Glenair®

High-Performance Micro-D Connectors and Cables

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Fourth Edition • February 2011

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High-Performance Micro-D Connectors and Cables
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CAGE Code 06324

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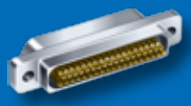
Product Selection Guide

High-Performance Micro-D Connectors and Cables

B — Micro-D в металлическом корпусе для стандартных применений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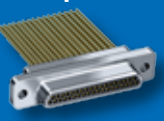
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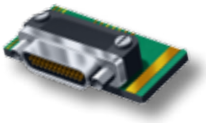
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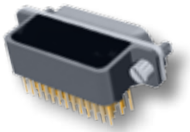
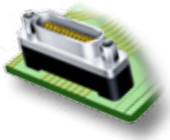

GMR7590C **C-32**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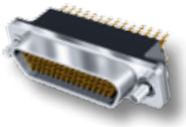
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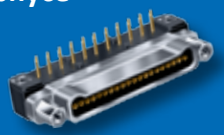
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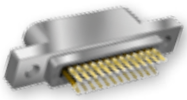
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Plastic Shell Solder Cup **E-15**


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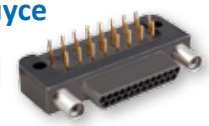
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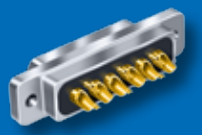
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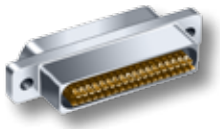
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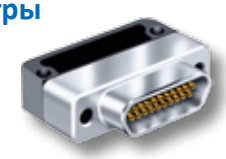
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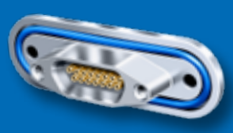
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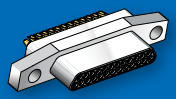
Product Selection Guide

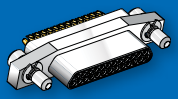
High-Performance Micro-D Connectors and Cables

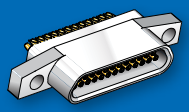
Micro-D Well-Master™ 260 высокотемпературные

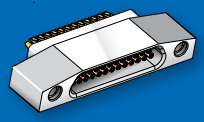

Pin (Plug)
PCB Header **J-1**


Socket (Receptacle
Cable Connector **J-1**


Pin (Plug)
Solder Cup **J-2**


Pin (Plug) with
Jackscrews **J-2**


Socket (Receptacle)
Thru-Hole Mtg. **J-3**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J

Micro-D Специальные приложения и модификации


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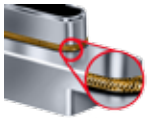
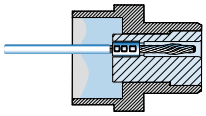
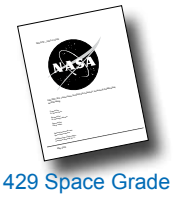

Mod 497 Ground Spring **K-4**

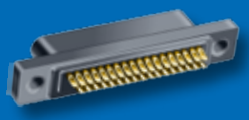

Mod 428 200°C **K-5**

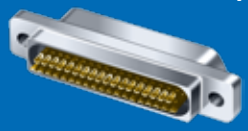


Mod 429 Space Grade **K-6**

K

MIL-DTL-83513 разъемы и аксессуары


Plastic M83513 **L-8**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Hardware **N-8**


Switching Shells **N-3**


Face Seals **N-4**


Plastic Covers **N-4**


Metal Covers **N-5**


Rubber Covers **N-7**

N

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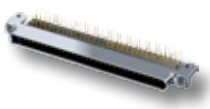
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P

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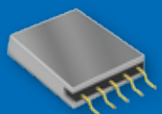
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Q

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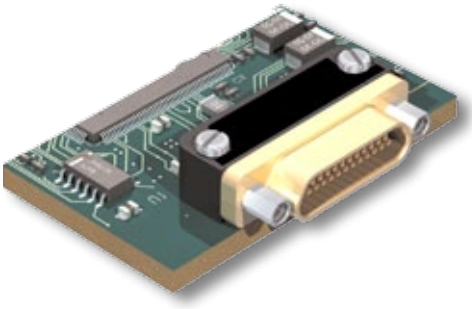


Six Reasons

to Select a Glenair High-Performance Micro-D Connector...

1 Recognized performance standards.

Every element of the MIL-DTL-83513 Micro-D is exactly controlled—from terminal spacing to approved wire termination methods. The military standard defines contact resistance, dielectric withstanding voltage, corrosion resistance, shock and vibration tolerances and a wide range of other electrical, mechanical and environmental performance standards. Standardized measurement and test methodologies ensure consistent, predictable performance throughout this broad family of ruggedized, miniature connectors.

2 Proven reliability under tough operating conditions.

For applications where interconnect failure is simply not an option, the Glenair high-reliability Micro-D offers a wealth of performance benefits which far outweigh any potential cost savings realized by specifying a lesser caliber connector. If downtime is a critical concern, other connectors cannot match the long-term durability and performance advantages of the MIL-DTL-83513 Micro-D, which include:

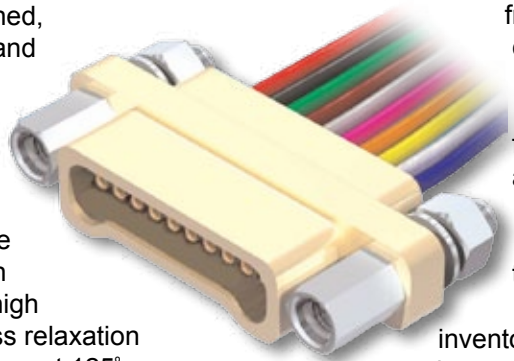
- Higher current ratings
- Lower circuit resistance
- Superior vibration and shock
- Optimized EMI/RFI shielding
- Broader operating temperature
- Better damage resistance
- Enhanced corrosion resistance
- Better contact retention
- Better environmental sealing

3 The flexibility of easy customization.

Manufacturers of satellite communications systems, geophysical exploration devices, medical diagnostics and industrial equipment face many of the same packaging requirements for reduced size, weight and shape as do their military counterparts. And the ability to design-in a wide range of custom modifications which fit the unique packaging requirements of these specialized applications is a distinct advantage of the Glenair Micro-D —making it the connector of choice for many unique or small quantity applications.

4 Advanced, high temperature tolerance.

Heat from electrical or environmental sources can soften mated contacts over time and reduce contact retention force. Under extreme conditions of shock and vibration this loss of normal retention can result in unstable resistance across the interconnect. This is the case for all types of contacts—machined, drawn, stamped and twisted. But materials selection, fabrication and heat treating techniques enable Glenair's TwistPin contact to resist high temperature stress relaxation for up to 1000 hours at 125° C and thus perform at levels unmatched by other contact designs.



5 Trouble-free mating and un-mating.

Glenair has perfected a nickel underplating combined with a proprietary duplex gold overplating which provides optimal contact lubricity (anti-galling) and effectively eliminates the oxidation common to copper flash underplating. Glenair's advanced plating process contributes to the overall durability of the connector by reducing contact engaging and separating forces. Glenair 100 contact Micro-D connectors have been successfully tested to 25,550 mating cycles (test report ER1010) proving the durability of the Glenair plating process.

6 Fast Turnaround and Same-Day Availability.

Are the Micro-D connectors and accessories you need either in stock or able to be manufactured in a short period of time? Glenair has built its reputation on fast turnaround and can deliver TwistPin products—from discrete connectors to complete assemblies—faster than anyone else in our business. We maintain the world's largest inventory of Micro-D connectors and accessories, all available for immediate shipment with no quantity or price minimums.

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Not All Micro-D's
Are Created Equally

The MIL-DTL-83513 and MIL-DTL-32139 specifications define the minimum acceptable performance levels for Micro-D and Nanominiature connectors. While the specs are rigid in their performance benchmarks, manufacturers are given considerable leeway when it comes to contact design, crimp fabrication, contact finish and material selection. Stamped and formed contacts, for example, are widely used in Micro-d connectors due to their low-cost and ease of manufacture. But independent testing clearly shows that TwistPin style contacts provide superior performance in such areas as high temperature tolerance, contact retention and crimp strength. If you have already made the decision to use either a Micro-D or Nano sized connector because its ruggedized performance outweighs the potential cost-savings realized in a lesser-caliber connector, then you owe it to yourself to understand the very real differences between stamped pins and the Glenair TwistPin Contact System.

Split-Tine Contact Systems

The socket contact is made by machining a copper alloy tube, then cutting a longitudinal slot. The contact is then crimped to bend the tines together. The smallest split tine contact systems are used in connectors with .075 inch spacing. The TwistPin offers improved vibration performance and higher contact density.

M39029 Split Tine Contact System

Two Reasons to Choose TwistPins

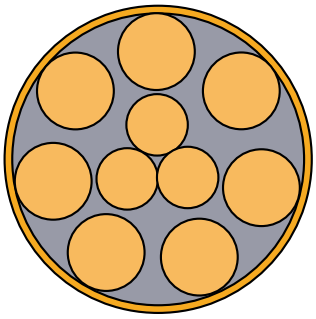
This unretouched photograph shows important differences between the TwistPin and stamped pins.

1 A Better Crimp Joint

Micro-D connectors are factory-terminated to wire. Board mount and insulated wire pigtails have crimp joints where the wire attaches to the contact. Micro-D crimp joints are concealed with epoxy potting. The Micro-D is unique among high reliability mil spec connectors because the mil spec allows stamped crimp barrels and does not specify that the crimping process must use mil spec crimp tools. The thin sheet metal in the stamped pin cannot produce a satisfactory gas-tight crimp joint, so spot welding is required to reduce the chance of failure.

2 A Stronger Front End

Both types of contacts meet the requirements of MIL-DTL-83513. But only the TwistPin offers a stronger front-end with its seven points of contact, high normal force and better resistance to vibration.



Seven Points of Electrical Contact

The TwistPin size #24 contact has seven strands of BeCu wire surrounding three filler strands . Each strand makes contact with the socket, assuring low resistance, plenty of contact wipe, and excellent shock and vibration performance.

The Glenair TwistPin Contact

MicroPin

NanoPin

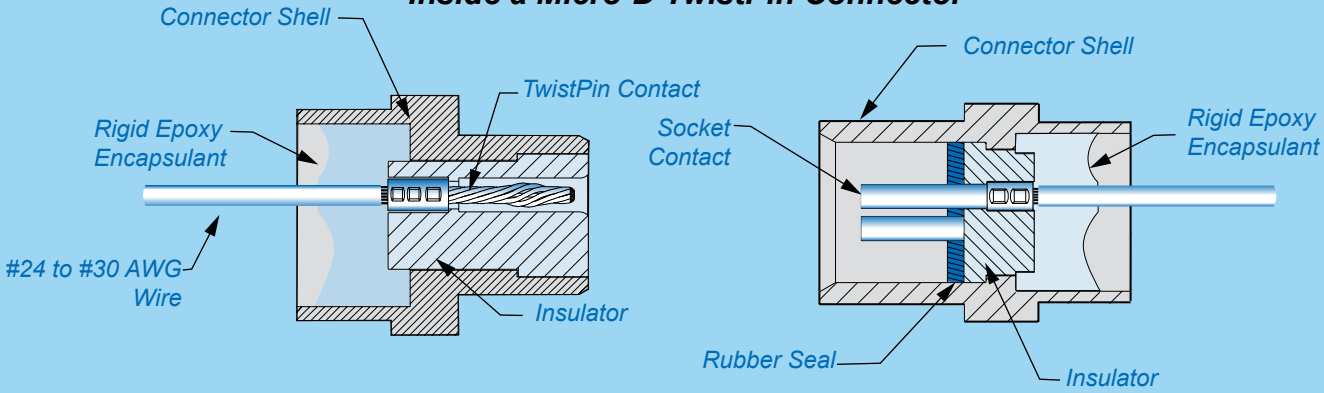
At-a-Glance

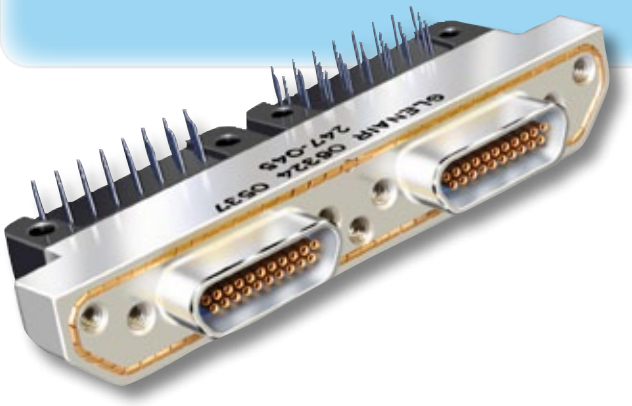
Question:
Why choose a TwistPin connector?

Answer: Design Flexibility and Reliable Performance

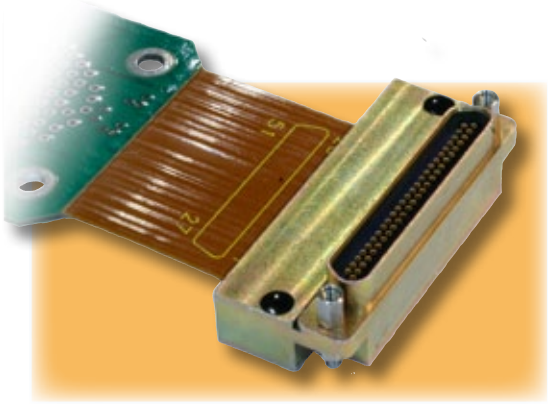
If reliability and performance were the only considerations in the design of a micro contact system, everyone would opt for a TwistPin contact and a machined socket and crimp sleeve. But cost and ease of manufacture are significant issues as well, which is why stamped and formed contacts, as well as split-tine M39029 contacts, are still widely used. The Glenair TwistPin Contact System provides a superior wire attachment which translates to lower contact resistance—and it does so under extreme conditions of vibration, shock and high heat. An additional key benefit of the TwistPin contact is the ease of designing a custom package to fit your exact needs. The precision machined components can be readily integrated into a wide range of connector package envelopes.

Inside a Micro-D TwistPin Connector





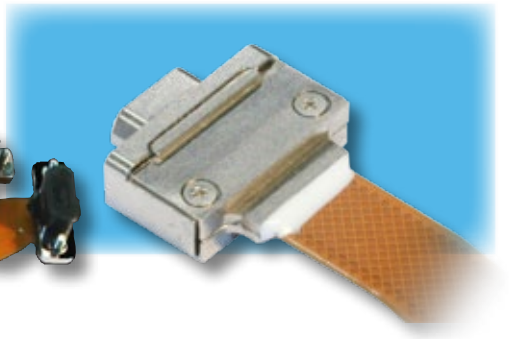
TwistPin Contacts
The TwistPin contact is made with a bundle of beryllium copper wires welded at the tip to form a semispherical radius and "bulged" to create a spring.

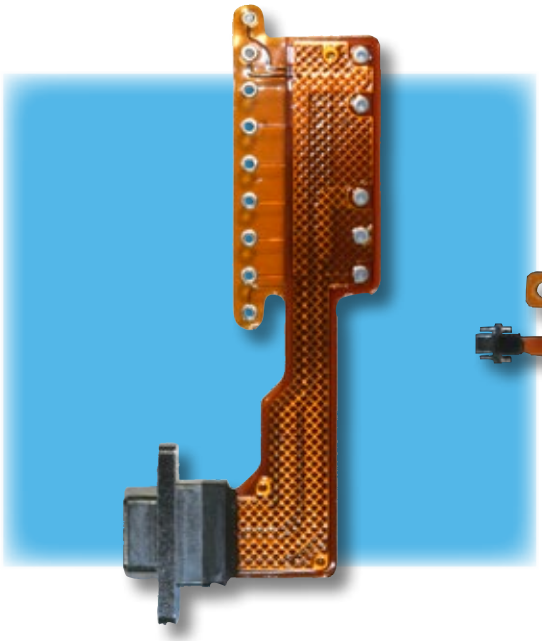


Four Reasons
to Select Glenair for Your Next Micro/Nano Flex Circuit Project

1 Unsurpassed Experience in Micro/Nano Flex Circuit Production

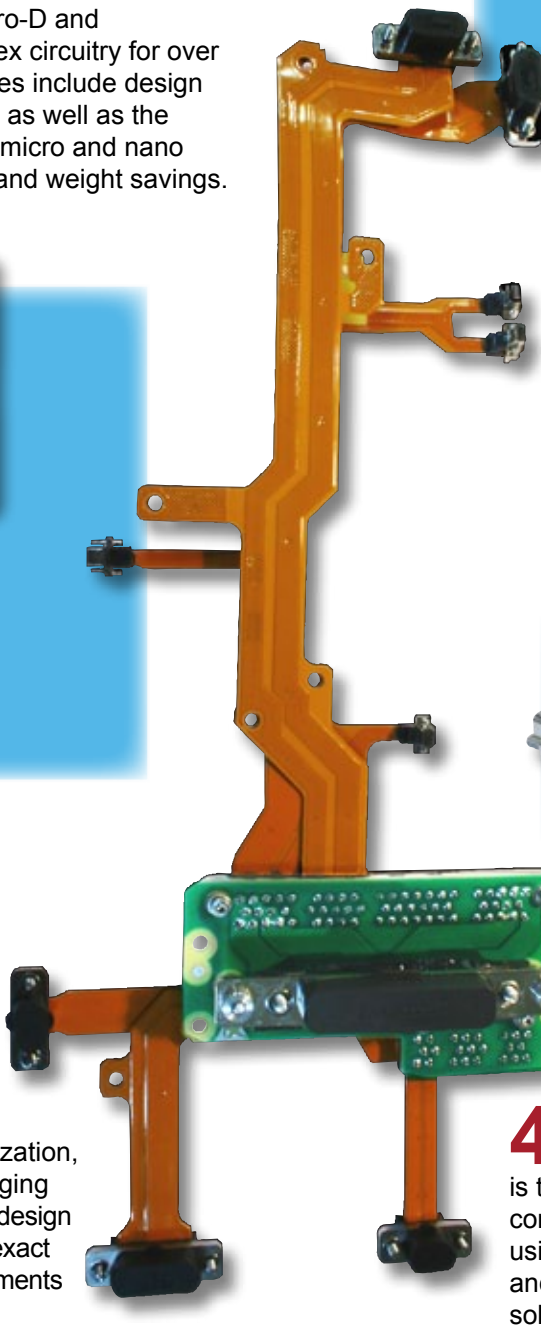
Glenair has been integrating Micro-D and Nanominiature connectors into flex circuitry for over 30 years. Our technical capabilities include design and layout of turnkey assemblies as well as the production of custom-configured micro and nano interconnects for maximum size and weight savings.





2 Full Spectrum Product Offering

Glenair offers a complete range of miniaturized printed circuit board connectors with high-reliability TwistPin contacts. We supply both through-hole and surface mount designs in every angle and mounting style for integration into single-sided, double-sided and multilayered flex circuitry.



3 Application Design

Our turnkey Micro-D and Nanominiature flex circuit assemblies are produced to exacting specifications. Customer-supplied designs are reviewed and revised to insure the most advantageous utilization of EMI shielding, polarization, strain-relief and connector packaging technologies. At Glenair, the final design solution is optimized to meet the exact mechanical and electronic requirements of the application environment.

4 Termination Expertise

Glenair's experienced workforce is trained and qualified to produce consistently reliable circuit terminations using the most advanced techniques and technologies, including automated solder reflow systems.

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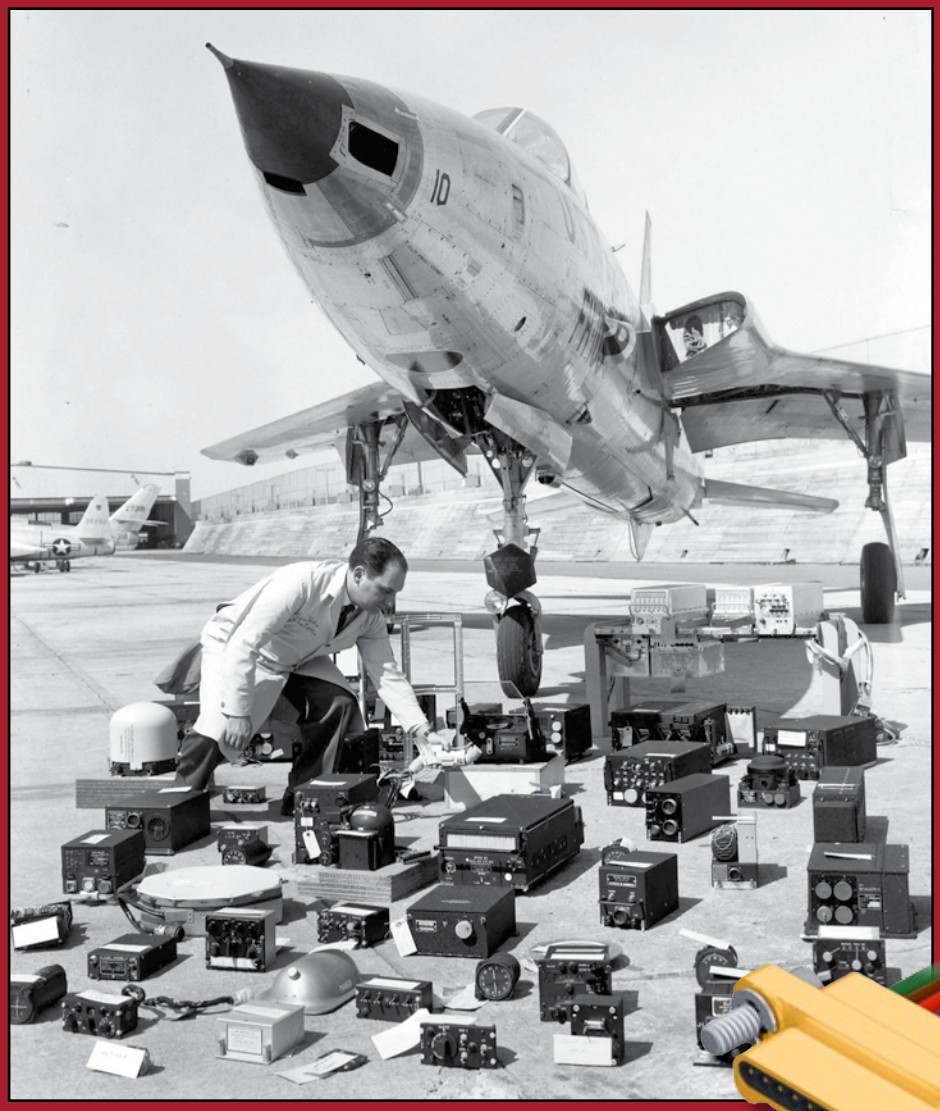
Aircraft On Ground?

Need a Connector Now?

Glenair Micro-D's In Stock!



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MICRO-D STANDARD MATERIALS AND FINISHES	
Connector Shell, Metal	**Aluminum Alloy 6061 In Accordance With SAE AMS-QQ-A-250/11:** Plating Code 1: Cadmium With Yellow Chromate Conversion Coating in Accordance With SAE-AMS-QQ-P-416, Type II, Class 3 Plating Code 2: Electroless Nickel In Accordance With ASTM B733 Plating Code 4: Black Anodize In Accordance With MIL-A-8625 Type II Class 2 Plating Code 5: Gold Plated In Accordance With ASTM B488 Over Electroless Nickel In Accordance With ASTM B733-90. Plating Code 6: Chem Film In Accordance With MIL-C-5541 Class 3 **Stainless Steel, 300 Series:** Plating Code 3: Passivated In Accordance With SAE AMS 2700
Connector Shell, Plastic	Liquid Crystal Polymer, 30% Glass-Filled, In Accordance With MIL-M-24519
Insulator	Liquid Crystal Polymer, 30% Glass-Filled, In Accordance With MIL-M-24519
Interfacial Seal	Fluorosilicone Rubber In Accordance With A-A-59588
Terminal Block, PCB	Liquid Crystal Polymer, 30% Glass-Filled, In Accordance With MIL-M-24519
Pin Contact (TwistPin)	Beryllium Copper, Gold Plated In Accordance With ASTM B 488 Type II Class 1.27 (50 Microinches Minimum) Code C, Over Nickel Underplate In Accordance With SAE AMS-QQ-N-290, Class 2, (30-150 Microinches).
Socket Contact	Phos Bronze In accordance With ASTM 139 Gold Plated In Accordance With ASTM B 488 Type II Class 1.27 (50 Microinches Minimum) Code C, Over Nickel Underplate In Accordance With SAE-AMS-QQ-N-290, Class 2, (30-150 Microinches).
Encapsulant (Potting)	Epoxy Resin, Hysol EE4215/HD3561
Jackscrews, Jackposts, Float Mounts	Stainless Steel, 300 Series, Passivated In Accordance With SAE AMS 2700
Pigtail Wire, Insulated Hookup	Wire Type E: Silver-Coated Copper Wire, Extruded PTFE Insulation, 600 Volts RMS, 200°C., In Accordance with NEMA HP3 (Replaces MIL-W-16878/4) Wire Type K: Silver-Coated Copper Wire, Extruded PTFE Insulation, 600 Volts RMS, 200° C., In Accordance with SAE AS 22759/11 Wire Type J: High-Strength Silver-Coated Copper Alloy Wire, Crosslinked Modified ETFE Insulation, 600 Volts RMS, 200° C., In Accordance with SAE AS 22759/33
Pigtail Wire, Uninsulated	Wire Finish Code 3: Solid Copper Wire In Accordance With A-A-59551, Gold-Plated, Solder Dipped in 63/37 tin-lead Wire Finish Code 4: Solid Copper Wire In Accordance With A-A-59551, Gold-Plated

MICRO-D PERFORMANCE SPECIFICATIONS

1 **SCOPE**

1.1 **Scope**. This specification covers performance requirements for Glenair Micro-D connectors manufactured in accordance with MIL-DTL-83513F.

1.2 **Description**. MWD plastic and MWDM metal shell Micro-D connectors on .050 inch (1.27 mm) centers, with TwistPin contacts.

2 **ORDER OF PRECEDENCE**

2.1 **Order of precedence**. In the event of a conflict between the requirements of this specification and the references cited herein, this document takes precedence.The requirements set forth in customer specifications and Glenair detail drawings shall take precedence over this document.

3 **REQUIREMENTS**

3.1 **Electrical performance requirements**.

3.1.1 **Insulation resistance**. 5,000 megohms minimum between any pair of contacts and any contact and the shell when tested in accordance with EIA-364 Procedure 21, which specifies 500 volts DC.

3.1.2 **Dielectric withstanding voltage**.

3.1.2.1 **Dielectric withstanding voltage (sea level)**. 600 volts ac, rms 60 Hz. Connectors shall show no evidence of breakdown or flashover when subjected to the DWV test of EIA-364 Procedure 20.

3.1.2.2 **Dielectric withstanding voltage (70,000 feet).** 150 volts ac, rms 60 Hz. Connectors shall show no evidence of breakdown or flashover when subjected to the DWV test of EIA-364 Procedure 20.

3.1.3 **Contact resistance**

3.1.3.1 **Contact resistance (M83513 Group C qualification)**. The voltage drop of a mated pair of contacts attached to wires shall not exceed the values shown when tested in accordance with MIL-DTL-83513F Paragraph 4.5.8, using 2.5 amps test current.

Wire	Voltage Drop (mV)
M22759/11-26	65 Maximum
M22759/33-26	75 Maximum
A-A-59551 25 gage	60 Maximum

3.1.3.2 **Contact resistance (lot acceptance testing)**. The voltage drop across a mated pair of contacts shall not exceed 8 millivolts when tested in accordance with EIA-364-06, using a test current of one ampere ± 2%. If the connector under test is wired, the calculated resistance across the contacts shall not exceed 8 milliohms when the maximum specified wire resistance per foot is subtracted from the total resistance.

3.1.4 **Low signal level contact resistance**. When tested with a micro-ohmeter using a test current of 100 milliamperes maximum and 20 millivolts open circuit maximum, the resistance of a mated pair of contacts shall be 32 milliohms maximum. Test procedure shall be in accordance with EIA-364-23.

3.1.5 **Contact Current Capability**. Contacts shall be capable of carrying 3.0 amperes in continuous duty operation from -55° C. to +150° C. when tested in accordance with EIA-364-70.

3.1.6 **Shell-To-Shell Conductivity**. A mated pair of nickel-plated metal shell Micro-D connectors fitted with an optional grounding spring on the plug shell mating face, shall not exceed 10 millivolts maximum voltage drop when tested in

accordance with EIA-364-83.

3.1.7 **Shielding Effectiveness**. A mated pair of metal shell Micro-D connectors fitted with an optional grounding spring on the plug shell mating face shall meet a requirement of 65 dB minimum attenuation when tested in accordance with EIA-364-66.

3.1.8 **Magnetic Permeability**. Magnetic permeability, when tested in accordance with EIA-364-54, shall not exceed 2 mu.

3.2 **MECHANICAL REQUIREMENTS**

3.2.1 **Contact engaging and separation force**. Maximum engaging force shall be 6.0 ounces when tested in accordance with EIA-364-37, except with a .0221 ± .0001 diameter sleeve with a 6-10 microfinish. Minimum separation force shall be 0.5 ounces when tested in accordance with EIA-364-37, except with a .0230 ± .0001 diameter sleeve with a 6-10 microfinish.

3.2.2 **Connector mating and unmating force**. The maximum mating and unmating force shall not exceed a value equal to 10 ounces times the number of contacts, when tested per EIA-364-13. Mate connectors three times before initial measurements are taken.

3.2.3 **Contact Retention**. Contacts, when tested in accordance with EIA-364-29, shall withstand a 5 pound axial load for a minimum of 5 seconds, with a maximum allowable displacement of .005 inch.

3.2.4 **Crimp Tensile Strength**. Wire shall not break or pull out of crimp joints at less than the specified force when tested in accordance with EIA-364-08.

Wire	Gage	Force in Pounds
M22759/11	24	8
M22759/11	26	5
M22759/11	28	4
M22759/33	24	12
M22759/33	26	10
M22759/33	28	6

3.2.5 **Insert retention**. Inserts shall not be dislodged or moved from their original position when subjected to an axial load of 50 pounds per square inch when tested in accordance with EIA-364-35.

3.2.6 **Resistance to soldering heat.** Connectors with solder cup contacts shall not be damaged following soldering with a 360° C. solder iron for at least 4 seconds in accordance with EIA-364-56 Procedure 1. Connectors with printed circuit board terminations shall withstand immersion in a solder bath for 9-11 seconds at 260° C. when tested in accordance with EIA-364-56 Procedure 3 Test Condition B. Connectors, after cooling, shall not exhibit damage or warpage when examined at 10X magnification. .

3.2.7 **Solderability**. Solder cup and printed circuit terminals shall meet the solderability requirements of MIL-STD-202 Method 208.

3.2.8 **Durability**. Micro-D connectors shall be capable of 500 cycles of mating with no damage or degradation to electrical performance. Engaging and separation force and mating forces shall not exceed the requirements of 3.2.1 and 3.2.2.

3.3 **ENVIRONMENTAL REQUIREMENTS**

MICRO-D PERFORMANCE SPECIFICATIONS

3.3.1 **Salt spray (corrosion)**. Connectors shall show no exposure of base metal due to corrosion when subjected to the salt spray test of EIA-364-26. In addition, connectors shall meet contact resistance, low circuit level contact resistance and mating force requirements.

Shell material, finish (code)	EIA-364-26 test condition	Duration (hours)
Aluminum, cadmium plating (01)	A	96
Aluminum, electroless nickel plating (02)	B	48
Aluminum, black anodize (04)	B	48
Aluminum, chem film (06)	B	48
Aluminum, gold (05)	B	48
Stainless steel, passivated (03)	D	1000

3.3.2 **Fluid immersion**. Connectors shall meet mating force requirements following 20 hours immersion in synthetic lubricating oil and 1 hour immersion in coolanol 25, when tested in accordance with MIL-DTL-83513F paragraph 4.5.18.

3.3.3 **Thermal vacuum outgassing**. The assembled connector mass excluding metallic parts shall not exceed 1.0% total mass loss (TML) or 0.1% total volatile condensible materials (CVCM) when tested in accordance with ASTM E595. ***NOTE: the interfacial seal on metal shell MWDM receptacle connectors slightly exceeds the allowable CVCM unless it is specially processed. This is acceptable per MIL-DTL-83513 but may not be permissible for specific space programs.***

Outgassing properties of Micro-d components

Component	Material	Brand Name	% Total Mass Loss (TML)	% Collected Volatile Condensable Material (CVCM)	Test Report
Thermoplastic Insulators and PCB Trays	Liquid Crystal Polymer	Vectra® C-130	0.03	0.00	NASA Test #GSC17478
Potting Compound	Epoxy	Hysol C9-4215	0.48	0.01	Glenair Test
Interfacial Seal “as received”	Fluorosilicone	(none)	0.99	0.13	Glenair Test
Interfacial Seal with Oven Bakeout 8 hrs. 400° F.	Fluorosilicone	(none)	0.03	0.01	Glenair Test
Interfacial Seal with Thermal Vacuum Bakeout24 hrs. 125° C.	Fluorosilicone	(none)	0.08	0.02	Glenair Test
Wire	Tefzel®	Tefzel®	0.22	0.01	NASA Test #GSC19998

3.3.4 **Thermal shock**. Unmated connectors shall withstand 5 cycles of thermal shock with a minimum temperature of -65° C. and a maximum temperature of 150° C. when tested in accordance with EIA-364-32, Condition IV. Connectors shall not exhibit any detrimental damage or degradation of electrical performance.

MICRO-D PERFORMANCE SPECIFICATIONS

3.3.5 **Humidity**

3.3.5.1 **Humidity, MWDM connectors with interfacial seals**. Wired, mated connectors shall be subjected to humidity conditioning in accordance with EIA-364-31, Test Condition IV. After a minimum of 3 hours of step 7a of the final cycle, and while the connectors are still subjected to high humidity, the insulation resistance shall be measured when the chamber temperature reaches 20° ± 5° C. Insulation resistance shall not be less than 100 megohms, and connectors shall pass a DWV test of 360 volts (rms 60 hertz ac).

3.3.5.2 **Humidity, MWD plastic connectors without interfacial seals**. Wired, mated connectors shall be subjected to humidity conditioning in accordance with EIA-364-31, Test Condition IV. On completion of step 6 of the final cycle, connectors shall be removed from the chamber, unmated and surface moisture removed. Connectors shall meet 1 megohm minimum and shall pass a DWV test of 100 volts (rms 60 hertz ac).

3.3.6 **Vibration (sine)**. Connectors, when mated, wired in series and fixtured in accordance with MIL-DTL-83513F, shall not exhibit any discontinuity longer than 1 microsecond when tested in accordance with EIA-364-28 Test Condition IV, which specifies 12 hour duration, 10 Hz to 2000 Hz, and amplitude of 20 g_n peak. Connectors shall not be damaged and no loosening of parts shall occur.

3.3.7 **Shock**. Connectors, when mated, wired in series and fixtured in accordance with MIL-DTL-83513F, shall not exhibit any discontinuity longer than 1 microsecond when tested in accordance with EIA-364-27, Test Condition E, which specifies an amplitude of 50 g peak. Connectors shall not be damaged and no loosening of parts shall occur.

3.3.8 **Marking Permanency**. Connector marking shall meet the requirements od MIL-STD-202 Method 215.

3.3.9 **Fungus resistance**. Connector materials shall meet the requirements of MIL-STD-810 Method 508.5.

Micro-D Weights

MICRO-D METAL SHELL WEIGHTS IN GRAMS[1]						
Layout	Solder Cup	Pigtail[2]	PCB "CBR"	PCB "BR"	PCB "BS"	PCB "CBS"
9P	1.7	1.6	3.9	5.9	4.1	3.1
9S	1.7	1.6	3.9	5.9	4.1	3.1
15P	2.3	2.2	4.8	6.8	4.7	3.3
15S	2.2	2.1	4.7	6.7	4.7	3.4
21P	3.0	2.9	5.6	7.7	5.7	4.1
21S	2.6	2.5	5.4	7.6	5.6	4.8
25P	3.3	3.2	6.1	8.3	5.9	5.3
25S	3.0	2.9	6.0	8.2	6.1	5.5
31P	3.9	3.8	7.6	9.5	7.2	6.5
31S	3.6	3.5	7.5	9.4	7.3	6.6
37P	4.4	4.2	8.4	11.1	8.5	7.7
37S	4.1	3.9	8.4	11.0	8.3	7.5
51P	5.1	4.9	11.0	12.7	9.6	8.6
51S	4.8	4.7	10.9	12.8	9.5	8.6
51-2P	5.0	4.8	10.9	12.5	9.5	8.5
51-2S	4.7	4.4	10.8	12.4	9.4	8.5
67P	5.7	5.5	13.4	13.6	10.6	9.5
67S	5.4	5.3	13.2	13.4	10.5	9.4
69P	6.2	6.0	14.0	14.1	11.1	10.0
69S	5.9	5.8	13.5	13.9	11.0	9.9
100P	9.1	8.6	26.6	27.5	25.4	22.9
100S	8.2	7.9	26.4	27.1	24.8	22.3

1. Nominal weight shown. Add 10% for maximum weight. 2. Weight is connector only. See table below for wire weight calculation.

STAINLESS STEEL MICRO-D WEIGHT ADDERS	
Layout	Stainless Steel Adder in Grams
9P	1.9
9S	2.0
15P	2.4
15S	2.4
21P	2.9
21S	2.8
25P	3.2
25S	2.9
31P	3.4
31S	3.2
37P	3.6
37S	4.1
51P	4.0
51S	3.8
51-2P	6.2
51-2S	6.0
67P	7.1
67S	6.8
69P	7.3
69S	7.0
100P	8.3
100S	8.0

1. Nominal weight shown. Add 10% for maximum weight.
2. Weight includes 18 inches of M22759/11-26 insulated #26 AWG copper wire.

HOW TO CALCULATE WEIGHTS FOR DIFFERENT WIRE TYPES AND LENGTHS		
Wire Type	Wire Gage (AWG)	Maximum Wire Weight Per Inch in Grams
M22759/11	24	.098
M22759/11	26	.072
M22759/11	28	.052
M22759/33	24	.076
M22759/33	26	.053
M22759/33	28	.034
M22759/33	30	.025

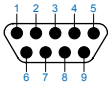
EXAMPLE CALCULATION:

MWDM2L-37P-6K7-54B (54 inches of M22759/11 #26 gage wire)

1. Find the connector weight in the "Pigtail" column above .... 4.2 g.
2. Find the wire weight in grams per inch.....072 g./in.
3. Multiply the # of conductors times length and weight
   37 wires x 54 inches x .072 g./in. =.....144 g.
4. Add the connector weight to the wire weight ..... 148.2 g.

Micro-D Contact Arrangements

MICRO-D CONTACT ARRANGEMENTS (FACE VIEW PIN CONNECTOR)



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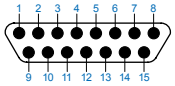

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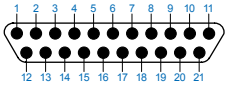

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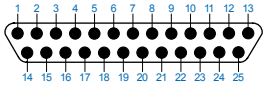

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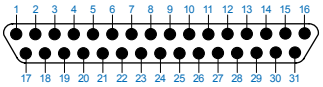

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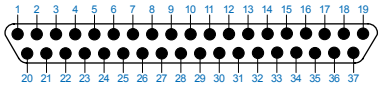

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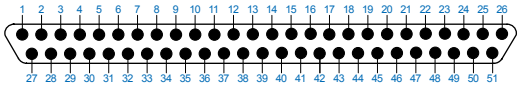
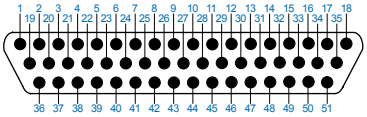


51 Pin (Special 2 Row)



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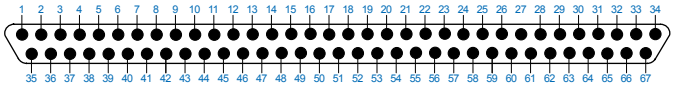

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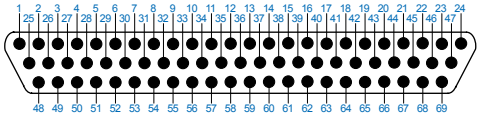

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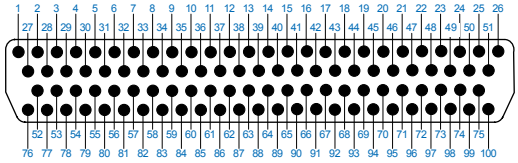
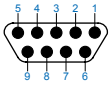


100 Pin

MICRO-D CONTACT ARRANGEMENTS (FACE VIEW SOCKET CONNECTOR)



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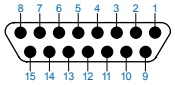

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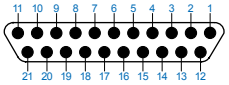

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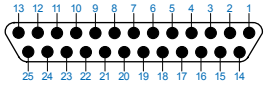

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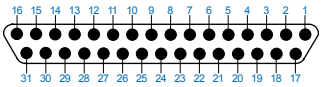

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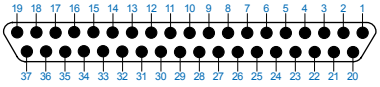

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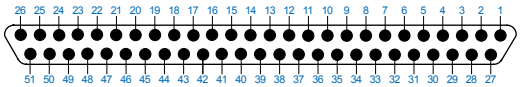

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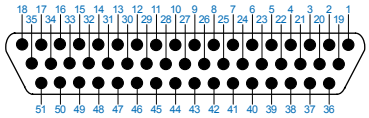

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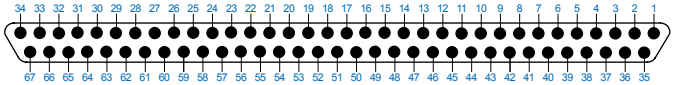

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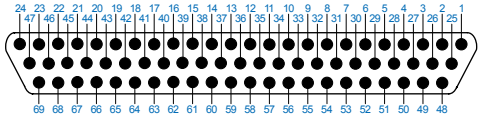

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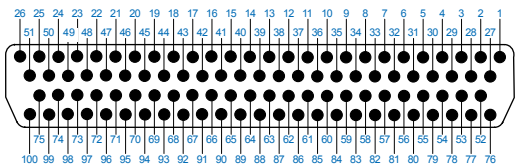
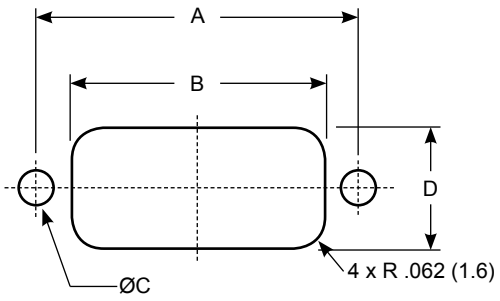


100 Socket

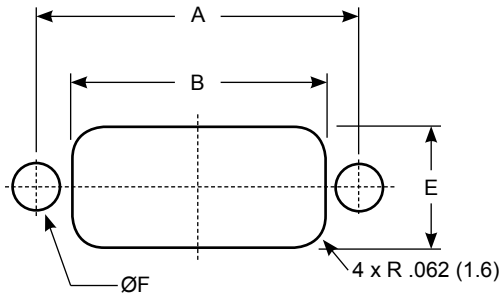
U.S. CAGE Code 06324
Printed in U.S.A.

Micro-D Panel Cutouts

RECOMMENDED MICRO-D PANEL CUTOUTS



Front Panel Mounting



Rear Panel Mounting

PLASTIC SHELL MWD CONNECTORS (M83513/06 THRU /09)

Layout	A		B		C		D		E		F	
	In. ± .003	mm. ± 0.08	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05	In. +.005 -.000	mm. +0.13 -0.00	In. ± .002	mm. ± 0.05
9	.565	14.35	.410	10.41	.091	2.31	.174	4.42	.219	5.56	.126	3.20
15	.715	18.16	.560	14.22	.091	2.31	.174	4.42	.219	5.56	.126	3.20
21	.865	21.97	.710	18.03	.091	2.31	.174	4.42	.219	5.56	.126	3.20
25	.965	24.51	.810	20.57	.091	2.31	.174	4.42	.219	5.56	.126	3.20
31	1.115	28.32	.960	24.38	.091	2.31	.174	4.42	.219	5.56	.126	3.20
37	1.265	32.13	1.110	28.19	.091	2.31	.174	4.42	.219	5.56	.126	3.20
51	1.215	30.86	1.060	26.92	.091	2.31	.217	5.51	.261	5.56	.126	3.20

METAL SHELL MWDM CONNECTORS

Layout	A		B		C		D		E		F	
	In. ± .003	mm. ± 0.08	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05	In. ± .002	mm. ± 0.05	In. ± .005	mm. ± 0.13	In. ± .002	mm. ± 0.05
9	.565	14.35	.410	10.41	.091	2.31	.277	7.04	.256	6.50	.126	3.20
15	.715	18.16	.560	14.22	.091	2.31	.277	7.04	.256	6.50	.126	3.20
21	.865	21.97	.710	18.03	.091	2.31	.277	7.04	.256	6.50	.126	3.20
25	.965	24.51	.810	20.57	.091	2.31	.277	7.04	.256	6.50	.126	3.20
31	1.115	28.32	.960	24.38	.091	2.31	.277	7.04	.256	6.50	.126	3.20
37	1.265	32.13	1.110	28.19	.091	2.31	.277	7.04	.256	6.50	.126	3.20
51	1.215	30.86	1.060	26.92	.091	2.31	.317	8.05	.300	7.62	.126	3.20
51-2	1.615	41.02	1.460	37.08	.091	2.31	.277	7.04	.256	6.50	.126	3.20
67	2.015	51.18	1.858	47.19	.091	2.31	.277	7.04	.256	6.50	.126	3.20
69	1.520	38.61	1.360	34.54	.091	2.31	.317	8.05	.300	7.62	.126	3.20
100	1.800	45.72	1.452	36.88	.120	3.05	.363	9.22	.406	10.31	.148	3.76

MIL-STD-681 Color Code Chart

MIL-STD-681 COLOR CODE CHART FOR MICRO-D CONNECTORS

PIN NO.	MIL-STD-681 NUMBER	Base Color	First Stripe	Second Stripe	PIN NO.	MIL-STD-681 NO.	Base Color	First Stripe	Second Stripe	Third Stripe
1	0	BLK			51	957	WHT	GRN	VIO	
2	1	BRN			52	958	WHT	GRN	GRY	
3	2	RED			53	967	WHT	BLU	VIO	
4	3	ORN			54	968	WHT	BLU	GRY	
5	4	YEL			55	978	WHT	VIO	GRY	
6	5	GRN			56	9012	WHT	BLK	BRN	RED
7	6	BLU			57	9013	WHT	BLK	BRN	ORN
8	7	VIO			58	9014	WHT	BLK	BRN	YEL
9	8	GRY			59	9015	WHT	BLK	BRN	GRN
10	9	WHT			60	9016	WHT	BLK	BRN	BLU
11	90	WHT	BLK		61	9017	WHT	BLK	BRN	VIO
12	91	WHT	BRN		62	9018	WHT	BLK	BRN	GRY
13	92	WHT	RED		63	9023	WHT	BLK	RED	ORN
14	93	WHT	ORN		64	9024	WHT	BLK	RED	YEL
15	94	WHT	YEL		65	9025	WHT	BLK	RED	GRN
16	95	WHT	GRN		66	9026	WHT	BLK	RED	BLU
17	96	WHT	BLU		67	9027	WHT	BLK	RED	VIO
18	97	WHT	VIO		68	9028	WHT	BLK	RED	GRY
19	98	WHT	GRY		69	9034	WHT	BLK	ORN	YEL
20	901	WHT	BLK	BRN	70	9035	WHT	BLK	ORN	GRN
21	902	WHT	BLK	RED	71	9036	WHT	BLK	ORN	BLU
22	903	WHT	BLK	ORN	72	9037	WHT	BLK	ORN	VIO
23	904	WHT	BLK	YEL	73	9038	WHT	BLK	ORN	GRY
24	905	WHT	BLK	GRN	74	9045	WHT	BLK	YEL	GRN
25	906	WHT	BLK	BLU	75	9046	WHT	BLK	YEL	BLU
26	907	WHT	BLK	VIO	76	9047	WHT	BLK	YEL	VIO
27	908	WHT	BLK	GRY	77	9048	WHT	BLK	YEL	GRY
28	912	WHT	BRN	RED	78	9056	WHT	BLK	GRN	BLU
29	913	WHT	BRN	ORN	79	9057	WHT	BLK	GRN	VIO
30	914	WHT	BRN	YEL	80	9058	WHT	BLK	GRN	GRY
31	915	WHT	BRN	GRN	81	9067	WHT	BLK	BLU	VIO
32	916	WHT	BRN	BLU	82	9068	WHT	BLK	BLU	GRY
33	917	WHT	BRN	VIO	83	9078	WHT	BLK	VIO	GRY
34	918	WHT	BRN	GRY	84	9123	WHT	BRN	RED	ORN
35	923	WHT	RED	ORN	85	9124	WHT	BRN	RED	YEL
36	924	WHT	RED	YEL	86	9125	WHT	BRN	RED	GRN
37	925	WHT	RED	GRN	87	9126	WHT	BRN	RED	BLU
38	926	WHT	RED	BLU	88	9127	WHT	BRN	RED	VIO
39	927	WHT	RED	VIO	89	9128	WHT	BRN	RED	GRY
40	928	WHT	RED	GRY	90	9134	WHT	BRN	ORN	YEL
41	934	WHT	ORN	YEL	91	9135	WHT	BRN	ORN	GRN
42	935	WHT	ORN	GRN	92	9136	WHT	BRN	ORN	BLU
43	936	WHT	ORN	BLU	93	9137	WHT	BRN	ORN	VIO
44	937	WHT	ORN	VIO	94	9138	WHT	BRN	ORN	GRY
45	938	WHT	ORN	GRY	95	9145	WHT	BRN	YEL	GRN
46	945	WHT	YEL	GRN	96	9146	WHT	BRN	YEL	BLU
47	946	WHT	YEL	BLU	97	9147	WHT	BRN	YEL	VIO
48	947	WHT	YEL	VIO	98	9148	WHT	BRN	YEL	GRY
49	948	WHT	YEL	GRY	99	9156	WHT	BRN	GRN	BLU
50	956	WHT	GRN	BLU	100	9157	WHT	BRN	GRN	VIO

Glenair®

RoHS Compliance Information

TwistPin Connectors and RoHS Compliance

European Union Directive 2002/95/EC on Restriction of the use of certain Hazardous Substances ("RoHS") states that certain types of equipment (primarily consumer electronic products such as personal computers) shall not contain lead, mercury, cadmium, hexavalent chromium, PBB's or PBDE's. For the record, Glenair does not produce any OEM products of this type. Furthermore, our interconnect components are either free of the substances RoHS controls, or specifically intended for use in military-aerospace applications that are exempt. Makers of consumer products should refer to the following guidelines to insure Glenair interconnect components are correctly specified when used in in RoHS regulated electronic equipment.

Are Micro-D Connectors RoHS compliant?

The products in this catalog can be ordered with various plating finishes. Some of these finishes such as cadmium and chem film, along with solder-dipping, do not comply with the RoHS directive.

Why doesn't Glenair eliminate non-RoHS products?

Glenair products are typically used in defense and aerospace equipment exempt from RoHS requirements. Glenair will continue to offer cadmium and chromate finishes in accordance with DoD and aerospace specifications. Our part numbers contain a broad range of plating finish ordering codes. Customers can easily specify RoHS compliant finishes if desired.

Products that do not comply with RoHS regulations:

1 **Cadmium plating** is available on metal shell connectors in this catalog. Note that cadmium plating does not currently comply with RoHS rules.

2 **Chem film** is available on metal shell connectors.This coating contains hexavalent chromium which does not currently comply with RoHS rules.

3 **Tin-lead solder dipped printed circuit board tails.** Board mount M83513 Micro-D's and other products are normally solder dipped in 63% tin 37% lead molton solder. RoHS compliance for consumer products requires elimination of solder coatings containing lead.

RoHS compliance made easy

1 **Specify electroless nickel plating on the connector shell.** Or, choose stainless steel shells for maximum corrosion protection and RoHS compliance.

2 **Use Mod Code 513 on Micro-D board mount connectors.** Board mount Micro-D's and other products are normally solder dipped in 63% tin 37% lead molton solder. Any solder-dipped part can be supplied with RoHS compliant gold-plating instead simply by adding Mod Code 513 as a suffix to the standard part number.

MICRO-D RoHS COMPLIANCE EXAMPLES

Part Number	Problem	Solution	RoHS Compliant Part Number
MWDM***1***L-37PSB	Plating code 1 specifies cadmium plating.	Change to electroless nickel plating (code 2).	MWDM**2**L-37PSB
MWDM2L-25SCBRP-.110	CBR style PCB connectors are solder-dipped in tin-lead.	Add Mod Code 513 to change the PC tail finish to gold plating.	MWDM2L-25SCBRP-.110-513
MWDM***6***L-9S-6K7-18L	Plating code 6 specifies chem film.	Change to electroless nickel plating (code 2).	MWDM**2**L-9S-6K7-18L
M83513/03-E07C	Cadmium plated shell and solder-dipped contacts.	Change to nickel plating and gold contacts	M83513/03-E05N

MICRO-D CONNECTOR PLATING CODES: RoHS COMPLIANCE

Micro-D Plating Code	Plating Type	RoHS Compliance	Notes
1, A	Cadmium with yellow chromate conversion coating over electroless nickel	No	Electroless nickel is the preferred alternate.
2, B	Electroless nickel	RoHS Compliant	First choice for RoHS compliance. Good corrosion resistance, excellent conductivity, M83513 approved, always in stock.
3, F	Stainless steel shell, passivated	RoHS Compliant	Higher cost but unsurpassed corrosion resistance, not conductive enough for typical EMI needs. Build-to-order.
4, D	Black anodize over aluminum	RoHS Compliant	Economical, non-reflective, non-conductive. Build-to-order.
5, E	Gold over aluminum	RoHS Compliant	Low volume, higher cost, excellent conductivity. Build-to-order.
6, C	Chem film	No	Electroless nickel is the preferred alternate.

MICRO-D BACKSHELL PLATING CODES: RoHS COMPLIANCE

Plating Code	Plating Type	RoHS Compliance	Notes
C	Black anodize	RoHS Compliant	Inexpensive, non-reflective, not suitable for EMI (poor conductivity), build-to-order.
E	Chem film	No	Electroless nickel is the preferred alternate.
J	Cadmium with yellow chromate conversion coating over electroless nickel	No	Electroless nickel is the preferred alternate.
M	Electroless nickel	RoHS Compliant	First choice for RoHS compliance. Good corrosion resistance, excellent conductivity, M83513 approved, always in stock.
NF	Cadmium with olive drab chromate conversion coating over electroless nickel	RoHS Compliant	Electroless nickel is the preferred alternate.
Z2	Gold	RoHS Compliant	Low volume, higher cost, excellent conductivity, build-to-order.