

smiths interconnect



# Railway

Connectivity Solutions

---

BEYOND  
CONNECTIVITY

# About Smiths Interconnect



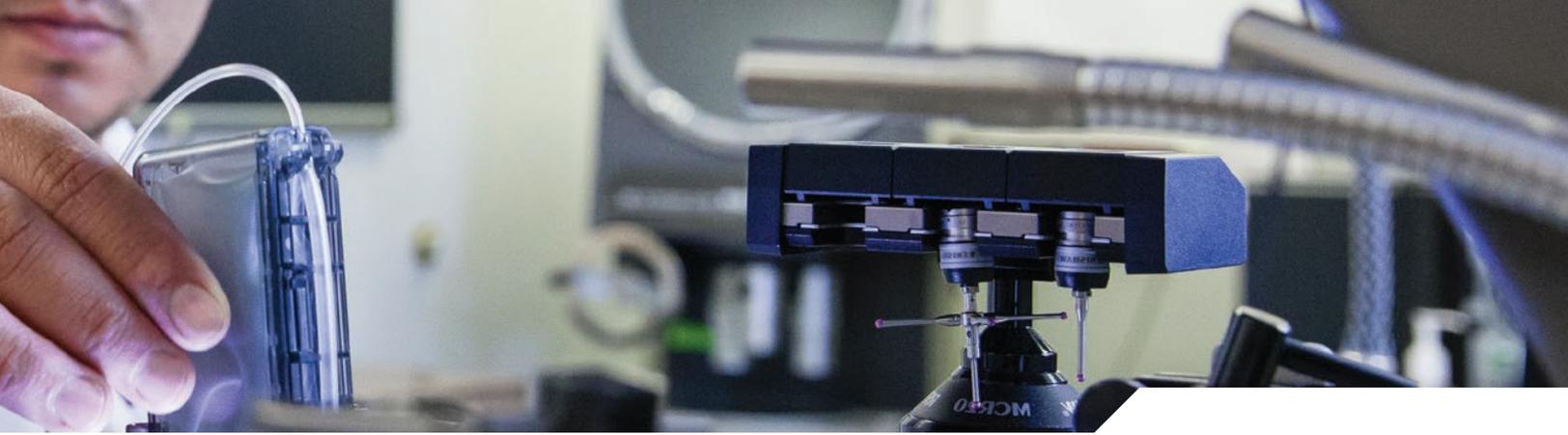
## We Offer



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 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, 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, rugged embedded transceivers, solutions for antenna systems, and a wide range of innovative RF and microwave solutions.



## Defense & Aerospace



## Communications



## Industrial



# Your partner of choice for innovative connectivity solutions

**60+** Years Experience

### Technology

Broad Range of Advanced Interconnect Technologies

### Flexibility

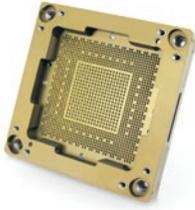
High Volume Product Platforms & Complete Tailored Solutions

### Service

Global Reach with Local Support

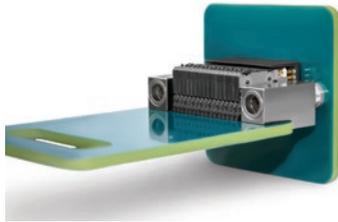
Smiths Interconnect is part of Smiths Group plc, a global leader in applying advanced technologies for markets in threat and contraband detection, energy, communications and engineered components. Smiths Group has a presence in more than 50 countries.

# Technology Brands



## IDI

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



## HYPERTAC

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



## HSI

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



## SABRITEC

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



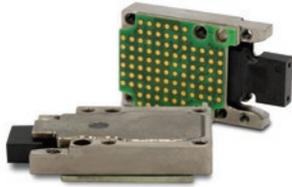
## EMC

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



## LORCH

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



## REFLEX PHOTONICS

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



## RF LABS

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



## MILLITECH

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



## TECOM

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



## TRAK

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

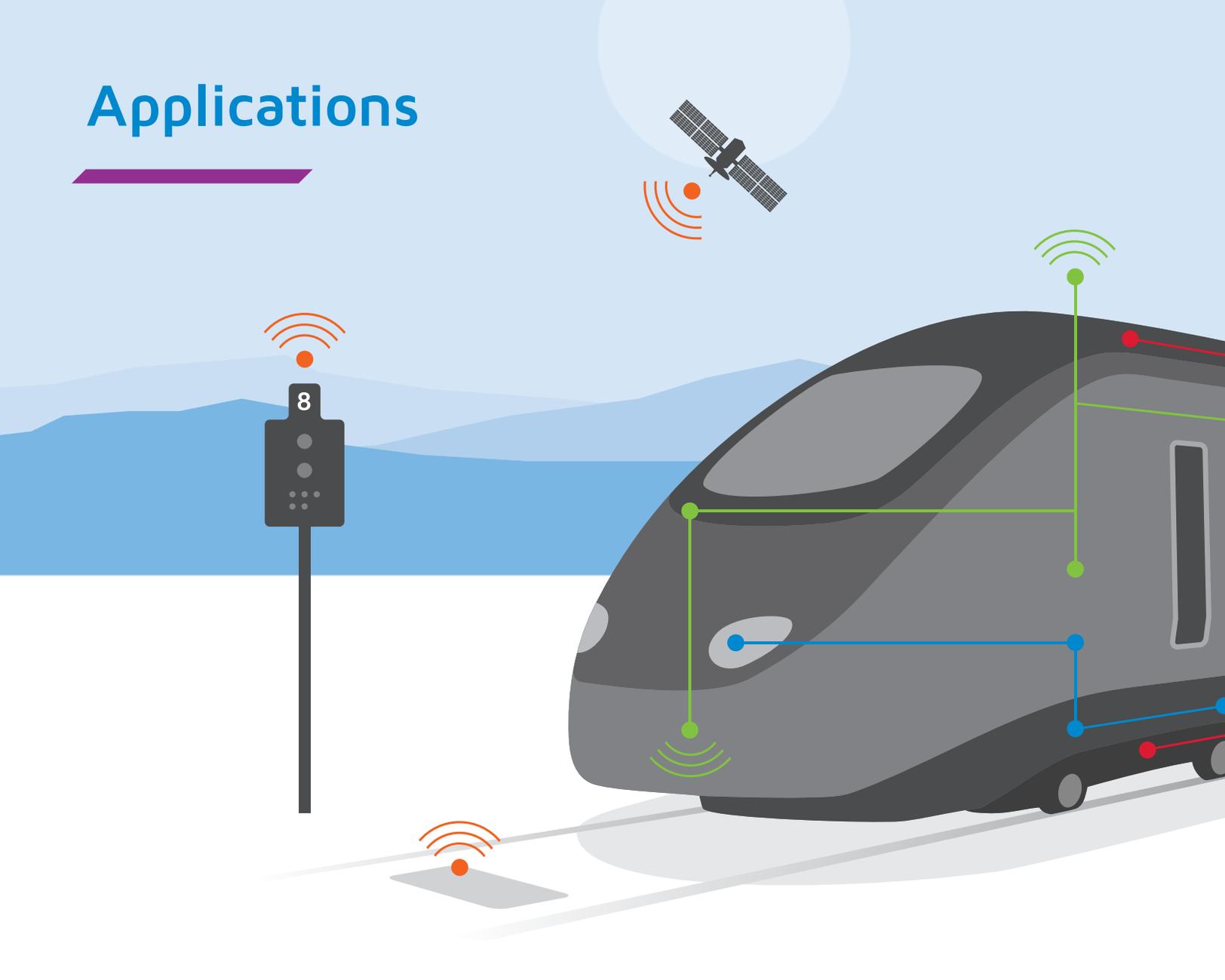
Connectors

Fiber Optics & RF Components

Semiconductor Test

RF/MW Subsystems/Smiths Interconnect Inc (SII)

# Applications



## Rolling Stock

### Safety Control & Command

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

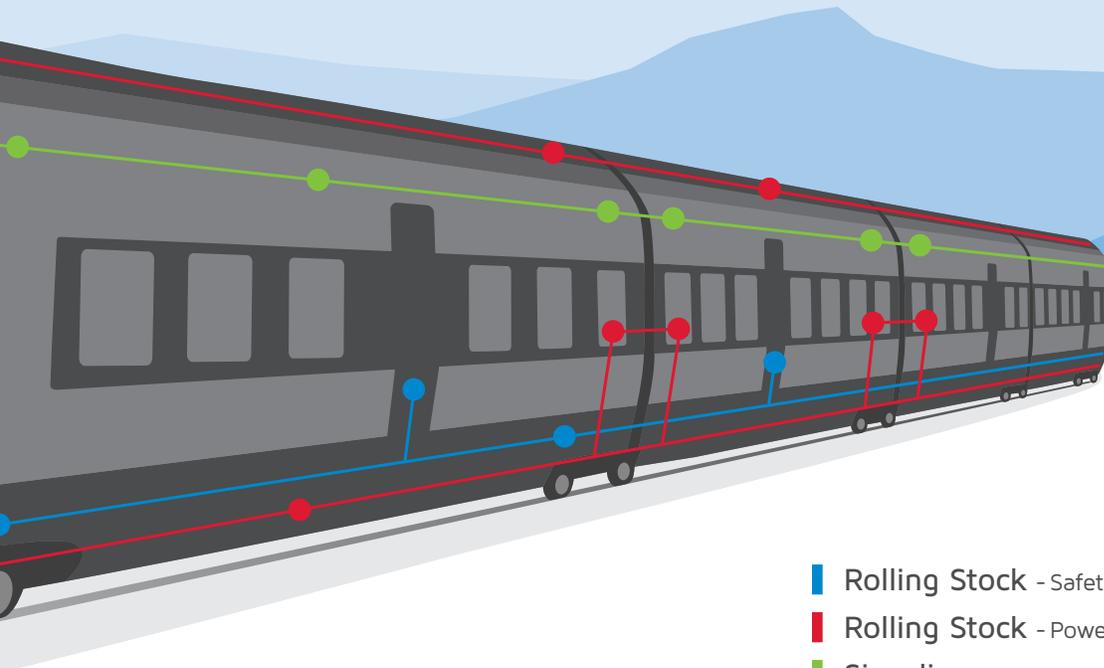
## Rolling Stock

### 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
- Signaling
- Infrastructure



## Signaling

- 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

# Connectors



## Sustainability, Reliability & Safety

Through our Hypertac, HSI, IDI and Sabritec technology brands, we supply application-specific, high-reliability electrical interconnect solutions from platforms to bespoke products. Our reliable contact technologies are the core of our advanced interconnect solutions: Hyperboloid, Spring Probe, High Speed, Fiber Optic and High Power.

**Environmentally  
friendly solutions  
that conform  
to main railway  
standards**

## Environmentally Sealed Rectangular Plastic

### REP Series

- Conforms to EN 45545 and EN 50124 standards
- Voltage rating up to 400 V
- Allows wire sections from 0.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup> (20-12AWG)
- Shunt function available
- 2, 6, and 12 way standard sealed insulators
- Crimp, straight or bent termination options



## Mini Modular

### H/N Series

- High-density mini modular connectors
- Allows up to 900 contact positions
- Building block system composed of custom module combinations within a connector frame
- Keying system available
- Jackscrews available in half-turn quick disconnect
- Float mountable for blind mating



## Data Transfer Rectangular

### 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 & crimp termination styles



## Rack & Panel Modular Plastic

### B Series

- Compliant to NF F 61-030, 16-101, 16-102
- 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



## Rack & Panel Modular Plastic

### L Series

- Mixed signal, power, coaxial, fiber optic and pneumatic modules
- Provides up to 200 amp power
- Cable to chassis and rack & panel; plastic backshell with strain relief and half turn quick disconnect jackscrew
- Float mountable for blind mating
- Configurations compliant to EN45545 standards
- Large offering thanks to the modularity
- High reliability contact technology
- Several locking devices and hood are proposed



Efficient,  
environmentally  
friendly & flexible  
solutions



## Float Mount Modular Metal

### LHS/LHZ Series

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



## Rectangular Modular Metal

### Hypermod Series

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



## Heavy Duty Modular Coupler

### F Series

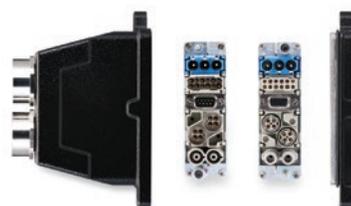
- Qualified according to SNCF NF F 61-030 standards
- Hybrid connector: signal, power, data (Ethernet), quadrx & fiber optics contacts available
- Mating safety by guiding and coding pins
- IP68 heavy duty aluminum shell



## Heavy Duty

### HDC Series

- Designed and tested according to IEC 61373 /IEC 61984 for higher robustness and durability
- Waterproof and anti-corrosion characteristics for harsh outdoor environments
- Up to 650A and 5000V and up to 1000M data transmission speed
- Several signal types supported such as power, signal, and ethernet/fiber optic data and pneumatic
- Pre-assembled cables version available



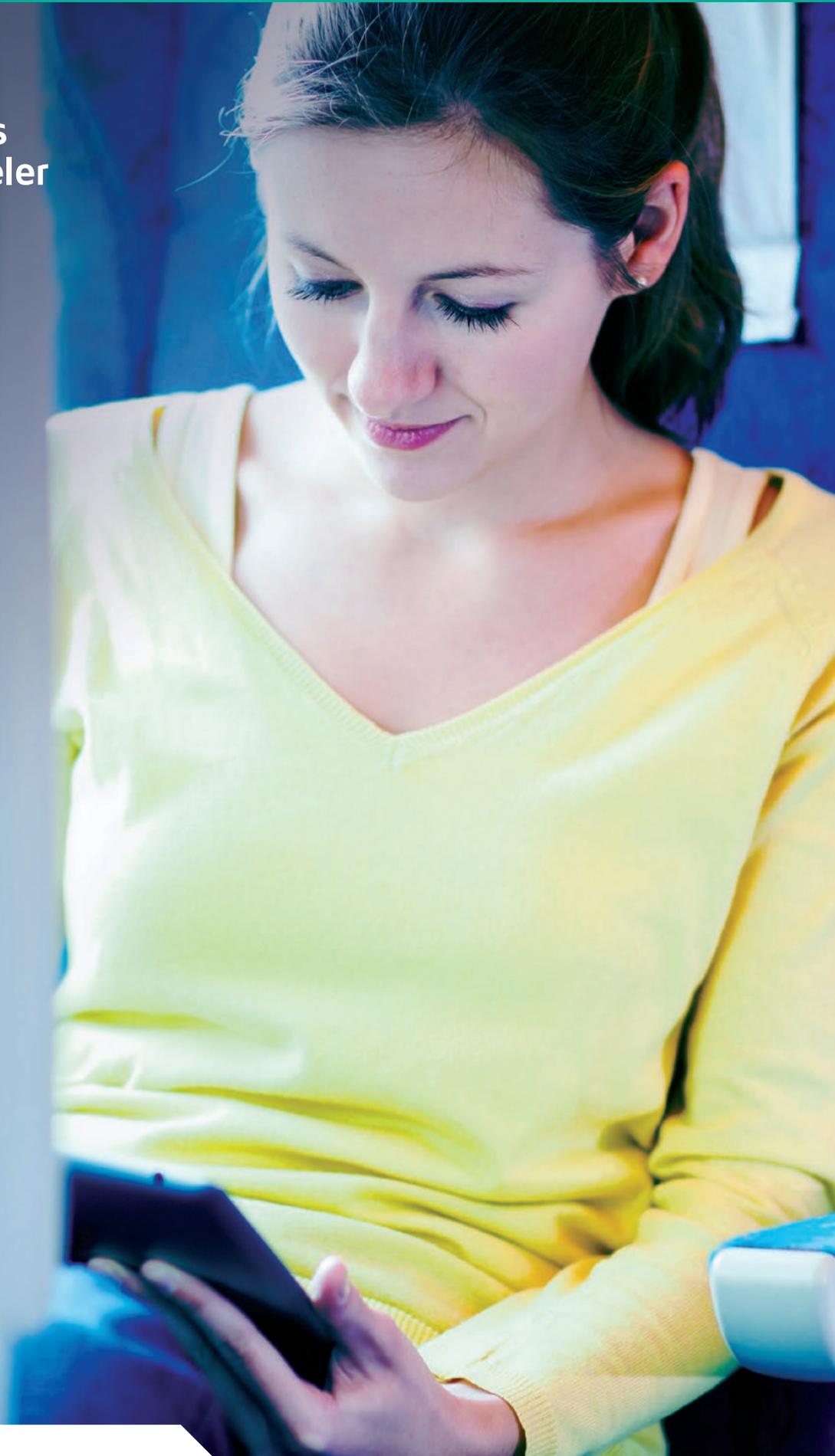
## High Density, High Power, Intercoach Couplers

### Transformer Heavy Power Series

- Compliant to: NF F 61-030, 16-101, 16-102 and EN 45545-2 (HL3 for RV22 and RV23)
- High power, up to 300A / 500A
- Straight, angled and shunt termination styles
- Cable section size from 25mm<sup>2</sup> to 50mm<sup>2</sup> / 240mm<sup>2</sup>
- IP66, IP67 rating according to NF EN 60529
- Tortac® High Power Contact (HPT) technology



Supporting  
on-board services  
for improved traveler  
experience



## Rugged Circular Metal

### M12 Series

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



## 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



## Shielded Circular Metal

### C Series

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



## Circular Metal Transponder

### BOA Series

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



## EMI/EMP Filter

- 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



## 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
- Immunity to shock and vibration fretting
- Straight dip, right angle solder, crimp, solder cup and Wire Wrap® terminations
- Board-to-board, cable to board, cable to cable and stacking



# RF Components & Cable Assemblies



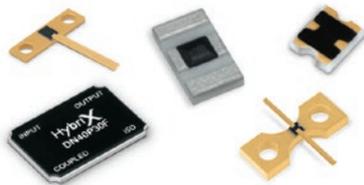
## Advanced Technologies & Solutions

Through our EMC and RF Labs brands, we provide RF/Microwave components including resistive & signal distribution components and cable assemblies for demanding high reliability environments. They target a broad range of frequency spectrum applications and high reliability interconnects supporting high performance operations and they attenuate, level or terminate signals in a variety of packages and footprints.

**Application  
specific premium  
interconnects for  
high durability**

## RF Components

- Temperature variable attenuators
- Thermopad® temperature variable attenuators from DC through Ka Band
- High power and small signal fixed attenuators
- RF resistors and terminations including surface mount chips, tab & cover chips, flange mounted and rod types Diamond RF Resistives®
- Surface mount outrigger resistors and terminations
- Surface mount chip equalizers
- Isolators and circulators



## Semi-Rigid & Hand Formable

### Cable Assemblies

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



## RF Cable Assemblies

### Titan-Flex® Series

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



## RF Flexible Cable Assemblies

### Lab-Flex® Series

- Custom braids for strength
- Field proven up to 50 GHz
- Low loss, up to 40% less loss
- Shielding greater than 90 dB
- Stranded center conductor version available



## Did you know?

Our Lab-Flex® cable assemblies are qualified for harsh environments and support up to 50 GHz.

# Global Capabilities

---



## Reliable Solutions

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

---

Market-leading  
Engineering and  
Technology Solutions

60+

Years  
Experience





## Certifications, Standards & Compliance

- 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

## Manufacturing

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

## 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



# 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.

[more > smithsinterconnect.com](https://www.smithsinterconnect.com) | [in](#) [🐦](#) [📺](#)

## Business Unit

Connectors

Fiber Optics &  
RF Components

Semiconductor  
Test

RF/MW  
Subsystems

# Worldwide Support

## Americas

### Sales

connectors.uscsr@smithsinterconnect.com

### Technical Support

connectors.ustechsupport@smithsinterconnect.com

### Sales

focom.uscsr@smithsinterconnect.com

### Technical Support

focom.techsupport@smithsinterconnect.com

### Sales

semi.uscsr@smithsinterconnect.com

### Technical Support

semi.techsupport@smithsinterconnect.com

### Sales

subsystems.csr@smithsinterconnect.com

### Technical Support

subsystems.techsupport@smithsinterconnect.com

## Europe

### Sales

connectors.emeacsr@smithsinterconnect.com

### Technical Support

connectors.emeatechsupport@smithsinterconnect.com

### Sales

focom.emeacsr@smithsinterconnect.com

### Technical Support

focom.techsupport@smithsinterconnect.com

### Sales

semi.emeacsr@smithsinterconnect.com

### Technical Support

semi.techsupport@smithsinterconnect.com

### Sales

subsystems.csr@smithsinterconnect.com

### Technical Support

subsystems.techsupport@smithsinterconnect.com

## Asia

### Sales

asiacsr@smithsinterconnect.com

### Technical Support

asiatechsupport@smithsinterconnect.com

### Sales

focom.asiacsr@smithsinterconnect.com

### Technical Support

focom.techsupport@smithsinterconnect.com

### Sales

semi.asiacsr@smithsinterconnect.com

### Technical Support

semi.techsupport@smithsinterconnect.com

### Sales

subsystems.csr@smithsinterconnect.com

### Technical Support

subsystems.techsupport@smithsinterconnect.com



## Your Partner of Choice

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.

[more > smithsinterconnect.com](#) | [in](#) [twitter](#) [youtube](#)