smiths interconnect
bringing technology to life

Connecting as one

Railway

Capabilities

About Us

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 commercial aviation, defence, space, medical, rail, semiconductor test, wireless telecommunications, and industrial markets.

Smiths Interconnect is the supplier of choice for safe, efficient and reliable connectivity in railway applications. Our experience in high performance connector solutions, antenna systems, RF components and cable assemblies for rolling stock, signaling and infrastructure results in customer-driven, reliable solutions for our customers.

Our technology brands (EMC, Hypertac, IDI, Lorch, Millitech, RF Labs, TECOM, and TRAK) are synonymous with exceptional performance whenever a technologically advanced, high quality solution is required to ensure reliability and safety.

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.

By unifying the competencies and capabilities of its world-leading interconnect brands, Smiths Interconnect offers:

- Technical excellence and vast 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 methods, 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 and applications. Extensive portfolio of RF devices used to attenuate, level or terminate signals available in a variety of packages and footprints

HYPERTAC

High Performance Electrical Connectors for the Most Demanding Applications

Premium interconnect solutions for electrical and electronic applications requiring superior quality, performance and reliability. Hypertac connectors utilize the superior performing hyperboloid contact technology; ideal for 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. Off-the-shelf and custom products proven to deliver the best solution for the customer's specific application.

LORCH

RF/Microwave Conditioning Products with High Selectivity Using Multiple Topographies

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 test of millimeter-wave components, assemblies, and fully integrated subsystems for SATCOM, test and measurement, radar and scientific 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 durability and harsh environments.

TECOM

Advanced Antenna Systems & Solutions for RF & Microwave Applications

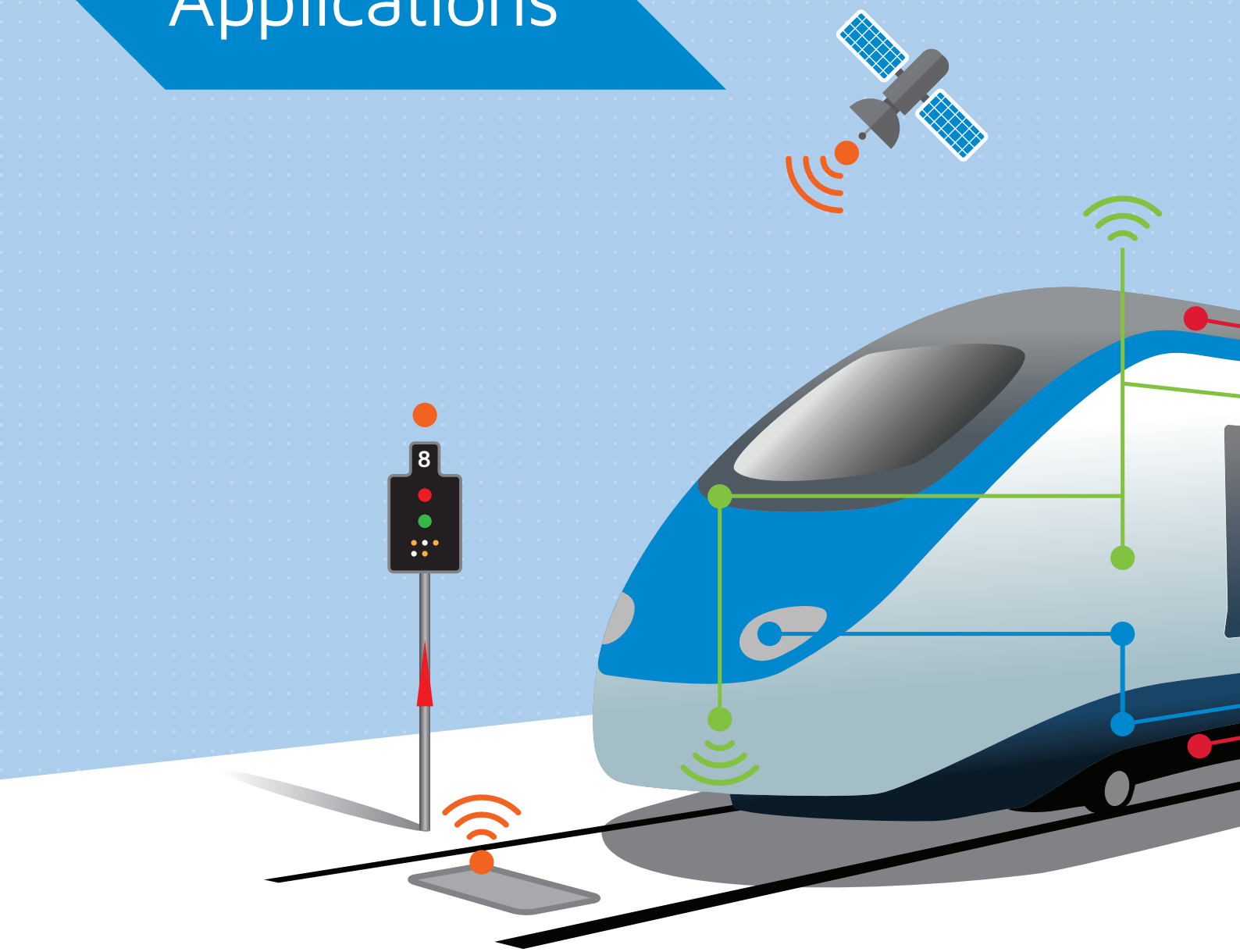
Best-in-class high frequency antennas and positioners for instrumentation, flight termination, datalink, in-flight connectivity, and telemetry applications integrated into the world's most respected commercial and military platforms.

TRAK

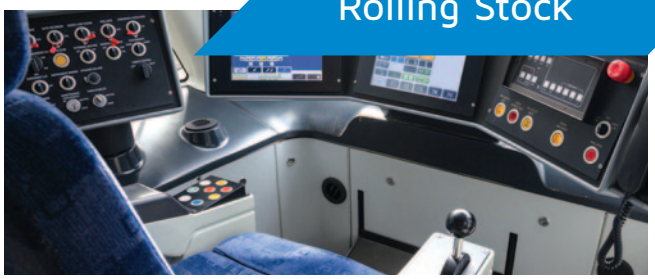
High Reliability RF/ Microwave Subsystems & Components

Integrated microwave subsystems and assemblies, high performance ferrites, and time and frequency systems for defence, commercial aerospace, space, homeland security and public safety applications.

Applications



Rolling Stock



Safety Control & Command

- Driver Cabin
- Lightning
- Alarms
- Sensors
- Seats
- Door & Brake Control
- Electromagnetic Valves
- Air Conditioning

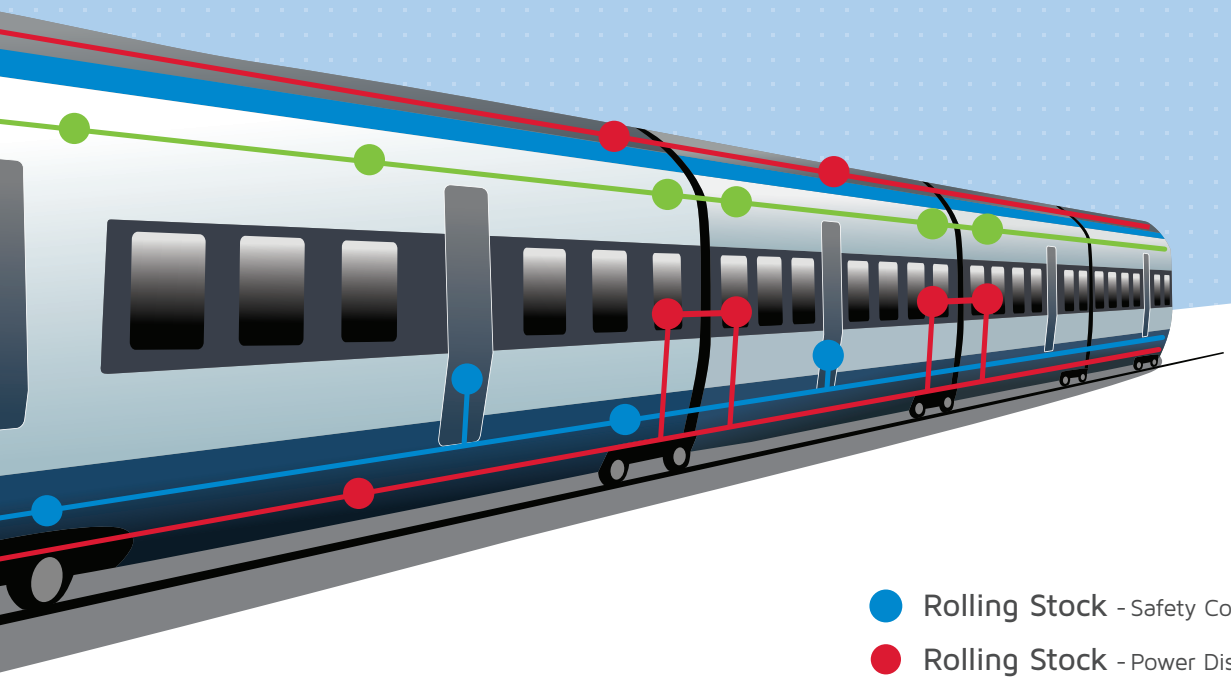
Rolling Stock

Power Distribution

- Energy Storage Systems
- Inter-vehicles Junctions
- Regenerative Braking Systems

Providing A Competitive Advantage

We offer proven quality, innovative and environmentally friendly solutions conforming to the main international railway standards. We constantly adapt our products to tomorrow's technologies while meeting our customers requirements. Our know-how and application expertise ensure the design and manufacturing of cost effective product platforms as well as completely tailored solutions for the harshest railway conditions. We provide our customers with a competitive advantage when tackling the challenges of higher power, increased data rates, wider bandwidth, and greater connectivity all within a smaller footprint.



- **Rolling Stock** - Safety Control & Command
- **Rolling Stock** - Power Distribution
- **Signalling**
- **Infrastructure**

Signalling

- Digital Tracking ERTMS/ETCS
- Communication-based Train Control
- Passenger Information Systems

Infrastructure

- Digital Tracking GSM-R
- Ground Communications
- Video Surveillance
- E-Ticketing
- Red Light Traffic Management

Rolling Stock

Safety Control & Command

Top: Smiths Interconnect connectivity solutions are used in driver desk applications.

Reliable Connection

The extreme operating conditions within railway applications demand high quality and reliability interconnect solutions. Our Hypertac® hyperboloid contact technology with its continuous points of contact ensures uninterrupted connectivity in demanding environments where reliability and safety are critical.

Our Connectivity Solutions Provide:

- Extended contact life provides low cost of ownership
- Reduced system costs due to immunity to shock and vibration
- Reliable contact technology ensures reduced qualification and maintenance costs

Circular Metal Ethernet Connectors

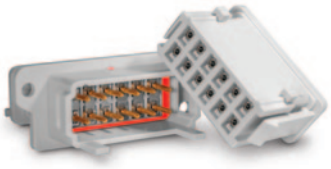
M12 Series

- Compact IP67 metal shell
- 360° EMI shielding
- Hyperboloid contact technology
- Compliant with rail fire and smoke standards
- Straight and right angle 90° rotatable backshell
- Compatible with most commonly used rail cables
- Easy to terminate, field attachable

Environmentally Sealed Rectangular Plastic

REP Series

- Conforms to main rail standards: EN 45545, EN 50124
- Voltage rating up to 400 V
- Fire and smoke standards compliant
- Allows wire sections from 0.5mm^2 to 2.5 mm^2 (20-12AWG)
- Shunt function available
- 2, 6 and 12 way standard sealed insulators
- Crimp, straight or bent termination options



Flexible Cable Assemblies

Lab-Flex® Family

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

Modular Rack & Panel

LHS / LHZ Series

- Qualified according to SNCF standards NF F 61-032
- Signal, power, coax and data (Ethernet) modules available
- Float mounting ± 1.25 mm
- Gold plating Hyperboloid contacts with a large crimp section

Rectangular/ Modular Connectors

Hypermod Series

- Conform to DIN 43652 standard
- Approved by SNCF according to NF F 61-030
- Signal, power, coaxial and 1.2 GHz high speed quadrax contacts available

Rolling Stock

Power Distribution

Top: Smiths Interconnect HBB Series on a rail inverter.

High Power Solutions

Connecting power cables in rolling stock is critical. Beyond specific parameters like voltage, current, or watertight sealing, other application requirements must be considered: environmental and operating conditions, robustness, handling, and other customer specific requests. Our high power connectivity solutions deliver both extreme vibration resistance and space saving footprints to ensure reliable power supply. Our high reliability hyperboloid technology is scalable allowing for additional contact points resulting in reduced overheating and lower mating forces when connecting.

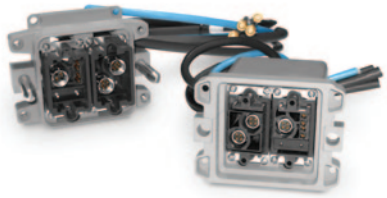
Our High Power Solutions Offer:

- High current-carrying capacity in a compact size
- Customer configurable architecture
- Minimal voltage drop and power loss
- High resistance to vibration and shock
- Low maintenance cost
- High voltage capability

Heavy Duty Modular Coupler

F Series

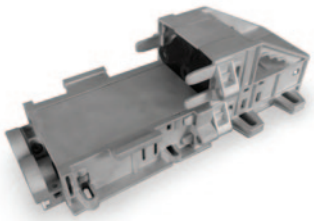
- Qualified according to SNCF NF F 61-030 standards
- Hybrid connector: signal, power, data (Ethernet), quadrax & fibre optics contacts available
- Mating safety by guiding and coding pins
- IP68 heavy duty aluminum shell



Heavy Power Branch Connector

Transformer Heavy Y

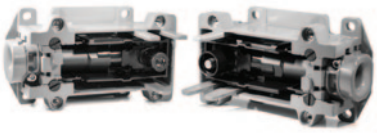
- Multi-pole connector for derivation, 1 to 5 poles
- Compliant with the EN45545-2; (HL3 for R22 & R23)
- IP66 & IP67 fully sealed
- Current ratings up to 300A
- Operational voltage 3,6 KV, withstanding voltage 12 KV (EN 50124 OV3 PD4)
- Robust aluminum metal protection



High Power Modular Solution

Transformer Heavy Power

- Compliant with the EN45545-2; (HL3 for R22 & R23)
- IP66 & IP67 fully sealed
- Customer configurable architecture, 1 to 5 poles
- Current ratings up to 300A
- Insulator design according to EN 50124 Pollution Degree 4
- Robust aluminum metal protection
- Anti-swaying device on connector back end



High Power Quick Release

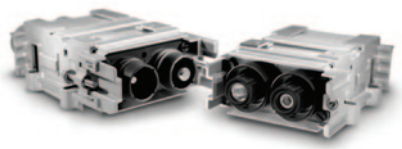
HBB Series

- Compact and small size for weight savings
- Quick locking device
- Current ratings from 300A to 500A
- 360° EMI/RFI shielding
- IP67 fully sealed
- Robust metal shells
- Finger proof IP2X

High Reliability Modular Connector

Transformer Easy Power

- Compliant with the EN45545-2; (HL3 for R22 & R23)
- IP66 & IP67 fully sealed
- Multi-pole connector up to 5 poles
- Current ratings up to 700A
- Unique component for several configurations; easy customization defined by the end-user



Signalling

Top: Junction with Smiths Interconnect signal, power and high speed quadrax connectors.

Enhanced Technologies

The volume of information required within railway systems has increased substantially and traditional connection technologies can no longer support the transmission requirements for speed, integrity and distance. Our high-speed signal and data transmission portfolio delivers a viable solution for Ethernet-based challenges engineers face when designing modern trains. Our solutions are engineered to mitigate the effects of shock, vibration and fretting corrosion, providing optimal signal integrity to push data rate limits.

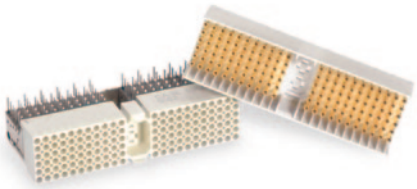
Our Data Integrity Products Offer:

- Superior connectivity
- Extensive range of high quality and reliable solutions
- Custom-manufactured and fully tested systems

Compact PCI Systems

Aurora & cPCI Series

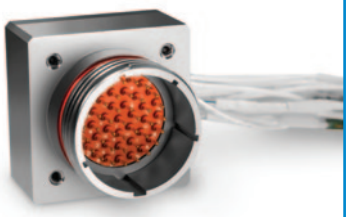
- Qualified to S-311-P-822
- Intermateable with cPCI COTS systems
- Hyperboloid & bifurcated contact system
- Data rate performance up to 6.25 Gbps



EMI / EMP Filter

Filter Connectors

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



Modular Rack & Panel

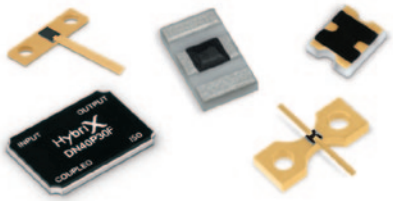
L/H Series

- Hybrid connectors: signal, power, coax, fibre optics and high speed contacts available
- High density up to 1.000 contacts in one connector shell
- Modular and mini-modular series

Electronic Components

RF Components

- Thermopad®
- Attenuators
- Resistors
- Terminations
- Diamond RF Resistives®
- Isolators and Circulators



Data Transfer Rectangular Connectors

CEA Series

- Offset grid contact layout, one or two contact rows within dielectric connector body
- 1.5mm nominal pin DIA contact size: 3, 5 and 9 contact positions
- Hand solder, dip solder and crimp termination styles

RF Cable Assemblies

Titan Flex Test

- Robust solder termination
- Crush resistant and durable
- Superior electrical performance
- Optimized to 18 GHz

Infrastructure

Top: Smiths Interconnect BOA connectors and cable assemblies used on Eurobalise Transponder Systems.

Reliability in Demanding Environments

Reliable and maintenance-free contact line systems are critical to avoid service interruption in electric railway and tram systems. Smiths Interconnect is a full-service provider offering innovative and sustainable solutions. In addition to our wide range of interconnect products, our engineering teams can help with solutions based on a customer's specific requirements such as extremely high vibration resistance, extended service life, fluctuating temperature ranges, high transmission reliability and demanding fire safety prerequisites.

Our Customers Benefit From:

- Close relationships enabling in-depth knowledge of our customers' needs
- Products that facilitate high capacity and rapid-rate data distribution
- Extensive range of high quality and reliable solutions

Transponder Connector

BOA Series

- Compliant to VG95234, MIL-C-5015, MIL-C-26482
- Superior safety
- Simple and cost effective installation
- Practically maintenance-free
- Low susceptibility to vandalism
- Vibration tests compliant to IS-402

Semi-Rigid & Hand Formable

Cable Assemblies

- High frequency
- High isolation: up to >100 dB
- Copper or aluminium jackets
- Range of protective coverings available

Value Added Solutions

Cable Assemblies

- Combining one or several connectors with electrical or optical cable harness
- Patch cords between control cabinets and antennas
- Inter-car jumpers
- Network transmissions (Ethernet, MVB, WTB...) using copper or fibre optics

Modular Rack & Panel

B Series

- Compliant to NF F61-030, NF F16-101, NF F16-102
- Hybrid connector: signal, power, coaxial and high speed contacts
- Up to 100 signal 1.50mm contacts
- Interchangeable contact retaining system
- Design adapted to customer footprint and electrical voltage

Shielded Circular Connectors

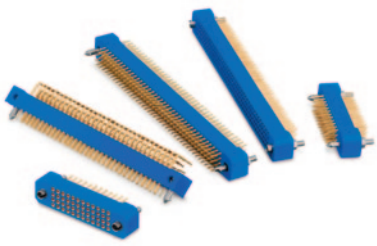
C Series

- Suitable to EN Railway cables
- High shock and vibration resistance EN 61373 Level 2
- IP67 metal shell
- Hyperboloid gold plating contacts with a large crimp section
- High performance in a smaller space

Wide Choice of Configurations and Terminations

PCB Connectors for Harsh Environments

- Low, medium and high density connectors with long life cycle
- Signal, power, coaxial and high speed, RF contacts and spring probes solutions
- Board-to-board, cable to board, cable to cable and stacking



Capabilities

Engineering

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

Manufacturing

- Precision Machine Shops
- Connector, Contact & Cable Assembly
- Automated PCB Assembly & Inspection
- Automated Hybrid Assembly
- Automated Test & Tune
- System Integration
- Validation Testing

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
- High Power RF Testing

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

- ISO 9001
- ISO 14001
- OHSAS 18001
- 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
- HE 501
- HE 704
- UTE C93-425
- UL94 VO
- RoHS
- IRIS

Worldwide

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 America, Europe and Asia.

UK Headquarters

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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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