

smiths interconnect



Space
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 Defense and Aerospace, Communications and Industrial markets.

Smiths Interconnect is the supplier of choice for safe, efficient and highly reliable connectivity in space applications. Our proven expertise and know how, gained over more than 60 years in the space market, enable us to design innovative solutions that are smaller, lighter weight and robust where increased ruggedness is paramount to withstand vibration, shock, temperature extremes and radiation.

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.



DEFENSE
& 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

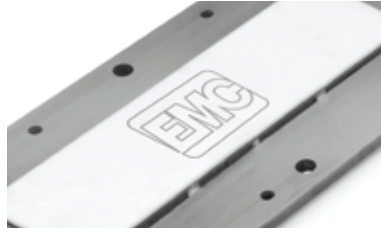
Advanced engineered solutions integrating the combined expertise of our technology brands to create value for our customers

Optimized 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

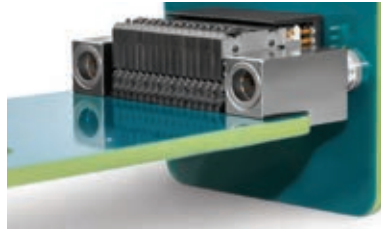
EMC



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.

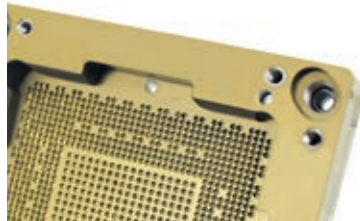
HYPERTAC



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.

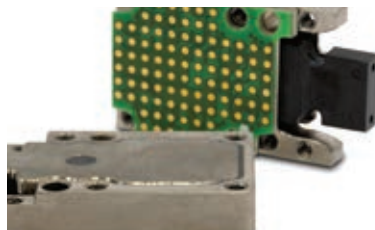
MILLITECH



Leader in Millimeter-Wave Technology & Product Solutions

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.

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 defense, commercial aerospace, space, homeland security, and public safety applications.

HSI

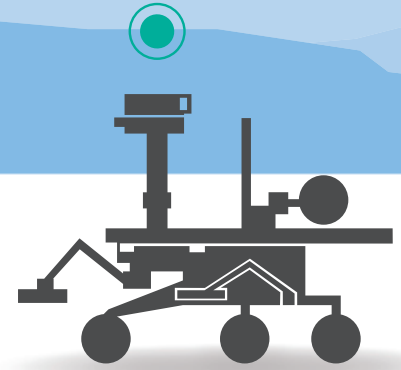
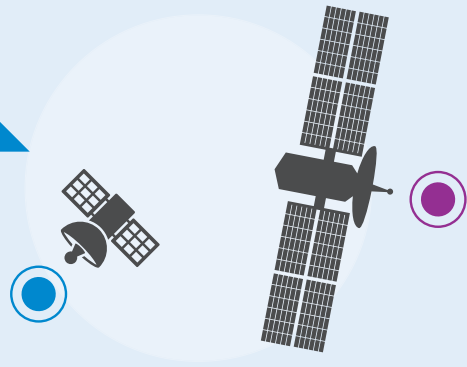


High Reliability Connectors for Commercial Aerospace & Railway

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



Satellites GEO/MEO



- Navigation & Communication
- Gamma Ray Detection
- Weather Monitoring
- Radio/TV Networks
- Broadband
- Space Environmental Sciences

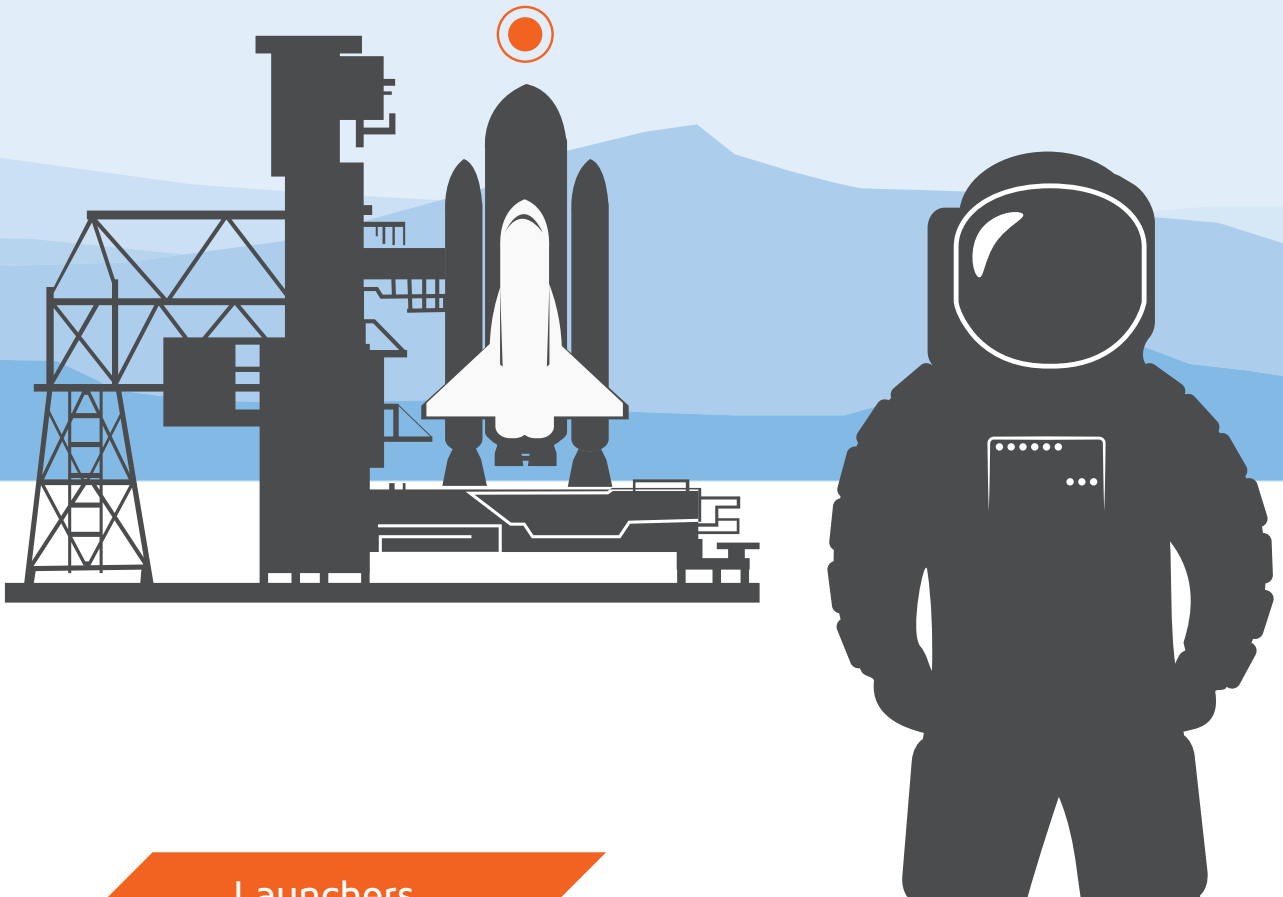
Satellites LEO



- Earth Observation
- Surveillance
- Telecom
- Space Telescopes
- Earth Sensing
- Space Cubes

Providing A Competitive Advantage

We design, develop and manufacture high reliability RF, microwave and mmW systems and components, connectors and cable assemblies that ensure optimal performance, durability and safety in space-related operating environments. We are an approved vendor for international space agencies including ESA, ISRO, JAXA and NASA, and have proudly delivered failure-free performance in numerous spaceflight programs. We work globally with our customers and space agencies to design the next generation of solutions for launchers, satellites, manned space flight and ground systems support.



Launchers



- Attitude Correction Module
- Central Units / Communication
- Command Memory Boxes
- Control Boxes
- Sensors

Ground Systems



- Docking Systems
- Ground Stations
- Communications
- Mars Rovers
- Mobility
- Navigation Systems



Satellites

GEO/MEO



Top: Diamond RF resistives increase the power to weight ratio for satellites.

Proven Space Heritage

The primary satellite functions of navigation, broadband communication and environmental sciences not only require the highest performance components, but also ultra-high reliability since operating conditions are extreme. Smiths Interconnect designs compact and reliable spacecraft suitable products which minimize mass, footprint and volume. Our solutions use space approved materials and controlled processes for minimum mission lifetimes of 15 to 20 years.

Key Benefits

- Broad range of ESA & NASA approved solutions
- Controlled and qualified design and manufacturing processes
- Technical advice on appropriate screening levels for non-standard products

Cable Assemblies

Semi-Rigid,
Hand-formable, and
Flexible Series

- High performance RF
- Wide range of connector, plating and jacket type options
- Custom bent configurations or packaged straight for on-site routing



EMI Filter

Passive Low-Pass
Filtering Solutions

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



RF Components

Diamond
RF Resistives®

- Extreme high power-to-size ratings to 300 W
- Excellent peak power performance
- Super compact form factor



Connectors

High Speed Copper

- Integrated EMI spring fingers for superior EMI performance with low contact resistance
- Twinax, quadrax, quadsplitter
- Micro-D size RF connectors with complete harness capabilities
- NASA space approved
- Data rates up to 6.25 Gbps
- Standard 100 and 150Ω quadrax and twinax contacts



Radiation-Resistant Optical Transceivers

- Meet highest level SWaP requirement
- Resistant to heavy-ion, Gamma rays, and high energy protons
- ECSS/ESCC/NASA standards
- High I/O density
- Resistant to temperature extremes



RF Ferrites & Passives

Coaxial

- Microwave and millimeter-wave
- Waveguide coaxial, drop-in and stripline isolators and circulators
- Low loss and high power single and multiple junctions with integrated terminations





Satellites

LEO



Top: COTS+ platform products that meet the reliability and service demands of LEO satellites.

Ahead of Industry Trends

Given current trends, the LEO satellites market is experiencing an influx of fresh interest with new investors turning the high-tech and stringent regulated space industry into a vibrant playground of new operators and innovative applications. Smiths Interconnect's broad product portfolio provides customers a combination of technology and lower cost of ownership solutions that enable operators to overcome potential market entry barriers while enjoying the benefits of an established market player.

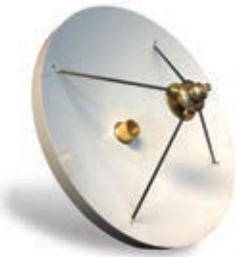
Key Benefits

- Compact form factor, high reliability
- Standard product selection available
- Space requirement expertise

Antenna & Quasioptical Products

mmW Antenna Systems

- Full range includes aperture, reflector and lens-based options
- Standard and custom designed models from 18 to 325 GHz
- Additional offerings: polarizers, orthomode transducers, monopulse comparators, and waveguide rotary joints



Cable Assemblies

Flexible Series

- Qualified to NASA & ESA requirements
- Flexible low loss Lab-Flex Q up to 40 GHz
- Robust and reliable cable to connector technology



mmW Components

Amplifiers

- Broad array of power amplifiers (AMP) up to 16-way, and low noise amplifier (LNA) solutions
- Standard and custom multi-component solutions from 18 to 110GHz
- Superior performance and efficiency for high frequency applications
- GaN, GaAs, InP, and SiGe technologies



RF Components

Temperature Variable Attenuators

- Product versions from DC to 50 GHz
- Excellent RF broadband performance
- Footprint compatibility with Thermopad®
- Surface mount, wire bond, tab, flange and coaxial configurations



S-Band QFH Antenna

Hemispherical Coverage Antennas

- Perfect communication link between ground-based stations and spacecraft

- High isolation between TX and RX bands through sophisticated feeding circuitry
- Multiple frequency coverage: S-Band, L-Band and GPS (L1 and L2)



Stacking Connectors

Spring Probe Interposers

- ESCC 3401/076 approved
- Z-Axis interconnects with solderless contacts
- High density button contact
- Design flexibility



Telemetry & Tracking Beacon Antennas

Microwave Antenna Solutions

- Adjustable mounting flange
- Heat resistant, survives 3000°F
- Environmentally qualified
- Flush mounted for zero drag
- Rugged construction, quartz aperture, S.S. body
- Small and lightweight





Launchers



Top: Digital data connectors provide extremely high resistance to shock and vibration on ESA launch rockets.

When Failure is Not an Option

Customers in the space industry know that liftoff is always the most dynamic and crucial phase of the process. The launch vehicle is the delivery mechanism for space-bound hardware and astronauts. Smiths Interconnect has a keen awareness of the criticalities associated with the launch process. Robust components are demanded for space launch applications, and we offer a broad portfolio of high density interconnect solutions that provide long contact life, unparalleled

signal integrity, immunity to shock and vibration, and elimination of contact fretting in extreme operating environments.

Key Benefits

- Proven technology with small footprint and low power consumption
- Extended life and guaranteed performance levels
- Improved signal speed and integrity
- Interoperability solutions

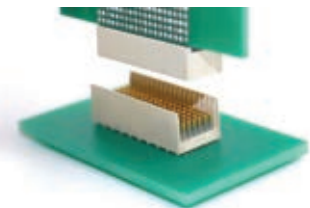
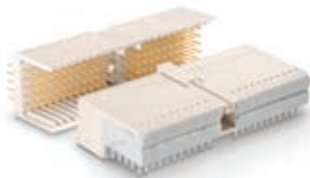
Compact PCI Systems

Aurora Series

- Bifurcated contact system
- Enhanced gold plating for increased MTBF
- Intermateable with COTS systems
- Lower system cost of ownership

cPCI Series

- NASA GSFC qualified
- High-temp LCP insulator meeting outgassing requirements
- Reverse gender to commercial 2mm products
- Keying feature ensures proper mating
- Modular design for 3U/6U configurations



High Density PCB

KN & KA Series

- Up to 5 rows and 400 contacts
- Signal, power & coaxial
- ESA & NASA space approved
- Next generation VITA 63 connectors
- Space approved VME architecture



Modular Power

MRG Series

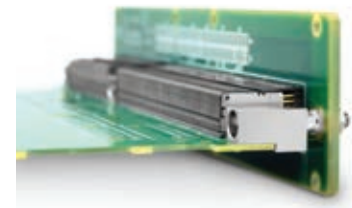
- Mate detection system
- Single-pole, dual-pole, tri-pole & multiple custom options
- Common amperage rated molded components
- Up to 1,000 A current carrying capacity



Rugged PCB

KVPX Series

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





Ground

Systems



Top: Thermopad® attenuators are used on the Mars Rover to compensate for temperature variations.

Standard Rugged Solutions

The space industry requires interconnect technology that delivers flawless, dependable and consistent performance, for it plays a key role in getting critically important initiatives off the ground. In real-world application scenarios involving geo-navigational engineering, wireless communications and receiving stations, Smiths Interconnect's rugged, cost-effective solutions meet the unique needs of our space customers on the ground, during liftoff and ultimately in the reaches of deep space.

Key Benefits

- Ultra-rugged, light weight and low outgassing
- Advanced composite materials with optimized strength, thermal and electrical performance
- Greater flexibility for easy routing and faster installation
- Optimized inspection and cleaning processes
- Excellent RF performance maintained in harsh environments

Fiber Optic

Single and Multimode

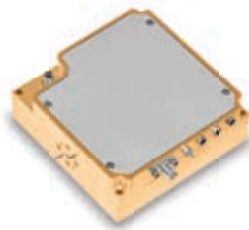
- Expanded beam & butt joint termini
- Electro-optical transceiver products
- MIL-DTL-38999 connectors
- Added value solution with cable assemblies



Integrated Microwave Assemblies

Up/Down Converters

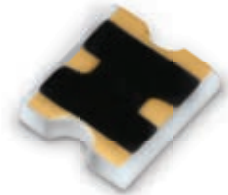
- Single and multichannel
- High dynamic range
- Radiometer front ends
- Through 220 GHz



RF Components

Attenuator Range

- Surface mount, wire bondable, tab and cover, coaxial configurations
- Support every application from DC to 50 GHz
- 0.1 to 400 watt versions
- Commercial and high reliability product lines
- Space and military qualified



Filtered Rack & Panel

ARINC Series

- ARINC 404 and 600
- Intermateable and interchangeable with standard non-filter connectors
- Protection against primary lightning, EMI and EMP
- Standard interfaces
- Custom inserts



Modular Connectors

L & N Series

- Mixed signal, power, and coaxial modules
- Up to 200 A power
- Cable to chassis and rack and panel
- Plastic backshell with strain relief and half turn quick disconnect jackscrew
- Float mountable for blind mating



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.

Facility Certifications & Registrations

- ISO 9001
- AS 9100 Rev. D
- ISO 14001
- DOD Internal
- Security
- IPC
- OHSAS 18001

Product ESA & NASA Specifications

- ESA/SCC 3401/016, 017, 039, 065 & 076
- NASA GSFC S-311-P-822, 826 & 835
- NASA EEE-INST-002
- NASA STD 8739.3
- MIL-PRF-38534
- MIL-DTL-55302
- ANSI/J-STD-001



Engineering

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

Manufacturing

- Precision Machine Shops
- Connector, Contact & Cable Assembly
- Automated PCB Assembly & Inspection
- 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 Centers
- Cabling / Prototype Assembly
- 3D Printing

Testing/Qualification

- Electrical
- Metallurgical
- Mechanical
- Environmental
- Real Time X-Ray
- RF Test Capability up to 300 GHz
- High Speed Digital
- Anechoic Chamber Testing
- ESS & Environmental Qualification
- High Power RF Testing
- Multipaction
- Optical Testing





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.

