

A Modular High Speed Twinax and Coax Connector System for Spacecraft Datalinks

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INTRODUCTION

The ever-growing demands on industry for faster communication speeds has been a challenge for all, over the years. In support of the space industry Glenair has developed a new connector range, the GMMD – Glenair Modular Micro-D. In this paper we will briefly review the outline of the GMMD connector system, it's formats and capabilities.

MICRO-D CONNECTOR LIMITATIONS

The micro-D format has been available for many years and is a known, reliable and proven connector format. Many sizes (contact counts), orientations, interface to PCB and cables, backshells and other hardware available in a compact package.

That compact format of contacts on a 1.27mm pitch results in a problem for 100Ω differential signal transmission.

Adjacent contacts are experience significantly lower impedance than 100Ω, closer to 60Ω.

Cross talk is not easily controlled.

PCB and cable termination areas not ideal for high speed signaling.

GLENAIR'S MODULAR MICRO-D

Glenair has developed the GMMD series to include individually shielded twinax elements. Each with a well-defined 100Ω differential pair.



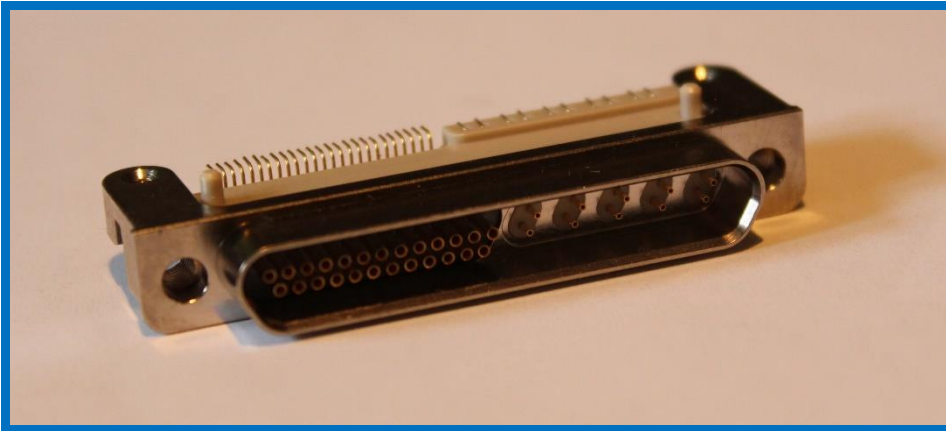
The contact is a #30 nano twist pin.

Discrete lines can be included using standard micro-D #24 twist pins.

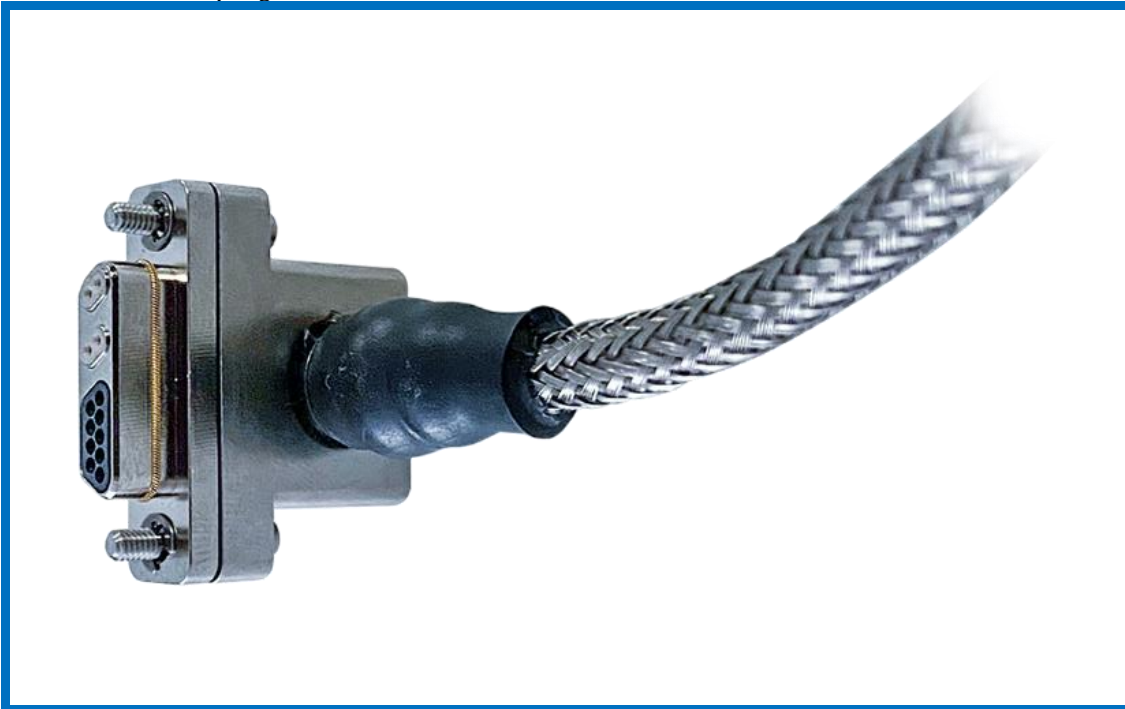
This gives a contact system in the micro-D shell very well tested and proven in environments exposed to high shock, vibration and temperature ranges.

Any number of twinax up to 16 can be incorporated into the GMMD connector and any number of discrete lines, using standard micro-D format, i.e. 9, 15, 21, 25, 31, 37, 51 and 67.

Ensuring a good interface to the PCB is via surface mount tails.



A canted coil EMI spring is used to ensure low resistance from cable screen to PCB.



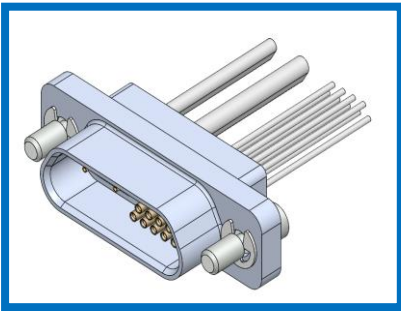
The GMMD range is available with vertical and horizontal PCB terminations. The horizontal format in two options, on the PCB top surface – HR (Horizontal Receptacle) and also for edge launched – HRE (Horizontal Receptacle Edge launched).

Receptacles also available in flying lead format and with RPM (Rear Panel Mount) options, environmentally and EMI sealed with fluorosilicone O-rings, non-conductive or with a choice of nickel or silver doped silicone.

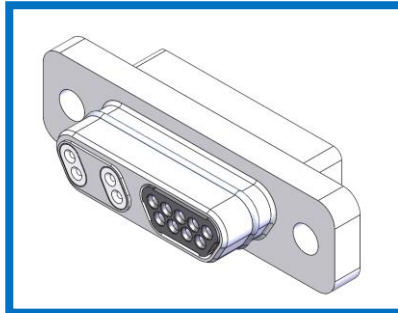
All materials used are low/no outgassing. Many shell and backshell plating options can be selected including gold. NASA and ESA screening options are also available when required.

All the standard backshell and jackscrew/jackpost options can be used with the GMMD range as the shell sizes are standard 2-row sizes (9, 15, 21, 25, 31, 37, 51 and 67).

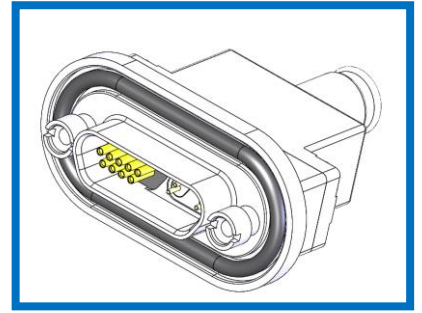
Below are images of the available shell formats:



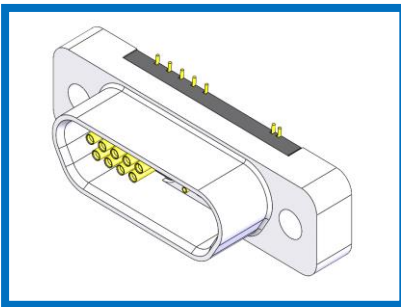
Flying lead receptacle



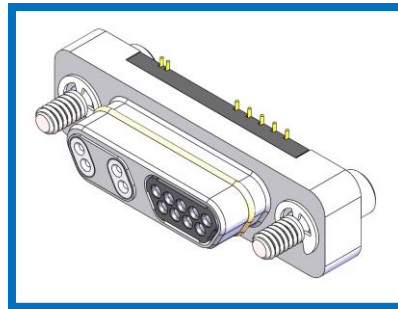
Flying lead plug



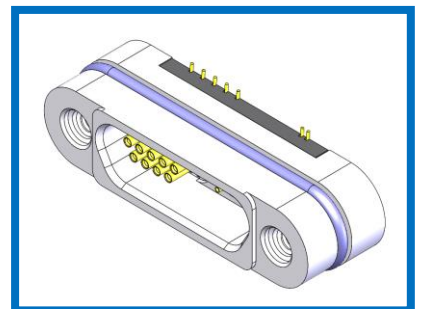
RPM flying lead receptacle



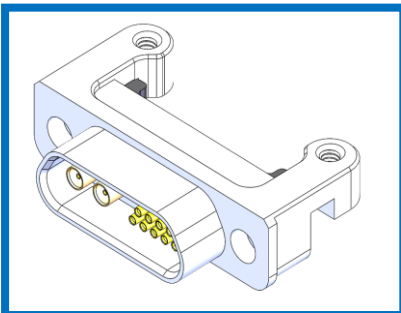
Vertical SMT receptacle



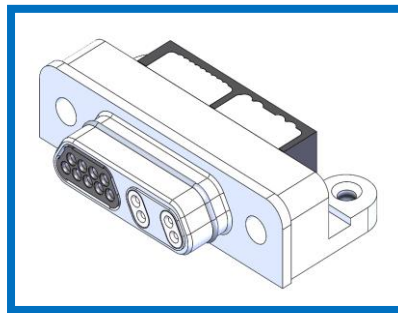
Vertical SMT plug



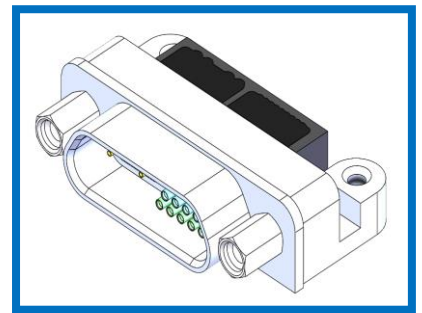
Integrated hardware receptacle



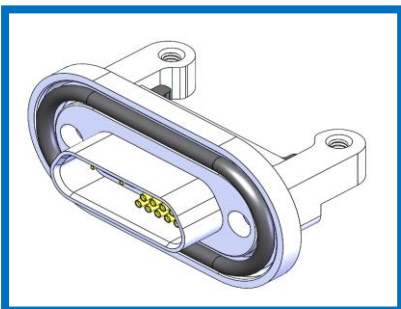
Edge launched receptacle



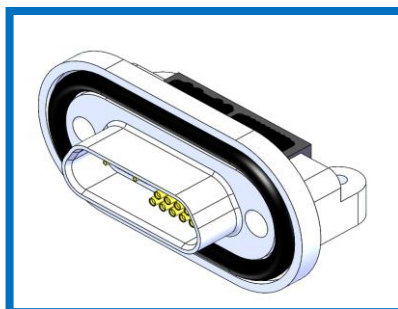
Horizontal plug



Horizontal receptacle



RPM edge launched receptacle

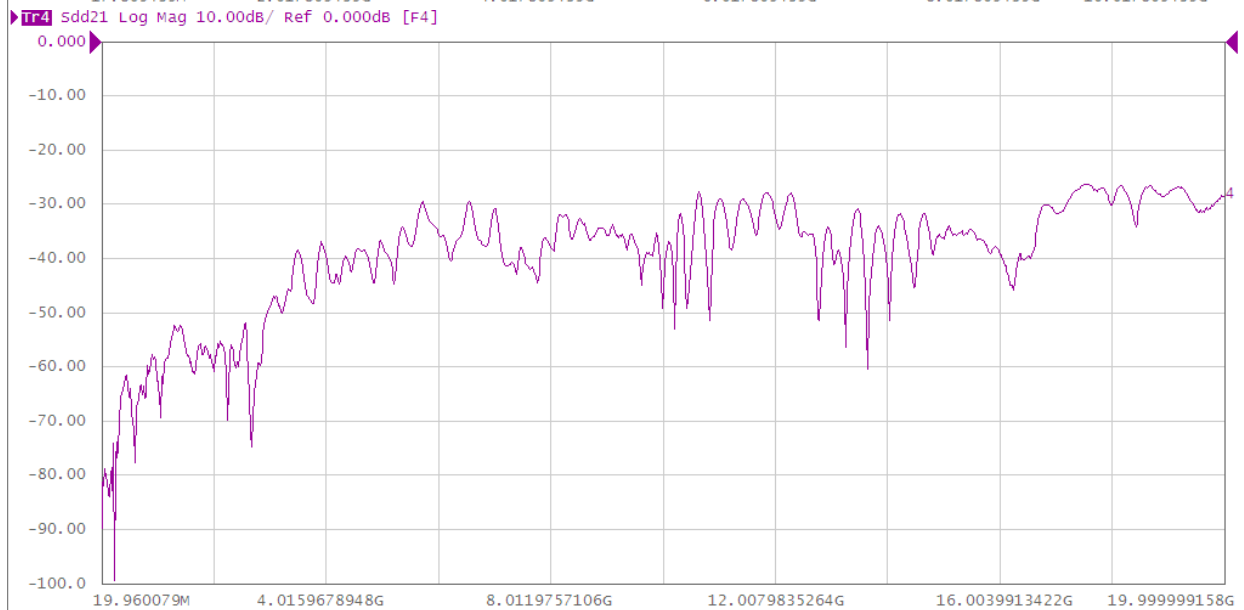
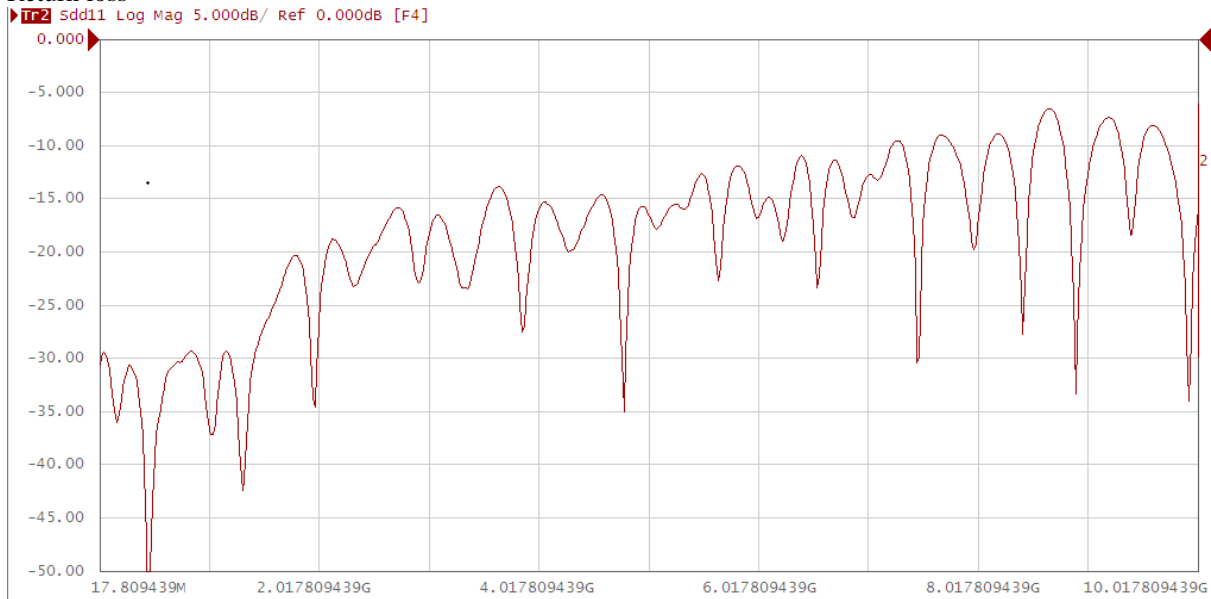


RPM receptacle

GMMD TWINAX SIGNAL INTEGRITY REPORTS

The images below are from tests made on a complete assembly from a vertical receptacle to a 250mm long cable using 28awg twinax and back to another vertical receptacle, i.e. two complete GMMD interfaces.

Return loss



Near End Cross Talk

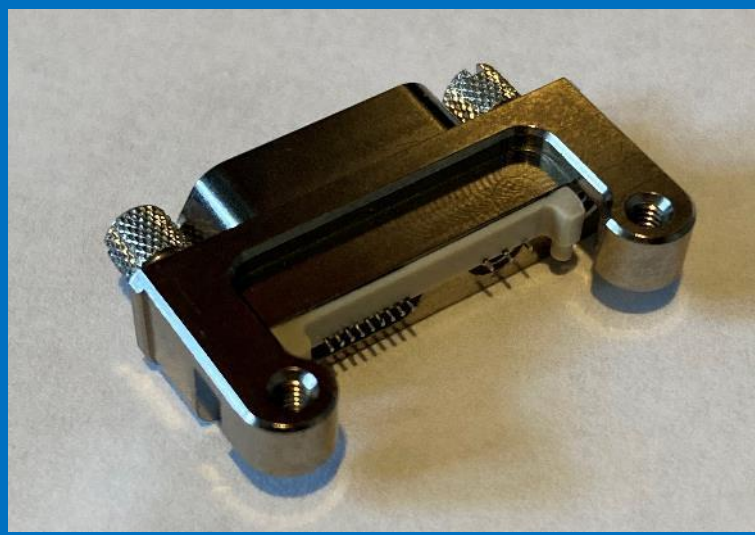
GMMD FOR COAX

In addition to the twinax contacts the GMMD range includes coax contacts, us the nano #30 twist pin as a centre conductor.



50 and 75Ω options available, isolated from the connector shell and are suitable for 047 and 086 coax wire types.

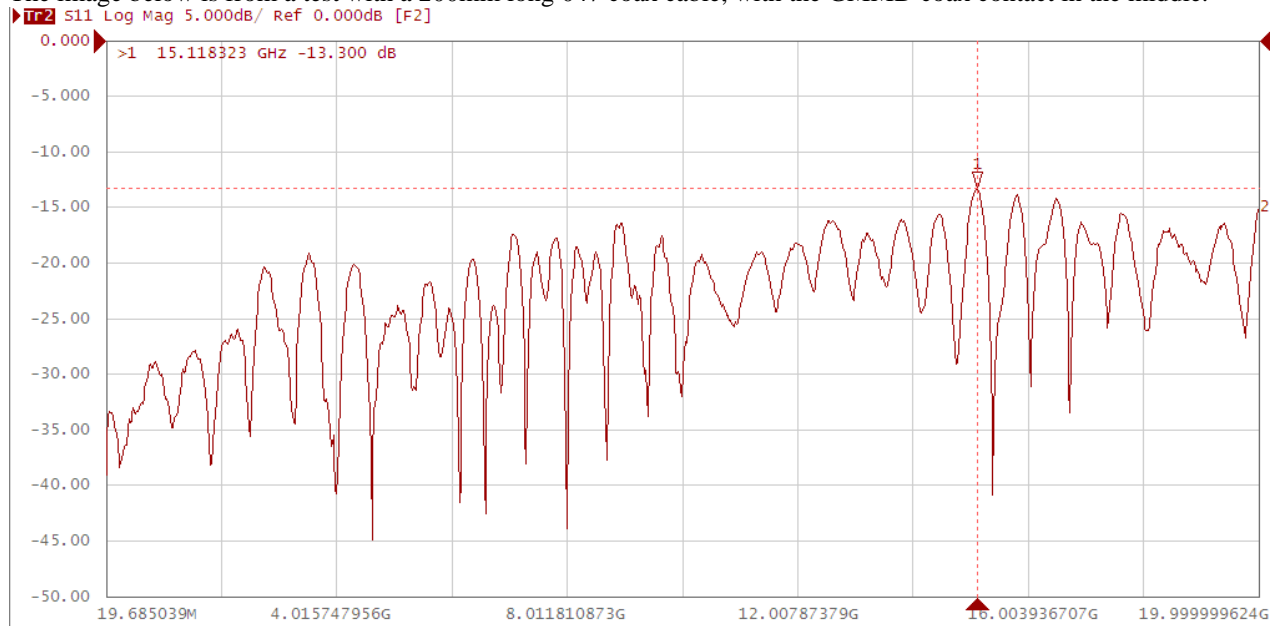
The receptacles are edge launched for horizontal PCB termination or can be for cable exit.



The GMMD range can house up to sixteen 50Ω coax contacts in a shell size 67 or eight in a shell size 31. Any combination of discrete lines plus coax can be considered.

GMMD COAX SIGNAL INTEGRITY REPORT

The image below is from a test with a 200mm long 047 coax cable, with the GMMD coax contact in the middle.



CONCLUSIONS

Glenair's GMMD range offers a proven contact system, (Glenair's twist pin) integrated into a well-known, reliable shell format.

SMT receptacles allow for simple PCB mounting and optimum high-speed performance.

This offers a low-risk solution to high data rate interconnects (up to and beyond 10Gb/s and >20GHz for RF applications).