



Solutions for Electronic Systems



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High Technology. High Quality. High Reliability.

Industry Standards Organizations & Approval Agencies

ARINC

(Aeronautical Radio, Inc.)

BWB

(Federal Office of Defense Technology and Procurement - agency for **VG specifications**)

DSCC

(Defense Supply Center, Columbus)

EDA

(European Defense Agency)

EN

(European Standard)

ESA

(European Space Agency)

JAXA

(Japan Aerospace Exploration Agency)

NASA

(National Aeronautics and Space Administration)

PICMG

(PCI Industrial Computer Manufacturers Group)

SAE

(Society of Automotive / Aerospace Engineers)

VSO

(VMEbus Standards Organization)

Tyco Electronics is the industry's leading provider of high performance, high reliability interconnect systems. Our product portfolio is both broad and deep, encompassing board level, input/output and production break connector systems, rugged fiber optic products, hook-up wire, controlled impedance electrical cable, harnessing products, relays, contactors, solenoids and the tools required to assemble, install and maintain these products.

While industry standard and agency qualified products are the foundation of our offering, our goal is to provide our valued customers the best tool for the job. As a result, we offer many unique solutions, focusing our engineering assets upon the best solution and teaming with our customers for their advantage.

In a hostile and technology intensive theater, failure is not an option. With more than 50 years of Aerospace and Defense heritage, we are committed to assuring our customers' success. Our products are high quality, high reliability and high technology.

That's Our Commitment and Your Advantage!

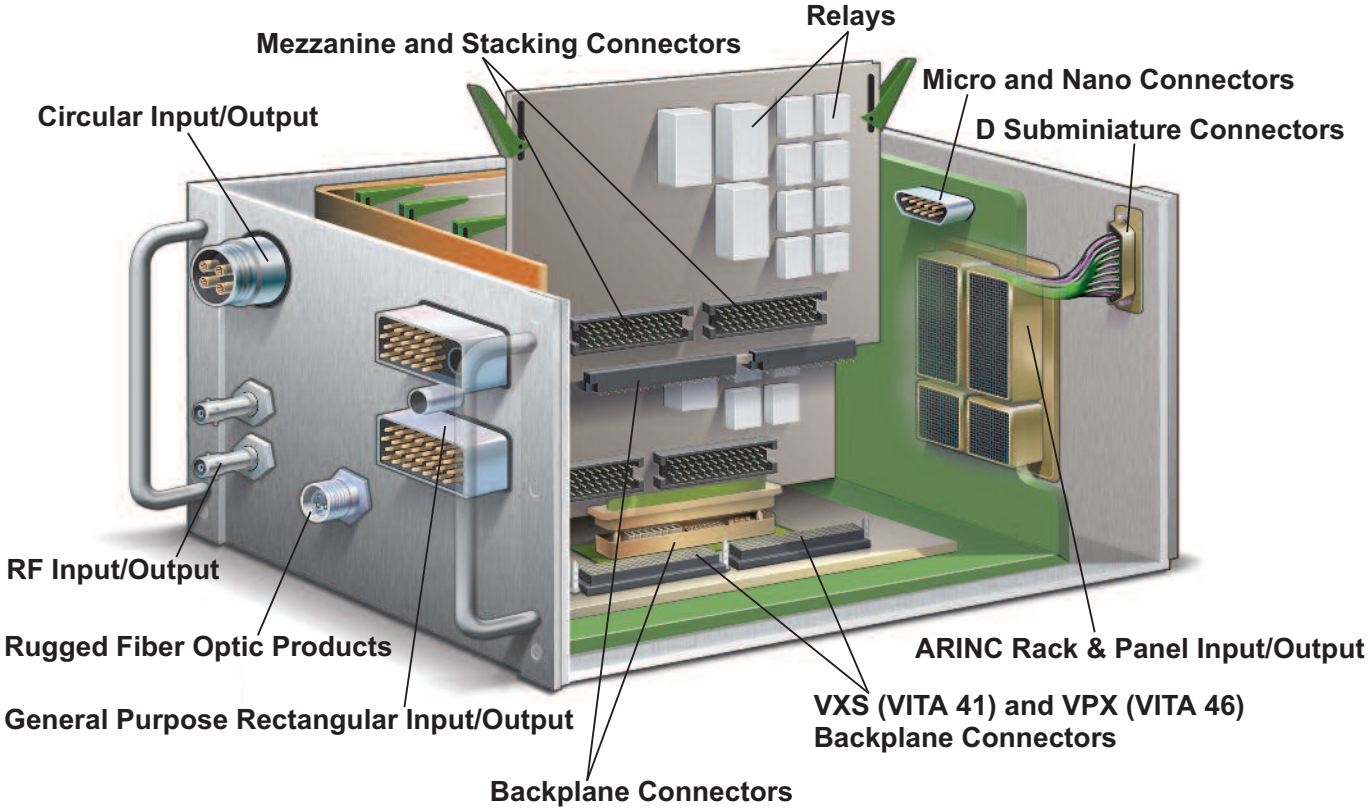
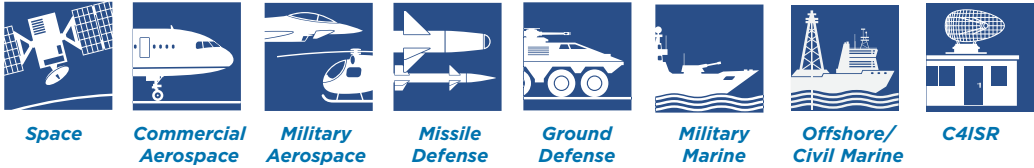


Electronic Systems including:

- C4ISR Electronics - Command, Control, Computing, Communication, Intelligence, Surveillance, Reconnaissance
- Avionics & Electronic Enclosures - Line Replaceable Units (LRU's), Line Replaceable Modules (LRMs), Card Cages

Electronic Enclosures & Avionics Applications

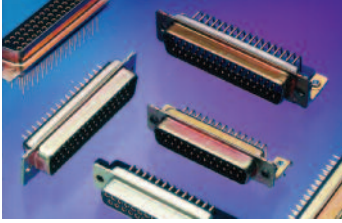
Electronic Systems Market Segments include:



Box Level Interconnect Input/Output & Production Break

Product Information

Associated Product Families



AMPLIMITE Military Subminiature D Connectors

- For input/output and product break harnessing
- NASA qualified designs
- Ultra-light features improved EMI performance and up to 20% weight savings
- ULTRA-LITE AMPLIMITE Connectors
- 24308 D-Sub Connectors
- 311P405 (Coax Mix) Connectors
- 311P407 (Series 90) Connectors
- 311P409 (Series 109) Connectors



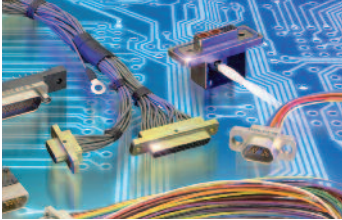
RF Connectors

- For high performance coaxial applications
- Always EU RoHS/ELV Compliant
- Qualified to MIL-PRF-39012, MIL-DTL-83517, MIL-PRF-55339
- SMA
- Hermetic SMA
- SSMA
- OSMM
- One-Step BNC/TNC
- SMK (2.92 mm)
- OSP (BMA)
- OSSP
- SMP and SMPM



Nanominiature Connectors

- Low out-gassing
- High shock and vibration ratings
- Wide temperature range (-200 °C to +200 °C)
- Lightweight and space-proven
- Sealed Circular Connectors
- Rectangular & DUALOBE Connectors
- Strip Connectors
- Flying Leads and Cable Assemblies



Microminiature Connectors

- Low out-gassing and durable
- High shock and vibration ratings
- Lightweight and space-proven
- Circular Connectors
- Microminiature D Connectors
- Rectangular Connectors
- Flying Lead and Cable Assemblies



ARINC Rack and Panel Connectors

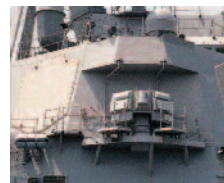
- I/O for LRUs and LRMs
- Blindmate
- Rugged, High Pin Count
- Signal, RF, Power and Optic (LuxCis Optical Termini & Mini Expanded Beam)
- Press Fit, Solder and Crimp Contacts
- ARINC 600
- ARINC 404
- M83527 Style
- Quadrax Connectors



Quadrax Connectors

- For ethernet and fiber-channel applications
- Designed for use with wire seal boots for sealing and optimized alignment
- Front metal-shell design provides a full ground plane
- Designed per ARINC 600 - Supplement 14
- M38999 Style Circular
- ARINC 404 and 600 Rectangular
- General Purpose Rectangular
- Direct Attach
- 4Q4 D-Subs: Available in cable applied plug and receptacle, along with right-angle PCB receptacle; Excellent density - 4 quadrax contacts in a .5" x 2.0" window; Uses standard D-Sub jacking hardware

LuxCis is a trademark of Radiall, S.A. Product is manufactured under license from Radiall, S.A.



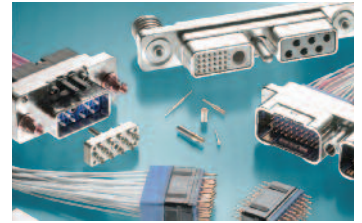
Box Level Interconnect Input/Output & Production Break

Product Information

Associated Product Families

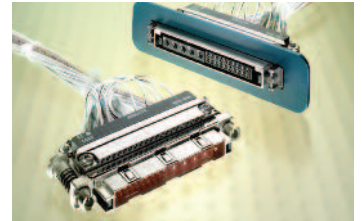
General Purpose Rectangular (GPR) Connectors

- I/O for LRUs and LRMs
 - Production Break for Stanchion Disconnect
 - Various Blindmate and Latching Designs
 - Signal, RF, Optic, Power
 - Crimp Style and PC Tail Contacts (Straight & Right Angle)
 - Uses 2-3 times less space than circular connectors
- GPR A
 - GPR B
 - GAIN Connectors
 - Specials
 - Backshells
 - Quadrax Connectors



MTC Connectors

- Lightweight materials for weight savings
 - Reliable, thin and stackable
 - Environmentally sealed
 - EMI accessories available
- MTC100-XXX-XXX
 - MTC10-XXX-XXX-XXX
 - MTC-XXX-XXXX
 - MTC-122-XXXX
 - MTC-197CTA-XXXX
 - MTC-197D-XXX-XXX



Industrial Ethernet (1, 2, 3 & 10 Gbps), Modular Plugs and RJ45 Connectors

- Standard and ruggedized interconnect
 - Wire/Cable and Board applied
 - Sealed and filtered
 - High density and high performance
- 10 Gig Sealed Cat 6E qualified small circular size M12
 - Circular Sealed
 - Modular Plugs and Accessories
 - Cable Mounted Jacks
 - PCB Mount Jacks
 - Filtered Jacks
 - Integrated Magnetics
 - Modular Couplers



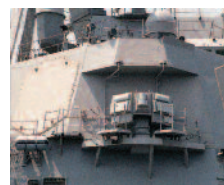
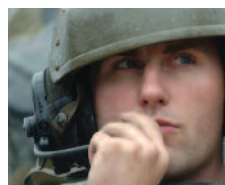
USB Connectors

- Plug and play capability
 - Hot pluggable
 - Complete family of boardmount receptacles
 - Cable mount overmold plug kits
 - Outside-the-box for user friendly flexibility
- Industrial, Circular, Sealed
 - Standard, Micro and Mini
 - Standard and Miniature A & B Styles
 - Cable and PCB Applied



Fire Wire Connectors

- Conforms to IEEE 1394 standard
 - Easy connections to equipment
 - For use with plug and play devices
 - High performance and user friendly
- Standard & Miniature A & B Styles
 - Cable & PCB Applied
 - Backshells & Accessories
 - Multiposition PCB Mount



Box Level Interconnect Internal - Backplane

Product Information

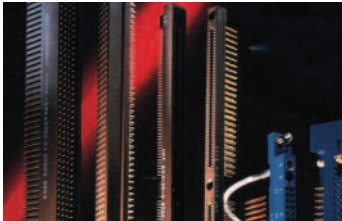
Associated Product Families



High Speed Ruggedized (HSR)

- Common insert/shell geometry enables multiple configurations
- High performance up to 10 G b/s
- High power contact 15 amp/contact
- Rugged metal shell with integral guidance hardware
- ESD shielding available

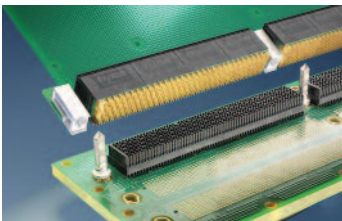
- High Speed Differential
- RF
- Power
- Fiber Optics



AMP-HDI/Box/Mini-Box Connectors

- M55302 and other rugged varieties
- Reliable 4-beam box type contact design provides four areas of contact per connection
- .050, .075, .100 centerlines available
- Quad-beam contact redundancy makes it an excellent choice for high vibration environments

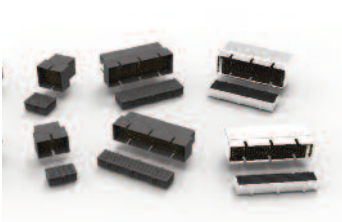
- AMP-HDI Connectors
- AMP-HDI LRM Connectors
- .100 Box
- .075 Box
- .050 Minibox
- Power, Coax, Fiber



MULTIGIG RT 2 Connectors

- Used in VITA 41 VXS and VITA 46 VPX applications
- Pinless backplane connector capable of supporting data rates up to 12.5 Gb/s
- Up to 56 high-speed lines per cm board space, in 25.4 mm slot-pitch

- VITA 41
- VITA 46
- Optic
- RF
- Machine Guide Hardware



FORTIS Zd Connector

- Allows 10 Gb/s+ data rates
- Extreme mechanical and electrical performance
- Modular design
- Three shell varieties for application versatility
- Protected pin field on backplane for reliability and durability

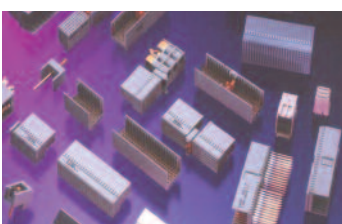
- Plastic
- Shielded
- Machined Metal



Eurocard Connectors

- Used in VME and VME64X applications
- Meets DIN 41612 and IEC 60603-2
- Two-piece reliability
- Flame-retardant polarized housing
- Standard DIN sizes as well as half sizes, and expanded sizes
- ACTION PIN post assemblies for reliability

- Type B
- Type C
- Type D
- Type F
- Type G
- Type M
- Type Q
- Type R
- Coax, High Power



2mm HM Connectors

- Used in Compact PCI applications
- Hard metric 2mm pitch
- Open pin field connector capable of supporting data rates of 2.5 Gb/s depending on the S/G ratio

- 4, 5, 8 and 12-row configurations



Box Level Interconnect Internal - Backplane

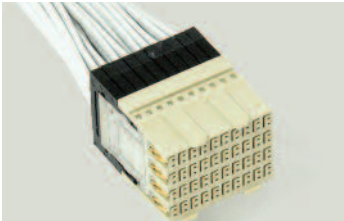
Product Information

Z-PACK HM-Zd Connectors

- Used in ATCA applications
- Designed specifically for high speed differential applications
- Modular connector system with a standard module size of 25.00 (.984)

Associated Product Families

- Vertical and Right Angle Press Fit Pin Headers
- Right Angle and Vertical Press Fit
- 2, 3 or 4 Contact Pairs per Column

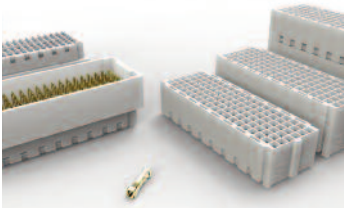


Box Level Interconnect Internal - Stacking

Mezalok Connectors

- 114 position footprint compatible to XMC footprint
- Mini-Box contact system provides 4 points of contact
- LCP plastic housings offer superior thermal stability
- Rugged surface mount mezzanine connector

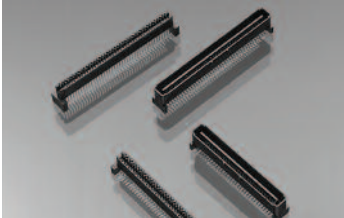
- 60 position
- 114 position



1mm Free Height Connectors

- Used in IEEE 1386 PMC applications
- For board stacking applications
- High density packaging on 1.0 centerline spacing
- Board stacking heights available from 8 to 15 mm

- Receptacles with Locating Posts
- Plugs with Locating Posts



AMPMODU System 50 and 50/50 Connectors

System 50

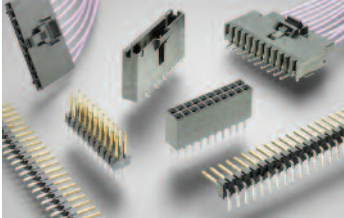
- Available in select sizes from 10 through 100 positions
- High density 1.27 x 2.54 centerline grid
- Compatible with standard surface-mount processes
- Stand-offs for free drainage of flux cleaning solutions

- Dual-Row
- Vertical
- Shrouded Header
- Receptacle Assemblies

50/50 Connectors

- 3 board stacking heights (6.35, 8.13 and 9.91 mm)
- Reliable dual beam receptacle contacts for redundant contact
- Receptacle and header allow for drainage of processing fluids
- Polarized header and receptacle assemblies

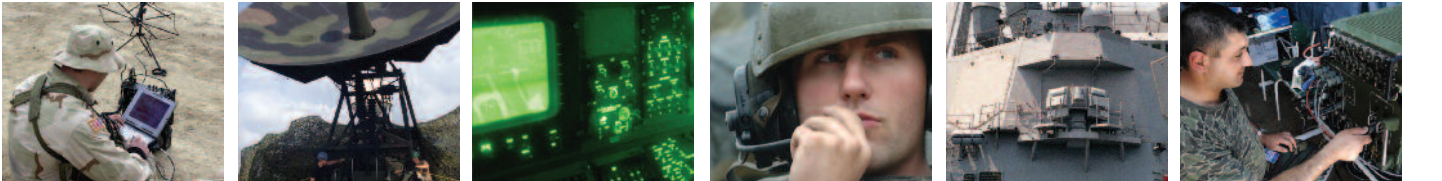
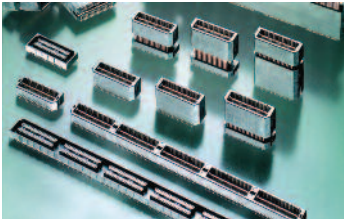
- Board-to-board Vertical Headers
- Board-to-board Right Angle Headers
- Cable-to-board Connectors
- Terminating Covers



MICTOR Connectors

- Controlled impedance design
- High density two-piece connector family designed for high performance applications for motherboard/daughtercard and backplane/daughtercard interconnections from 40 to 240 positions
- Provides for mezzanine stacking 10.92 to 38.94mm from 40 through 200 positions
- Aerospace compatible materials
- Redundant interfaces on mating contacts

- Right-Angle (straddle mount)
- Vertical Plug and Receptacles
- Right-Angle Plugs and Receptacles

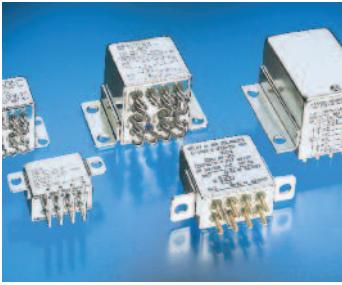


Power Distribution and Motion Control

High Performance Relays, Solenoids and Sensors

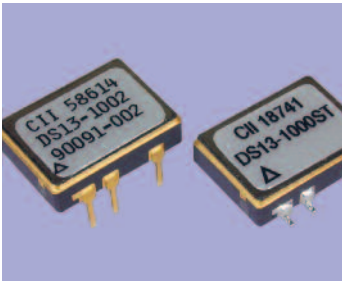
Product Information

Associated Product Families



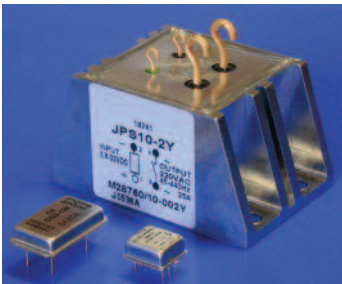
CII High Performance Relays

- Qualified to MIL-R-39016, MIL-R-28776, MIL-R-28750, MIL-R-5757, MIL-R-83726, MS27245, MS27247, MIL-R-6016 and MIL-R-83536
- Hermetically sealed
- High shock and vibration ratings
- Designed to perform in a wide range of extreme environments
- Multiple terminal and mounting styles available
- TO-5 / Minigrad Relays - 1 and 2 poles, up to 1 amp switching
- Fifth-Size Relays - .150 grid, 2 and 4 poles, up to 2 amps switching
- Crystal Can Relays - 2 to 6 poles, up to 10 amps switching
- Midrange Relays - 1 to 4 poles, up to 50 amps switching
- TD2 Series 10A mid range time delay relays



DC Solid State Relays

- Output ratings from low level to 2 Amps
- Hermetically sealed
- Optically coupled
- Some with short circuit protection & isolated status line
- Some models have bi-directional output
- Qualified to DSCC drawings 90091, 89116, 88062, 85092 & 87034
- DS11 Series
- DS13 SERIES
- JTS5, 6, 7 SERIES
- MS18 Series
- MS14 Series



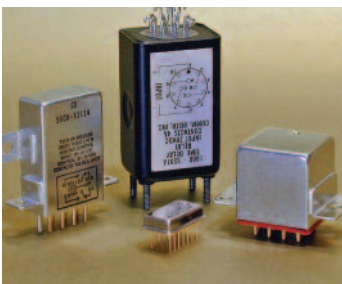
AC Solid State Relays

- Output ratings from 2 to 25 Amps
- Zero voltage turn-on for reduced switching noise
- Qualified to MIL-PRF-28750
- Qualified to DSCC drawing 86031
- JDS9 Series
- PS12 Series
- JPS10 Series



KILOVAC High Voltage Relays

- Voltage isolation to 70 kV
- Current carrying capability to 110A
- * Service life to 10 million cycles
- Various contact forms available
- Flange, panel and PC board mounting styles
- Optional coils, mountings and terminals
- 270 Vdc Aerospace relays



KILOVAC Timers & Sensors

- Time delay relays, with output ratings up to 10A, with relay and solid state output
- Interval times and repeat cycle timers
- Voltage, frequency & phase sensors
- 1600/1700 Series (delay on operate timers)
- 2400 Series (delay on operate timers)
- 4600 Series (internal timers)
- 5600/1700 Series (delay on release timers)
- 1310/1350 Series (voltage sensors)
- 1400 Series (phase sensors)
- 7000 Series (frequency sensors)



Power Distribution and Motion Control

High Performance Relays, Solenoids and Sensors

Product Information

HARTMAN Contactors

- Lightweight, environmentally sealed
- Hermetically sealed enclosures available for the most severe environmental conditions or altitudes above 50,000 ft.
- Multiple main contact configurations
- Designed to meet application requirements of MIL-PRF-6106

Associated Product Families

- AC Contactors
- DC Contactors



Custom Tubular Solenoids

- Designed and built to customer requirements
 - Push, pull or combination motion
 - Broad operating temperature range
 - Multiple termination and mounting options
 - 200 °C magnet wire insulation is standard
- Fin Locking
 - Primer Firing
 - Fuel Valve
 - Directional Valve
 - Refueling Release



HARTMAN Lightweight 28 Vdc Contactors

- Main contact ratings to 1,000 amps
 - Available with a variety of auxiliary contact arrangements
 - Side stable and latching models
 - Standard, reverse current, and automatic dropout types
 - AC Models also available
 - Hermetically or gasket sealed models in conventional or bus bar mounting
- K Series
 - KA Series
 - KAF Series



KILOVAC Lightweight 270 Vdc Contactors

- Interrupt currents up to 2,000 amps
 - Voltage isolation from 5 to 1,800 Vdc
 - One- or two-pole models with normally open or normally closed main contacts
 - Latching and non-latching types
 - Available with a variety of auxiliary contact arrangements
- MAP
 - CAP
 - EV
 - LEV



Sensors

- Contactless and wearless monitoring of positions, linear and rotary motions
 - Binary (High/Low), Linear (0mm-200mm) and Rotation (360 ° absolute)
- Pulse Wire Sensors
 - Speed Sensors
 - Hall Sensors
 - PLCD Sensors
 - Resolver
 - Position Pick-off Unit (PPU)

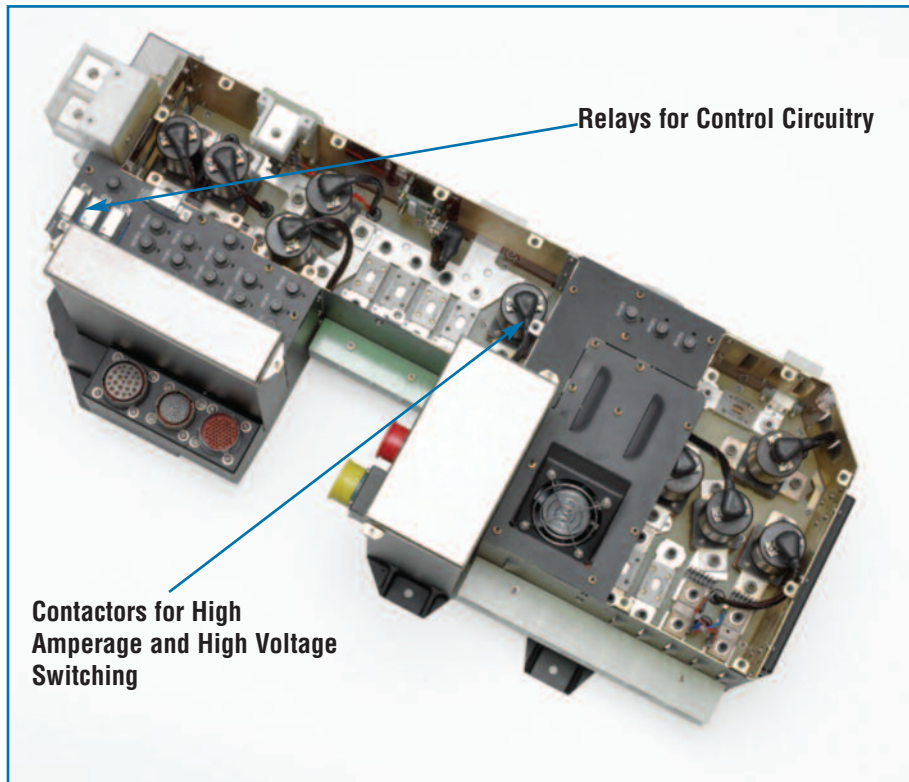


Power Distribution Assemblies



Custom Power Distribution Assemblies

- Custom designed and built AC or DC products for aerospace applications
- Commercial and military applications
- Value-added service
- Lightweight
- For primary and secondary power distribution



Fast Protocol & DataBus Harnessing

Product Information

Controlled Electrical Cables

- Lightweight, small size
- Low capacitance
- High data rates
- High flexibility
- High speed I/O connectors and contacts

ElectroLoss FilterLine Wire and Cable

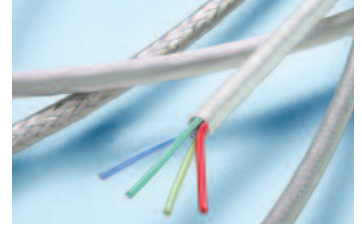
- Suppresses EMI above 100 MHz
- Lightweight, small size
- * SPEC 55 insulation
- 600 volt
- -65 °C up to +200 °C [-85 °F to +392 °F]

MIL-STD-1553 Data Bus

- Offers a complete system of interconnection hardware for all MIL-STD-1553B multiplexing needs

Associated Product Families

- CHEMINAX Coaxial Cables
- CHEMINAX Twin Axial Cables
- QUADLITE Cable



- XL-ETFE (insulation and cable jacket, if any)
- Conductive XL-ETFE (cable jacket)
- Space 55FA, 55FB
- Space, low fluoride 55FA, 55FB
- Low fluoride 55FA, 55FB



- Couplers
- Cables
- Triax Connectors and Contacts
- Bus and Stub Terminators
- Cable Marker Sleeves
- Harness Design software



Harness Assembly Applications

Helical Convolex Tubing

Identification

Adhesives

RF & Controlled Impedance Cables

EPD & Fiber Optic Cables

Power Cables

Heat-Shrinkable Tubing

Heat-Shrinkable Molded Parts

Cable Jacketing Products

Backshells, Adapters, Feedthroughs

Wire/Fiber Applied Connectors & Cables

1553 DataBus products

Hook-Up Wire

Splices and Shield Terminations



Typical Harness Design Cycle

MANUFACTURING

Tyco Electronics' customer-driven approach to manufacturing has produced:

- Preinstalled components for ease of assembly
- A complete set of compatible harness components (virtually everything that fits between two connectors) designed to meet the user's specific environmental requirements
- Worldwide support
- Application products and equipment
- A complete set of process standards
- Quality control, training and assurance



MAINTENANCE

Tyco Electronics offers:

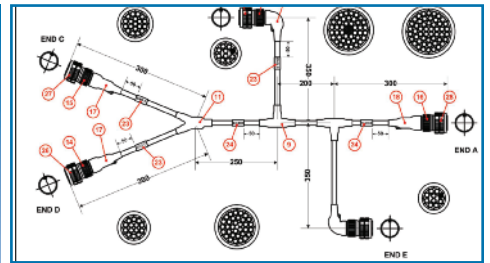
- Harness repair products (including tools and instructions) and techniques
- Kits qualified to regional specifications
- Local training and repair techniques
- A worldwide distributor network for repair products



UPGRADES

Working with Tyco Electronics simplifies the entire upgrade design cycle, whether it involves incorporating new technology or adding new capabilities as mission requirements change. Tyco Electronics customers can:

- Quickly and easily redesign systems with HarnWare design software
- Employ Tyco Electronics' full line of repair, retrofitting and upgrade services and products



Product Information

Custom Maintenance and Repair Kits

- Customizable to specific platforms
- Custom sub-assemblies for quick repair
- Designed for use in the field or at a depot
- Lightweight case for easy transportation
- Tooling is available

Repair Products

- Easy, quick installation
- Repair done on fueled aircraft
- One-step terminations
- Tooling available

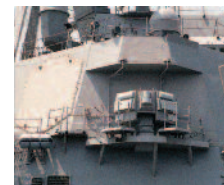
Associated Product Families

Typical Products include:

- Wire, Cable and Cable Assemblies
- Heat-shrink Tubing
- Shield Terminators and Adapters
- DataBus and MTC products
- Connectors, Terminals, Contacts, and Splices
- Molded and Harnessing Products

- Cold Applied Splice
- Side Entry Bushings
- RF One-Step
- Field applied connectors and harnessing components
- LightCrimp Plus Fiber Optic Mechanical Splice

Repair Products



Vehicle and Box-to-Box Harnessing & Protection Products

Product Information

Hook-Up Wire

- Small size, reduced weight
- Resistant to electrical arc tracking
- Flexible
- Low outgassing

Multicore Cables

- Small size, lightweight
- Specially formulated cable jacket materials
- Complete range of components
- Special shielding to address EMI/EMC problems
- Custom designed and purpose built
- Low fire hazard for modern high-speed vessels

Molded Parts and Adhesives

- Adhesive coating forms a watertight seal, protecting cables and equipment from corrosion and mechanical abuse
- Meets requirements for most military and commercial marine applications
- Adhesives and sealants accommodate a wide range of applications, materials and environmental conditions

Spin-Coupled and Solid Backshell Adapters

- Available in many configurations to match applications
- Easy to install onto connectors
- Ideal for high-reliability applications
- Kitted for customer convenience
- May use TINEL-LOCK rings or band straps
- Accommodates Raychem boots

HexaShield High Performance EMC/EMI Adapters

- Superior EMC/EMI Shielding performance
- Simple installation and easy re-entry
- Excellent mechanical and environmental resistance
- Efficient strain relief
- Versatile and flexible

SolderSleeve Devices and SolderShield Splices

- Controls EMI
- Designed to provide an environment resistant shield termination on cables
- Rated for 150 °C minimum up to 200 °C max.

Heat Shrink Tubing

- Made of polyolefins, fluoropolymers, and elastomers enhanced by radiation cross-linking and heat-shrinkability
- Tubings shrink to conform to virtually any shape
- Provides dependable insulation, mechanical protection and strain relief

Associated Product Families

- SPEC 44 Wire
- SPEC 55 Wire
- SPEC 80 FlexLine Wire

- SPEC 44 Wire
- SPEC 55 Wire
- Type 99 Wire
- 100 Wire and Cable
- ElectroLoss FilterLine Wire
- Flexible Power Cables

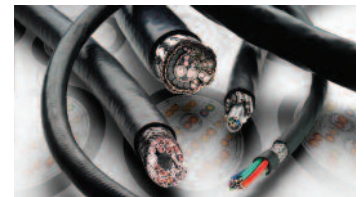
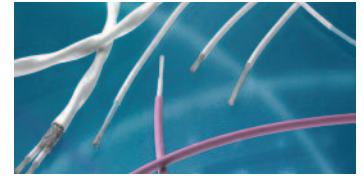
- RayOLon Sealing Sleeve
- Boots
- End caps
- Feedthroughs
- Transitions
- Hot melt tapes and epoxies

- TXR Series
- 2xxM Series
- BND Series

- HexaShield Adapter product line
- A flexible version is also available and works well for high-speed data signals, allowing multiple repairs (FLX40 Series)

- D-110 Series
- D-1744 Series
- D-436 Series
- D-200 Series
- S063 Series
- S096 Series
- S0175 Series
- S200 Series (200 °C)
- D-150 Series
- S01, S02, S03 Series (150 °C)

- Single-Wall
- Dual-Wall
- Heavy-Duty
- Special Purpose



For custom harness assemblies available, contact TE.



Typical Harness Design Cycle

DESIGN

HarnWare Harness Design Software:

- Produces complete drawings, diagrams, parts lists and labor estimates in a fraction of the time additional methods require
- Allows correct component selection for form, fit and function to produce a systemized harness design
- Enables different designs to be rapidly evaluated to arrive at the most cost effective solution

PROTOTYPE

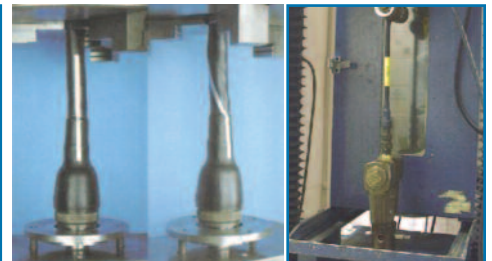
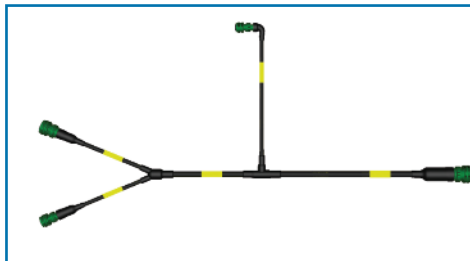
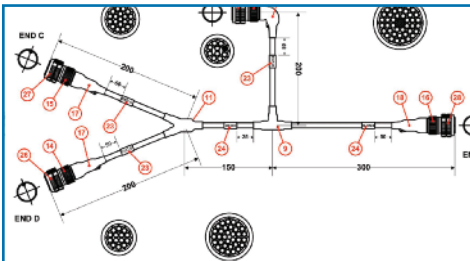
Worldwide support for rapid prototyping and mock-up is available through Tyco Electronics.



TESTING

Tyco Electronics is fully equipped to test harness systems for flammability and resistance to:

- EMI
- Physical and thermal challenges
- Fluids



HarnWare Software

In a fraction of the time needed for traditional methods, HarnWare design software can produce the following features/benefits:

Features:

- Two-dimensional drawings
- Labor and production cost estimates
- Parts list
- A list of selected components compatible with the operating environment

Benefits:

- Specification of correct components
- Rapid, complete answers
- More control of the design package, which simplifies updates and changes
- Multiple generations of designs (Mark I, Mark II, etc.)



Typical Harness Design Cycle

MANUFACTURING

Tyco Electronics' customer-driven approach to manufacturing has produced:

- Preinstalled components for ease of assembly
- A complete set of compatible harness components (virtually everything that fits between two connectors) designed to meet the user's specific environmental requirements
- Worldwide support
- Application products and equipment
- A complete set of process standards
- Quality control, training and assurance



MAINTENANCE

Tyco Electronics offers:

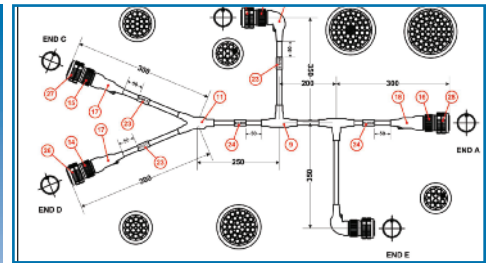
- Harness repair products (including tools and instructions) and techniques
- Kits qualified to regional specifications
- Local training and repair techniques
- A worldwide distributor network for repair products



UPGRADES

Working with Tyco Electronics simplifies the entire upgrade design cycle, whether it involves incorporating new technology or adding new capabilities as mission requirements change. Tyco Electronics customers can:

- Quickly and easily redesign systems with HarnWare design software
- Employ Tyco Electronics' full line of repair, retrofitting and upgrade services and products



Product Information

Custom Maintenance and Repair Kits

- Customizable to specific platforms
- Custom sub-assemblies for quick repair
- Designed for use in the field or at a depot
- Lightweight case for easy transportation
- Tooling is available

Repair Products

- Easy, quick installation
- Repair done on fueled aircraft
- One-step terminations
- Tooling available

Associated Product Families

Typical Products include:

- Wire, Cable and Cable Assemblies
- Heat-shrink Tubing
- Shield Terminators and Adapters
- DataBus and MTC products
- Connectors, Terminals, Contacts, and Splices
- Molded and Harnessing Products

- Cold Applied Splice
- Side Entry Bushings
- RF One-Step
- Field applied connectors and harnessing components
- LightCrimp Plus Fiber Optic Mechanical Splice

Repair Products





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