



Series 80 Mighty Mouse Performance and Specifications Review

MIGHTY MOUSE THE NEW HIGH-PERFORMANCE STANDARD

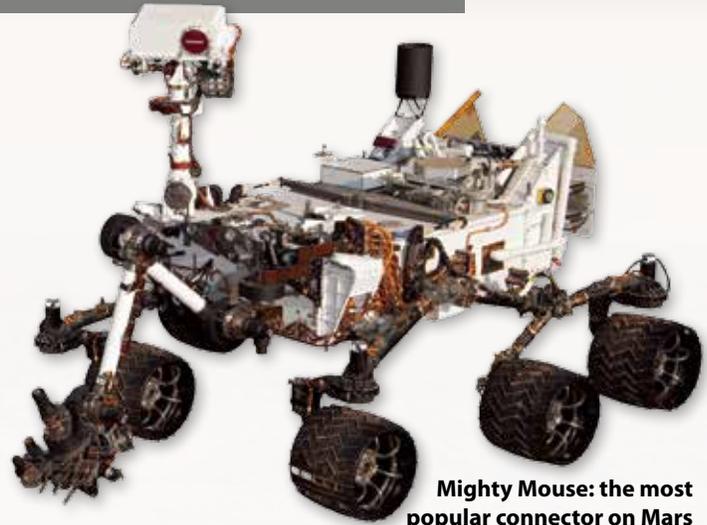
Glenair has recognized a growing need in tactical military, aerospace and specialty industrial markets for a connector series that mimics the electrical and mechanical performance of popular mil-standard connectors, such as MIL-DTL-38999, but in a smaller and lighter package. The Series 80 Mighty Mouse Connector is perfectly suited for the wide range of power and signal applications that depend on reliable environmental and mechanical performance and electromagnetic compatibility as well as high-speed applications such as gigabit Ethernet. Six different coupling styles are offered. Size #23 crimp contacts are standard, set on .076" centers. At just half the size and weight of D38999, the high-performance Mighty Mouse is now specified on hundreds of mission-critical interconnect applications worldwide and has become the de facto high-performance connector solution for many former users of D38999.

Glenair developed the Series 80 Mighty Mouse over a dozen years ago as a smaller and lighter version of D38999. Our goal was to radically reduce the size and weight of this flight-critical connector while maintaining its core performance features. Our miniaturization work took place in three key areas beginning with reduction of the shell package size and the integration of banding and shrink boot accessory functions. The integration of the backshell not only saves size and weight, it reduces cost and complexity.

Next, we designed and qualified our own SAE-AS39029 contacts based on the shorter "Series II" family of signal, data and specialty contacts. We also developed an extensive range of innovative short contacts including fiber optic and pneumatic applications. The development of our own range of shorter, Series II type contacts was a key step in gearing Mighty Mouse to meet any and all interconnection



**Mighty Mouse vs. 38999:
Half the Size and Weight**



Mighty Mouse: the most popular connector on Mars

challenges. The graphic on the next page shows just some of these high-performance contacts—from standard 39029 crimp signal and power contacts to our own unique shielded differential Twinax contact, miniaturized fiber optic contacts and highly specialized gas and pneumatic contact solutions.

Finally, we re-designed the sub-miniature D38999 insert arrangements to a higher density, ultra-miniature standard. Legacy circular connectors can be grouped into standard, miniature and subminiature families. These groupings reflect the packaging density and the contact size, and also represent the evolution of the connectors over the past 70 years. The standard group includes the venerable 5015's (including Glenair IT/ITS connectors) as well as the 28840 shipboard connector (which we also supply). Miniature circulars include the 26482 (Glenair IPT series), and the 26500 and 83723 which are still popularly specified in both military and commercial aerospace applications. The D38999 series, the only significant subminiature circular, has been a standard choice for high-performance systems for decades and Glenair supplies these connectors in every class including QPL hermetic versions, as well as environmentals, filters, fiber optics and more.

The Series 80 Mighty Mouse represents the evolution of circular technology beyond the 38999 sub-miniature format—a technology which is absolutely unmatched in today's interconnect industry. Glenair is the unchallenged

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Mighty Mouse contact sampler



design and market leader for reduced package size and weight connectors of this type and style. All Series 80 Mighty Mouse versions use #23 contacts on .076 inch (1.9 mm) spacing as core contact technology, and we have extended this model with special-purpose rectangular, modular and (even) higher-density connectors.

This then is the benchmark we have established with Mighty Mouse: Interconnect systems that are so small and light that they are weighed in tenths of grams while still meeting the performance specifications of even the most mission-critical of applications. But the benefits of connector package size reduction are not limited to the connector itself, as we will discuss in the following paragraphs.

Large format connectors: The hidden costs

Let's look at some of the hidden costs of large format/weight connectors, starting at the board. Obviously, large form factor I/O-to-board connectors, such as the array of D38999 Series III connectors shown to the right, force an expansion of board real estate. Larger boards in turn lead to larger form factor boxes, panels and enclosures. And of course larger gage wires and lower density contact arrangements lead to fatter and heavier interconnecting cables, including increases in accessory hardware size, and the amount of shielding and jacketing material required.

The final result is that electronic systems pay a huge penalty in size and weight. Obviously this is not a problem in every application. But with the lower power and signal voltage requirements of today's electronic systems, the opportunity is ripe to design systems with reduced size circuits and connectors.

The graphic says it all. Small connectors, small wires and contacts, higher density contact arrangements, integrated accessory functions and the many other design advancements of the Series 80 Mighty Mouse translate to smaller and lighter boards, boxes, cables and systems.



Mighty Mouse means smaller and lighter boxes, boards and cables compared to MIL-DTL-38999

Mighty Mouse Mechanical Performance: Equal to D38999

Mechanical

Nothing illustrates the performance potential of the Series 80 Mighty Mouse better than a cross-sectional view of the ultraminiature connector's architecture. Note that this plug and receptacle pair on page 7 share many of the same design features as D38999. Shells are precision machined and are designed for keyed mating and shell-to-shell bottoming. Sealing features include cork-and-bottle interfacial seals, O-ring seals and robust grommet wire seals. In the mated condition, the connectors are sealed IAW MIL-STD-810, method 512, 1 meter for 1 hour, and pass rigorous altitude immersion requirements IAW MIL-DTL-38999. Two-piece dielectrics and copper contact retention clips are modeled after D38999 and, together with the shell-to-shell bottoming, provide for equal levels of grounding and shell-to-shell resistance as D38999. Contacts, as we mentioned before, are either QPL AS39029 signal contacts, such as the size 23 pin and socket contacts shown in the diagram, or enhanced-durability contacts designed IAW AS39029 requirements (in the case of our fiber optic solutions and proprietary shielded contacts). Note that Mighty Mouse offers either an integrated band porch or accessory threads as a standard feature of the design.



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Mechanical Perf. Feature/Connector Class	MIL-DTL-38999	Mighty Mouse
Full Mate Visual Indicator	Yes	Yes
Integrated Contact Retention System	Yes	Yes
Interfacial and Grommet Seals	Yes	Yes
Fully Shielded	Yes	Yes
Lightning Strike	Yes	Yes
Shell-to-Shell Bottoming	Yes	Yes
Threaded/Toothed Accessory Interface	Yes	Yes
Full Range of Assembly Tools	Yes	Yes
Environmental	Yes	Yes
Space-Grade	Yes	Yes
Hermetic	Yes	Yes
EMI Filter	Yes	Yes
3500 PSI Submersible	No	Yes
Ground Plane	Yes	Yes
ESD	Yes	Yes
Lanyard Release	Yes	Yes
Bulkhead Feed-Thru	Yes	Yes
Sav-Con® Connector Saver	Yes	Yes

The table shown above lists some of the core mechanical features of the Mighty Mouse, again in lock-step with D38999. Note that all the desirable features of the 38999 are duplicated in the Mighty Mouse: from a full-mate visual indicator, to its adequate mass in resistance to lightning strike.

Service Class

You will see the term Service Class still used in many connector catalogs. This pertains to the environmental parameters in which the connector will operate successfully. For example, service class defines the level of environmental sealing, or chemical resistance, or the ability to withstand vibration, or corrosion resistance or operating temperature. Some examples from 38999 Series III: class G for space grade, class H for hermetic, class K for firewall. These class grades are all fully supported and qualified in the Series 80 Mighty Mouse. For a detailed report on all these benchmarks, please see Section B of this catalog, where a complete performance specification is supplied. In addition, we are pleased to offer our Mighty Mouse customers detailed test reports on any aspect of the connector's performance. As we like to point out, Mighty Mouse is a mature connector series with over twelve years of successful deployment in high-reliability applications. And we have the testing to prove it.

See the table above for a little more detail on connector classes. Note that Mighty Mouse again stacks up well against D38999 and even surpasses thirty-eight-nine in the category of high-pressure submersible interconnects. From standard environmentals to space-grade versions, hermetics, EMI filters, ground plane designs and more, Mighty Mouse delivers every class of connector available in D38999. And

these are not just special capabilities available with long-lead times. These products are all available as standard catalog offerings, with thousands of popular part numbers available for immediate same-day shipment.

Wire Termination

Turning to wire termination, Mighty Mouse is again the equal of its larger and heavier role-model. We offer straight and right-angle PC tail terminations, single and double-ended cordsets (which by the way are available as quick-turn catalog items, even including high-speed variants, shielded and overmolded versions), solder cup, and of course crimp. We even offer flex terminations and back-to-back jumpers.

Plating

Glennair is a major innovator in material and plating technologies, particularly for conductive and RoHS (cadmium-free) applications. Some of the more popular Glennair material and plating solutions include plated composites, RoHS compliant Nickel-PTFE and electroless-nickel—all available for Mighty Mouse. Glennair has mastered the difficult challenges of fielding plated specialty metal parts in harsh and corrosive applications and can offer standard Mil-qualified formulas as well as unique solutions for special applications. All our materials are sourced in accordance with DFARS 252.225-7014 Preference for domestic specialty metals requirements.

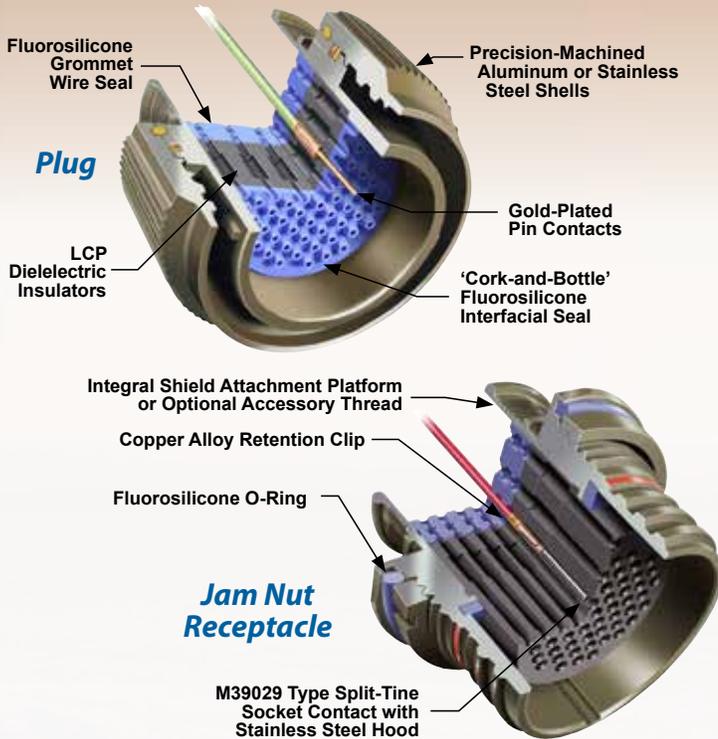
Mighty Mouse Performance: Superior to D38999

We've already offered quite a few facts demonstrating how Mighty Mouse, even with its smaller size and weight, is equal to the performance standards set by MIL-DTL-38999. So next we'll take a look at some of the ways this ultraminiature connector actually outperforms 38999.

More Shell Sizes & Contact Arrangements

First off, Mighty Mouse offers a greater range of shell sizes and contact counts for more efficient matching of circuit requirements to available shell sizes and insert arrangements. This, combined with the broader range of coupling styles offered by Mighty Mouse, makes the connector series far more versatile than 38999. In other words, users can standardize on Mighty Mouse more readily than 38999—throughout their entire range of application requirements—without having to turn to a different series with new contact termination tooling, assembly procedures, quality standards and so on to meet unique or unanticipated circuit requirements.

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A Broader Range of Contacts

Both 38999 and Mighty Mouse offer an incredibly broad range of signal, data, power and specialty contacts. But Mighty Mouse once again outstrips 38999 with a broader range of contact sizes and types including layouts with size 23, 20, 20HD, 16, 12, and size 8 contacts and cavities. Mighty Mouse also offers a broader range of hybrid layouts and more sizes and types of fiber optic termini, pneumatic termini and, opto-electric contacts, low-insertion force contacts and more. In fact, no other connector series in our industry supports as diverse a range of contact technologies as Mighty Mouse.

Mighty Mouse Rectangular Version

The Series 79 Micro-Crimp takes all the attributes of the Mighty Mouse and packages them up in a high-performance rectangular.

Like the Mighty Mouse, the Micro-Crimp connector features crimp, rear-release size #23 contacts on .075 inch (1.9 mm) spacing, as well as size #12 and #16 power and coaxial crimp contacts in a range of hybrid layouts. Available in 29 insert arrangements, Micro-Crimp provides superior EMI shielding and improved environmental sealing compared to M24308 D-sub connectors. Micro-Crimp plugs include an EMI spring made of gold plated stainless steel or copper alloy. Right angle PCB receptacles feature an aluminum alloy EMI shroud.

Micro-Crimp meets the shielding effectiveness requirements of EIA 364-66, and fluorosilicone interfacial seals and grommets, and watertight EMI gaskets for panel mounts ensure adherence to MIL-STD-810F for 1 meter immersion for 1 hour. The Series 79 Micro-Crimp is ideally suited for blind-mate rack and panel and/or module-to-chassis applications and is a perfect complement to Mighty Mouse in systems that require both high-density, stackable connectors as well as circulars for ease of mating.

Constant, Relentless Innovation

Another strength of Mighty Mouse compared to D38999 is the relentless innovation that has brought the series to a point where it now outstrips the series in versatility and application. Glenair also offers a range of series extensions including high-speed, high-density, USB equipped, and fiber-optic variants. High-quality documentation, including performance specifications and comprehensive test reports are available for every solution. Complete information is available in this catalog, and at www.glenair.com.

More Wire Sizes Supported

Mighty Mouse also offers broader wire support, from size 22 to 28; turnkey cordsets—right out of the catalog with short leadtimes and guaranteed quality; Integrated band porch or accessory thread interface; Split shell Cobra connectors (more on this later) for ultra-low-profile wire routing; high speed PFA Teflon inserts for optimized high-speed performance; a compatible rectangular series—Micro-Crimp—that features the exact same contacts, density and performance as Mighty Mouse; and last but not least, the performance benefits of lower harmonic shock susceptibility that comes from the reduced mass of Mighty Mouse compared to 38999.

Six Mating Styles

Turning to mating technology, MIL-DTL-38999 offers four mating styles: two bayonets, the popular triple-start threaded and the rarely used breach-lock series IV version. Mighty Mouse offers six mating technologies: The series 800 UNF thread version designed for use in small instruments; the Series 801—our most popular style—that combines small size with rapid double-start stub acme mating; The threaded-coupling Aqua Mouse with its high-pressure piston seal for 3500 PSI applications; the quarter-turn-to-full-mate series 803 bayonet; the Quick disconnect series 804 push-pull; and the Series 805 with triple-start coupling and ratcheting anti-decoupling mechanism—an exact work-alike to the series III 38999—of course with reduced size and weight as the principle differentiator.