



## Capabilities Brochure

EMI/EMP Filter • Quadrax • Twinax • Fiber Optic • Triax  
Coax • High Power • High Density Miniature Circular  
Connectors • Contacts • Cable Assemblies





# Engineered Interconnect System Solutions

Sabritec is a highly integrated engineering and manufacturing company providing special interconnect solutions for military, aerospace, telecom, space, medical, test and measurement, and commercial applications. Sabritec designs and manufactures a full spectrum of connectors that include Filter, Quadrax, Twinax, Fiber Optic, High Power, Coax, and Triax connectors, contacts and cable assemblies. Sabritec also manufactures custom multi-pin circular, rack and panel and D-Subminiature connectors, as well as extreme environment water immersion proof connectors.

Sabritec is known for solving complex problems within tight time constraints. Our in-house capabilities encompass design, development, manufacturing and testing. As an engineering driven company, our staff has in-depth experience in electrical and mechanical design, EMI/RFI/EMP suppression techniques, microwave transmission, high voltage applications, severe environments as well as material and plating selection.

Sabritec's modern 50,300 sq. ft. facility is conveniently located in Irvine, California with additional manufacturing in Mexico. Major emphasis is placed on sophisticated computer controlled precision fabrication equipment.

## Quality Certifications

- MIL – I – 45208A
- ISO 9001:2000 Certified
- AS 9100 Certified Rev B
- ISO 14001 Certified
- OHSAS 18001 Compliant
- Six Sigma Focus



## About Smiths Interconnect

Smiths Interconnect, [www.smithsinterconnect.com](http://www.smithsinterconnect.com), is a leading provider of specialized electronic and radio frequency products for the wireless telecommunications, aerospace, defense, and medical markets. It is part of Smiths Group, [www.smiths.com](http://www.smiths.com), 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.

## Our Vision

To be the preferred solution provider for high reliability interconnects while maximizing stakeholder value.



## Our Mission

Partnering with our customers to design and manufacture high performance, precision interconnects for our chosen markets. Through teamwork with our employees and suppliers, we will achieve sustained profitable growth by providing excellent customer service.

Sabritec provides specialty, enhanced performance connectors and cable assemblies and as such does not currently offer circular, rack and panel, or D-subminiature connectors that are listed on military standard Qualified Products Lists (QPL) per applicable detail specification sheets. Sabritec's connectors are fully interchangeable with applicable QPL products and meet the applicable requirements of all military standards listed in this brochure.



# Vertical Integration

Sabritec's facility is vertically integrated, creating high quality precision interconnect products from initial concept, design and development, through production and acceptance testing.



3D CAD Modeling

## Engineering

- Autocad drafting and solid modeling capabilities
- Finite element analysis (mechanical & electrical)
- Electrical Simulation
- Product Lifecycle Management (PLM)



High Speed Copper Solder Assembly

## Assembly Capabilities

- Soldering IPC-A-610 & J-STD-001 Certified
- Solder trained personnel
- Reflow ovens, static pots, & hand solder stations
- Marking, offset printing, electro & plasma etching
- Semi-automatic equipment
- Automatic installation of clips, hoods and mill-max



CNC Mill Machining Centers

## Machine Shop

- Full model machine shop
- Plastic and rubber molding
- Prototyping & assembly tooling
- Full turning equipment
- CNC Milling, Lathes and Screw machines



CNC Swiss Machining Centers

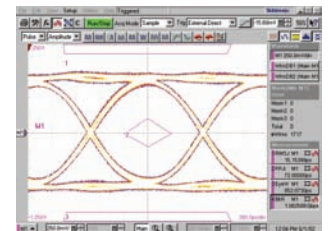
## Testing Capabilities

### Capabilities Electrical

- DWV, IR, & Continuity
- EMI, Crosstalk & Impedance
- Capacitance & Diode Verification
- VSWR to 40 GHz
- Jitter & Eye Pattern
- Fiber Optic Insertion Loss Testing

### Capabilities Mechanical/Environmental

- Thermal Cycling & Thermal Shock
- Temperature Humidity & Salt Spray
- Durability
- Mechanical Loading
- Electrical Born-In Life Testing



Eye-Patten, Jitter & Skew Measurements

Tektronix CSA 8000

## Other Capabilities

- Plastic injection molding
- Rubber compression molding
- Metal forming
- Heat treating
- Plating (Gold, electroless nickel and passivation)
- X-Ray fluorescents



Plating Capability



# Quadrax and Twinax Connectors/Contacts

Sabritec manufactures connectors for the following protocols:

- Fibre Channel
- Ethernet: 10 Base-T, 100 Base-T and 1000 Base-T
- Firewire: IEEE 1394a and 1394b
- USB, DVI and Infiniband



Data rates exceeding 2 Gbits/second can be achieved depending cable length and electrical characteristics.

Sabritec has reverse gender inner contacts where the larger heat treated rigid socket contacts protrude in reverse gender configuration. These contacts are designed to provide a more reliable & rugged interconnect and better blind mate capability with less chance of bent inner pins.

## Micro Quadrax

- Designed for differential pair matched impedance applications
- Low impedance ground shield



## Micro Twinax

- Controlled impedance with tightly spaced PCB footprint spacing
- NDL, SMA and Micro D size constraints
- NDL series are 25% smaller in diameter than SMA coaxial connectors



## Micro-D Twinax Connectors (MDTX)

- Twinax blindmate assemblies in Micro-D housing
- Permit signaling of high speed Ethernet data rates in one connector
- Allows for modularity in PCB routing of high speed signaling

## Backplane and Panel Mount Connectors



- P1 & P3 mounting dimensions
- Can be driven via matched impedance differential pair interconnections
- High density differential pair signals from the LRU via motherboard to daughter card plug in module

## Ruggedized D-Sub Quadrax/Twinax Connectors



- Grounded to the outer shield of a twinax or quadrax contact directly to the shell
- Multi-finger ground spring for superior EMI shielding
- Extremely low contact resistance
- Low RF noise and high durability of up to 1,000 mating cycles

## Dura Speed Quadrax and Twinax (DSQ & DST)

- Low insertion force/high mating cycle precision contacts
- Capable of withstanding a minimum of 6,000 mating cycles
- Designed to fit Sabritec's standard cavities for all high speed product lines



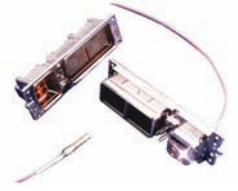
## High Speed Size 10 Quadrax and Twinax Contacts

- 50% smaller than standard Size 8 Quadrax and Twinax Contacts
- Fit into standard MIL-DTL-38999 shells for high density packaging solutions



# Fiber Optic Connectors/Contacts

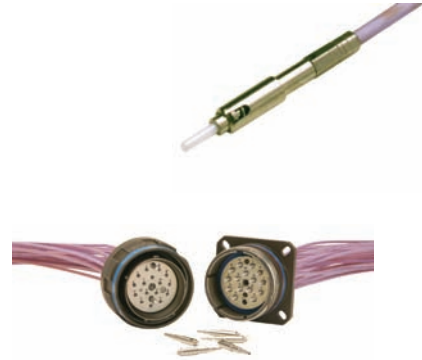
Sabritec offers rugged fiber optic interconnects capable of supporting wide bandwidth applications. All fiber optic connectors and contacts are offered fully terminated and tested ensuring signal integrity for ruggedized application environments.



Sabritec also offers a complete line of fiber optic connectors to terminate to the other end of the cables including Ruggedized Single Channel (RSC), FC, ST, LC Duplex/Simplex, MTP, MT-RJ and Ruggedized SC connectors.

## ARINC 801 Terminus (Fully Qualified)

- Single terminus design for all connector formats
- Pull-proof design (no strain relief backshell needed)
- Hermaphroditic design
- PC ferrule end face
- Polarization key allows APC polish for better return loss performance
- Compatible with multi-mode and single-mode fiber
- Standard 1.25 mm LC ferrule and termination process
- Insertion loss: -0.25dB (typical) mated pair



## Size 5 and 12 Expanded Beam Contacts

- Multi-mode applications 62.5/125 and 50/125  $\mu$ m
- Reduced influence from alignment errors
- Increased protection for fiber
- Reduced influence from dirt and debris
- Simple cleaning
- Size 5 Insertion loss: -0.8 dB (typical) mated pair
- Size 12 Insertion loss: -1.0 dB (typical) mated pair
- Size 12 Expanded Beam contacts are dimensionally identical to size 12 electrical contacts per M39029/56-353 and M39029/58-365



## Size 16 Butt-Joint Contacts

- Single-mode and Multi-mode applications 62.5/125 and 50/125  $\mu$ m
- Connector formats for MIL-DTL-38999 and ARINC 600
- Physical contact polish provides low insertion loss and low back reflection
- Meets or exceeds all applicable requirements of MIL-T-29504
- Insertion loss: -0.25dB (typical) mated pair



## Ruggedized Single Channel Connectors

- Multi-mode applications
- Anti-vibration coupling mechanism on plug
- 4 Keyway orientation options
- Precision ceramic ferrule
- Low insertion loss: -0.4 dB (typical)



## DIN Contacts

- Twist protection pin
- Multi-mode applications
- Screw lock mechanism
- Low insertion loss: -0.20 dB (typical)





# EMI/EMP Filtered Connectors

Sabritec designs and manufactures a full spectrum of sophisticated filter connector products. Our specialty is in the design of interconnect solutions addressing EMI/RFI filtering and EMP transient protection to meet demanding HIRF and Lightning requirements. Sabritec's filter connectors use monolithic capacitor arrays, the most reliable method of EMI/RFI filtering.

## Filter Connectors Features

- Internal monolithic planar capacitors
- Interchangeable and intermateable with non-filtered connectors
- Multiple capacitance values, ground and feed-thru lines available in one capacitor array
- Space efficient packaging of EMI/RFI and EMP transient protection
- Standard catalog surge protection
- JANTX or high reliability commercial grade TAZ devices
- Voltage rating: 100 VDC – 1000 VRMS
- Capacitance range: 100 pF– 200 nF
- Mixed capacitances 10:1 ratio within same ceramic (1,000 pF – 10,000 pF range)



Sabritec's filter connectors are designed to meet or exceed all applicable requirements of military specifications. Our filter connectors are intermateable and interchangeable with standard non-filtered QPL connectors.

- |                                       |                 |
|---------------------------------------|-----------------|
| • MIL-DTL-38999 Series I, II, III, IV | • MIL-DTL-26500 |
| • MIL-DTL-83723 Series III            | • MIL-C-83733   |
| • MIL-C-26482 Series II               | • MIL-DTL-83513 |
| • MIL-C-81659/ARINC 404               | • MIL-C-55302   |
| • MIL-DTL-24308                       | • MIL-DTL-83527 |
| • MIL-C-81511                         | • ARINC 600     |



## Additional Filter Connector Formats/Options

- RoHS Compliant Solderless Filter Connectors
- ESD Connectors
- Filter Composite Connectors
- Grounded Circular Connectors
- IP67 Water Sealed



## Filtered Adapters

Non-filter applications can be upgraded to EMI/Transient protection without modification to the system with Sabritec's In-Line Filter Adapters. The adapters are designed to be installed between the existing plug and receptacle without having to rewire or disassemble the system.





# Triaxial Connectors/Contacts

Sabritec's concentric twinax/triax interconnects are built for high performance, yet are low profile enough to be used extensively in Data Bus, video and other wide band width applications where small size, speed, reliability and tight space constraints are required.

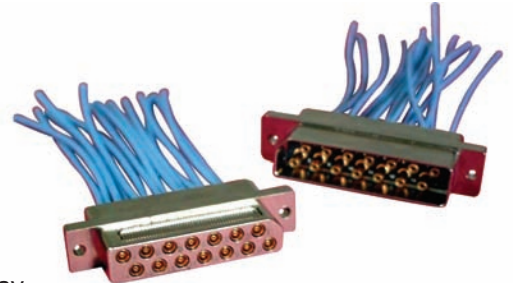
## NDL Triax Connectors

- Quick connect/disconnect detent locking (NDL-Q) version
- Threaded coupling (NDL-T) version
- Ideal for MIL-STD-1553 data-bus applications
- Includes straight, right angle cable mount and PCB mount connectors



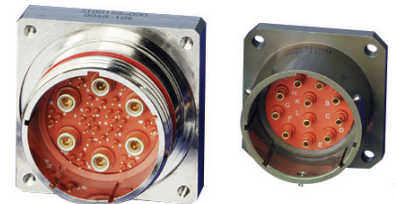
## Ruggedized D-Sub Size 10 Triax Contacts

- Size #10 Interface Triax contacts
- Polarizing shell to prevent mismatching
- Mating repeatability
- Contact arrangements available in 2,4,7 and 14 way
- Supports video link ARINC 429, MIL-STD-1553 and other data bus architectures



## MIL-DTL- 38999 Triax Contacts

- Available for MIL-DTL-38999 Sizes 8, 10, and 12 cavities
- High impedance 85 Ohm Size 8 contacts available for high speed applications
- Size 8 Triaxial contacts meet applicable requirements of MIL-C-39029/90- 529 and /91-530 slash sheets

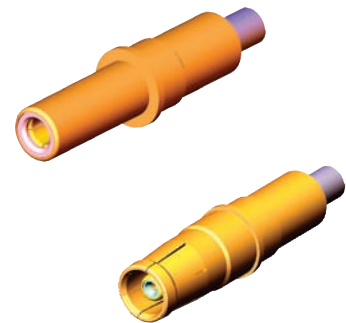


## ARINC 404 and ARINC 600 Triax Contacts

- Fits into standard size cavities for ARINC 600 and 404 series QPL connect
- Several different cable types and impedance values available
- Size 12 Triax allows for high density packaging
- 75 Ohm contacts available

## High Differential Impedance Triax Contacts

- Designed for ARINC 600 and MIL-DTL-38999 connectors
- Available in 60, 75 and 85 ohm differential pair impedance
- Balanced characteristic impedance between middle and center conductors
- Multidirectional routing of cable to fit into standard contact cavities





# RF Coaxial Connectors/Contacts

Sabritec complete line of RF Coaxial connectors feature our MDHC, SCX, MDCX, SMP, SMPM, grounded circular, MIL-DTL-38999, ARINC 404 and 600 connectors and contacts. These connectors are ideal for board to board stacking arrangements. Our coax connector line is used in several Integrated avionic, navigation and communications systems, and satellites for military, commercial, space and telecom applications.

## High Frequency Multiway Connectors (MDHC)

- Multipin assemblies (4, 6, 8, 10, 12 way) in Micro-D size shell
- Low VSWR:
  - 1.3:1 up to 30 GHz (max mated pair)
  - 1.5:1 up to 40 GHz (max mated pair)
- Small diameter (0.133" max overall)
- No cumbersome spring loaded contacts or mounting hardware
- Drop in replacement for MDCX contacts (10 GHz to 40 GHz)



## MDCX Connectors

- Low VSWR 1.25:1 up to 10 GHz (max mated pair)
- Mixed MDCX, Signal and Hyperboloid contacts
- Small diameter (.125" max overall)
- Low profile design
- Multipin assemblies (4, 6, 8, 10, 12 way)



## High Frequency Contacts (MHC) DC - 40 GHz

- Fit standard cavities for MIL-DTL-38999, ARINC 404, ARINC 600 and MIL-DTL-24308 D-Sub connector formats
- Socket contacts are spring loaded float mount for superior RF performance and reliability
- Low VSWR
  - Size 8: 1.15:1 Typ Mated Pair (DC to 26.5 GHz)
  - Size 12: 1.30:1 Typ Mated Pair (DC to 40 GHz)
- Insertion Loss:
  - 0.15 dB to 26.5 GHz Typ (Size 8)
  - 0.2 dB to 40 GHz Typ (Size 12)



## SCX Coaxial Connectors

- Small diameter (.145" max dia. overall)
- Operates up to 20 GHz
- Low profile mated pair length (.375" max)
- Constant airline impedance interface
- Constant 50 Ohm characteristic impedance



## Torque Assist Coax Connectors

- Rear body is extended to alleviate stress against the cable to connector solder joint.
- Slotted extension straddles the semi-rigid cable confining it to its initial direction while increasing the mutual solder surfaces between the cable and connector body



## Coax Contacts

- Conforms to MIL-C-39029 style coaxial contact dimensions
- MIL-DTL-38999, ARINC 404 and ARINC 600
- Low VSWR up to 5 GHz
- 50 Ohm characteristic impedance
- Fits into standard (QPL) connector cavities





# High Density Miniature Circular Connectors

## High Power Connectors/Contacts

### High Density Miniature Circular Connectors (HDMC)

Sabritec's High Density Miniature Circular Connectors (HDMC) have the performance of a MIL-DTL-38999 connector in a smaller size with significant weight savings. These connectors are offered with Size 23 crimp removable contacts or Size 12 High Frequency Coax (MDHC) 40 GHz contacts and are compatible with industry standard backshells.

A wide variety of high density space saving shell sizes with Size 10 High Speed Twinax, rugged Fiber Optic signaling, Coax, shielded Triax and EMI filtered layouts are available in larger shell sizes. Size 10 Twinax/Quadax contacts are ideal for applications exceeding 2 GBits/sec. Please consult factory for more information on alternate shell sizes and layouts.

Advantages over MIL-DTL-38999 Shell Size 9 Connectors

- Greater than 50% space savings
- Increased signal density by 40%
- 70% weight reduction



### High Power Connectors and Contacts

Sabritec's High Power connectors utilize the superior performing Hyperboloid® contact technology, ideal for harsh and demanding environments with low contact resistance. These connectors provide high current ratings with smaller contacts for the same power thus saving overall weight and space.

- Low coupling force
- Improved low rate of wear and high coupling durability
- Shock and vibration resistance
- Reduced contact resistance
- Increased power handling capability by 25% compared to standard contacts
- Contact mating sequence can be used to gain benefits such as power switching
- Mating of shorter contact can energize main power for system or safety requirements
- High Power Contacts are available for circular, rack and panel and custom connector shell sizes
- Rack and panel solutions offered with hybrid arrangements of Power, Quadax/Twinax, RF and Fiber Optic contacts into one multi-bay panel
- Accessory hardware is also available with custom backshells and power modules exceeding 500 A current ratings



### Hyperboloid® Performance vs MIL-C-39029

Pin Size	Pin Diameter, mm (in)	Socket OD Max, mm (in)	MIL Spec Current Rating Continuous, A	Hyperboloid® Contact Current Rating Continuous, A	Hyperboloid® Contact Resistance Typical, mΩ	Hyperboloid® Contact Resistance Max, mΩ
8	3.61 (0.142)	6.50 (0.256)	46	60	0.20	.50
4	5.72 (0.225)	9.53 (0.375)	80	100	0.10	.50
0	9.07 (0.357)	13.35 (0.526)	150	300	0.10	.20
00	10.31 (0.406)	18.55 (0.730)	185	300	0.07	.20
0000	12.70 (0.500)	21.02 (0.828)	225	500	0.05	.10



# Cable Assemblies/Custom Interconnects

## Water Sealed/Ground Plane Connectors

### Value Added Cable Assemblies

All cable assemblies are subjected to mechanical visual and dimensional inspections, thus ensuring a dependable and reliable rugged cable assembly. Sabritec cable assemblies are tested for electrical or optical characteristics. Product quality, reliability and on-time delivery are essential to all of Sabritec's products. Please contact our applications engineering department for more information.

### Custom Interconnects

Sabritec's expertise is precision design and manufacturing of electronic interconnect systems. Our engineers work directly with customers to develop unique solutions that address specific customer needs and industry requirements. The combination of engineering talent and in-house manufacturing capabilities, such as 3D solid modeling, high precision machining, injection molding and complete assembly to provide customers with quick turnaround on custom designs.

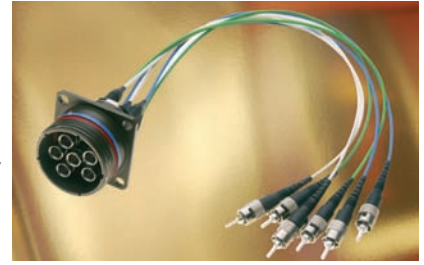
We can easily modify standard products and/or create completely unique designs from start to finish. If you have the need for a custom product, please contact us with any questions or specifications.

### Water Sealed Connectors

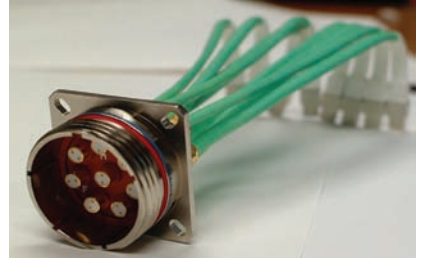
Electronic equipment that is used in harsh environments requires connectors that can withstand exposure to moisture, dust and other elements. Also many applications require components to meet the Ingress Protection (IP) rating of IP67. Sabritec has developed water sealed connectors that can be successfully used in systems where moisture, humidity, water, and dust are present. The Sabritec design method is capable of sealing up to 35 psi in the unmated, open faced condition. These connectors are ideal for high-pressure/low leakage applications in land, air, sea, and space environments. The water sealed connector features can be added to both filtered and non-filtered multipin connectors, coaxial, triaxial and high speed copper connector types.

### Ground Plane Circular Connectors

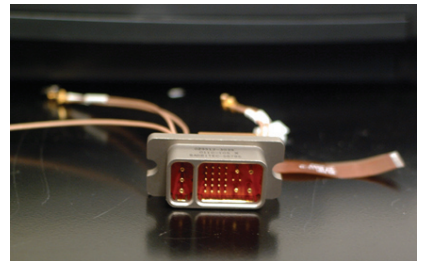
Sabritec's grounded circular connectors are designed to ground the outer shield of a triax, coax, twinax or quadraax contact directly to the shell of the connector. An innovative designed multi-finger contact spring mechanism fixed within each metalized grounded connector cavity serves a dual purpose. It acts as a mechanically sound and well proven contact retention clip mechanism as well as a multi-finger contact engagement point for superior EMI shielding resulting in extremely low contact resistance values when measured from the coax or triax contact outer body to the connector flange. The contact resistance is 5 milli-ohms maximum. All ground plane connectors meet or exceed all applicable requirements of standard QPL MIL-Spec circular connectors.



MIL-DTL-38999 Connector with Size 5 Expanded Beam Contacts



MIL-DTL-38999 Twinax Connector with Value Added Cable Assembly



Water Sealed Hybrid Connector with Coax, Power and Signal Contacts



MIL-DTL-38999 Compliant Water Sealed Connector



Grounded Circular Connectors

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# Company Profile



## We Welcome Your Challenges!

In today's high technology environment, success comes to those with the agility to move in new directions very quickly. Organizations must be adept in rapid response, creativity and flexibility balanced with a commitment to the highest quality and price performance. Sabritec is such a company.

Many of our customers first come to us with a difficult interconnect problem. Often, they are using a connector or cabled system that must be upgraded to handle new size and weight constraints, and/or harsher environments. They are pleased with our solutions, and you will be, too. Drawing on solid experience, Sabritec's technical team wastes no time in finding a successful solution. In fact, we may have already solved a problem similar to yours.

Sabritec's main operations are located in our vertically integrated facility in Irvine. This facility provides the ability to quickly respond and provide complex interconnect solutions from initial concept, design and development, through production and acceptance testing, guaranteeing the customer the best product quality available anywhere. Further comprehensive in-house manufacturing and assembly capabilities assure total control over both quality and lead time, providing flexibility to meet your tight schedules and to react to midstream specification changes with minimal schedule impact.

Working with Sabritec can ensure the smooth progress of your projects to save time and money and contribute greatly to the program's overall success. We will work closely with your procurement and engineering staffs to define requirements clearly and to respond quickly as well as a cost effective manner.

Sabritec's proven ability to perform can be a major advantage in your next program. Call or e-mail us for details on how quickly we can become an important part of your team. Sabritec is an ISO 9001:2000/AS9100 Rev B Certified company.





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