



SPACE-GRADE Complex Cable Assemblies

We like to begin our presentation of Glenair's proven-performance space-grade products with the golden umbilical life support cable used by Commander Ed White in the first American space walk in 1965. This was a complex cable assembly with an exacting set of performance requirements. Even though this application is now over 50 years old, it still reflects Glenair's design and fabrication expertise and that we have been a go-to supplier for the space industry for almost 5 decades. Today we continue to fabricate high-performance cables for space, from rugged Viton® overmolded designs to ultra-lightweight SpaceWire jumpers for the high-speed space data transmission protocol. Other notable space cable applications include:

- Dozens of robotic spacecraft, including orbiters, landers, and rovers, have been launched to Mars since the 1960s. Glenair cables have ridden along on several, helping to fulfill navigation, data and communication requirements.
- Complex interconnect cable assemblies made by Glenair have also traveled to and from orbit dozens of times on the Space Shuttle, as well as numerous space-launch vehicles. Glenair-made interconnect harnesses also served on all twelve manned Gemini capsules.



Commander Ed White on the first American spacewalk, 1965 with Glenair-manufactured "Golden Umbilical" cable

PROVEN PERFORMANCE IN SPACE

- The "Golden Umbilical" life-support cable
- JPL Mars probes (orbiters, landers, and the Curiosity rover)
- AIRS satellite
- Gravity Probe mission
- Space Shuttle
- Titan II launch vehicles
- SpaceWire (MIL-DTL-83513)



COMPLEX MULTIBRANCH AND OVERMOLDED CABLE ASSEMBLIES



Multibranch wire harness for a space lab application



Complex Mighty Mouse cable harness for a Mars rover application



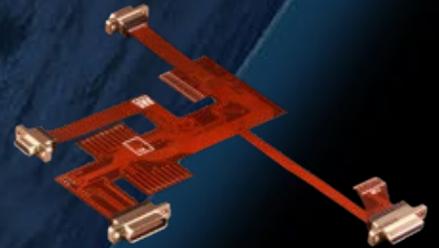
ESA and NASA screened Micro-D/Nano cable assembly



Space-grade Micro-D flex assembly with NASA EEE-INST-002 screening



Hybrid flex/rigid flex multibranch Micro-D flex assembly with discrete RF circuits



Micro-D subminiature multibranch flex assembly

TURNKEY FACTORY-TERMINATED CONDUIT ASSEMBLIES



Complex multibranch high altitude electrical wire conduit assembly

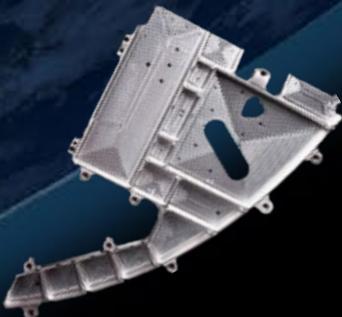


Lightweight, halogen-free wire conduit assembly



Crush-resistant aerospace metal-core conduit assembly

AEROSPACE-GRADE INTEGRATED SYSTEMS



Precision-machined, injection molded or stamped-and-formed boxes and structural members



Military-aerospace and space-grade multibranch interconnect cable assembly staff and facilities



Turnkey integrated system assemblies



Artist concept of NASA's Juno spacecraft, exploring Jupiter. Credit NASA/JPL-Caltech

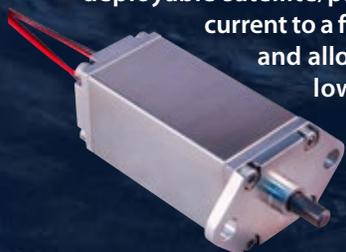


SERIES 06 HDRM

Pyrotechnic-Free Space Mechanisms

High-reliability, non-explosive (split-spool) HDRMs, separation nuts, and pin pullers/pushers for dependable stowage and release of deployable space systems

Glenair HDRM space mechanisms are optimized for foolproof release reliability with built-in mechanical and electrical redundancy. The planned release of the deployable satellite/payload is activated by a pre-determined value of electrical current to a fuse-wire system which causes the wire to break under tension and allows a pre-loaded mechanical bolt to actuate. Glenair's line of low-shock, redundant and non-redundant space mechanisms includes both HDRM devices as well as a family of pin pushers and pin pullers. Customer-defined housing and mounting configurations are available. Consult factory for specific device TR level and qualification test reports.



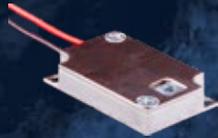
Glenair pyrotechnic-free release mechanisms offer quick release time, low shock, relatively low power input, and virtually no temperature sensitivity. Series includes separation nuts, HDRMs, pin pushers, and pin pullers—direct wired or connectorized—with higher preload carrying capacity compared to competitor solutions.

- Pyrotechnic-free alternative (low-shock fuse-wire) for single-event release of deployable space systems—electrical initiation up to 5 amps
- User-serviceable and refurbishable units
- Redundant or non-redundant actuation circuit
- Not susceptible to transient and noise (EMI/EMP/ESD/RFI) inputs
- Extended temperature ranges: -150°C to +150°C

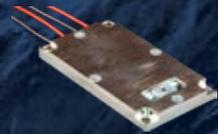
HDRM CATALOG PRODUCT SELECTION GUIDE



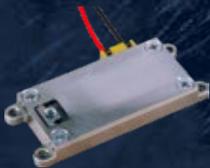
Note: Preloading assembly, release actuator, and load-carrying structure may also be custom-packaged per customer requirements



061-002
Light-Duty HDRM
Non-redundant circuit,
5 or 20 lb release preload



061-003
Light-Duty HDRM
Redundant circuit,
30 lb release preload



061-014
Light-Duty HDRM
Non-redundant circuit,
75 lb release preload,
Side load bearing



061-007
Medium-Duty HDRM
Redundant circuit,
300 lb release



061-006
Medium-Duty HDRM
Redundant circuit,
1000 lb release preload



061-005
Medium-Duty HDRM
Redundant circuit,
2500 lb release preload



062-002
Heavy-Duty HDRM
Redundant circuit,
5000 lb release preload



063-001
Heavy-Duty HDRM
Redundant circuit,
8750 lb release preload



064-001
Heavy-Duty HDRM
Non-redundant circuit,
20,000 lb release preload



061-010
Light-Duty Pin Pusher
Non-redundant circuit
6 lb push force



061-009
Light-Duty Pin Puller
Non-redundant circuit
18 lb pull force



061-011
Light-Duty Pin Puller
Non-redundant circuit
18 lb pull force



061-013
Medium-Duty Pin Puller
Redundant circuit
50 lb pull force

DEPLOYMENT APPLICATIONS



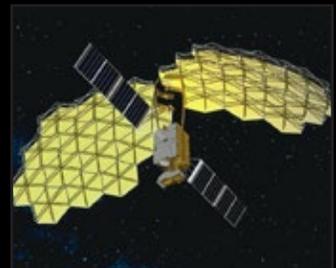
Solar Arrays



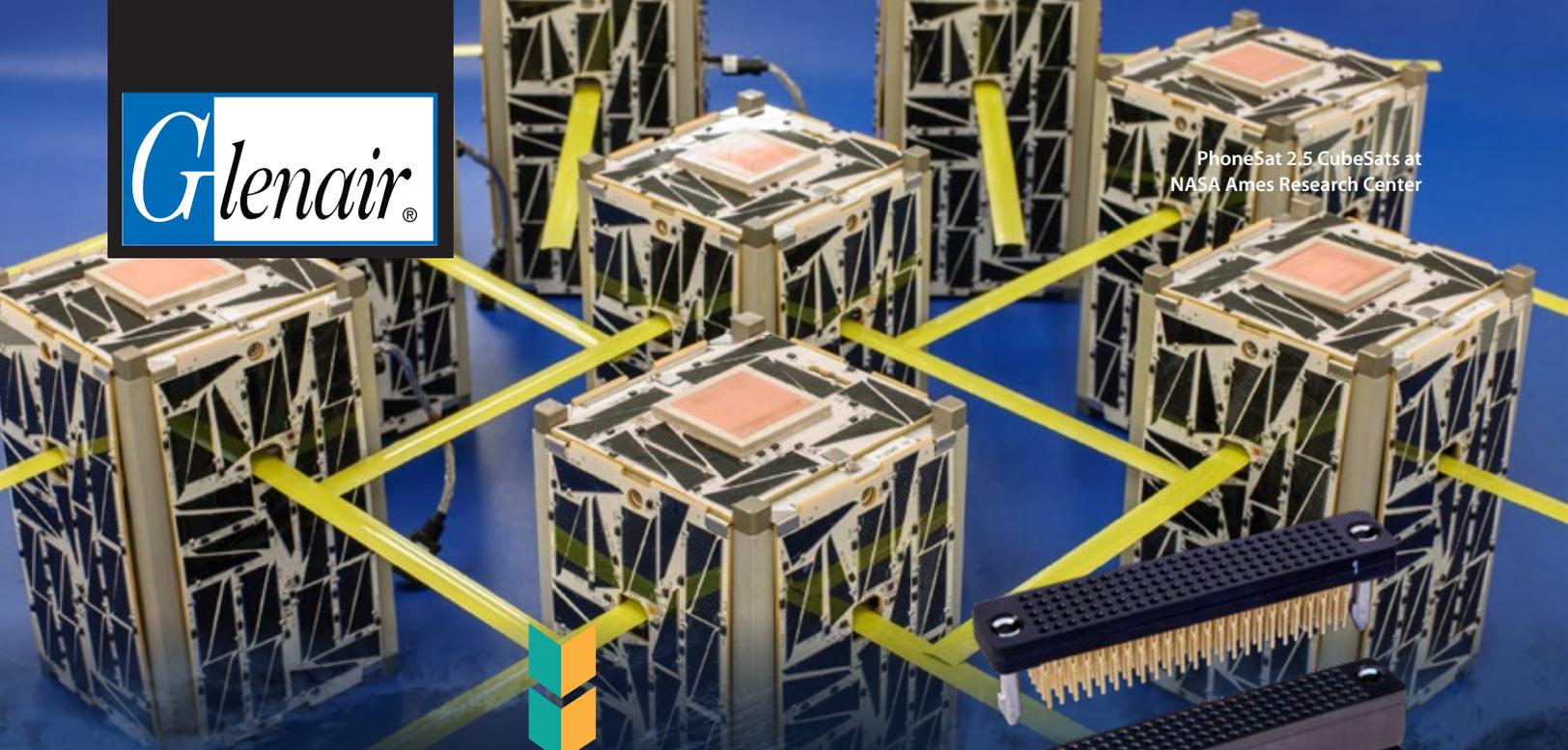
Booms and Masts



Antennas



Reflectors



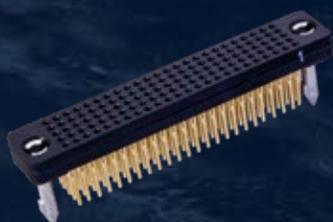
HD STACKER™

High-density, solder-free, PCIe-ready board-to-board stackable connectors

Mission-critical board-to-board connector applications demand fail-safe signal integrity as well as rugged and reliable harsh-environment performance. The HD Stacker™ brings Glenair innovation to stacking board-to-board connectors with several significant design improvements: Ultra high-density .0625" Chevron Contact System provides 55% more contacts per connector size, or a 31% size reduction for the same number of contacts as compared to current industry solutions. Polarized connector bodies and available polarized guide pins prevent accidental mismatching. The solder-free press-fit compliant pin contacts are removable, repairable, and available in custom lengths. HD Stacker™ connectors may also be ordered with pre-wired cable or flex jumper terminations. High-speed signal integrity test reports are available upon request. Choose HD Stacker™ for the ultimate in high-density, rugged board-to-board stackable connector performance.

- High-density .0625" pitch Chevron Contact System
- PCIe Rev 3 capable
- Signal integrity to 10.5Gb/sec.
- Polarized insulator and hardware options
- Solder free "eye of the needle" compliant tail for press fit installation
- High-temp PPS insulator meets NASA outgassing requirements
- Available wired / flex jumpers
- Available between-board spacers up to 1 inch

HD STACKER™ FOR MISSION-CRITICAL BOARD-TO-BOARD APPLICATIONS



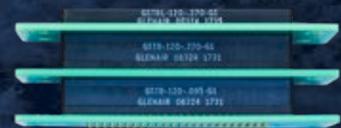
Solder-free press-fit (compliant pin) board mounting



.0625" pitch contact spacing: highest available density



Polarized shells and keyed guide pin hardware prevent mis-mating



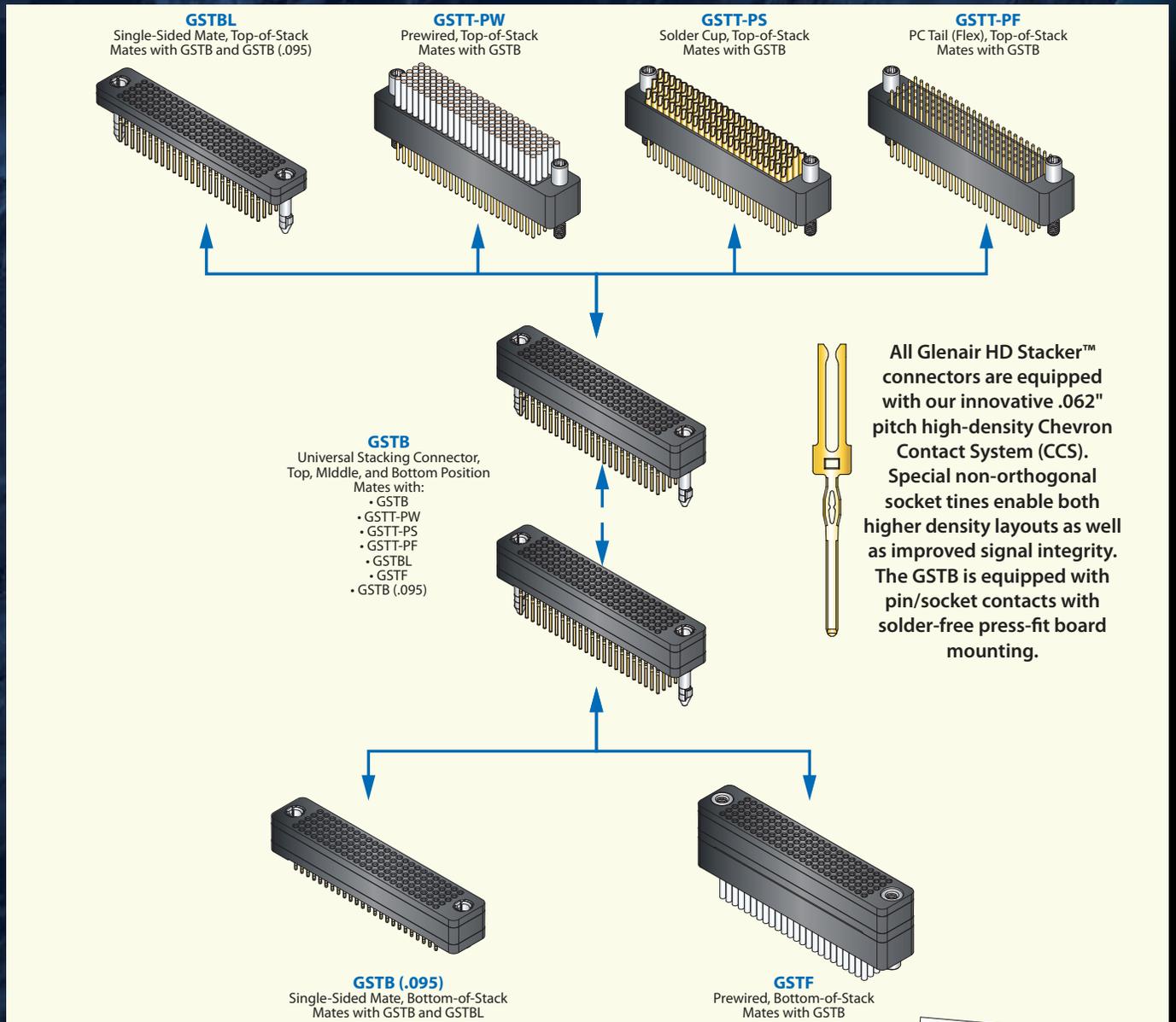
Controlled signal integrity for differential applications (PCIe Rev 3 capable)

.0625" PITCH COMPLIANT PIN High-Density Stacker™



Rugged board-to-board stackable connectors

HD STACKER™ POSITION AND MATING COMPATIBILITY GUIDE



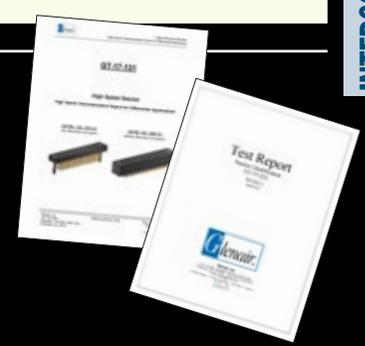
INTERCONNECT SHOWCASE

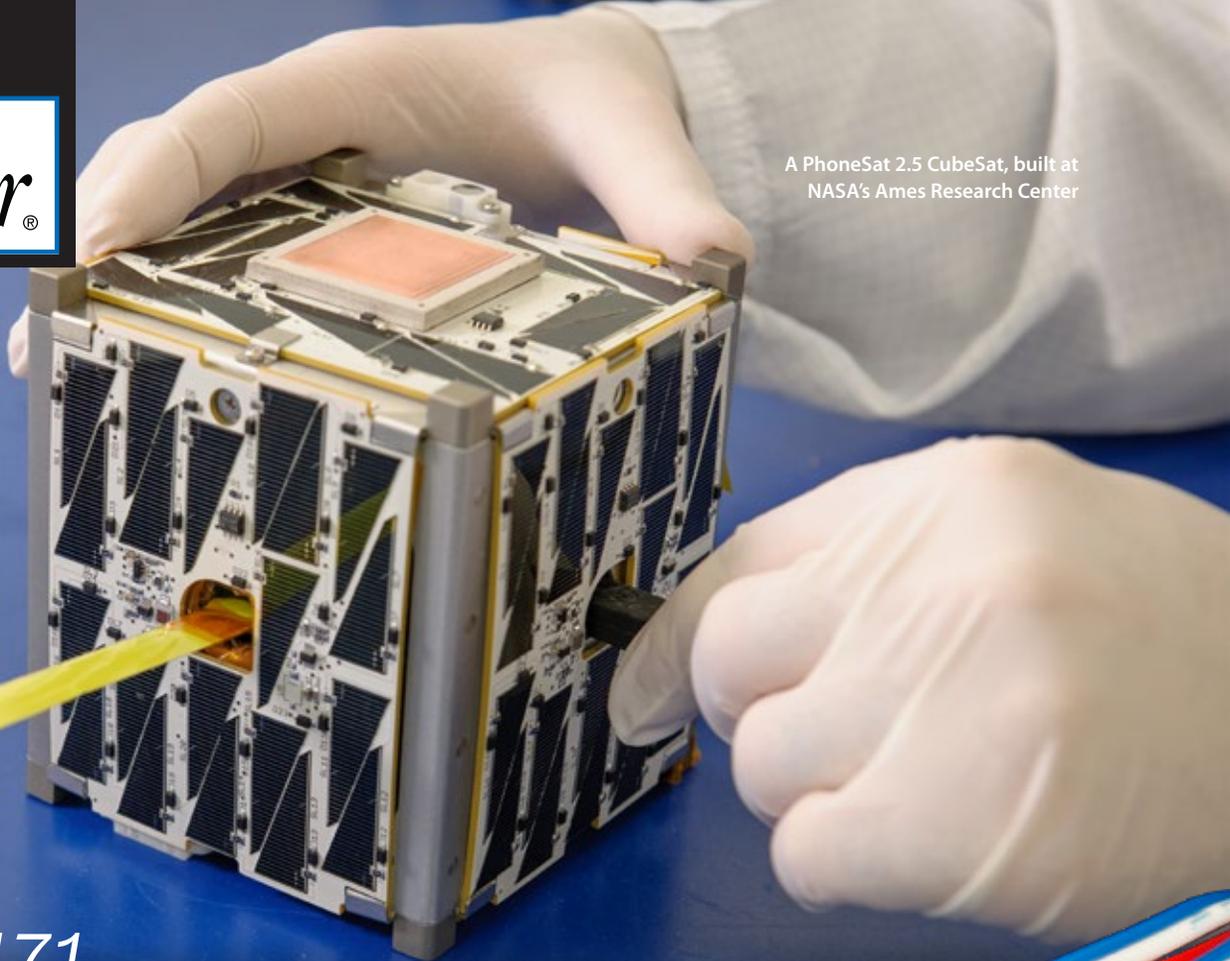
QUALIFICATION TESTING / HIGH-SPEED PERFORMANCE

Stacker connectors were qualified in accordance with MIL-DTL-55302G testing for:

- Contact engagement/separation
- Contact retention
- DWV
- Electrical resistance
- Mechanical vibration and shock
- Insulation resistance
- Thermal shock
- Contact resistance
- Humidity

High-frequency electrical performance tests were performed for: Insertion loss, return loss, crosstalk, and time domain performance metrics including impedance and eye pattern. Complete test reports are available at www.glenair.com/technical_information_test_reports





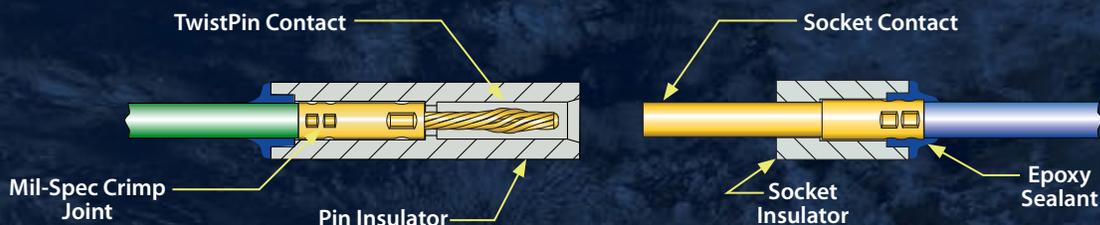
SERIES 171 Latching MicroStrips™

TwistPin performance and durability in an economical, space-saving single row package

Series 171 MicroStrips™ are made for high-reliability wire-to-board and wire-to-wire applications. These high-density strip connectors are typically used in ruggedized 3 Amp signal applications, where higher-performance contacts, precision machined shells and space-grade dielectrics offer significant advantages compared to commercial-grade headers and jumpers. Glenair's rugged, high force TwistPin contact accepts up to #24 gage wire, the current rating is 3 Amps, the voltage rating is 600 Vac, and the temperature rating is -55C to +150C. The Series 171 Latching MicroStrip connector meets all applicable requirements of MIL-DTL-83513. Choose solder cup, pre-wired, or printed circuit board versions. A stainless steel latch provides secure coupling.

- High-reliability TwistPin contact system
- #24-30 AWG wire size
- .050" pitch contact spacing
- Solder cup, pre-wired or PCB header terminations
- 3 Amps, +150C, 600 Vac

LATCHING MICROSTRIP™ CROSS-SECTIONAL VIEW



SERIES 171

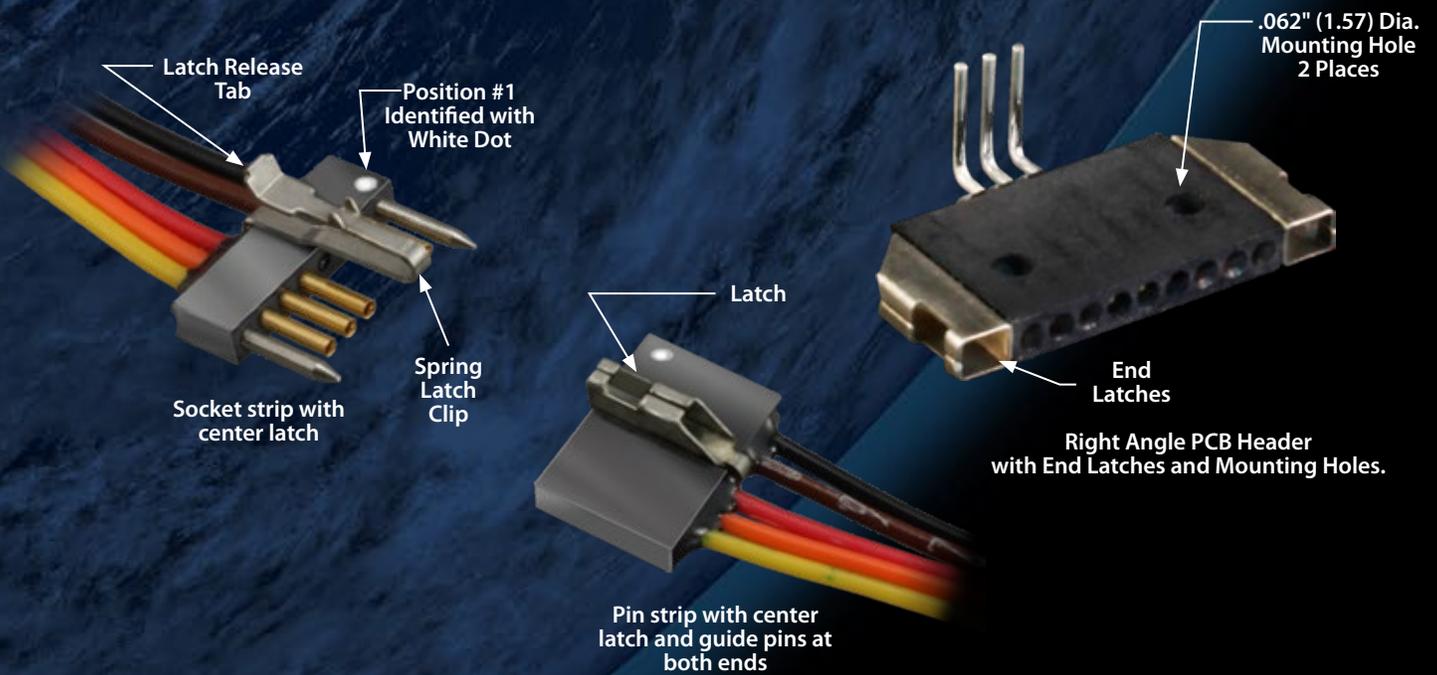
Latching MicroStrips™

Superior TwistPin contact performance



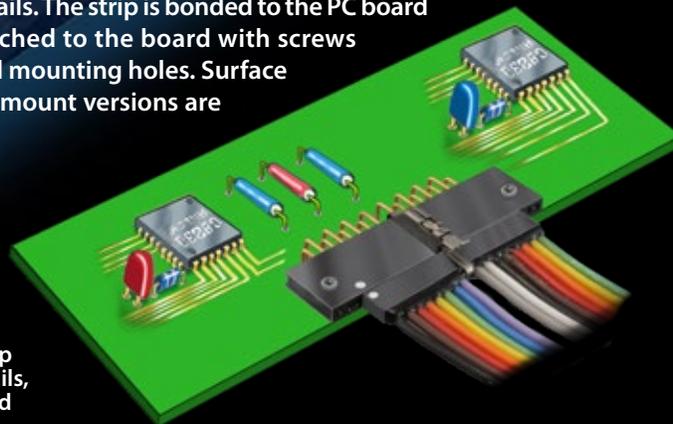
ABOUT SPRING LATCHES, GUIDE PINS AND MOUNTING HOLES

Optional stainless steel latch clips provide secure mating when subjected to shock and vibration. A single center latch is suitable for most applications. Dual end latches are also available. The spring latch is always installed on the socket strip. The latch receiver is installed on the pin strip. To unmate the connectors, simply press the release tab while pulling the connectors apart. MicroStrips™ are available with stainless steel guide pins. A single guide pin provides circuit polarization. A guide pin on each end helps to align connectors when mating and prevents damage to contacts. For most applications the preferred configuration is a single center latch with no guide pins. Mounting holes are now available. Attach strips to circuit boards with size 0-80 screws (customer-supplied).



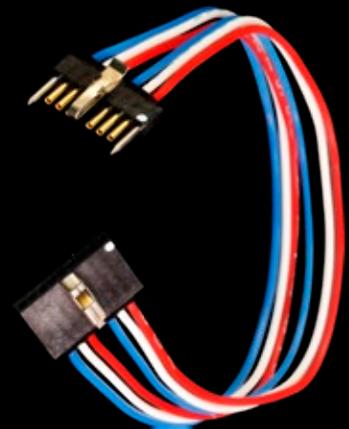
ABOUT BOARD MOUNT STRIPS

Space customers typically use MicroStrips™ for high reliability board-to-wire I/O applications. The pin strip is usually configured with right angle thru-hole PC tails. The strip is bonded to the PC board with epoxy, or attached to the board with screws installed in optional mounting holes. Surface mount and vertical mount versions are also available.



Right angle pin strip with staggered PC tails, mounting holes and center latch

SINGLE ROW BACK-TO-BACK MICROSTRIPS



.050" pitch single row surface mount back-to-back microstrip



Physical layer SpaceWire router aboard the James Webb Space Telescope (NASA)

SpaceWire Cable Assemblies

Flight- and lab-grade SpaceWire qualified cable assemblies for IEEE 1355 space network node interconnection of routers, switches, recorders, transceivers, and other physical layer devices

The success of any space mission begins with reliable data transmission and Glenair SpaceWire cables, built to meet the strict standards set forth by ECSS-E-ST-50-12C make this a reality. Our SpaceWire cables offer bidirectional, high speed data transmission rates up to 400 Mbits/s while significantly reducing cross talk, skew, and signal attenuation. By incorporating a serial, point-to-point cable, with low voltage differential signaling (LVDS) reduced costs are realized through an easily integrated data transmission cable. These features allow SpaceWire cables to be incorporated across various satellite data transmission programs without the expense of costly design customization.

Glenair SpaceWire assemblies begin with a high performance cable built with expanded polytetrafluoroethylene (ePTFE) insulation. This material allows for low-loss transmission of LVDS signals, maximizing data-rates while allowing for the implementation of standard hardware protocols, thus eliminating the need for design customization and long lead time cable projects.

TYPICAL USES INCLUDE

- EGSE applications
- Radar sensor systems
- Hi-resolution camera equipment
- Sensor, mass-memory unit, and telemetry subsystem interconnections

APPROVED FOR USE BY:

- ESA
- NASA
- JAXA
- RKA

CONNECTOR/CABLE

- Laboratory and space-grade versions available
- Qualified MIL-DTL-83513 Micro-D connectors
- Gold-plated copper alloy TwistPin contacts
- Basic cable, 4 twisted pair cables and a ground
- Epoxy resin potting
- EMI banding backshell

PERFORMANCE

- 3 Amps
- Temperature tolerance -200° to 180° C
- 100 Ω impedance shielded signal pair
- Very low skew, signal attenuation and crosstalk
- 65dB minimum attenuation shielding effectiveness
- Low magnetic permeability IAW EIA-364-54

POINT-TO-POINT AND SINGLE-ENDED SpaceWire cable assemblies

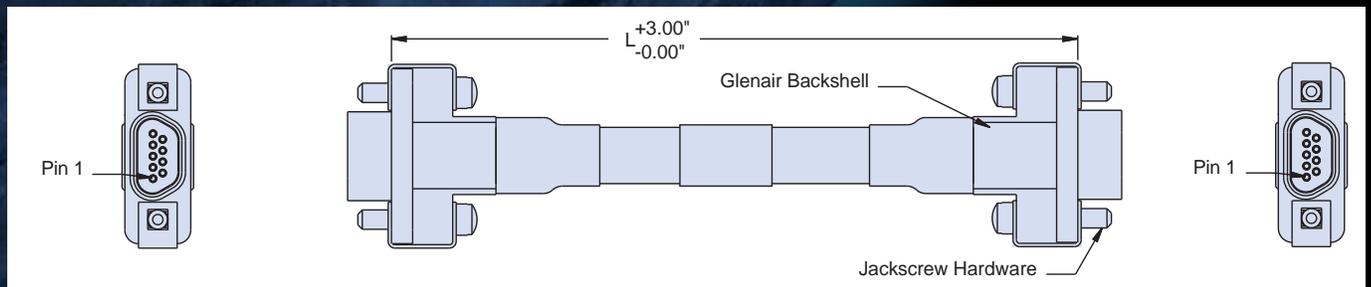
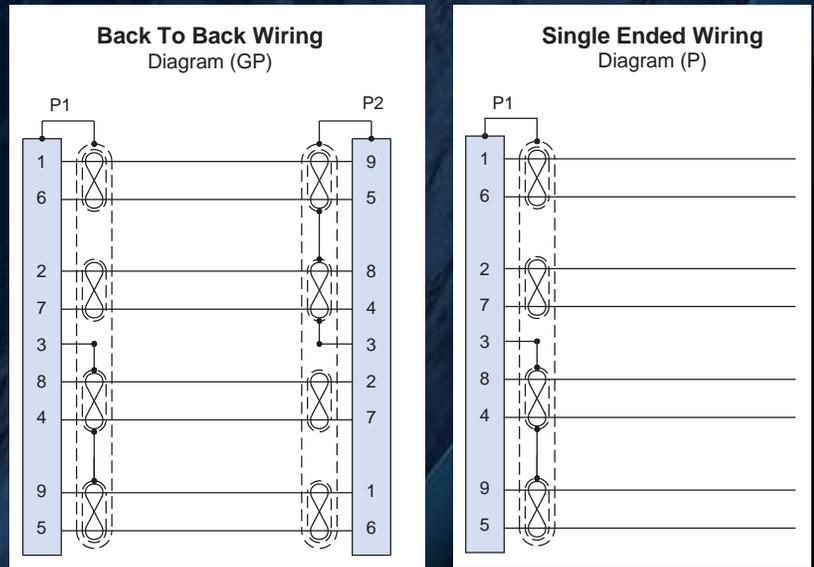
Technical specifications / how-to-order

NOTES:

1. Flight grade (cable Type F) assemblies to be screened IAW NASA EEE-INST-002, Table 2. Level 1 with 100% thermal vacuum outgassing (24 hours/+125°C/10⁻⁶ torr). Reference Glenair Mod Code 429C.
2. Operating temperature - 200°C to +180°C. Reference Glenair Mod Code 428.
3. Electrical performance:
Dielectric withstanding voltage: 600 VAC.
Insulation resistance: 5000 megohms @500 VDC.
4. Assembly to be identified with Glenair's name, Part Number, Cage Code and Date Code or ESCC Component Part Marking Standards.

MATERIALS/FINISH:

- Shells/backshells - aluminum alloy/electroless nickel.
- Insulators - high grade rigid dielectric/N.A.
- Contacts - copper alloy, gold plated.
- Hardware - stainless steel/passivated.



How To Order Spacewire	
Sample Part Number	GSWM 2 L -9 GP -6 F B -16 S
Product Series	GSWM –Glenair Spacewire Micro-D
Shell Plating	2 –Electroless Nickel 5 –Gold
Insulator Material	L –LCP
Shell Size	-9
Connector Type	P –Single Ended Pin (Plug) GP –Pin (Plug) Connector Both Ends
Wire Gauge	-6 –26 AWG -8 –28 AWG -0 –30 AWG (30 AWG–Lab Only)
Cable Type	F –Flight Grade L –Lab Grade
Termination Option	B –Backshell
Cable Length In Inches	-16 = 16 inches (12 inches minimum)
Hardware	S –Male Slotted Jackscrew P –Female Jackpost



JAXA Kibo Laboratory module
from the International
Space Station



Certified SpaceWire cables for both
laboratory/test applications and
flight applications



SERIES MWDM Micro-D Connectors

- High density Micro TwistPin contacts set on .050" centers
- 9 to 130 contact arrangements
- Pigtail, PCB, solder cup, and flex terminations
- Single row, multi-row, low profile and high density insert arrangements
- QPL and commercial versions
- Same-day availability on all part numbers
- Qualified for use in ESA, NASA, JAXA applications



Standard



Hermetic



EMI Filter

TwistPin equipped MIL-DTL-83513 Micro-D connectors offer outstanding mating performance, durability and minimal contact resistance



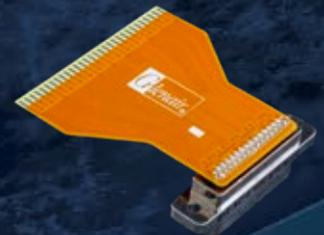
MasterLatch™



Surface Mount



Rear Panel Mount



Flex Circuit

MIL-DTL-83513 AND COMMERCIAL Micro-D Connectors

Mission-critical mating performance



Metal Shell Micro-D for Harnessing Applications

GRPM Solder Cup	GRPM Insulated Wire	GRPM Uninsulated Wire	MWDM Solder Cup	MWDM Insulated Wire	MWDM Back-To-Backs
Shielded Cable Assembly	MWDM Uninsulated Wire	GMDR Insulated Wire	GMDE Environmental	GSWM SpaceWire	GMLM MasterLatch

Micro-Ds for Printed Circuit Board

GRPM-CBS	GRPM-CBR	MWDM-BS	MWDM-BR
MWDM-CBR	MWDM-CBS	90° Surface Mount	GMR7580
GMR7590	GMR7580C	GMR7590C	Right Angle Filter

INTERCONNECT SHOWCASE



WellMaster™ 260



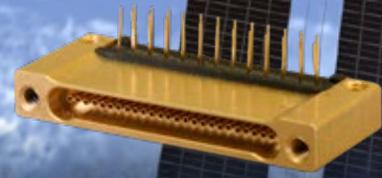
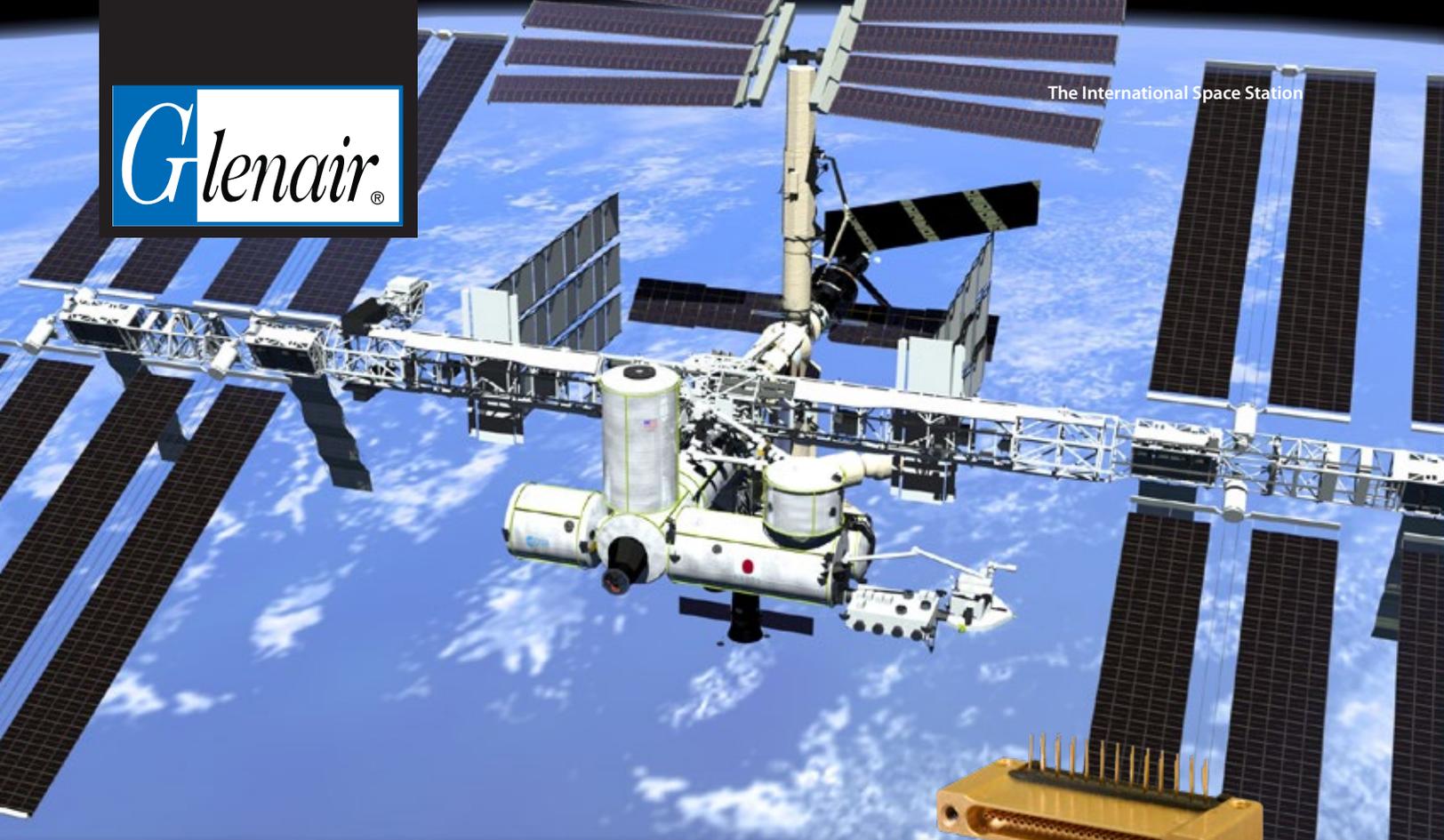
Sav-Con®



Latching MicroStrip



Low Profile

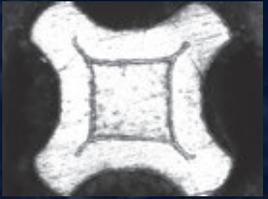


- 1 Amp current rating
- .025 Inch (0.64 mm) contact spacing
- #30 And #32 gage wire accommodation
- Single and double row
- Metal shell, aluminum, titanium or stainless steel
- TwistPin contact system
- Gold alloy contact, unplated
- Thru-hole and surface-mount PCB versions

SERIES 89 Nanominiature Connectors

MIL-DTL-32139 qualified connectors for mission-critical board-to-wire applications—simply the smallest and lightest mil-spec connector in the business

THE NANO TWISTPIN ADVANTAGE



Transverse cross-section of a TwistPin contact crimped to solid wire



- Gas-Tight Crimp Joint
- Better Shock and Vibration Performance
- Corrosion Proof Contact Alloy



SERIES 89 Nanominature Connectors



The smallest and lightest
mil-spec connector

Series 89 Nanominature Connector Performance Summary	
Contact Spacing	.025" (0.64mm) Contact Centers
Wire Accommodation	#30-#32 AWG
Current Rating	1 AMP Max
DWV	250 VAC RMS Sea Level
Insulation Resistance	5000 Megohms Minimum
Operating Temperature	-55° C. to +125° C.
Contact Resistance	71 Millivolt Drop Maximum
Shock, Vibration	100g's, 20 g's
Durability	200 Mating Cycles
Corrosion Resistance	48 Hours Salt Spray
Mating Force	5 Ounce Max, 0.4 Ounce Min

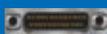
How Small Are They?



D-Subminiature Connector
25 Contacts
on 0.109 Inch Spacing



Micro-D Connector
25 Contacts
on 0.050 Inch Spacing



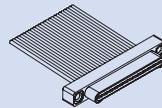
Nano Connector
25 Contacts
on 0.025 Inch Spacing



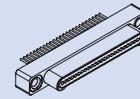
Now available: space-grade
Nano circulars

Series 89 Nanominature Product Selection Guide

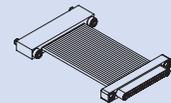
Pre-Wired
Single Row
Connectors



Insulated Wire

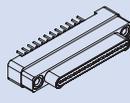


Uninsulated Wire

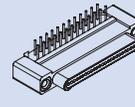


Back-to-Back Cables

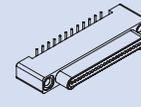
Pre-Wired
PCB
Connectors



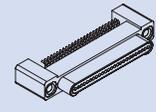
Thru-Hole Vertical



Thru-Hole 90°

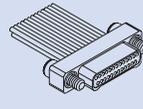


SMT Vertical

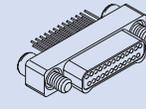


SMT 90°

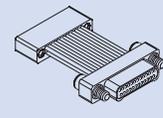
Pre-Wired
Double Row
Connectors



Insulated Wire

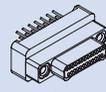


Uninsulated Wire



Back-to-Back Cables

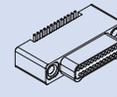
Double Row
PCB
Connectors



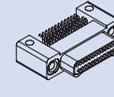
Thru-Hole Vertical



Thru-Hole 90°



SMT Vertical

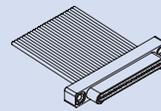


SMT 90°

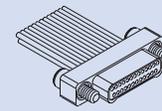


SMT Straddler

Pre-Wired
MIL-DTL-32139
Connectors



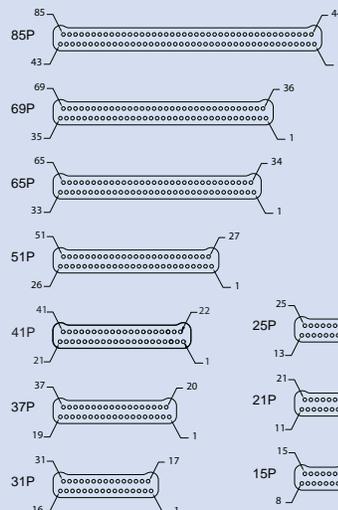
Single Row, Insulated Wire



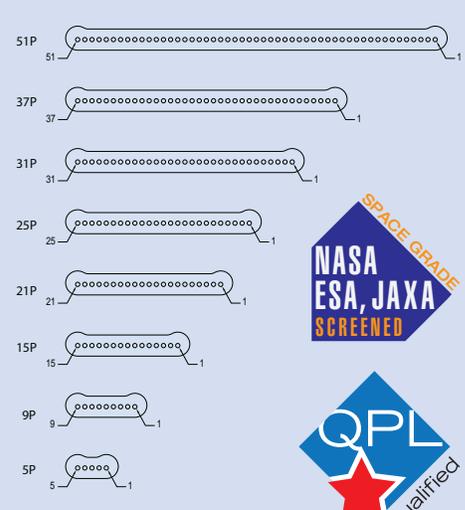
Double Row, Insulated Wire

NANOMINIATURE CONTACT ARRANGEMENTS

Single Row Mating Face of Pin
(Plug) Connector



Double Row Mating Face of Pin
(Plug) Connector



INTERCONNECT SHOWCASE

JAXA Kounotori H2
Transfer Vehicle and the
Canadarm on the ISS

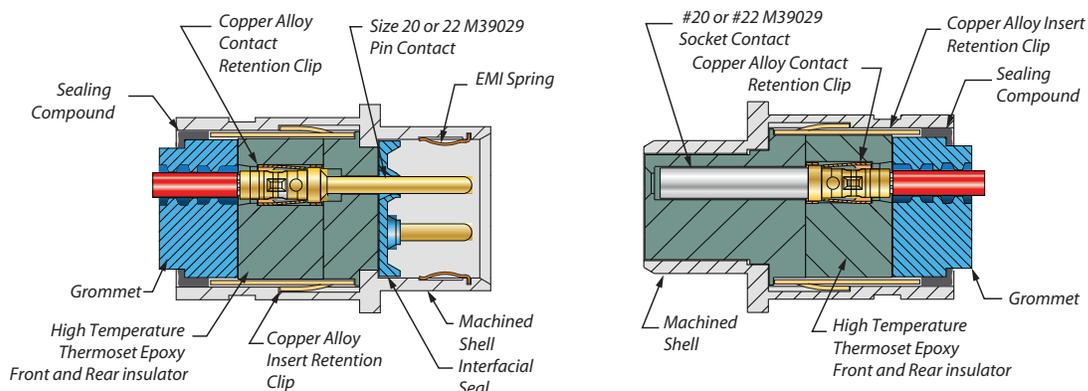
ADVANCED-PERFORMANCE HiPer-D Connectors

Space-grade M24308 intermateable

The HiPer-D connector is a M24308-type D-Subminiature connector with superior design features. Unlike standard M24308 connectors with stamped steel shells, the HiPer-D connector features a one-piece machined shell, 200°C continuous operating temperature rating and enhanced, mated shell EMI/RFI protection via an integrated ground spring. Aerospace grade fluorosilicone grommets and face seals (JAXA / NASA outgassing available) provide environmental protection. The HiPer-D is intermateable, intermountable and interchangeable with standard M24308 D-Sub connectors.

- Advanced temperature, vibration and EMC/ electrical performance
- 11 standard and 20 combo insert arrangements
- High temperature epoxy insulators
- Watertight sealing
- Rugged machined one-piece shell

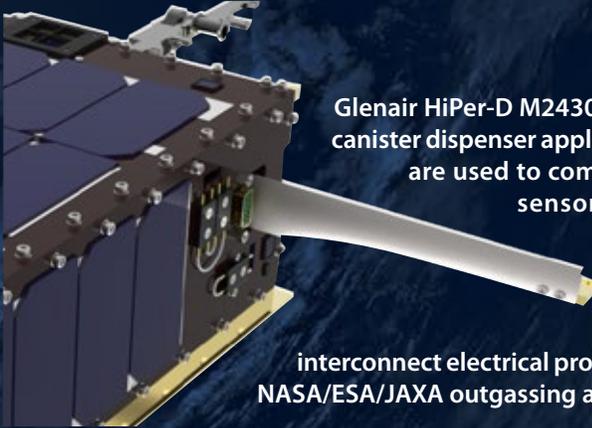
STANDARD AND HIGH DENSITY HiPer-D® - CUTAWAY



SERIES 28

HiPer-D Space Grade Connectors

Product features and specifications



Glenair HiPer-D M24308 D-sub connectors are ideally suited for CubeSat or NanoSat canister dispenser applications where rack and panel or connectorized wire assemblies are used to communicate with HDRMs, pin pullers, pin pushers, door status sensors, as well as system communications and testing prior to deployment of satellite equipment. Standardized usage of M24308 connectors on hardware interfaces simplifies interconnection and communication. Glenair HiPer-D space grade M24308 D-sub connectors eliminate potential interconnect electrical problems on mission critical systems. Connectors are supplied with NASA/ESA/JAXA outgassing and screening in accordance with NASA EEE-INST-0002.

HiPer-D High-Performance D-Sub vs. MIL-STD-24308		
Specification / Feature	M24308	HiPer-D
Temperature	-55°C to +125°C	-65°C to +200°C
Insulator	Thermoplastic	Thermoset Epoxy
Shell	Steel (Brass)	Aluminum (SST)
Voltage	1000 VAC	1000 VAC
Grounding	Dimples in shell (not in Mil-Spec)	Nickel-plated Copper Alloy EMI spring
Environmental	No	Yes
Vibration, sine	20 g	60 g
Vibration, random	N/A	43 g
Shock	50 g	300 g
Bolt-on backshells	No	Yes

HiPer-D M24308 COMBO-Ds for power, signal, and RF applications

- Size #8 power and 50 ohm or 75 ohm RF contacts
- Mixed layouts with #8's and #20's
- 200°C continuous operating temperature
- 20 tooled layouts
- Crimp and PC tail terminations

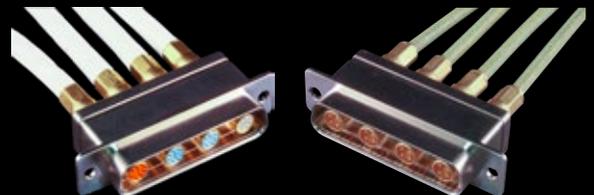


INTERCONNECT SHOWCASE

HIGH-SPEED HiPer-D HIGH-PERFORMANCE M24308

Crimp contact non-environmental connectors with #8 contacts for high-speed data transmission

- One-piece rugged machined aluminum shell
- Two to five size 8 Coax, Twinax, Quadrax or Ochito contacts
- Common ground plane (no insulators)
- Available in straight and right angle PCB versions





ESA Astronaut Alexander Gerst in the cupola of the International Space Station

Series 806 Mighty Mouse Mil-Aero Connectors



Advanced electrical, mechanical and environmental performance *plus reduced size and weight* compared to D38999

Series 806 offers significant size and weight savings while meeting key performance benchmarks for a broad range of applications such as commercial and military aerospace, industrial robotics, transportation systems and more. Designed for general use in harsh vibration, shock and environmental settings—as well as high-altitude, unpressurized aircraft zones with aggressive voltage ratings and altitude immersion standards—the Series 806 Mil-Aero features numerous mechanical design innovations including durable mechanical insert retention, radial seals and triple-ripple grommet seals. Its reduced thread pitch and re-engineered ratchet prevent decoupling problems, particularly in small shell sizes, solving one of the major problems of shell size 9 and 11 MIL-DTL-38999 Series III connectors.

- Next-generation small form factor aerospace-grade circular connector
- Designed for general use in harsh application environments such as aircraft, industrial robotics and more
- Upgraded environmental, electrical and mechanical performance
- Integrated anti-decoupling technology
- Higher density 20HD and 22HD contact arrangements
- Glass hermetic, lightweight aluminum hermetic, and filtered versions
- +200° C temperature rating

SAVE SIZE AND WEIGHT WITH SERIES 806 CONNECTORS

Series 806 Mil-Aero
Smallest Size
.500 In. Mating Threads
3 #20 Contacts or 7 #22 contacts



MIL-DTL-38999
Smallest Size
.625 In. Mating Threads
3 #20 Contacts or 6 #22 contacts



Product Features

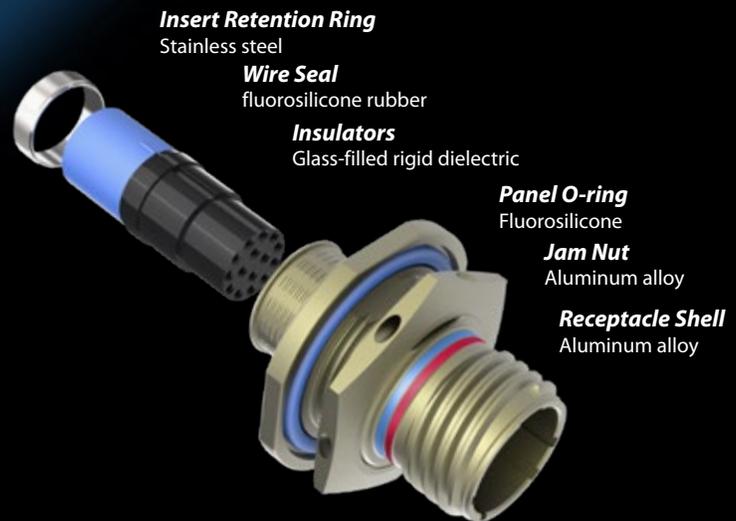
KEY FEATURES

- Next-generation high performance ultraminiature aerospace connector
- Reduced pitch triple-start 60° modified anti-decoupling stub ACME thread
- Higher density 20HD and 22HD contact arrangements
- +200°C operating temperature
- High strength 7075 alloy plug barrel
- “Triple ripple” wire sealing grommet (75,000 ft. rated)
- Snap in, rear release crimp contacts
- Metal contact retention clips
- Integral Nano-Band shield termination platform
- EMI shielding effectiveness per MIL-DTL-38999M para. 4.5.28 (65 dB min. leakage attenuation @ 10GHz)
- 10,000 amp indirect lightning strike
- 300g. shock
- MIL-S-901 Grade A high impact shock
- Aluminum and stainless steel versions
- Environmental crimp contact, glass-to-metal seal PC tail and solder cup hermetics, and EMI filter versions
- RoHS compliant nickel, nickel-PTFE, black zinc and stainless steel plus mil-grade cadmium finish options
- Printed circuit board versions with threaded flange

Plug Connector



Receptacle Connector



INTERCONNECT SHOWCASE



HIGH PERFORMANCE Series 791

The next-generation ultraminiature rectangular connector for demanding aerospace applications

Sometimes the simplest ideas are the best ideas. The Series 791 is a simple idea. Let's create a brand new class of connector – the ultraminiature rectangular. Let's combine the versatility of the Series 790 Micro-D type connector with the rugged features of our popular HiPer-D M24308 type connector. Let's add a unique dual lobe shell and let's recess the pins to eliminate the possibility of scooping damage. Let's add high speed datalink capability.

Originally designed for NASA's Orion project, the 791 is qualified for manned space flight. The 791's small size and blind mate capability make it a perfect choice for 2U and 3U electronics modules. Applications include radars, weapons systems, comms gear, satellites, exoatmospheric vehicles, avionics, power distribution units, instrumentation, and everywhere else in need of a smaller, higher performance interconnect system.



Polarized / keyed shells prevent mis-mating and allow designers to specify identical layouts side-by-side without risk of circuit damage

- Next-generation small form factor aerospace-grade rectangular connector
- Scoop-proof recessed pin contacts
- 37 arrangements, 12 shell sizes for the ultimate in versatility
- Rugged aluminum alloy dual lobe shell
- Environmental
- EMI shielded
- Blind mating



SERIES 791 MICRO-CRIMP

Next-generation ultraminiature rectangular for demanding aerospace applications

SPACE GRADE
NASA
ESA, JAXA
SCREENED

SERIES
791
SEVEN
NINETY-ONE



About The Series 791

The Series 791 is an aerospace-grade ultraminiature rectangular connector with EMI protection and environmental sealing. Originally developed for NASA's Orion capsule, The 791 is qualified for manned space flight and is ideal for radars, weapons systems and avionics gear.

The Series 791 is available either with crimp pins or with printed circuit terminals. Machined aluminum alloy shells feature dual lobes for polarization. Contact sizes range from size 8 to size 23 in 37 arrangements. Pin contacts are recessed to prevent scooping damage while mating. Crimp contacts conform to M39029 requirements and are rear release.

An optional ground spring reduces susceptibility to EMI problems. Fluorosilicone face seals and wire grommets prevent moisture and contamination. Panel mount versions are available with an O-ring, or for improved panel bonding, a metal spring.

Board mount versions include straight or right angle terminals. Right angle PCB connectors feature an aluminum shroud covering the terminals.

Hardware options include screwlocks, jackscrews or guide pins for blind mate applications.

Save Size and Weight with Series 791 Connectors

The Next Generation Ultraminiature Rectangular Connector for Demanding Aerospace and Defense Applications



M-17P17 with size 16 contacts

- Two to 102 contacts
- Coax, twinax, quadax and Ochito octaxial contacts
- Rugged aluminum shell with dual polarizing lobes



Shell size A – the smallest 791

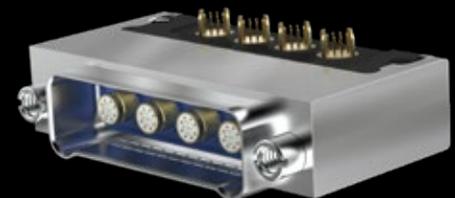
- Integral band platform for direct attachment of cable braid
- -65°C to +150°C
- Panel mount versions with O-ring or EMI spring



- 37 contact arrangements
- Crimp-and-poke or epoxy-sealed board mount versions
- Scoop-proof recessed pins
- Size 23, 16, 12 and 8 contacts



- Straight and right angle printed circuit board mounting
- 12 shell sizes
- Guide pins for blind mate modules



- Contacts meet SAE AS39029 requirements
- Internal ground spring for EMI protection
- Approved for manned space flight

INTERCONNECT SHOWCASE



Glenair Sav-Con's protected the umbilical connectors on every Space Shuttle mission

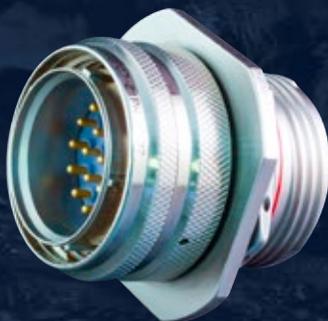


SAV-CON[®]

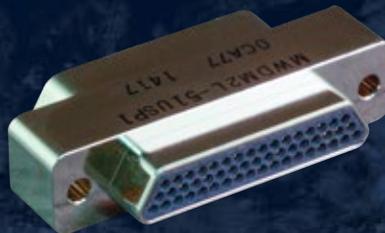
Connector Savers and Bulkhead Feed-Thrus

The smart solution for preventing contact damage and extending the service life of cable assemblies and box and panel-mount receptacles

- Sav-Con[®]s for every Military Standard connector—circular and rectangular
- Hundreds of successful space launch and space flight applications
- Glenair Sav-Con[®]s on board every Space Shuttle mission flown
- Bulkhead feed-thrus for environmental, filter and hermetic applications
- Pin/pin, pin/socket, and socket/socket versions
- Traditional plug-receptacle savers, as well as in-line versions and gender changers
- Available EMI/EMP filter savers and adapters
- Optional locking mechanism



Series changers and gender changers available in both Sav-Con[®] and bulkhead feed-thru configurations



circular and rectangular configurations available including hermetic and EMI/RFI filter configurations

HIGH-PERFORMANCE CONNECTOR GO-BETWEENS

Sav-Con® Connector Savers and Bulkhead Feed-Thrus



Each Glenair Sav-Con® Connector Saver meets the military specification performance requirements of its mating connector. Glenair manufactures and supplies a Sav-Con® connector saver for every military standard connector currently in use including:

- MIL-DTL-26482 Series I and II
- MIL-DTL-28840
- MIL-DTL-38999 Series I, II and III
- MIL-DTL-83723
- LN 29729 (SJT)
- PATT 105 and PATT 602
- MIL-DTL-5015
- Series 801 and 805 Mighty Mouse
- Series 89 Nanominiature
- M24308 D-Subminiature
- MIL-DTL-83513 Micro-D Subminiature
- Series 28 HiPer-D M24308 intermateable
- Series 79 Micro-Crimp

Comprehensive materials, plating, and polarization options available

TRADITIONAL PLUG-RECEPTACLE SAV-CON® CONNECTOR SAVERS



MIL-DTL-38999 series III type



Series 89 Nanominiature rectangular

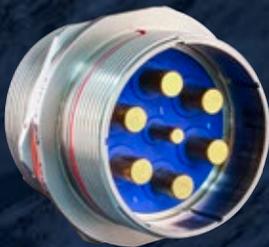


MIL-DTL-38999 series II bayonet-coupling saver



Series 80 Mighty Mouse Sav-Con®

BULKHEAD FEED-THRUS



Special high-voltage power bulkhead feed-thru



Special wide panel accommodation Mighty Mouse bulkhead feed-thru



MIL-DTL-5015 bulkhead feed-thru

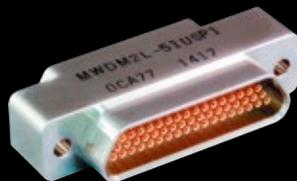


Special non-cadmium plating classes

SPECIAL-PURPOSE ADAPTERS AND SAVERS



EMI/RFI filter Sav-Con® adapter (D38999 Series III type shown)



Rectangular EMI/RFI filter Sav-Con adapter (MIL-DTL-83513 type shown)



Power distribution connector savers (MIL-D-5015 type shown)



INTERCONNECT SHOWCASE



NASA's STEREO
(Solar TErrestrial RElations Observatory),
artist's concept

SuperNine®

Blind-Mate Connectors

Rack and Panel Sealed, Assisted Kick-off and Feed-Through Blind-Mate to D38999



Application: Glenair Series 253 connectors are designed to meet applicable environmental, electrical and mechanical performance characteristics of D38999 Series III. The technology is well suited for use in commercial blind-mate instrumentation panels, satellite deployment, scientific research and development payloads, as well as interstage, UAV, and munitions release applications.

- Blind-mate, float mount interconnects for non-ITAR commercial as well as military/defense applications
- Optional assisted release (spring force) solutions to overcome pin/socket engagement force
- Panel-mount versions feature self-aligning float-mount technology for repeatable mating and de-mating
- Available in most symmetrical MIL-STD-1560 insert arrangements with contact sizes from #23 to #12
- Selected materials offer low outgassing properties and high resistance to both corrosion and stress corrosion cracking
- Optional outgassing bake-out process available
- Designed to withstand the rigors of launch and flight—including shock, vibration, thermal vacuum, acceleration, and temperature extremes
- Standard accessory threads and teeth per MIL-DTL-38999 accommodate a wide range of backshell accessories

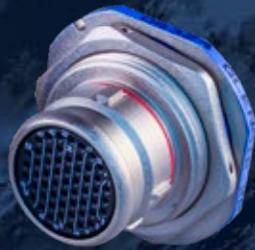
Current Rating	
Size Contact	Amps
23	5
22D	5
20	7.5
16	13
12	23

Unmated Test Voltages, AC RMS, 60 Hz				
Altitude (Feet)	Service Rating M	Service Rating N	Service Rating I	Service Rating II
Sea Level	1300	1000	1800	2300
50,000	550	400	600	800
70,000	350	260	400	500
100,000	200	260	200	200

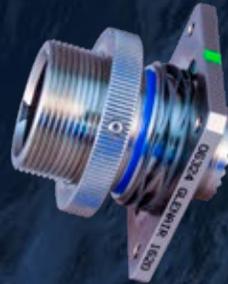
Space-grade blind-mate

Float-mount and assisted-release connectors

CRITICAL MECHANICAL FEATURES OF BLIND-MATE CONNECTORS WITH ASSISTED SEPARATION FORCE (ASF) AND MISALIGNMENT ACCOMMODATION



Roll-off nose: allows for the smooth disconnection of a blind mate connector. Without this feature, connectors can catch or hang during mate and demate.



Misalignment accommodation: Radial, axial, and angular misalignment in blind-mate applications is resolved in the receptacle design with mechanical float mounting and integral wave form springs.



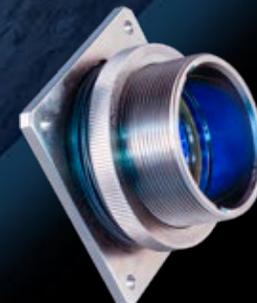
Sealing: Integrated misalignment accommodation makes environmental sealing difficult in blind mate circulars. Glenair SuperNine® blind-mate and assisted release connectors are available with auxiliary exterior seals.



EMI shielding: Glenair blind-mate circulars are available with auxiliary ground springs on receptacles, and ground fingers on plugs (shown), to optimize 360° shell-to-shell continuity.



Assisted separation: Spring-loaded kick-off posts are designed to overcome contact separation force (normal force) with adjustable flange-mounted springs. Separation force may be calibrated IAW application requirements and insert arrangement.



Assisted separation: Adjustment ring on receptacle shells provides reliable and repeatable calibration of assisted separation force. The adjustment ring interfaces directly with the spring-loaded kick-off posts on the plug. A set screw fitting locks the ring in place after adjustments have been made.

PRODUCT SELECTION GUIDE

Available non-ITAR rack-and-panel blind-mate and zero separation force solutions		
Basic Part No.	Description	Mates With
253-014	Float-mount plug with roll-on roll-off nose, environmental crimp contact	253-015
253-015	Float-mount receptacle with optional auxiliary seal and misalignment accommodation, environmental crimp contact	253-014
253-016	Float-mount plug with roll-on roll-off nose and spring-assisted release, environmental crimp contact	253-017
253-017	Float-mount receptacle with spring-assisted release and misalignment accommodation, environmental crimp contact	253-016
253-018	Bulkhead feed-thru with optional threaded plug or jam nut receptacle side IAW MIL-DTL-38999 Series III	253-019
253-019	Blind mate float mount jam nut receptacle with misalignment accommodation	253-018
253-033	Blind mate float mount jam nut receptacle and MIL-DTL-38999, series III feed-through with misalignment accommodation	253-018 and 38999

Also available: consult factory for specifications and how-to-order information		
Basic Part No.	Description	Mates With
253-022	Hermetic, blind mate receptacle	253-015
253-027-07	Blind mate PC tail receptacle with threaded standoff	253-015

SPACE-RATED

Lanyard-Release Quick-Disconnect Connectors

For mission-critical disengagement and release of launch and payload systems

Mil-standard 1760 lanyard-release connectors were originally developed for carriage stores management applications including weapons, pods, and drop tanks. Incorporating a common electrical interface as well as interfacing signals and pin and circuit assignments, lanyard-release connectors of this type are broadly employed for reliable, jam-free mating and disengagement. Space-rated versions of 1760 class cylindrical connectors take advantage of the technology's legacy in harsh-duty aircraft applications to ensure reliable and predictable performance in space. From fail-safe application in space station and space telescope deployment to rack-and-panel research equipment interconnection, these rugged axial-pull lanyard connectors deliver proven performance in accordance with all applicable NASA, ESA, and JAXA standards. Available in a wide range of connector packaging, from MIL-DTL-38999 SuperNine® to AS81703* and special small form-factor designs, these proven-performance interconnection devices may be equipped with standard signal or power contacts as well as shielded high-speed coax, twinax, and quadrax.



AS81703 space-grade lanyard release push pull mated pair with special order band and boot platform

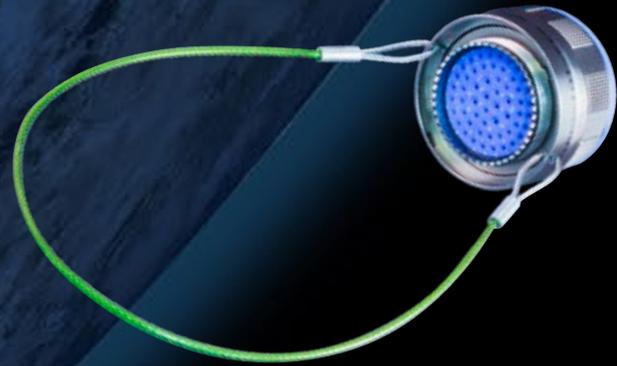
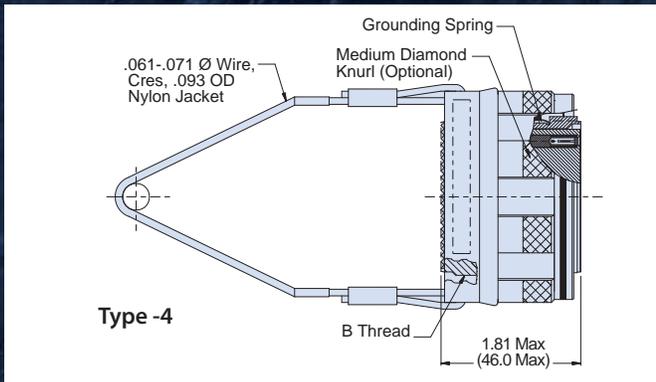
- Jam-free, push on/pull off technology
- Reliable fail-safe axial pull lanyard equipped coupling
- Instant disengagement for critical quick-release systems
- Manufactured IAW MIL-STD-1760
- Special umbilical buffers and go-betweens also available
- Blind-mate rack-and-panel versions available
- Qualified for military and space application
- Outgas processing IAW NASA, ESA and JAXA

SPACE-GRADE Lanyard-Release Quick-Disconnect Connectors



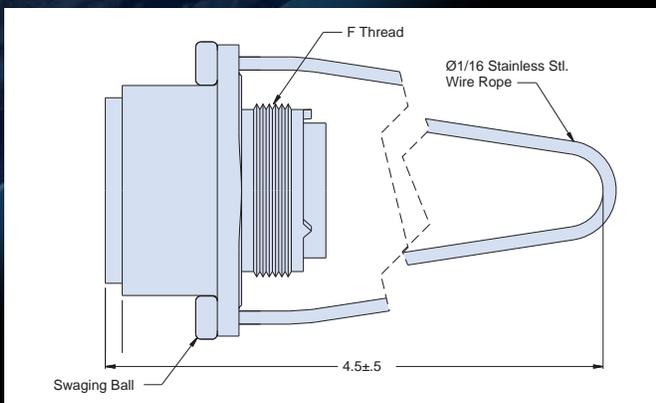
How To Order SuperNine® 233-216 MIL-DTL-38999 Type

Sample Part Number	233-216	-G6	ME	25-35	S	A	E	-4
Series / Basic Part No.	233-216 = Lanyard Release Plug							
Connector Style	G6 = Plug with EMI Spring							
Finish	ZL = Cres, Electrodeposited Nickel Z1 = Cres, Passivated ME = Al Alloy, Electroless Nickel							
Size and Arrangement	Per MIL-STD-1560 plus high density							
Contact Type	P = Pin S = Socket; 500 cycles							
Alternate Key Position	A, B, C, D, E, N = Normal (Per MIL-DTL-38999 Series III)							
Lanyard Length Code	See Lanyard Length Table							
Connector Type	4 = Type 4 (shown below, no accessory threads) 6 = Type 6 (not shown, includes accessory threads)							



How To Order 253-020 AS81703* Type Push-Pull Lanyard Release

Sample Part Number	253-020	-08	ME	25-35	S	N	812
Series / Basic Part No.	253-020 = AS81703 Type						
Connector Style	08 = Push-Pull Lanyard-Release Plug						
Finish	ZL = Cres, Electrodeposited Nickel Z1 = Cres, Passivated ME = Al Alloy, Electroless Nickel						
Size and Arrangement	Per AS81703						
Contact Type	P = Pin S = Socket						
Alternate Key Position	N, W, X, Y, B, C						
Lanyard Ring Mod Code	812 = Lanyard ring rotated 90° from master keyway Omit for standard ring						

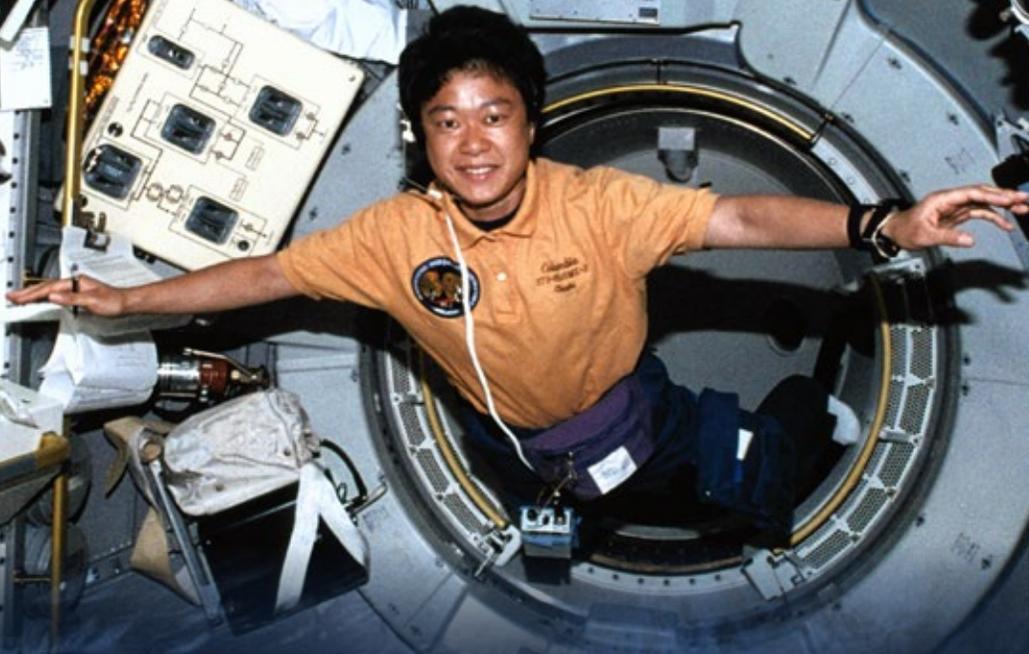


*The MIL-C-81703 standard was superseded by SAE-AS81703 10-December 2010 per Navair

INTERCONNECT SHOWCASE



Dr Chiaki Mukai is a cardiovascular surgeon and JAXA astronaut, the first Japanese woman in space



CIRCULAR AND RECTANGULAR Backshells and Connector Accessories

Corrosion resistance, weight reduction,
environmental durability and design innovation

Nowhere in the world does anyone manufacture and supply such a complete selection of backshell connector accessories—for space as well as all other mission-critical applications. In addition to traditional metal materials, Glenair also manufactures an extensive line of lightweight, corrosion-free composite thermoplastic interconnect components ideally suited for systems requiring electromagnetic compatibility, long-term durability and weight reduction.



- High-performance connector accessories for every environmental, mechanical and electromagnetic shielding requirements
- Qualified to AS85049, SSQ 21635, 21636, 22698 and 22681 and other standards and specs
- EMI shield termination, cable strain relief, connector protective covers and more
- Lightweight composite versions
- QPL'd AS85049 backshells
- Tens of thousands of popular part numbers in inventory ready for same-day shipment



The Glenair Qwik-Clamp connector accessory shown here is used on the International Space Station. This gold plated part is extremely resistant to space corrosion and radiation and is designed with all smooth surfaces to eliminate potential damage to space suits.

SPACE-GRADE INNOVATIONS

Circular and rectangular backshells and connector accessories

COMPOSITE DESIGN INNOVATION RADICALLY REDUCES INTERCONNECT SYSTEM WEIGHT



Band-in-a-Can composite backshell



Composite Swing-Arm with keyed drop-in banding insert



All-in-one booted "Piggyback" backshell



Isolated conductive ground path

SPACE-GRADE MICRO-D AND D-SUB BACKSHELLS AND ACCESSORY HARDWARE



Solid shell, lightweight aluminum



Solid shell, ultra-lightweight composite



Solid shell, trapezoidal, low-profile flange, lightweight aluminum



Solid shell, standard flange, lightweight aluminum



Split shell, standard and extended shroud

BACKSHELL INNOVATION SHOWCASE



TAG-Ring/Qwik-Ty® Feed-Through Fitting



Spring-Loaded "Flop-Lid" Protective Cover



Special Space Grade Rectangular Backshell



Ultra Low-Profile Backshell



Series 437-001 Backshell "Connector Saver"



Environmental Protective Covers



Mighty Mouse composite EMI/RFI banding backshell



High-Performance Banding Backshell

INTERCONNECT SHOWCASE