



# SABRITEC

*Your Connection to the Future*

A Smiths Group company



# Your Connection the the Future

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 connectors, High Speed Fibre Channel, Ethernet, IEEE 1394 Firewire, Fiber Optic, Coax, and Triax connectors, contacts and cable assemblies. Sabritec also manufactures custom multipin circular, rack and panel and umbilical launch connectors as well as extreme environmental water proof immersion connectors for sea and military land based equipment applications. Our products span the broad spectrum of interconnects from highly integrated assemblies on military missile systems to microminiature connectors on printed circuit boards. Our connectors provide protection to sensitive avionics electronic systems yet can endure harsh environments that are found in military operations.

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 and material and plating selection. We manufacture multilayer thick film ceramic capacitors in house.

Sabritec's modern 53,000 sq. ft. facility is conveniently located in Irvine, California. Major emphasis is placed on sophisticated computer-controlled precision fabrication equipment. We employ a number of CNC lathes, screw machines, milling machines, and turret machines. Additional capabilities include soldering and brazing, heat-treating, plating and fabrication.

## ***A Smiths Group company***

Sabritec is part of Smiths Group, plc, an international engineering company with market leading positions worldwide. Sabritec operates under the Smiths Interconnect division which offers a broad range of electrical and electronic connectors, low loss coaxial cable and connector assemblies, microwave components, antennas, lightning strike protectors, electrical surge suppressors, high frequency connectors, Passive Intermodulation Analyzers, backshells and conduit systems.



Recipient of the Boeing 2001 Exceptional Company Performance Award



Entire Sabritec Team

## *Our Vision*

*Sabritec's vision is to be our customer's premier choice for innovative interconnect solutions that offers the best value in technology, reliability, and cost.*

## *Our Mission*

*Sabritec's mission is to design and manufacture high performance, precision interconnect solutions for global military and commercial applications. Through teamwork with our employees and suppliers, we will achieve profitability and business growth by providing excellent service to customers in our niche markets.*



# Vertical

## Integration

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



3D CAD Modeling



Highly Trained Assembly Personnel

### Engineering

- Design and support engineers (manufacturing, industrial, quality)
- Autocad drafting
- Solid modeling capabilities
- Finite element analysis (mechanical & electrical)

### Other Capabilities

- Plastic injection molding
- Rubber compression molding
- Heat treating
- Plating –gold and electroless nickel
- X-Ray fluorescents

### Quality

*Our goal is to provide a superior interconnect product to our customers through innovative design and continuous improvement of manufacturing processes and operational performance.*

We will accomplish this through:

- Anticipating the needs of our market
- Listening to and understanding our customer's expectations
- Investing in tools and equipment to expand our technology
- Investing in our people through training and education
- Evaluating/improving our internal capabilities
- Partnering with a knowledgeable and capable supply base

### Certifications

- MIL – I – 45208A
- ISO 9001 Certified
- ISO 14001 Certified
- AS 9100 Compliant
- Six Sigma Focus



### Assembly Capabilities

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



Fibre Channel Copper Solder Assembly



In-Process Soldering Inspection

CNC Mill Machining Centers



Rack & Panel Connector Machining

CNC Lathes



Circular Connector Machining

Ceramic Capacitor Manufacturing



Multi-Layer Capacitor Array Manufacturing

## Testing

Sabritec's testing capabilities support wide bandwidth (DC to 50 GHz with up to 12.5 GHz Trigger). We utilize the Tektronix CSA8000 to measure the differential pair TDR impedance between twinax connectors, cable assemblies and quad cable fibre channel interconnect systems. CSA8000 testing features 20 GHz Bandwidth with 80E04 sampling module, 35 ps TDR reflected rise time, differential TDR, and crosstalk.

Sabritec's Wiltron 360B Vector Network Analyzer measures VSWR & insertion loss up to 20 GHz. All four parameters can be measured simultaneously & efficiently measuring precision RF transmission and reflection coefficients. Rapid data store and retrieval functions are quickly obtained for complex TDR analysis, stub tubing, and precise phase matching of RF Cable Assemblies, high frequency probes and waveguide tuners. Assembly line personnel also perform complex RF measurements. Rapid high production testing is performed with the use of pass/fail limit line set-ups and calibrations ensuring complete reliability of high quality 100% tested precision RF connectors and cable assemblies.

### Testing Capabilities include:

#### Capabilities Electrical

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

#### Capabilities Mechanical

- Thermal Cycling & Thermal Shock
- Temperature Humidity & Salt Spray
- Durability
- Mechanical Loading

## Machine Shop

- Full model machine shop
- Plastic and rubber molding
- Prototyping & assembly tooling
- Full turning equipment
- CNC milling machines
- CNC lathes
- CNC screw machines

CNC Swiss Machining Centers



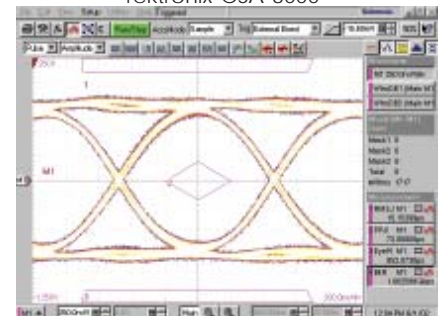
Precision Contact Machining

Production Automation Testing



Automatic Electrical Testing

Tektronix CSA 8000



Eye-Pattern, Jitter & Skew Measurements

# Fibre Channel

# Ethernet

Sabritec offers a complete line of differential twinax, quadrx high speed fibre channel/Ethernet connectors, contacts, and cable assemblies. Sabritec's fibre channel connectors are built for high speed data on demand and Ethernet applications, yet are low profile enough to be used extensively in Data Bus, video and other wide band width applications where small size, speed and reliability are required.

## Quadsplitter

- 150 Ohm differential pair impedance
- Minimizes jitter and data rate errors
- Quadrx to twinax transition
- High speed fibre channel matched impedance data-on-demand applications
- Data rates exceeding 2 Gbits/sec

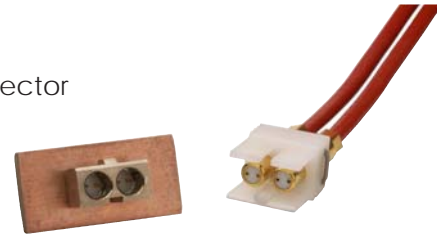


## Quadrx Contacts

- Meets ARINC 600 Ethernet specifications
- Four center contacts with a low impedance grounding shield
- Quad configuration applications exceeding 1 Gbit/sec
- Rear release/rear removable and front release/rear removable contact configurations

## Modular Block Connectors

- Transmit and receive signaling of high speed Ethernet data rates in one connector
- Modular activity in PCB routing of high speed signaling
- Capable of 100 Ohm differential pair matched impedance
- Maximum space utilization modularity and true signal integrity



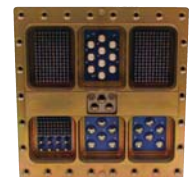
## ARINC 404 & 600

- High speed fibre channel insert assemblies
- Ruggedized expanded beam fiber optic contacts or high speed differential pair matched impedance contacts (150 Ohm and 100 Ohm differential impedance values)
- Ethernet based quad insert 100 Ohm impedance assemblies
- Concentric triaxial contacts
- For all types of data-bus and video interconnect systems including MIL-STD-1553B, ARINC 429, 100 Base-T, Ethernet, high speed video Hot-Link and fibre channel data links



## MIL-C-83527

- Anti-rotational keyed insert assemblies
- High speed fibre channel or Ethernet twinax and quadrx contacts
- Designed for extreme environmental concerns of shock, vibration and humidity



## Micro Twinax

- Matched impedance miniaturized connectors with controlled impedance
- Tightly spaced PCB footprint spacing allows for high density packaging
- SMA, NDL, and Micro-d size packages
- 100/150 Ohm impedance differential pairs
- Applicable for high-speed Ethernet (100 Base-T)
- Can replace existing NDL and SMA connectors



# Fibre Channel

## Fiber Optic Connectors



### Cable Mount/PCB/Fibre Channel Connectors

- Available in straight and right angle twinax contacts for MIL-DTL-38999, ARINC 600, and P0/P3 connector standards
- 150-ohm impedance differential pairs
- Minimizes jitter and data rate errors that degrade high speed digital signals
- Copper solution for fiber optic applications
- Used for high speed Fibre Channel matched impedance data-on-demand applications
- Data rates exceeding 2 Gbits/sec

Sabritec's fiber optic connectors offer a highly secure data transmission method with strong signal at high frequencies. Available contacts include size 5 expanded beam, size 16 butt-joint, and DIN style technologies 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.

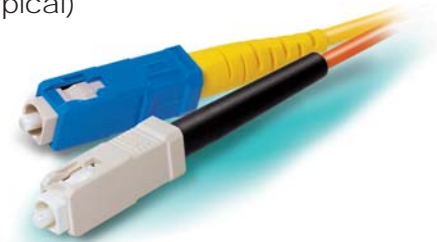
#### RSC

- Ruggedized construction
- Multimode applications (62.5/125)
- Anti-vibration coupling Mechanism on plug
- Jam nut receptacle
- 4 Keyway orientation options
- Precision ceramic ferrule
- Fiber end faces accessible for cleaning
- Insertion loss: 0.7 Db (Typical)



#### SC

- Ruggedized design
- Multimode applications (62.5/125)
- Precision ceramic ferrule
- Simple push-pull mating mechanism
- Simple cleaning
- Insertion loss: 0.7 Db (Typical)



#### Size 16 Butt-Joint Contacts

- Robust pin and socket design
- Multimode applications (62.5/125)
- Readily available for ARINC or MIL-DTL-38999 applications
- Excellent optical performance
- Fewer parts, easy termination process
- Concave polish provides for excellent mechanical performance
- Physical contact polish provides low loss and low reflection



#### Size 5 Expanded Beam Contacts

- Robust pin & socket versions
- Multimode applications (62.5/125)
- Available for ARINC or MIL-DTL-38999 applications
- Reduced influence for alignment errors
- Increased protection for fiber
- Reduced Influence from dirt and debris
- Simple cleaning
- Insertion loss: 0.8 dB (Typical)



#### DIN Connectors

- Twist protection pin
- Multimode applications (62.5/125)
- Screwing lock
- Insertion loss: 0.20 dB (Typical)



# EMI/EMP Filtered Connectors

Sabritec's filter connectors are used on most major military aircraft programs in the U.S. and Europe. These applications include cockpit upgrades, EMI filtering on navigation systems, power control units, and other aircraft avionics systems. We also make filtered adapters that some customers use as a "bolt on" EMI solution that allows them to contain EMI emissions without changing their existing connectors and box layout. Filtered rack and panel connectors (ARINC 600, ARINC 404, MIL-C-83527) are used on several commercial aerospace programs. Sabritec's filter connectors use monolithic capacitor arrays, the most reliable method of EMI/RFI filtering



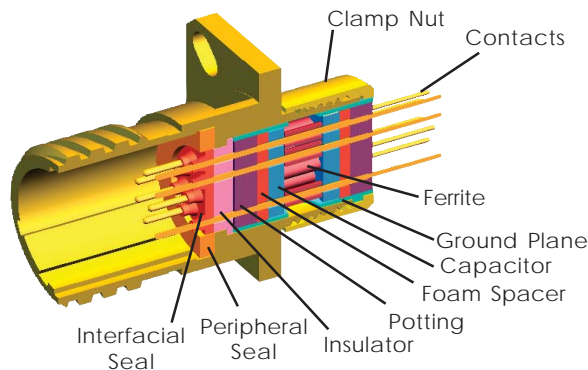
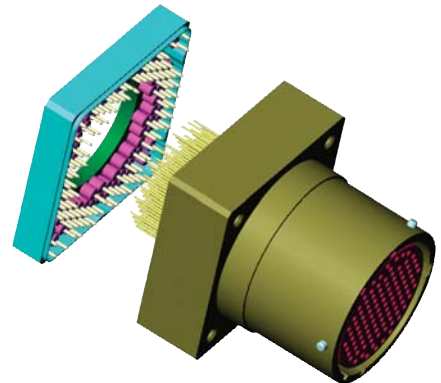
## Filter Connectors

- EMI/RFI filtering and EMP protection
- Internal monolithic planar capacitors
- Interchangeable and intermateable with non-filtered connectors
- One capacitor array, multiple capacitance values
- 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 – 100 Nf
- Ground lines & feed thru lines within single capacitor array
- Mixed capacitances 10:1 ratio within same ceramic (1,000 Pf – 10,000 Pf range)
- Filter types Pi, C and L Filters



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-C-26500   |
| • MIL-C-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-C-83527   |
| • MIL-C-81511                         | • ARINC 600     |
| • JAN 1001                            |                 |



EMI Filter Connector Cross-Section

## Advantages of Transient and EMI Suppression

- Transient protection can be combined with EMI filtering
- Standard "Catalog" diodes are used instead of custom or special parts
- Mixture of diode parameters power, voltage and polarity
- Diodes field removable/replaceable
- Transient protection is located at the interface of the system
- Shell reducing environmental and mechanical damage to diodes and filters
- System retrofit to EMP/EMI is compatible with unprotected connectors



## Filter Composite Connectors

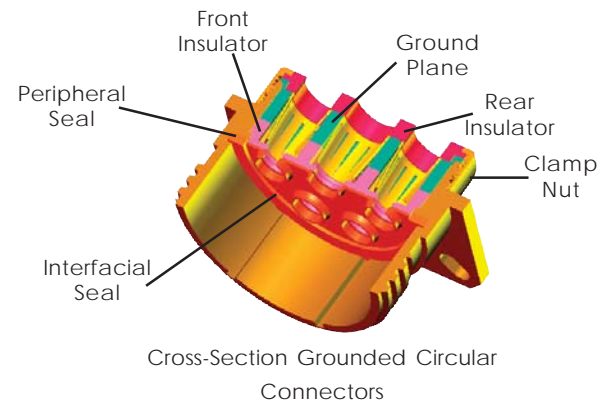
- All shell sizes and contact layouts
- Composite materials resist severe corrosion up to 2000 hrs of salt spray
- Nickel and cadmium plated versions
- Increased durability (up to 1500 cycles) with composite materials
- Magnetic permeability meets all MIL-DTL-38999 requirements



## Grounded Circular Connectors

Sabritec grounded circular connector series is designed to ground the outer shield of a triax or coax 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. Contact resistance is 5 milliohms max.

- Grounded multi-finger contact spring mechanism within each connector cavity
- Contact resistance: 5 milliohms max
- Intermateable and interchangeable with standard non-filtered connectors
- Superior EMI shielding
- Suitable for MIL-STD-1760 applications



## Monolithic Planar Capacitor Manufacturing

- Mixed capacitance, ground, and insulated lines capacitor
- Voltages vary up to 1000 VDC working
- Multilayer construction
- Voltage rating: 100 VDC – 1000 VRMS
- Capacitance range: 100 pF – 100 nF
- Ground lines & feed thru lines within single capacitor array
- Mixed capacitances 10:1 ratio within same ceramic
- (1,000 pF – 10,000 pF range)



Multi-layer Ceramic Capacitor Array

# Triax/Twinax

## Connectors & Contacts



Sabritec's triax series includes our ultraminiature NDL triaxial connector and contact series fitted for MIL-DTL-38999, ARINC 404, ARINC 600, MIL-C-24308 and high differential impedance contacts. Sabritec is the only company to offer NDL contacts, the smallest triax contact manufactured in the world. Triax contacts 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 and reliability are required.

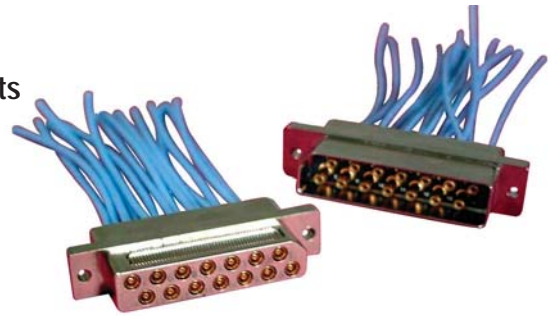
### NDL Triax Connectors

- Quick connect/disconnect detent locking (NDL-"Q") version
- Threaded coupling (NDL-"T") version
- Ideal for MIL-STD-1553 data-bus applications



### Ruggedized D-Sub Size 10 Triax/Twinax Contacts

- Size 10 Interface
- Transmits data at 100 Ohms
- Able to mate 14 contacts in a single interface
- Polarizing shell to prevent mismatching
- Mating repeatability

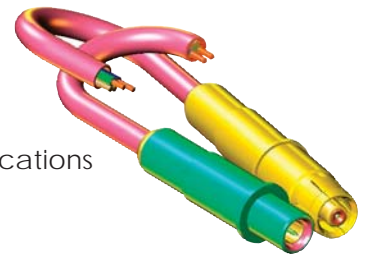


### ARINC 404 and ARINC 600 Triax/Twinax Contacts

- Sizes 5, 9, and 12
- Fits into standard size cavities for ARINC 600 and 404 series QPL connectors
- Several different cable types and impedances
- Size 12 Triax allows for high density packaging
- 75 Ohm contacts available

### MIL-DTL- 38999 Triax/Twinax Contacts

- Available for MIL-DTL-38999 Sizes 8, 10, and 12 cavities
- High impedance 85 Ohm size 8 contacts available for high speed applications
- Fits into standard size cavities for MIL-DTL-38999 series QPL connectors
- Size 8 Triaxial contacts fully qualified to MIL-C-39029/90- 529 and /91-530
- Several different cable types and impedances
- Size 12 Triax is one of the smallest available in the market that allows for high density packaging



### High Differential Impedance Contacts

- Designed for ARINC 600 and MIL-DTL-38999 connectors
- Available in 60, 75 and 85 differential pair impedance
- Optimized for balanced characteristic impedance between middle and center conductors
- Free rotation of cable entry for multidirectional routing of cable to fit into standard contact cavities



# RF Coaxial

## Connectors & Contacts

Sabritec complete line of RF Coaxial connectors feature our SCX, MDCX, Micro-D 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.

### 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



### ARINC 404 and 600 Contacts

- Size 5, 9 and 12 contacts
- RG-178 and RG-316 and numerous low-loss cable configurations
- Higher frequency versions of the standard ARINC contacts
- Performance up to 5 GHz



### Compliant Pin Connectors

- Solderless press-fit termination
- 50 ohm characteristic impedance
- Available in .200" standard footprint spacing
- Press-fit into .040" dia. + .003 plated thru holes
- Stack PCB connectors on both sides of the circuit board

### SMP and SMPM Connectors

- Low VSWR 1.25:1 up to 20 GHz (max mated pair)
- Snap-in vibration proof connection
- Suitable for high shock mobile applications
- Small diameter (.125" max dia. overall)
- Low profile mated pair length (.375" max)
- SMPM line is 30% smaller than the SMP with frequency ranges capable of 60 GHz



### End Launch Connectors

- Designed for standard .062" thick circuit boards
- .015" full radial float mount design
- Multiple blind-mate gang mating options



### MDCX Connectors

- Low VSWR 1.25:1 up to 20 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)
- 30% smaller than SCX



### MIL-DTL-38999 Contacts

- Low VSWR up to 5 GHz
- 50 Ohm characteristic impedance
- Fits into standard (QPL) connector cavities

### Micro-D Coax (MDCX) Connectors

- 30% smaller than the SCX
- Multipin assemblies with a Micro-D housing
- VSWR of 1:25:1 up to 20 GHz
- Low profile design
- Capable of blind mating



Our Engineering expertise and complete in-house manufacturing capability allows us to 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. We look forward to assisting you in every way possible. Below are just some of the special application connectors and contacts that Sabritec offers. Call Sabritec's Applications Engineering Department for help with your custom interconnect needs.

## Space Approved Connectors

Sabritec offers a full range of space level products designed to meet the rigorous environmental requirements for use in space applications. Our space connector line includes filtered and non-filtered D-subminiature and MIL-DTL-38999 Series III connectors. Other space approved products include MIL-DTL-38999 twinax, quadrax, micro twinax, fibre channel, multitway triax, NDL, Micro-D coax, SMP, and SMPM connectors and contacts.

- Continuous operation in low Earth orbit space environment
- Meets requirements for vibration and high/low temperature
- EMI shielding capability
- Meets requirements of NHB 8060.1 for outgassing, toxicity, flammability and other environmental concerns
- Inserts include low force/high durability power and signal, coax and triax contacts
- Accessories include backshells, (EMI and Power), protective covers and sealing plugs
- Suitable for use in space and military/aerospace applications



## Test and Measurement Connectors

Sabritec manufactures products that are suitable for the test and measurement industry. These connectors are used in test equipment applications that require high durability under extreme mating cycles and low insertion force. The complete product series includes modular block, micro-d coax, high impedance triax contacts, and concentric triax, twinax and quadrax contacts.

- Modular connectors for variety of combinations in single connector
- Low insertion- xtraction forces
- Low contact resistance
- Mini-modular connectors for off the shelf components
- Mixed power, signal, coaxial, triaxial and fiber optic modules
- High current ratings
- Immunity to shock and vibration
- Up to 100,000 mating cycles





## 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 professional technical team wastes no time on the route to a successful solu-

tion. In fact, we may have already solved a problem similar to yours.

Sabritec's operations are completely consolidated into our fully equipped facility in Irvine. This facility is vertically integrated 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 a 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 in 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**

17550 Gillette Avenue  
Irvine, CA 92614  
Tel: (949) 250 - 1244  
Fax: (949) 250 -1009  
[www.sabritec.com](http://www.sabritec.com)



*Space Approved Connectors*



*SCX Ultraminiature Coax*



*SMP Series Coax Connectors*



*NDL Series Triax Connectors*

# SABRITEC

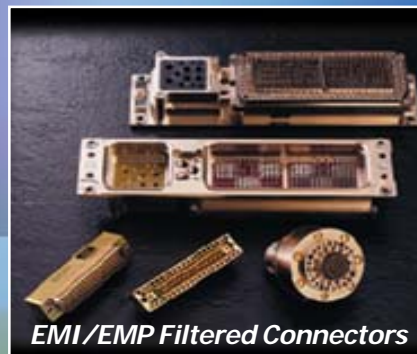
## Family of Interconnect Products



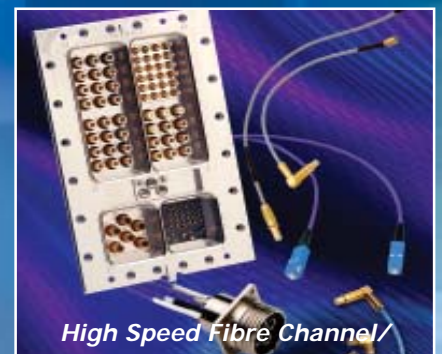
*Twinax Multiway Rugged D-Sub*



*Fiber Optic Connectors*



*EMI/EMP Filtered Connectors*



*High Speed Fibre Channel*



**Your Connection to the Future**

17550 Gillette Ave Irvine, CA 92614  
Tel (949) 250-1244 Fax (949) 250-1009  
<http://www.sabritec.com>

© December 2003  
Document #CB1203  
Printed in USA  
SABRITEC IS A SMITHS GROUP COMPANY

