

SPACE- AND MIL-
AERO GRADE FPC
IPC-6012 / 6013
SPECIALIZING IN
CLASS III, TYPES
1-4



Long-Length Flexible Printed Circuit
Assemblies, 3 to 8 feet



Glenair Fairway-Flex™ is a long-length, space- and mil-aero grade flexible printed circuit solution incorporating Glenair's broad range of innovative small form-factor circular and rectangular PC-tail connectors.

Glenair in-house 8X4 ASC autoclave and reel-to-reel imaging equipment enables one-piece construction of extra long "Fairway-Flex" FPCs with up to four layers circuit layers and industry-leading Kapton dielectric substrates.



- **Turnkey:** from design to prototype to volume production
- **Rapid prototyping process** includes 3-D "paper doll" fit-check mockups with copper-clad DuPont™ Kapton® to simulate actual flexibility
- **EMI/RFI Shielding** with solid or patterned shield planes, and/or with shielded I/O interconnects
- **Configurations include** single-sided, double-sided, and multilayered
- **Point-to-point and multibranch assemblies**
- **ISO 9001, AS9100 certified**

LONG-LENGTH Flexible Printed Circuit Assemblies

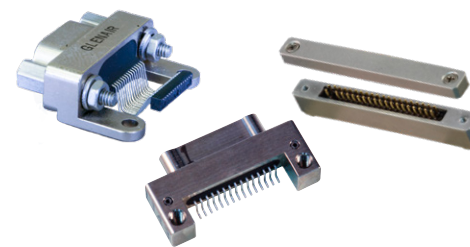
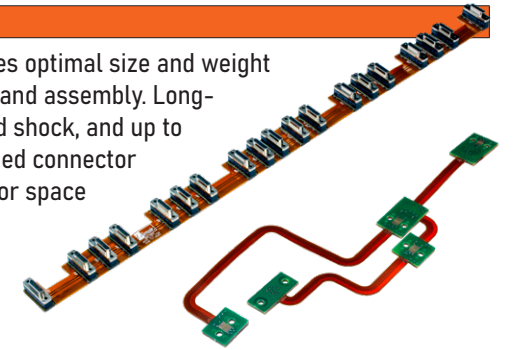


Fairway-Flex™ Signature Long-Length FPC

TECHNOLOGY OVERVIEW: FAIRWAY-FLEX

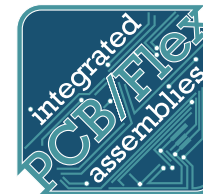
Replacing long-length wire bundle assemblies with high-density flex circuitry ensures optimal size and weight reduction, eliminates wiring errors resulting in faster, error-free on-site installation and assembly. Long-length Fairway-Flex assemblies offer better resistance to high levels of vibration and shock, and up to 1 million flex and duty cycles. Fairway-Flex designs offer both single- and double-sided connector mounting and 3D circuit routing within equipment enclosures, LRUs, and the aircraft or space fuselage.

Fairway-Flex assemblies may be equipped with **hard mount points and stiffeners** as required, as well as the ability to implement flex-to-install designs that combine PCB boards and flex circuitry



A key step in the conceptualization of most flex assemblies is the **selection of I/O and board-level PCB connectors**. Glenair manufactures the industry's most complete range of rectangular and circular PCB connectors for turnkey incorporation into flex assembly designs. Note that this lineup includes both industry-standard solutions such as D-Subs, Micro-Ds and Nanos, but also Glenair signature solutions such as the Series 79 Micro-Crimp, that offer better-than-QPL performance.

INTEGRATED PCB/FLEX SPECIFICATION STANDARDS



The following tables describe Glenair Fairway-Flex **manufacturing formats and specifications**. Glenair recommends commercial customers follow IPC-6012/6013 specification standards. Military customers may alternatively cite specifications IAW MIL-PRF-31032. 5. Vias for interconnect mounting and signal translation between layers to be located on far ends of extended length flex. For vias in center body of extended length flex—or for other non-standard requirements, consult factory.

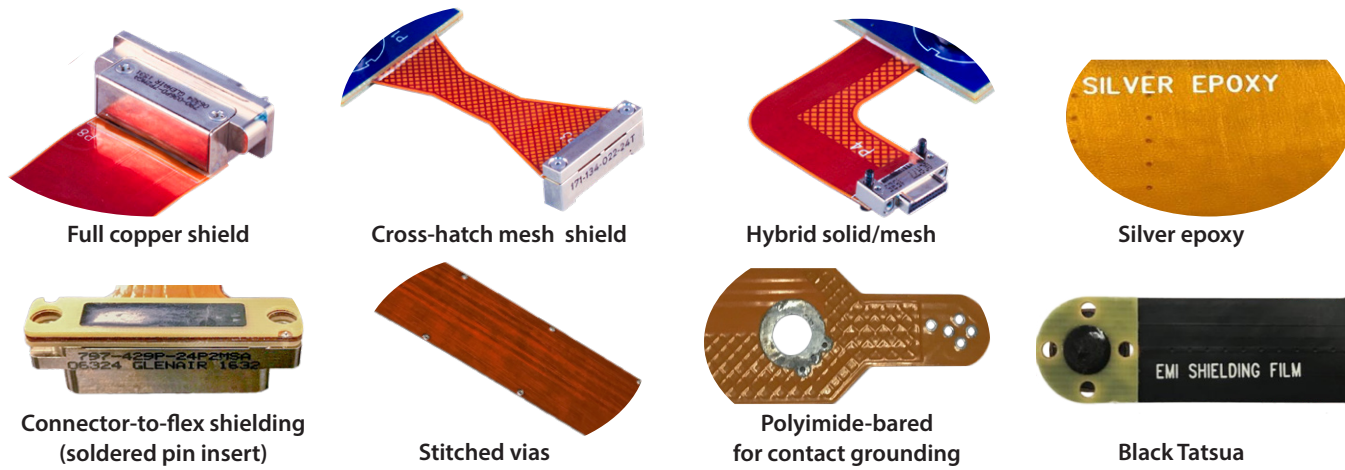
Fairway-Flex™ Assemblies

Design Formats	PADS • PADS PRO • Pro E / Creo • SolidWorks • Autodesk Inventor • CAM 350 • Altium • Valor • POLAR • XPedition
Manufacturing Formats	DXF • Gerber • ODB++ • IPC 2581
Layer Count	Max typ. up to 4
Termination	Thru hole • Reverse bare • Floating fingers • ZIF Termination
Conductor Width/Space	Lines: .010" • Spacing: .010" (design-dependent)
Bend Radius (military)	Single Metal Layer: 4–6X overall flex thickness • Double Metal Layers: 6–10X overall flex thickness • Multi Layer Metal: 12–15X overall flex thickness
Materials / Tg	Substrate: DuPont™ Kapton® polyimide flex adhesive and adhesiveless -60°C to 125°C Cover layer: DuPont™ Kapton® Stiffener: FR4 or DuPont™ Kapton® (metal stiffeners available upon request) Conductor: Copper, 1/4 ounce to 2 ounce High-temperature materials and more available
Surface Finish	ENIG • HASL • Immersion Tin and Silver • Soft and Hard Gold
Specs and Quality Management	IPC-6013 Class I, II, III, types 1-3 • ISO 9001, AS 9100J-STD-001 Space

Application / design options

GROUND PLANES AND SHIELDS

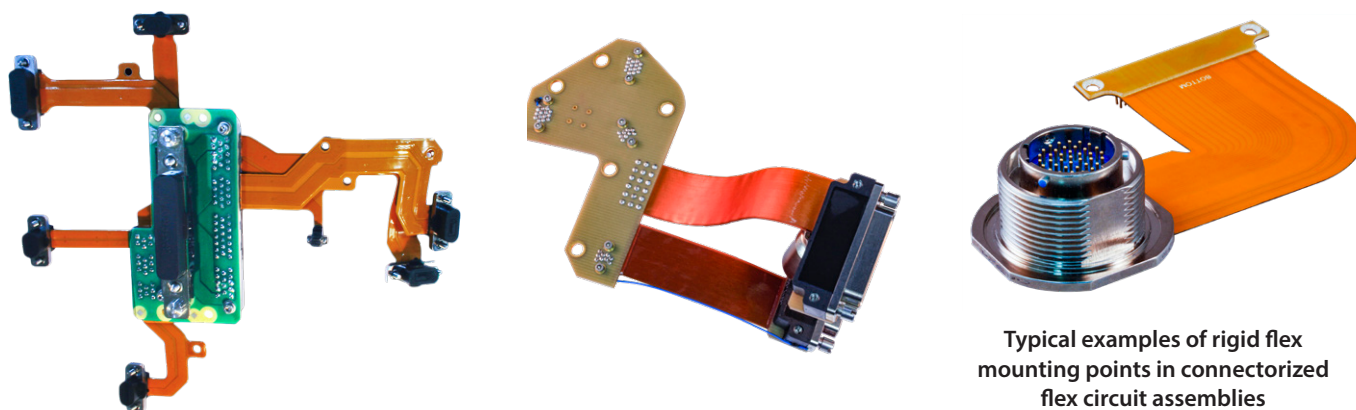
Managing EMI emissions and signal line impedance are critical aspects of flex circuit design. Effective use of ground / shield planes, appropriate connector interfaces, and matched-impedance flex circuits delivers optimal high-speed signal integrity.



STRAIN RELIEF OPTIONS FOR FLEX AND RIGID FLEX

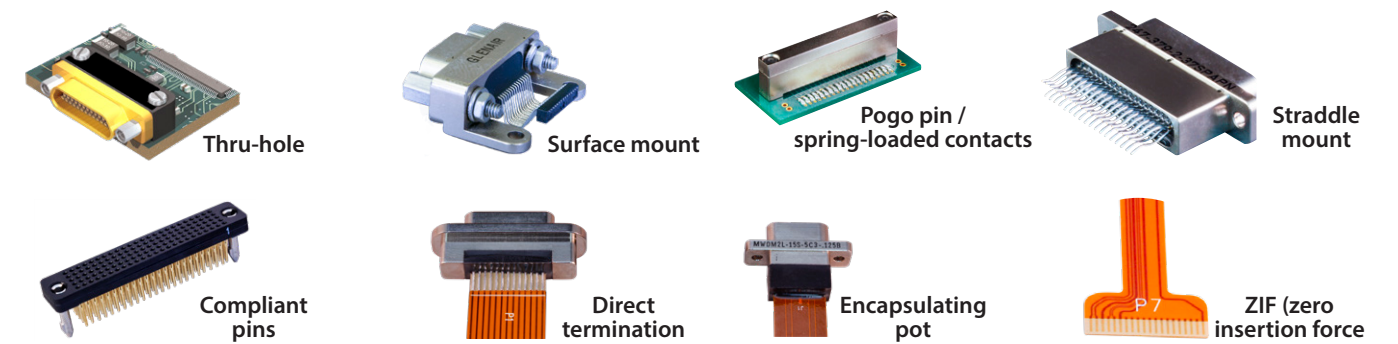


RIGID FLEX MOUNTING POINTS FOR IMPROVED VIBRATION AND SHOCK RESISTANCE



Application / design options

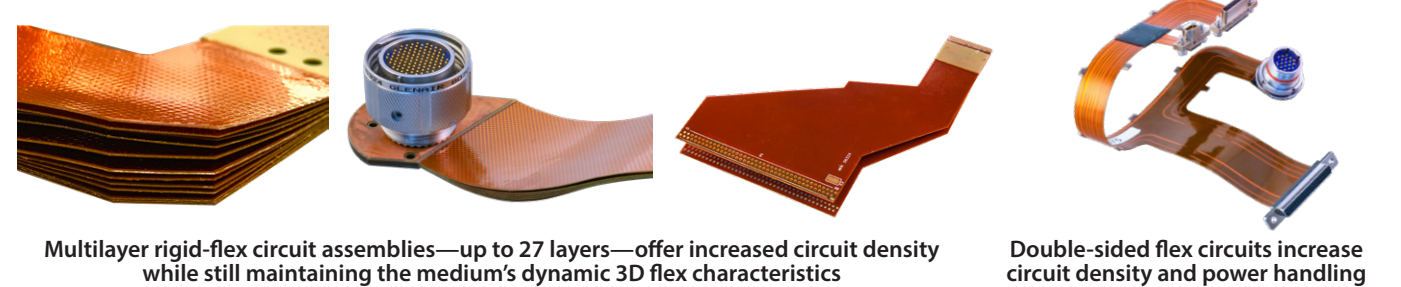
FLEX, RIGID FLEX, AND PCBA CONNECTOR TERMINATION OPTIONS



FLEX AND RIGID FLEX I/O CONNECTOR OPTIONS



MULTILAYER AND DOUBLE-SIDED FLEX AND RIGID-FLEX DESIGN OPTIONS



Rectangular PC-tail connectors
potted, sealed, and conformal-coating compatible

SERIES 28 HIPER-D M24308 HIGH-PERFORMANCE ENVIRONMENTAL PCB CONNECTORS



280-022 straight PC tail pin connector
280-023 straight PC tail socket connector
280-024 right-angle PC tail pin connector
280-025 right-angle PC tail socket connector
280-026 straight PC tail pin connector, low-profile

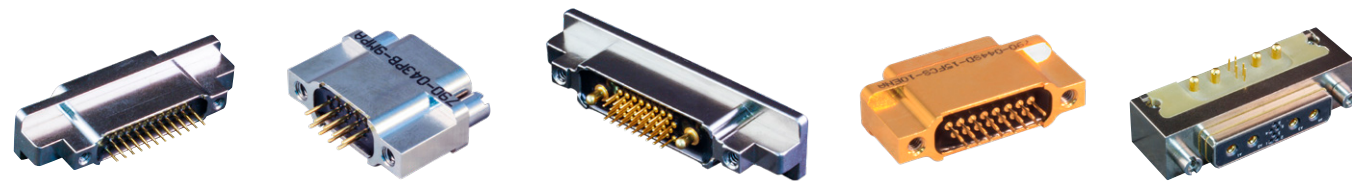


280-027 straight PC tail socket connector, low-profile
280-028 right-angle PC tail pin connector, low-profile
280-029 right-angle PC tail socket connector, low-profile
280-050 combo straight PC tail pin connector
280-051 combo straight PC tail socket connector



280-052 combo right-angle PC tail pin connector
280-053 combo right-angle PC tail socket connector
280-054 combo straight PC tail pin connector, low-profile
280-055 combo straight PC tail socket connector, low-profile
280-056 combo right-angle PC tail pin connector, low-profile

SERIES 79 HIGH-PERFORMANCE MICRO-CRIMP ENVIRONMENTAL PCB CONNECTORS



790-028 straight PC tail panel receptacle
790-043 straight PC tail free-standing receptacle
790-029 straight PC tail panel plug
790-044 straight PC tail free-standing plug
790-042 Right angle PCB panel-mount hybrid coax

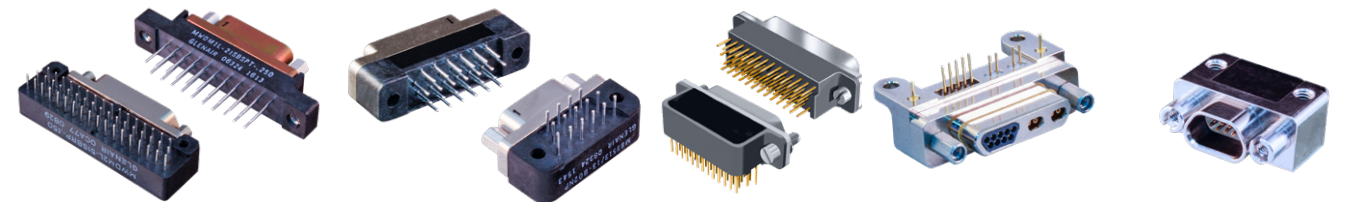
Rectangular PC-tail connectors
potted, sealed, and conformal-coating compatible

ALPHALINK • SERIES 791 • SERIES 792 HIGH-PERFORMANCE RECTANGULAR PCB ENVIRONMENTAL CONNECTORS



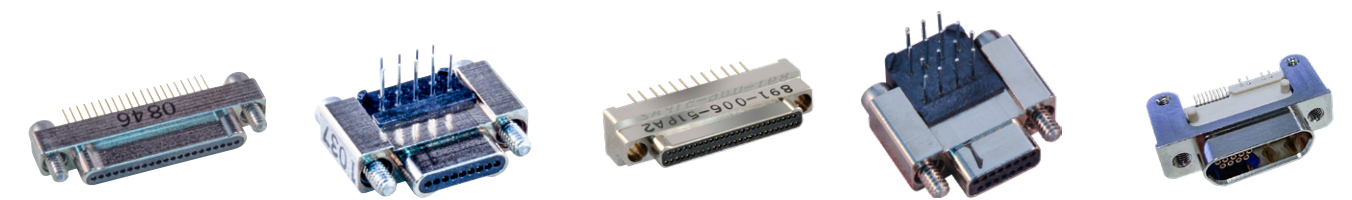
171-134 AlphaLink SL connector with spring-loaded contacts
GSTT-PF HD Stacker top-of-stack flex
GTBA/GTBB-SF MIL-DTL-55302 type flex vertical PCB
791-015/-011 Series 791 straight and 90° scoop-proof panel-mount with grounding fingers
792-006, -010 Straight and 90° high-speed El Ochito

MIL-DTL-83513 MICRO-D AND HIGH-SPEED MICRO-D ENVIRONMENTAL PCB CONNECTORS



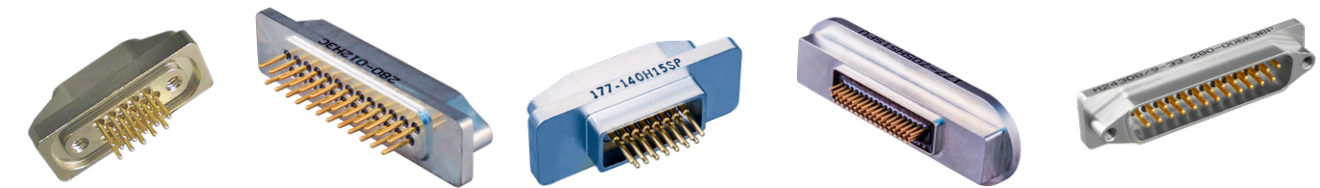
MWDM-B MWDM-BR vertical and 90° mount thru-hole PCB
MWDM-CBS MWDM-CBR vertical and 90° mount thru-hole condensed PCB
GMR75 GMR75C Condensed board, .075" pitch vertical and 90° PCB
GHS4-M VersaLink high-speed Micro-D right angle PCB
GHSM-HBR High-Speed Micro-D right angle PCB

MIL-DTL-32139 NANOMINIATURE AND GMMD ENVIRONMENTAL PCB CONNECTORS



890-006/-007 single-row vertical PCB plugs / receptacles
890-008/-009 single-row right angle PCB plugs / receptacles
891-006/-007 dual-row vertical PCB plugs / receptacles
891-008/-009 dual-row right angle PCB plugs / receptacles
GMMD high-speed micro with nano TwistPin contacts

HERMETIC RECTANGULAR GLASS-TO-METAL SEAL PCB CONNECTORS



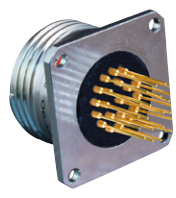
790-066 Series 79 hermetic PCB connectors
280-012H HiPer-D hermetic PCB connectors
177-140H Micro-D solder-mount hermetic PCB connectors
177-705H Micro-D rear panel-mount hermetic PCB connectors
QPL M24308/9 D-Subminiature straight thru-hole PCB hermetic

Circular PC-tail connectors
potted, sealed, and conformal-coating compatible

SUPERNINE® D38999 SERIES III ENVIRONMENTAL PCB CONNECTORS



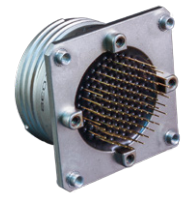
233-207
flush-flange receptacle



233-208
stepped contact receptacle



233-209
short standoff receptacle

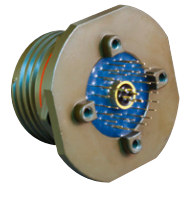


233-210
threaded standoff receptacle



233-211
dual flange receptacle

SUPERNINE® D38999 SERIES III ENVIRONMENTAL PCB SPECIALS



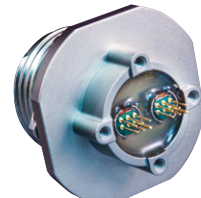
233-218
high-speed hybrid
with threaded standoffs



233-218
high-speed wall mount
with El Ochito® contacts



240-383D
dual-flange wall-mount
EMI filter connector



050-335
opto-electronic jam nut
with threaded standoff



257-859
PCB receptacle with
compliant pin contacts

SUPERNINE® D38999 SERIES III GLASS- AND LIGHTWEIGHT ENCAPSULANT-SEALED PCB HERMETICS



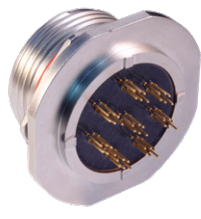
233-100-H2
box mount receptacle



233-100-H5
solder mount receptacle



233-100-H7
jam nut mount receptacle

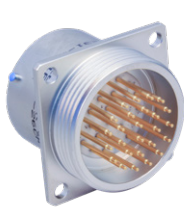


233-254
high-speed hermetic
jam nut receptacle

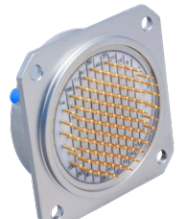


233-250
CODE-RED lightweight
hermetic jam nut receptacle

MIL-DTL-38999 SERIES I, II, III, AND IV QPL GLASS-SEALED PCB CONNECTORS—CLASS N, Y, AND H (SPACE-GRADE) HERMETIC



231-100-H0, H7, H5
Series I scoop-proof bayonet



232-100-H0, H2, H5, H7
Series II low-profile bayonet



233-100-H2, H5, H7, H8
Series III triple-start



234-100-H2, H7, H5, H8
Series IV scoop-proof breech-lock

Circular PC-tail connectors
potted, sealed, and conformal-coating compatible

SERIES 80 MIGHTY MOUSE MICRO MINIATURE ENVIRONMENTAL PCB CONNECTORS



Series 800
UN thread



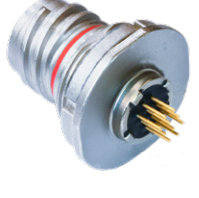
Series 801
double-start thread



Series 803
bayonet-lock

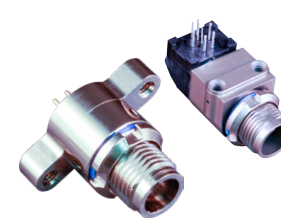


Series 804
push-pull QDC



Series 805
triple-start

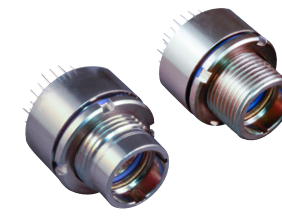
SERIES 88 SUPERFLY AND M32139-TYPE NANOMINIATURE CIRCULAR ENVIRONMENTAL PCB CONNECTORS



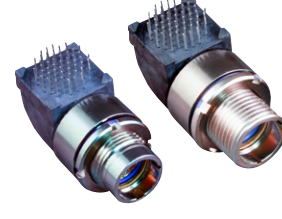
SuperFly
880-041R • 880-037R
QDC vertical and 90° receptacle



SuperFly
881-019R • 881-020R
threaded vertical and 90° receptacle



Nanominiature
893-008 • 893-009
breakaway and threaded straight



Nanominiature
893-010 • 893-011
breakaway and threaded right-angle

SERIES 806 MIL-AERO MICRO MINIATURE ENVIRONMENTAL PCB CONNECTORS



806-021 • 806-022
Environmental



806-058
High-frequency coax



806-039 • 806-040
High-speed El Ochito



240-806-21
EMI/RFI filter



806-025, -026 glass
806-028, -043 lightweight
Hermetic

SUPERSEAL RJ45 / USB ENVIRONMENTAL PCB CONNECTORS



MIL-DTL-38999 Sr. III
SuperSeal



Series 80 Mighty Mouse
SuperSeal



Series IPT 26482 type
SuperSeal



Series ITS 5015 type
SuperSeal



MIL-DTL-28840
SuperSeal