Withstand the Extreme Environments of Space with High-Reliability Solutions That Save Weight and Space
LAUNCHING RELIABILITY, ENSURING MISSION SUCCESS

Space Proven, Agency Approved
To meet the need of today’s space applications, we are continually innovating products that are smaller, lighter, and more capable—giving you the reliability you require in packages that enable you to create better systems.

TE Connectivity’s (TE) space solutions have been approved by the major space agencies:

- ESA (European Space Agency)
- ISRO (Indian Space Research Organization)
- JAXA (Japan Aerospace Exploration Agency)
- NASA (National Aeronautics and Space Administration)

Boosting Performance
TE traces its heritage in space exploration back to the days of the Explorer 1 satellite and Project Mercury manned flights. Today we work globally with space agencies, agency contractors, and commercial space companies to create the next generation of solutions for launch vehicles, satellites, manned missions, and deep space explorers.

Our high-performance solutions give you the features you need in every space mission:

Reliability
- Very wide temperature ranges
- Low outgassing
- Radiation resistance

Reduced SWaP
- Smaller size
- Lighter weight

DEUTSCH DBAS SERIES CONNECTORS
The rugged DBAS series offers easy and secure locking with a push/pull coupling ring for 100% mating. They are rated from -55°C to +200°C, and available in environmentally or hermetically sealed, rack-mountable, and lanyard release versions

MICRODOT HIGH-DENSITY CONNECTORS
Our nanominiature and microminiature connectors offer interconnect solutions for a broad range of space applications. For exceptional savings in weight and space, we have the nano and microminiature connectors in rectangular and circular configurations

Get your product to market faster with a smarter, better solution.
Solutions for Avionics

Standard Connectors and Accessories
• COTS Products
• Mil Spec PCB Connectors
• Mil Spec RF Connectors
• Circular Connectors
• Rectangular Connectors

Space-Saving Connectors
• Microminiature Connectors
• Nanominiature Connectors
• Rugged Optics

Relays
• Low Signal Relays
• Solid-State Relays

Wire and Cable
• ElectroLoss FilterLine Cable
• Controlled Electrical Cables

DEUTSCH CUSTOM DESIGNS AND UMBILICALS
We can custom design to your specific requirements, including deadface connectors, umbilical harnesses, and a range of standard connector styles

MULTIGIG RT 2-R CONNECTORS
Chosen as the backplane connector for SpaceVPX, our ultra-rugged, lightweight, high-speed VPX board-to-board interconnect is compliant to VITA 46 standards. This system is designed for high shock and vibration levels, featuring modularity and flexibility with a pinless wafer design in place of pin contacts

COAXIAL CABLE AND CONNECTORS
We provide a wide range of coaxial cable and connectors for flight applications, including space-qualified SMA, SSMA, SMP, SMPM small-form-factor connectors supporting frequencies to 40 GHz
RELIALIBILITY IS THE ONLY OPTION

Bring Performance Home
Reliability is mission critical. The overriding requirement of every component and system is meeting the demands of space. Our long experience in space, aerospace, and military applications means we know how to create products for maximum reliability.

SpaceVPX: Designing for Ultra-Rugged Reliability
Space VPX defines an embedded computing system for space—combining mission-critical reliability with the ability to withstand the extreme vibrations of liftoff and the extreme temperatures, background radiation, and other harsh conditions of extraterrestrial travel.

Our MULTIGIG RT 2-R connector was chosen for the SpaceVPX backplane based on its extreme ruggedness, light weight, low outgassing, and absence of tin whisker growth.

Reducing SWaP
Manned or unmanned, space flight requires extreme reliability combined with smaller, lighter components, subsystems, and systems. Every ounce saved means lighter payloads at liftoff and more efficiency during the mission.

LIGHTWEIGHT AMPLIMITE CONNECTORS
Our extensive line of subminiature-D connectors includes ultra-lightweight versions meeting NASA 311P and featuring one-piece aluminum shells. Weight savings are up to 20%, with enhanced EMI protection. The line includes both standard-density and high-density inserts

DEUTSCH 9305 AND DCS SERIES CONNECTORS
Available in 4 positions for 9305 Series, and 4 and 7 positions for DCS Series, these threaded subminiature circular connectors are environmentally sealed, hermetically sealed, or EMI shielded, with a temperature range from -55°C to +200°C

RAYCHEM MULTICORE CABLE
Get high-performance custom cable designs with different conductor sizes, counts, and cabling to achieve application specific needs. Multicore cables use our SPEC 44 and SPEC 55 technology for light weight and wide environmental performance
RAYCHEM TUBING AND MOLDED PARTS
Space-grade heat-shrink tubing and molded parts give wide temperature ranges, low outgassing, and radiation resistance. Thin-wall designs, available with or without adhesive lining, save weight and space and enable you to protect, strain relieve, identify, and organize.

RECTANGULAR CONNECTORS
A full line of rack-and-panel connectors support power, signals, RF, and optics in modular high-density rectangular connectors for easier “black-box” installation and removal of LRUs and similar equipment.

Solutions for Cabin Systems

Connectors
• Circular Connectors
• High-Speed I/O Connectors
• Subminiature-D Connectors

RF and Fiber Optics
• Mil Spec RF Connectors
• Rugged Optics

Wire and Cable
• Controlled Electrical Cables
• Hook-Up Wire
• Multiconductor Cable
ADVANCED DEVELOPMENT FOR EXTREME ENVIRONMENTS

Expertise in Material Science Yields Innovative Options

As the demand for bandwidth increases, so does the need to achieve improved SWaP by reducing the size, weight, and power consumption of components and systems. TE has pioneered such advances with thin-wall wire and cable, composite connectors, and miniaturization.

We are also actively researching next-generation solutions through advanced materials.

- Advanced composite polymers with optimized strength, chemical, thermal, and electrical performance
- Nanotechnologies, from carbon nanotube conductors and shielding to nanocrystalline metals
- Materials for chemical sensors, electrical components for fault location, and other sensors
- High-band-gap semiconductors for high-performance relays

Applying new materials and processes, or even using existing ones in new and novel ways, will allow future generations of products.

RAYCHEM HEXASHIELD BACKSHELLS

HexaShield adapters represent a significant improvement over pigtail termination methods, providing 360-degree shielding on the termination area of each cable. They are simple to install, easy to maintain, and dependably resistant to mechanical and environmental stresses.

COMPOSITE ENCLOSURES

Engineered polymers, micro-encapsulates, molded-in antennas, selective traces, EMI, and thermal management are crucial in any enclosure. We have the capability to design rugged, lightweight enclosures with our expertise in materials, manufacturing, engineering, and modeling.

RAYCHEM SPEC 55 SPACE WIRE

Cross-linked ETFE insulation with low corrosive characteristics achieve insulation walls as thin as 4 mm. Low-outgassing SPEC 55 wire and cable are capable of continuous operation from -65°C to 200°C, and reduce the effects of high-frequency EMI.
DEUTSCH 014 SERIES CONNECTORS
These pyrotechnic connectors offer high reliability under the harshest high-temperature conditions. Meeting ESA/SCC 3401 grade requirements, the 014 Series uses a bayonet coupling for fast connecting.

CARBON NANOTUBE WIRE AND CABLE
TE is at the forefront of commercializing CNT wire and cable to provide weight savings of at least 50% over copper. We are constantly improving performance of CNT shields and conductors, while optimizing them for crimp or solder termination.

Solutions for Interconnection Harnesses

Connectors
• Circular Connectors
• Nanominiature Connectors
• Rack and Panel Connectors
• Subminiature-D Connectors
• Microminiature Connectors

Networking
• Mil-Std-1553B
• Data Bus Components

Harnessing
• Molded Parts
• Rugged Optics
• Connector Accessories
• Tubing
• Shield Terminations
• Terminals and Splices
POWERFUL SOLUTIONS FROM ARRAY TO DEVICE

Manage Power End to End

We make power distribution efficient and manageable. TE offers relays and contactors with make/break current ratings up to 2000 A, current ratings up to 1000 A at 28 Vdc and 500 A at 900 Vdc, and hermetic sealing for reliability. Our relays offer an industry-leading combination of high-current switching in compact, lightweight packages.

Power cables and connectors are designed to carry power efficiently, with lower resistance and less bulk. Our power solutions include thin-wall insulation for smaller diameter, lighter weight, and more flexibility for easier routing.

HARTMAN SPACE-QUALIFIED RELAYS
Hartman relays feature lightweight construction in hermetically sealed enclosures for panel mounting, a variety of switching configurations, an efficient magnetic latching design with self-deenergizing coil, and main contact ratings of 100 A at 28 Vdc or 35 Vdc.

CONTACTORS
Our lightweight contactors handle high-power DC or high-voltage DC needs. They are available hermetically sealed, with a variety of electrical configurations, power ratings, voltage ratings, and mounting styles to make your electrical system more reliable and capable.

RAYCHEM HOOK-UP WIRE AND CABLE
Find the right wire and cable for your needs. We offer a wide range of options to meet needs for low outgassing, radiation and chemical/fuel resistance, and extreme temperatures. Our cables also help save weight and provide flexibility for easier routing.
DEUTSCH DS/ADS SERIES CONNECTORS
These connectors support Size 8 contacts capable of carrying 46 A—or up to 500 A in a fully loaded connector. A variety of insert configurations support both power and signals.

MID-RANGE RELAYS
Our MIL-PRF-6106 and MIL-PRF-83536 qualified hermetically sealed mid-range relays handle up to 50 A using a balanced force design with permanent magnet drive for long-life operation. Terminal styles include socket pins and hook solder terminals.

AFP FIBER OPTIC AND HYBRID PENETRATORS
Save space and increase reliability with hermetically sealed penetrators and feedthroughs designed to withstand harsh space environments. Penetrators are available in a range of configurations to accommodate optical, signal, and control needs in deep-space explorers, satellites, and manned craft.

Solutions for Power Distribution
Connectors
• Circular Connectors
• Terminals and Splices

Relays and Contactors
• AC/DC Power Relays and Contactors
• High-Reliability Relays and Contactors
• Mid-Range Relays

Wire and Cable
• Hook-Up Wire and Cable

Harnessing
• Molded Parts
• Tubing
PUTTING HIGH PERFORMACE TO WORK

Connecting Sensor to Actuator with Space-Proven Reliability

We help keep things moving, from positioning of solar arrays to operation of robotic arms and other equipment. Space-qualified, high-reliability components work steadfastly in the harsh environment of space, helping maintain precise motion control.

We offer end-to-end solutions, from sensor to actuator, with MIL-STD-1553B flight control data bus connectivity, and a range of relays and contactors to switch power efficiently.

We can help create application-specific sensors—including sensor elements, processing, packaging, and I/O connectors—to deliver accuracy and robustness in the harsh environment of space, and form factors to save weight and increase reliability. Capabilities include custom packaging and sealing, shielding, and wireless telemetry—in addition to a wide range of sensing technologies.

RAYCHEM HIGH-TEMPERATURE DEVICES
Shield termination devices provide environmentally protected shield termination on cables that are designed for applications requiring a maximum temperature rating of +200°C. SolderSleeve terminations insulate, strain relieve, and protect terminations from environmental damage.

RAYCHEM MIL-STD-1553B DATA BUS COMPONENTS
Our space-grade data bus products offer reduced weight, low outgassing, enhanced temperature ranges, and radiation resistance. We offer custom assemblies for high-performance networking of sophisticated subsystems to conserve space, weight, and power consumption.
Solutions for Actuation and Motion Control

Connectors
- Low-Magnetism Connectors
- Solar Array Connectors
- Terminals and Splices

Relays and Contactors
- Lightweight AC/DC Relays and Contactors
- Custom Solenoids

Wire and Cable
- Hook-Up Wire and Cable

Sensors
- Industrial-Grade Sensors
- Military-Grade Sensors

Harnessing
- Molded Parts
- Tubing

DEUTSCH UR AND RE SERIES CONNECTORS
Low general magnetism and outgassing in a lightweight, high-density connector make the UR series well suited to satellite applications. A companion RE series is intermateable and recommended for nonflight applications.

NASA APPROVED LATCHING RELAYS
TE high-reliability, space-qualified relays use lightweight low-outgassing materials, hermetic sealing, and inert gas backfilling to create rugged, high-performance, compact products. They are available in the smallest and most reliable high-current, high-voltage, midrange, and low signal configurations.

DEUTSCH D-PASO SERIES CONNECTORS
Designed for solar arrays, compact, ultra-flat D-PASO connectors offer an extreme temperature range of -170°C to +150°C, with mated connectors weighing under 50 g. Standard size 20 contacts allow current handling up to 7.5 A.
THE PERFORMANCE TO KEEP IN TOUCH

Reach for the Stars with Better Signal Integrity

Signal integrity in high-speed digital applications is critical, both on board spacecraft and in ground-based mission control and communications. TE is a leader in supporting higher speeds, both in commercial applications and in military/aerospace applications where increased ruggedness is required to withstand vibration, shock, and temperature extremes.

From uplinks/downlinks to control centers, we support microwave applications with RF connectors and cable, high-speed links at gigabit speeds over fiber, and high-performance processing with high-speed backplane and I/O connectors.

RUGGED OPTICAL INTERCONNECTS
For high-density applications, the MTC family uses a rectangular geometry to save space compared to circular connectors, and accepts standard ARINC 801 optical termini in a compact, lightweight design. We also offer ruggedized assemblies and expanded-beam connectors.

DEUTSCH RSM/ARSM SERIES CONNECTORS
These subminiature Mil-C-26482 connectors combine high contact density in a push-pull interface with an operating temperature from -55°C to +150°C and a choice of environmental or hermetic sealing.

FORTIS ZD BACKPLANE CONNECTORS
Fortis Zd connectors withstand the vibration and other mechanical stresses of military applications. Supporting data rates of 10+ Gb/s, the modular system builds on established technology to achieve rugged reliability and high-speed processing.
Our optical and RF modules allow LRUs and LRM to be disconnected at the VPX backplane. Optical modules for VITA 66 support MT, ARINC 801, and expanded beam contacts, while VITA 67 RF modules support four or eight blindmate SMPM contacts.

Solutions for Ground Systems

Connectors
- Circular Connectors
- High-Speed I/O Connectors
- MicroMiniature and NanoMiniature Connectors
- SubMiniature-D Connectors
- Mil Spec RF Connectors
- Rugged Optics

Relays and Contactors
- High-Performance Contactors
- Solid-State Relays
- Low Signal Relays

Wire and Cable
- Controlled Electrical Cables
- ElectroLoss FilterLine Cable
- Multiconductor Cables

CEELOK FAS-X CONNECTORS
CeeLok FAS-X connectors with industry-proven AS39029 contacts are designed for rugged environments and provide reliable, consistent high-speed performance, supporting 10G Ethernet and beyond.

VITA 66/67 OPTICAL AND RF MODULES
Our optical and RF modules allow LRUs and LRM to be disconnected at the VPX backplane. Optical modules for VITA 66 support MT, ARINC 801, and expanded beam contacts, while VITA 67 RF modules support four or eight blindmate SMPM contacts.
MAKE THE TE CONNECTION

Design Smarter and Faster

Begin solving your tough interconnection challenges by talking to TE. By involving us early in your design cycle, we can help you find the best solution—one that lowers costs, boosts performance, and meets demanding SWaP requirements. Our range of space-qualified, agency-approved products is extensive, and we work closely with customers on next-generation solutions and custom application-specific assemblies.

Count on our R&D programs and TE AD&M’s Advanced Development Group for the innovations that come from expertise in materials science, advanced processes, packaging, signal transmission, and other disciplines. When you are ready to launch your next mission, you will be glad that TE is on board.

POLAMCO BACKSHELLS
Our newest line offers a complete range of high-performance backshells for unshielded, shielded, and rugged conduit systems. Supporting one of the widest variety of Mil-Spec and COTS connectors, we have the solution for rugged, lightweight, and specialized needs.

RAYCHEM HARNESSING COMPONENTS
An array of space-qualified, low-outgassing cable, tubing, adhesives, molded parts, and backshells makes it easy to build high-performance harness assemblies. They feature low outgassing characteristics and provide environmental and mechanical robustness.
GOLD-PLATED TERMINALS
Increase the reliability of wire connections with TE’s gold-plated terminals. Available in multiple configurations, the nonmagnetic crimp terminals provide mechanical reliability, excellent corrosion protection, and low contact resistance required for space applications.

DEUTSCH DFE SERIES CONNECTORS
Rugged bayonet-coupling connectors meeting MIL-C-26482G Series 2, the DFE Series comes in various shell sizes to accommodate signal, power, and coaxial contacts. They offer 500-mating-cycle durability and a temperature range from -65°C to +200°C. Options include hermetic sealing.

RAYCHEM CONTROLLED ELECTRICAL CABLE
Cheminax cables bring tightly controlled electrical characteristics to miniature coaxial cable—offering electrical performance exceeding standard RG cables in a smaller, lighter design that saves weight and space while providing lower attenuation and capacitance.

Solutions for Subassemblies and Design
- Custom Harness Assemblies
- High-Speed Digital Cable Assemblies
- Harness Design Software

RF and Optics
- RF Cable Assemblies
- Rugged Optics

Packaging
- Composite Enclosures
- Antennas
- Power Distribution Units
LET'S CONNECT

We make it easy to connect with our experts and are ready to provide all the support you need. Just call your local support number or visit www.te.com/industrial to chat with a Product Information Specialist.

Technical Support
te.com/support-center

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WITHSTAND THE EXTREME ENVIRONMENTS OF SPACE WITH HIGH-RELIABILITY SOLUTIONS THAT SAVE WEIGHT AND SPACE

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