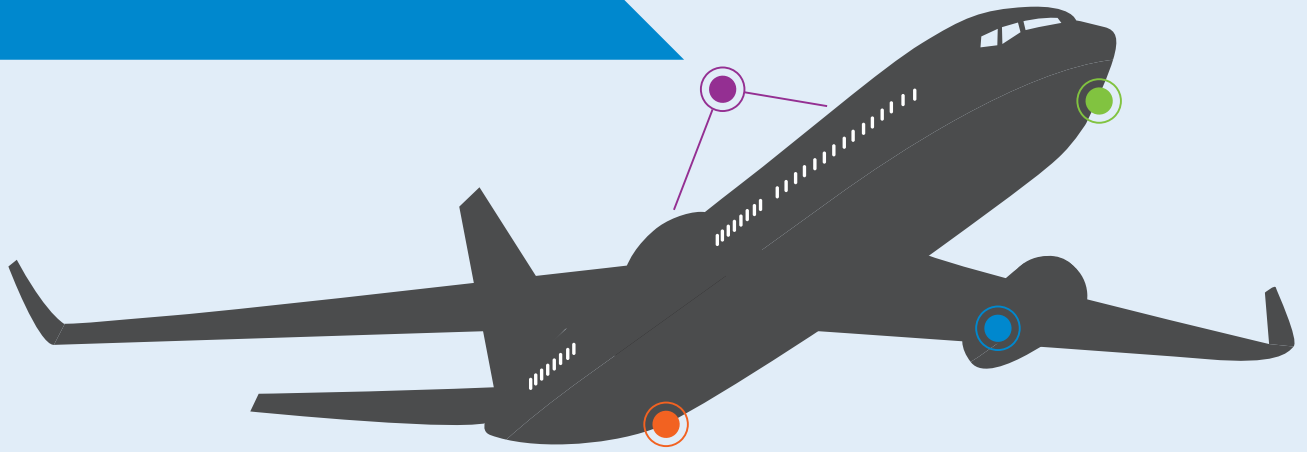


### High Reliability Connectors for Commercial Aerospace & Railway

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.

# Synonymous with exceptional performance, safety and durability

# Applications

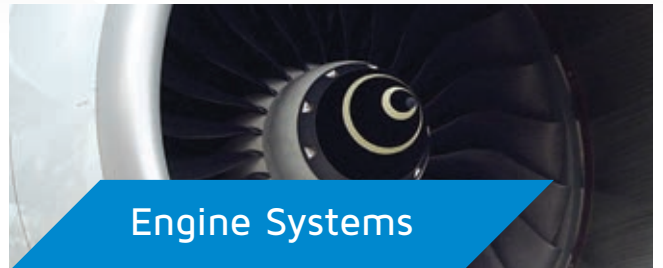


## Avionics



- Flight control & navigation systems
- Flight recorder
- Air traffic control
- Secondary surveillance radars
- Landing gear & brake control systems

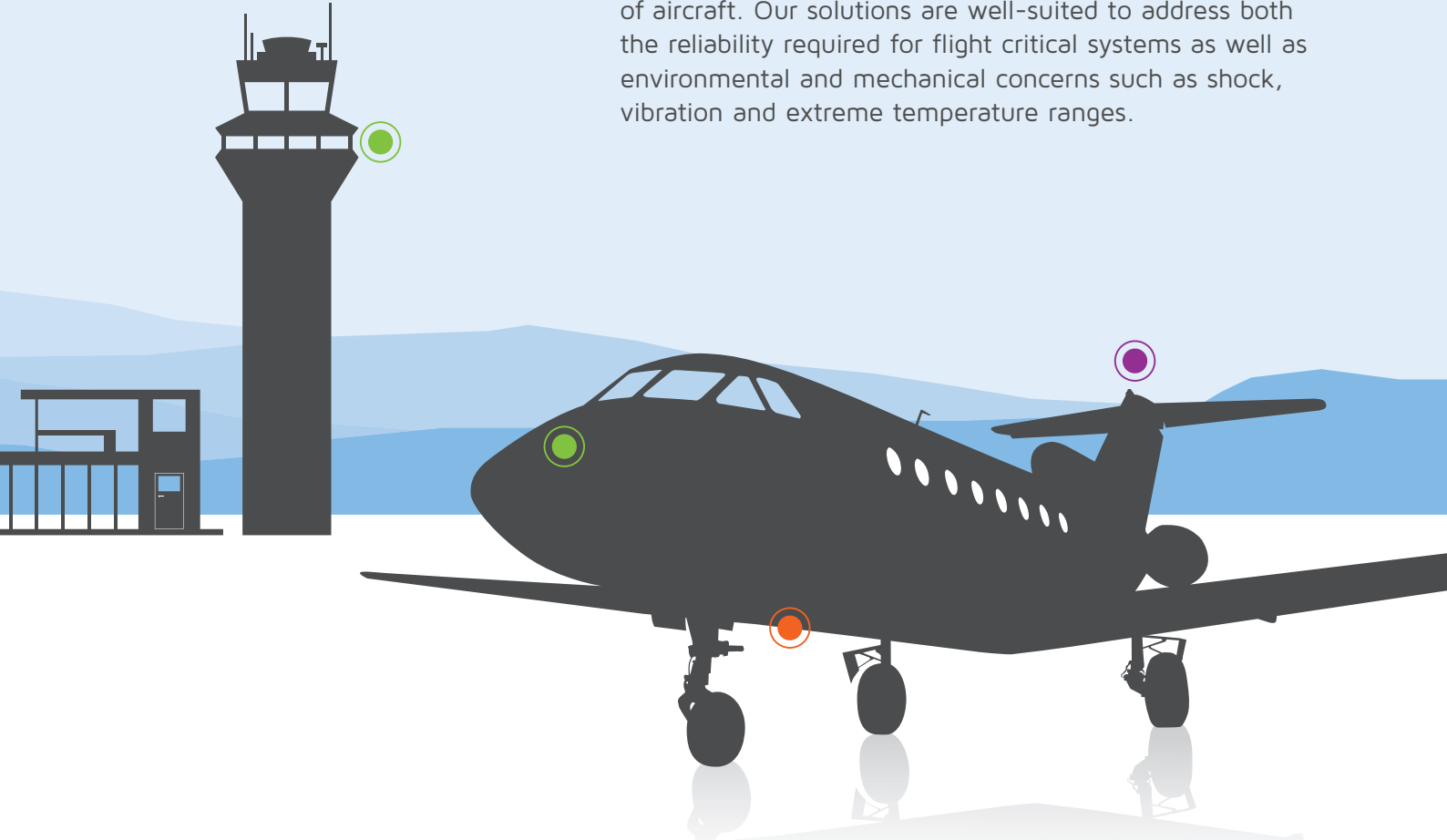
## Engine Systems



- Electronic engine controllers
- Power controllers
- Overspeed protection
- Vibration monitoring
- High temperature sensors

# Providing A Competitive Advantage

Smiths Interconnect is committed to developing advanced interconnect solutions, technologies and full system integration capabilities for the latest generation of aircraft. Our solutions are well-suited to address both the reliability required for flight critical systems as well as environmental and mechanical concerns such as shock, vibration and extreme temperature ranges.



## Power Distribution



- Power distribution & management
- Auxiliary power units
- De-icing systems
- Power conversion
- Motor drives

## SATCOM Connectivity



- In-flight entertainment
- Cabin communication systems
- Wireless connectivity
- High speed networking



# Avionics

Board Level

## Market Leading Reliability

Smiths Interconnect avionic board level solutions maximize system performance through unmatched signal integrity and mechanical endurance with a wide range of standard product and custom solutions.

## Key Benefits

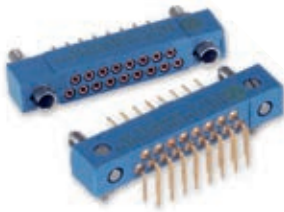
- Product versatility and program heritage
- Reduced system costs due to immunity to shock and vibration
- Ability to operate under extreme temperatures
- Low insertion and extraction forces for reduced board strain and improved serviceability



## Board to Board Connectors

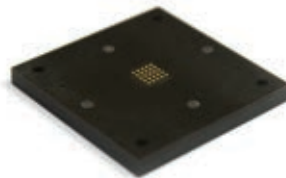
### KN Series

- Available in 2 and 3 row configurations, from 17 to 160 contacts
- ESA qualified: ESCC 3401 039
- Guiding devices with or without polarisation (16 keys available)
- Wire wrap, crimp, solder cup, straight and right angle PC tails
- Front release, rear removable contacts



## Custom Spring Probe Interposers

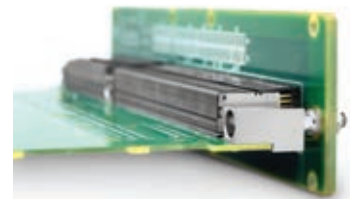
- Low profile, high compliance ratio
- Compression mount termination options
- Mixed signals and functionality designed into a single connector
- Integrated alignment, latching and sealing features



## Rugged Backplane Interconnect

### KVPX Series

- Fully footprint compatible with VITA 46/48 standards
- Flexible modular design for standard 3U, 6U and custom configurations
- 100  $\Omega$  differential impedance
- Data rate performance up to 10 Gbps



## Compact PCI Interconnect Solutions

### Aurora & cPCI Series

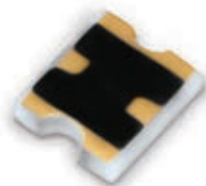
- Qualified to NASA GSFC: S-311-P-822
- Intermateable with cPCI COTS systems
- Hyperboloid & bifurcated contact systems
- Data rate performance up to 6.25 Gbps



## RF Components

### Attenuator Range

- Fixed to 50 GHz and temperature variable to 36 GHz
- Power handling up to 400 watts
- Totally passive with no signal distortion
- Several metalization and configuration options



## Signal & Power PCB

### MHD/MDD Series

- Signal and HE 807 cavities for power and coaxial contacts
- Ruggedized metal or plastic shell available
- ESA qualified: ESCC 3401/065
- Up to 400 signal contact positions





# Avionics

I/O

## Enhanced Technology

Smiths Interconnect avionic I/O solutions offer versatility in mounting options, with modular construction focusing on standard products as well as customer configured solutions. Our products have a proven pedigree providing application confidence with superior EMI shielding.

## Key Benefits

- Increased system level protection due to superior EMI filtering and transient protection options
- Modular construction provides design flexibility
- Optimized impedance matching for signal integrity
- Superior data transfer rates under extreme environmental exposure

## EMI Filter

### Transient Protected Solutions

- Intermateable and interchangeable with standard non-filter connectors
- C, L and Pi style of all formats
- Insertion loss simulation for actual circuit configurations
- TVS protection meeting the requirements of RTCA D-160 section 22 up to level 5



## Fibre Optic

### Single and Multimode

- Butt-joint and expanded beam technology
- Floating design ( $< -0.5\text{dB}$ ), low loss fibre available
- Connector formats for MIL-DTL-38999, ARINC 600
- Fully terminated and tested
- PC or APC ferrule end face



## RF Components

### Navigation & Communication

- Coaxial, stripline & waveguide topologies
- IFF/MODE-S, TACAN
- Ground to air data & voice communication
- Radar altimetry and range finding



## Flexible Cable Assemblies

### Lab-Flex® Family

- Field proven up to 65 GHz
- Low loss, up to 40% less loss
- Custom braids for strength
- Shielding greater than 90 dB
- Stranded centre conductor version available



## High Speed Copper

### Quadrax and Twinax

- Standard 100 and 150  $\Omega$  quadrax and twinax contacts
- Micro twinax and quadrax connectors
- Rugged D-Sub, ARINC and MIL-DTL-38999 standard quadrax and twinax
- Data rates up to 6.25 Gbps
- Reverse gender quadrax contacts



## Rigid Cable Assemblies

### Semi-rigid and Conformable

- High frequency
- RF leakage: up to  $> 100\text{ dB}$
- Copper or aluminium jackets
- Range of protective coverings available





# Engine

## Systems

### Extreme Robustness

Smiths Interconnect engine system solutions offer superior hyperboloid contact technology resulting in higher temperature and vibration capability allowing for more sensors, monitoring and control systems to be located at or near the engine system.

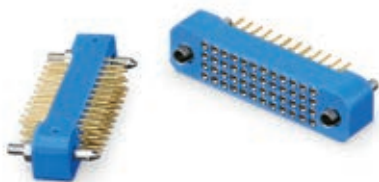
### Key Benefits

- Extended contact life for increased MTBF and reduced system cost of ownership
- Modular construction of EMI/EMP filtering designed for high shock performance requirements (> 1,000 G's)
- Significant performance at elevated temperature conditions beyond standard MIL Spec (> 260°C)
- Sensor positioning closer to the engine

## Board to Board Connectors

### KA Series

- Available in 2 to 5 row configurations, from 17 to 490 contacts
- Over 2,500 configurations
- Guiding devices with or without polarisation (16 keys available)
- Straight dip, right angle solder, crimp, solder cup and wire wrap termination options
- Front release, rear removable contacts



## Circular Power

### HBB Series

- Current rating 300 A and 500 A, 1 pole
- Cable and panel mount variants
- Push lock to mate connector
- Rugged metal shell
- 360° EMI/RFI shielding option
- Sealed IP69 and IP6K9K when mated
- RoHS compliant



## EMI/EMP Filter

### Transient Protected Solutions

- Optimised filter style and value on receipt of signal type and data rate
- Improved shock and vibration resistance
- Low impedance control system
- Transient protection in accordance with RTCA D 160F waveform and level specifications



## RF Components

### Diamond RF Resistives

- Highest power and frequency, smallest size
- Very low parasitic capacitance
- Footprints from 0402 (20W) to 2010 (300W)
- Size and weight reduction in space & hi-rel applications
- Easy-to use packages: chips, flange and tabbed





# Power

## Distribution

### Increased Power Handling

Smiths Interconnect power distribution solutions offer superior hyperboloid contact technology resulting in system stability as well as higher power handling, low contact resistance and temperature variants. Systems include overall power distribution, auxiliary power units, de-icing systems, power conversion and motor drives.

### Key Benefits

- High current-carrying capacity in a compact size
- Customer configurable architecture
- > 20 independent points of contact provide low voltage drop and minimize temperature rise
- High resistance to vibration and shock reduces maintenance costs

## Board to Board Connectors

### KN Series

- Available in 2 and 3 row configurations, from 17 to 160 contacts
- ESA qualified: ESCC 3401 039
- Guiding devices with or without polarisation (16 keys available)
- Wire wrap, crimp, solder cup, straight and right angle PC tails
- Front release, rear removable contacts



## Circular Power

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- Sealed IP69 and IP6K9K when mated
- RoHS compliant



## Modular Power

### MRG Series

- Mate detection system
- Custom single pole, dual pole, tri-pole and multi-pole configurations
- Common amperage-rated moulded components
- Up to 1,000 A current carrying capacity



## Signal & Power PCB

### MHD/MDD Series

- Signal and HE 807 cavities for power and coaxial contacts
- Ruggedized metal or plastic shells available
- ESA qualified: ESCC 3401/065
- Up to 400 signal contact positions





# SATCOM

Connectivity

## Gate-to-Gate Connectivity

Smiths Interconnect offers a complete line of network flexible Ku-band and Ka-band SATCOM antenna systems providing unmatched customer experience with broadband gate-to-gate connectivity for commercial air transport, business jet and various military applications.

## Key Benefits

- Connect at gate and stay connected for improved customer experience
- Network & modem agnostic enables selection of best in class connectivity and least cost routing
- 360° skew rotation reduces the number of antenna configurations needed
- Proven technology with over 1000 KuStream® 1000 installs and 15 million flight hours



## Antenna Control Unit

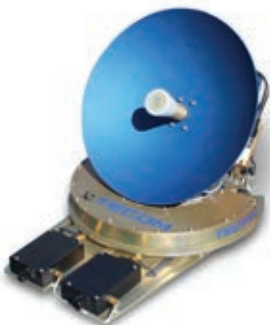
- Provides antenna positioning command and control
- Interfaces with aircraft for navigation information



## Ka-Band Antenna Systems

### KaStream® 5000 Series

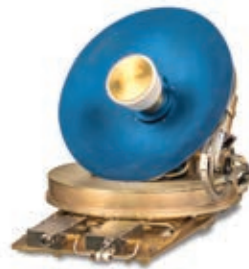
- Light weight fully integrated 3 LRU system
  - High gain antenna system with integrated High Power Transceiver (HPT)
  - Antenna Control Unit (ACU)
  - Modem agnostic (customer selected)
- Broad frequency coverage for commercial and military applications
- Real time switchable dual polarisation
- Operates on global Ka-band HTS satellite networks
- DO-160 qualified



## Ku-Band Antenna Systems

### KuStream® 5000 Series

- Light weight fully integrated 3 LRU system
  - High gain antenna system with integrated High Power Transceiver (HPT)
  - Antenna Control Unit (ACU)
  - Modem agnostic (customer selected)
- Full Ku-band spectrum coverage for military and commercial applications
- Gate-to-gate connectivity
- Operates on global Ku-band networks and new HTS satellites



## Ku-Band High Power Transceiver

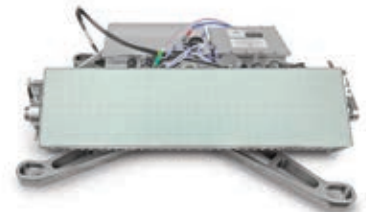
- Qualified for commercial airborne use
- Modular BUC, BDC, SSPA, power supply and controller in compact package
- Optional internal reference ensures compliance when exposed to random vibration DO-160 profiles



## Ku-Band Antenna Systems

### KuStream® 1000 Series

- Integrated 4 LRU system
  - Satellite Antenna Assembly (SAA)
  - Antenna Control Unit (ACU)
  - High Power Transceiver (HPT)
  - Modem agnostic (customer selected)
- Large Install Base
  - Over 1000 aircraft installations
  - More than 15 million flight hours
  - Commercial and military variants
- Market leader
  - Full Ku-band spectrum coverage for military and commercial use
  - Full compliance with stringent FCC regulatory standards
  - Gate-to-gate connectivity
  - Operates on global Ku-band networks and new HTS satellites





# SATCOM

Connectivity

## Superior Performance

Smiths Interconnect offers connectors and cable assemblies well suited to provide high performance and durability in harsh environments. Our RF/microwave components incorporate advanced resistive and signal distribution technologies for a broad range of frequency spectrum applications. Our embedded transceivers are ideal when high data rate communication links, low SWaP as well as radiation resistance performance are required.

## Key Benefits

- Excellent performance in a variety of environmental conditions
- Targeting high-reliability interconnects where high data rate communication links, low SWaP as well as radiation resistance performance are required
- Unparalleled average and peak power handling
- Standard and custom solutions to fit customers' needs

## Cable Assemblies

### Lab-Flex® Series

- Excellent performance over flexure in a variety of environmental conditions
- Low loss designs available for Ku/Ka band designs (DC-40 GHz)
- High shielding and extremely durable mechanical life due to braiding designs and solder terminations.
- Solid centre conductor designs available DC-65 GHz in low loss phase stable (Lab-Flex® T) designs.
- Phase matched options available



## High Speed Data

### ARINC 801 Series

- High density, butt joint interconnect technology
- Standard 1.25 mm ferrule and sleeve
- Multi-mode and single-mode applications
- Low loss, low back reflection
- Standard MIL-DTL-38999 and ARINC 600 Size 16
- Removable alignment sleeve holder



## RF Filters

### Low pass, Band pass and High pass

- Discrete, cavity, waveguide, ceramic and printed filters
- High volume production capability
- Frequency up to 51 GHz with high Q factor
- Power handling up to 100 watts



## Ferrites & Passive Sub-Assemblies Waveguide

### Isolators and Transitions

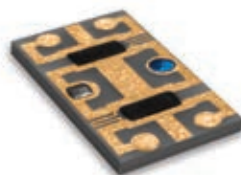
- Designed to operate up to 50 GHz with superior electrical performance
- Optimised for high power applications
- RF sealed and robust
- Waveguide devices and assemblies optimized for Ku and Ka bands



## RF Components

### Board-level Devices

- Resistive components up to 50 GHz
- Power handling up to 400 watts
- Temperature variable attenuators for passive gain compensation
- Broadband performance with compact factor



## Rugged transceivers with MPO interface

### LightVISION VM

- Robust screw-in board-mounted optical module with reduced footprint
- Performance up to 12.5 Gbps per channel with bandwidth from 25G or 50G (2 or 4 full-duplex transceiver lanes) up to 150G (12 channel transmitter and receiver modules)
- Standards MPO/MTP® cable connection
- Integrated microcontroller
- Low power consumption of 100 mW per channel
- Available in extended commercial grade temperature range (0 °C to 85 °C)
- Over 100 m reach on OM3 ribbon fibre with 850nm lasers



# Capabilities

Smiths Interconnect's in-house capabilities encompass design, development, manufacturing and testing to respond quickly and accurately to customers' needs, and provide the most reliable connectivity solutions.

## Certifications/ Standards Compliance

- EN/AS 9100
- MIL-DTL-3933
- MIL-DTL-39030
- MIL-DTL-38999
- MIL-DTL-83723
- MIL-DTL-83527
- MIL-DTL-24308
- MIL-DTL-83513
- MIL-C-26500
- MIL-C-81511
- MIL-C-26482
- MIL-PRF-55342
- ARINC 404
- ARINC 600
- ARINC 628
- ARINC 800
- ARINC 801
- HE 801
- HE 704
- Nadcap
- NF C-UTE C93-424



## Engineering

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

## 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
- System Integration
- Validation Testing
- Optical Alignment

## Prototyping

- CNC Turning & Milling Centres
- Cabling / Prototype Assembly
- 3D Printing

## Testing/Qualification

- Electrical Acceptance & Lot Test
- Mechanical
- Environmental
- 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
- High Power RF Testing
- Multipaction
- Optical Testing



# Locations

# Connecting Global Markets

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

## Americas

- Costa Mesa, CA  
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\*Smiths Interconnect, Inc. (SII), is the separate legal entity operating within the requirements of a Special Security Agreement (SSA) with Defense Security Services (DSS) of the United States.

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

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