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In This Issue:

Series 80 "Mighty Mouse" Connectors and Cables for Mission-Critical Applications

Glenair®

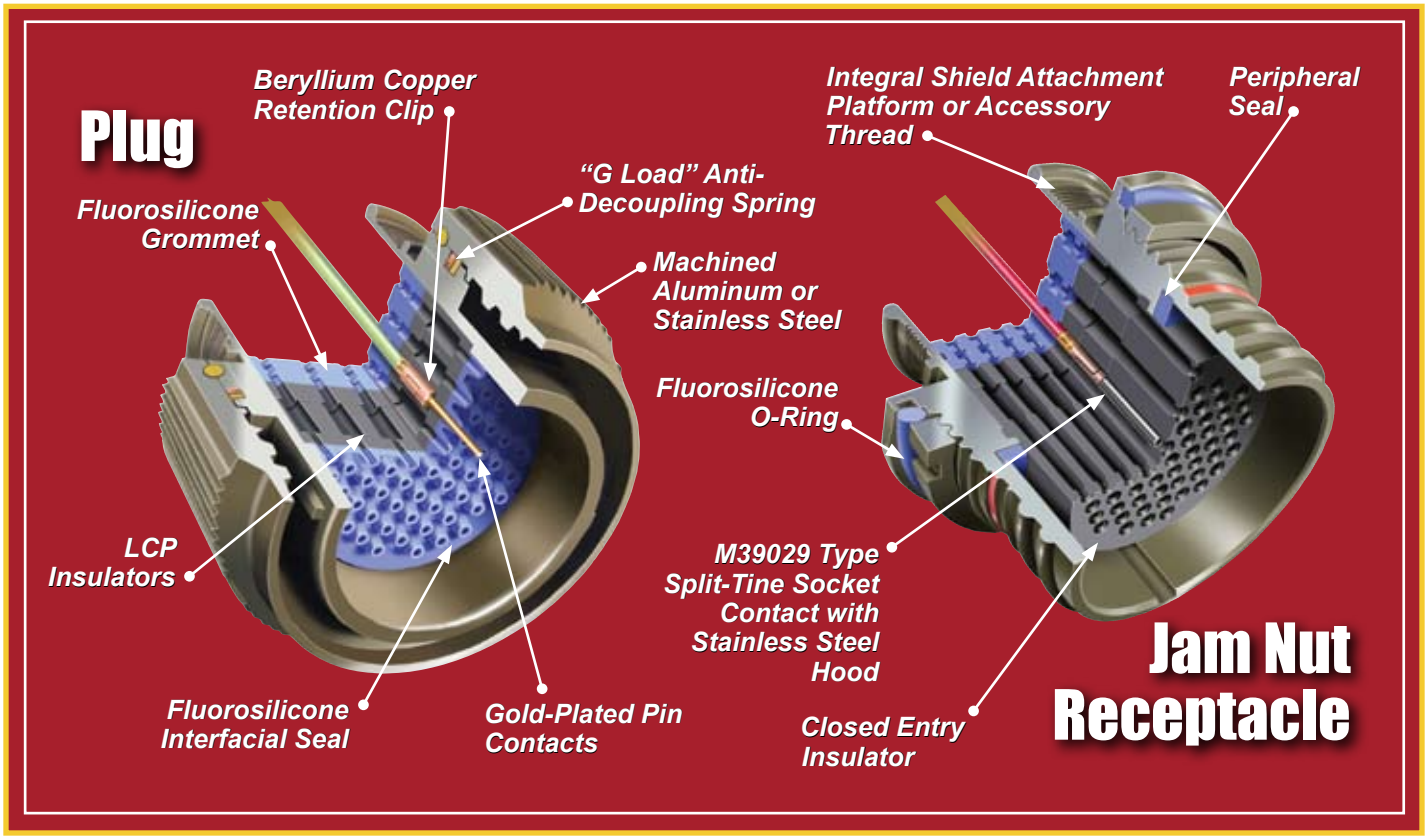
Half the Size and Weight of MIL-DTL-38999

Glenair Series 80 "Mighty Mouse" Connectors and Cables— Awesome Performance, Itty-Bitty Package

Almost three years ago, *QwikConnect* featured our Series 80 "Mighty Mouse" connector with a cover story titled, "Faster, Smaller, Lighter: The Glenair Series 80 "Mighty Mouse" Connector Comes of Age." Well, we're proud to say that since then this miniaturized connector product line has continued to evolve into an even more mature and versatile interconnection system—approved for use in such diverse applications as the Joint Strike Fighter and the Ground Soldier Ensemble (GSE).

The Series 80 "Mighty Mouse" now encompasses 34 fully-tooled signal, power and hybrid layouts with a variety of application-specific backshells, accessories and cabling options. The "Mighty Mouse" is designed for broad application in aerospace and defense systems and is ideally suitable for high speed data-transfer, RF communications, video and power management applications. The connector series supports protocols such as Ethernet, USB 2.0 and IEEE 1394 and can be supplied in cable form, ready for action.

By design, the Series 80 "Mighty Mouse" Connector is intended for *any* high-reliability interconnect application that requires robust environmental, electrical and mechanical performance *as well as* reduced size and weight.



The Connector for Mission-Critical Applications

The Series 80 "Mighty Mouse" Connector offers virtually equal performance to MIL-DTL-38999 interconnects with up to 71% weight and 52% size savings for similar contact layouts.

Over the last several years, "Mighty Mouse" has become the connector of choice for wearable soldier applications including helmet subsystems, power supplies, radio and data communications, weapon platforms and soldier controls. The value of integrated, soldier-wearable technologies such as GPS navigation, Blueforce tracking systems, laser rangefinders, thermal weapon sighting and more cannot be overestimated. Modern soldier systems are designed to place the soldier at the center of a powerful information network, and these are the technologies that make it happen.

Glenair's ability to work hand-in-hand with equipment manufacturers to devise the best possible interconnection solutions has helped contribute to the reliability of these vital soldier tools. We're proud to have played a role, however small, in keeping our fighting forces better equipped as they face the rigors of the battlefield. In addition to soldier systems, "Mighty Mouse" is now a key interconnect component in such diverse application environments as medical equipment, commercial aerospace, geophysical exploration and military vehicles.

SERIES 800

Original "Mighty Mouse" with UNF Threads

A general purpose connector for high-speed Ethernet switches, tactical equipment and instrumentation.

SERIES 801

Double-Start ACME Thread

More rugged keys and threads compared to Series 800. Faster mating, slightly larger than Series 800.

SERIES 802

"Aqua Mouse" 3500 PSI

Rugged stainless steel shell with Marine-Bronze coupler. 3500 PSI hydrostatic pressure rated in mated condition.

SERIES 803

Bayonet

Quick-mating, light duty, general purpose. Not rated for immersion. 50 milliohms shell-to-shell resistance.

SERIES 804

Push-Pull

Breakaway connector for headsets and tactical equipment. Gold-plated spring for long mating life and superior EMI shielding.

SERIES 805

Triple-Start ACME Thread

"Clicker" ratchet mechanism and ground spring for military airframes and avionics boxes. Fast-mating, D38999 equivalent.

Different application requirements call for different interconnect solutions. The Series 80 "Mighty Mouse" Connector has been designed to address virtually every unique application requirement faced by a high-performance circular connector. Each coupling configuration delivers robust environmental/EMI performance while reducing the size and weight of the overall interconnect package.

	SERIES 800	SERIES 801
		
Description	Original "Mighty Mouse" with UNF Threads	Double-Start ACME Thread
Number of Contacts	1 to 37	1 to 130
Coupling	Threaded Coupling with 4 ½ Turns to Full Mate	Threaded Coupling with 1 ½ Turns to Full Mate
Water Immersion, Mated	MIL-STD-810 Method 512 Mated 1 Meter for 1 Hour	MIL-STD-810 Method 512 Mated 1 Meter for 1 Hour
EMI Shielding	Good	Good
Vibration and Shock	37 g's Random Vibration; 300 g's Shock	37 g's Random Vibration; 300 g's Shock
Mating Cycles	2000 Cycles	2000 Cycles
Electrical Performance	#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC	#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC
Proven Performance Applications	Commercial air frame sensors; UAV telemetry; Tactical computers; field radios	Military air frame; Dismounted soldier; Tactical ground weaponry; Avionic (FLIR) systems

The "Mighty Mouse" features #23 contacts to accept #22 to #28 wire. Contact spacing is .076." for #23 contact layouts. Size #12, #16 and #20 layouts are also available for higher current requirements and for coaxial contact accommodation. Even with its smaller package and reduced-size arrangements, the Series 80 "Mighty Mouse" maintains the same approximate electrical and mechanical performance as larger and heavier Military Standard environmental connectors.

SERIES 802	SERIES 803	SERIES 804	SERIES 805
			
"Aqua Mouse" 3500 PSI	Bayonet	Push-Pull	Triple-Start ACME Thread
1 to 130	1 to 55	1 to 85	1 to 130
Threaded Coupling with UN Threads	Push-to-Mate, ¼ Turn to Lock	Quick-Disconnect	One Full Turn for Full Mate
1000 Feet Immersion in Salt Water (mated)	Splashproof only	MIL-STD-810 Method 512 Mated 1 Meter for 1 Hour	MIL-STD-810 Method 512 Mated 1 Meter for 1 Hour
Good	Fair	Very Good	Excellent
37 g's Random Vibration; 300 g's Shock	37 g's Random Vibration; 300 g's Shock	37 g's Random Vibration; 300 g's Shock	37 g's Random Vibration; 300 g's Shock
2000 Cycles	250 Cycles Aluminum 2000 Cycles SST	2000 Cycles	500 Cycles
#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC	#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC	#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC	#12: 23 AMP, 1800 VAC #16: 13 AMP, 1800 VAC #23: 5 AMP, 500 VAC
Pipe line inspection equipment; Well logging; Amphibious vehicles; Unmanned submersibles	Soldier system radios; Autosport diagnostics; Airborne surveillance; Communication systems	Helmet breakaway connector; QDC battery; Missile applications; Weapon interconnects	Military air frame; Joint Strike Fighter; F-16

All connectors in the Series 80 family are available with rear-release crimp contacts or with PC tail or solder cup terminations. Shell styles, including in-line plugs, square-flange and jam-nut receptacles are available for all types. Integrated banding platforms for EMI shield termination or rear-end threads for backshell accessories are also standard throughout the line.

Mighty Mouse and Unmanned Aerial Vehicle Systems

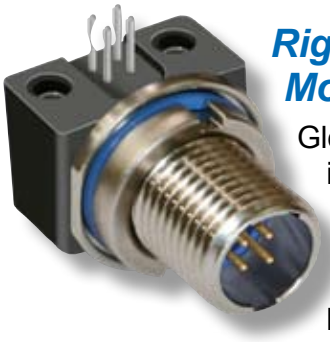
Unmanned Aerial Vehicles, or UAVs, are not new to the battlefield. As early as the mid-19th century, Austrian unmanned balloons loaded with explosives were set adrift over enemy lines. In the First World War, unmanned "aerial torpedoes" were used against zeppelins. By the 1960s, Air Force drones—launched and controlled from a DC-130 and equipped with high-speed cameras—were used to spy over enemy territories. This type of UAV became the *de facto* spy drone well into the modern era, but was still limited by its cumbersome takeoff and recovery requirements.

Enter the miniature UAV. These "MUAVs" resemble model planes in size but pack a high-tech payload of electronic surveillance equipment. Backpackable MUAV's can be portaged into the field and launched manually or via a bungee system. Field-deployable drones are equipped with infrared cameras and other sensors, which can be controlled remotely affording soldiers greater safety and increased situational awareness on the battlefield.

As UAVs continue to evolve to smaller and lighter formats, the task of integrating rugged, high-reliability electronics becomes a major challenge. Unlike the drones of yesteryear, modern UAVs have even more stringent electrical and mechanical performance requirements for their interconnect assemblies.

The Series 80 "Mighty Mouse" connector is the ideal choice for soldier deployable MUAV's, ground robotics and other remote-controlled systems. The connector series is extremely rugged, environmentally sealed and used widely in soldier electronic systems such as controllers, ruggedized computers, and power supplies.

SERIES 80 "M



Right Angle Board Mount Connectors

Glenair has developed the interconnect industry's first military, ruggedized solution for miniaturized right angle printed circuit board connectors. Until now, it has not been easy to find the right waterproof, fully shielded connector to replace RJ-45's for military-grade Ethernet switches and other high speed differential impedance applications. Glenair's new right angle connectors offer military grade performance in a small, economical package. Ideal for 100/1000BASE-T or IEEE 1394, these connectors are rated for MIL-STD-810 Method 512 immersion. Eliminate the extra labor to install flex or wire jumpers from your board to conventional mil spec circular connectors. Available in the Series 800 and 801 "Mighty Mouse" connector styles, this new product finally solves significant packaging problems for military Ethernet and other high speed serial data systems.

Series 805 "Mighty Mouse" Triple-Start: A True D38999 Series III Work-Alike

The new Series 805 connector offers the ease of triple-start threading with upgraded EMI protection and vibration resistance in a miniaturized package. Developed to provide significant performance enhancements compared to other "Mighty Mouse" versions, the Series 805 incorporates a ratchet mechanism in the coupling nut to prevent de-mating under severe vibration and

MIGHTY MOUSE" HIGHLIGHTS

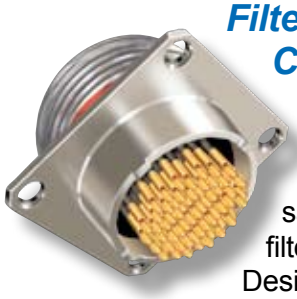
shock conditions. EMI performance is outstanding due to a serpentine ground spring on the plug barrel. This nickel plated beryllium copper spring assures low shell-to-shell resistance. Shielding effectiveness exceeds 60 dB through 15 GHz. The Series 805, although slightly larger than other Series 80 versions, saves size and weight compared to D38999 connectors with no compromise in performance.

Series 802 "Aqua Mouse" Submersible 3500 PSI-Rated Connector

Now available in all standard "Mighty Mouse" contact layouts and shell sizes and a wider choice of finish treatments, the Series 802 "Aqua Mouse" delivers high pressure sealing and rugged design in a miniature package. Fully submersible and rated to 3500 PSI, the "Aqua Mouse" withstands exposure to corrosive environments and high pressure. These connectors feature 316 stainless steel housings and anti-galling marine-bronze coupling nuts. Printed circuit board versions are available, along with hermetic receptacles.

Hermetic "Mighty Mouse" Receptacles

When your application calls for a miniaturized hermetic for a sealed box or instrument, "Mighty Mouse" hermetics are the answer. Made of stainless steel with a glass seal, "Mighty Mouse" hermetics are available in all Series 80 receptacle styles with solder cup or PC tail contacts and are 100% tested to meet 1 X 10^{-6} cc/sec helium leakage. These sealed receptacles achieve an open face pressure rating of 1,000 PSI.



Filtered "Mighty Mouse" Connectors

Glenair's filtered "Mighty Mouse" connectors provide significant size and weight savings compared to larger filtered mil-spec connectors. Designed to meet stringent aerospace performance requirements, "Mighty Mouse" filtered connectors are offered with standard filter arrays or with customized filters to meet your specific needs. Transient voltage suppression and space-grade bake-out processing is also offered.

Series 80 Cordsets for Harsh Environments

Available in all Series 80 styles and shell sizes, Glenair's ASAP "Mighty Mouse" overmolded cordsets offer watertight sealing and excellent cold temperature flexibility. Features include expanded wire size choices, right angle overmolding, and low smoke, zero halogen jacketing for installation where combustion toxicity is a concern. These cables are 100% tested and ready to use. Standard overmolded cables feature polyurethane jackets or rubber jackets with flexible strain reliefs. Estane® polyurethane jacketing resists abrasion, provides excellent flexibility, and withstands continuous exposure to weather and solvents. Shielded 90% braid coverage and BAND-IT® shield termination meet EMI requirements. Ordering is simple: no minimums, and cordsets are made-to-order from stocked connectors and cable.

SERIES 80 "MIGHTY MOUSE" HIGHLIGHTS

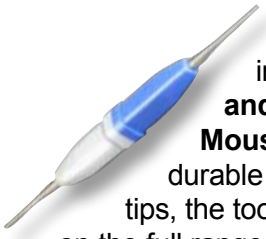
Fiber Optic and Hybrid "Mighty Mouse" Connection Systems

We have engineered 2, 3 and 4 channel fiber optic layouts into a size 9 "Mighty Mouse" package for both high-speed as well as hybrid power and signal applications. Available in both plug and jam nut receptacle styles, this new miniaturized fiber optic product accommodates Glenair's high performance front release size 16 custom termini (available separately). Also available is a hybrid "Mighty Mouse" connector with one center size 16 optical terminus surrounded by ten signal contacts. Call Glenair for custom Series 80 optical and hybrid layouts, shell styles and shell sizes.

"Mighty Mouse" Connection System Accessories

"Mighty Mouse" Backshells for all Series 80 connectors are reduced in size compared to standard industry backshells and are specifically designed to fit the cable sizes used with these miniaturized connectors. Standard "Mighty Mouse" backshells come in three versions: environmental, EMI and environmental/EMI. Environmental backshells feature silicone o-rings for a watertight seal. EMI backshells feature an EMI ring for easy shield termination. Environmental/EMI versions include both the o-ring and EMI shield termination ring. Straight entry backshells are available with direct coupling or rotatable coupling. 45° and 90° adapters feature rotatable coupling nuts.

"Mighty Mouse" Heat-Shrink Boots provide strain relief and environmental protection. These adhesive-lined boots fit all Series 80 connectors. Choose standard Mil-spec grade material, or low smoke, zero halogen material when toxicity is a concern. Available in straight or 90° versions. All sizes are in stock for immediate delivery.



Rounding out our range of new accessories, Glenair has introduced a **new Contact Insertion and Removal Tool for "Mighty Mouse" crimp contacts**. Made of durable plastic with high-strength steel tips, the tool provides superior performance on the full range of wires sizes accommodated by the "Mighty Mouse" connector family. Tools are reasonably priced and provide reliable performance.

New Power and Coaxial Layouts

We now offer 34 contact layouts in all Series 80 shell styles. These arrangements accept size #12 and #16 contacts for power and RF requirements.

"Mighty Mouse" Sav-Con® Connector Savers

These adapters prevent wear and damage to mission-critical equipment. Contact Glenair for more information.

PCB Grounding: Another Glenair Innovation

Customers have asked for a better way to attach connector shells to traces on PC boards and flex circuitry. The Glenair Solution: gold-plated copper alloy ground pins, factory-installed into the connector shell for direct soldering to the PC board.

SERIES 80 "MIGHTY MOUSE" CONTACTS AND CONTACT ARRANGEMENTS

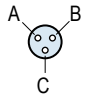
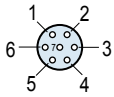
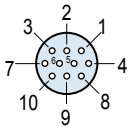
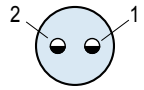
Glenair offers the most common Series 80 insert arrangements and terminations as standard catalog (COTS) products. Insert arrangements are available for as few as 1 and as many as 130 contacts. Custom layouts, such as might be required to accommodate a different gage or type of contact may be readily incorporated into existing shell/coupling designs. In addition to all of this technical superiority, our customers find the Glenair "Mighty Mouse" technical support and sales team a pleasure to work with. We turn around quotes fast, fulfill sample requests with pleasure, and maintain a huge stock of finished connectors and components to assure deliveries to meet even the most aggressive and expedited requirements. Glenair also delivers extremely fast turnaround on non-standard layouts and, depending on quantities and other aspects of the deal, completes all NRE work with little or no charge to the customer.

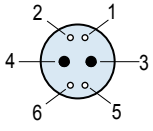
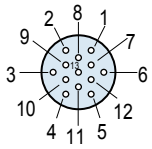
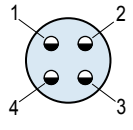
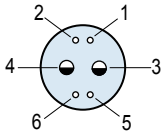
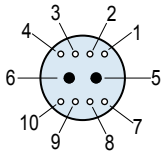
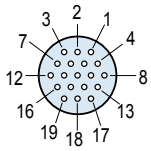
Series 80 "Mighty Mouse" Contact Arrangements

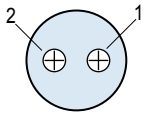
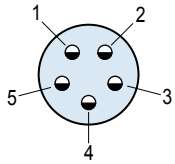
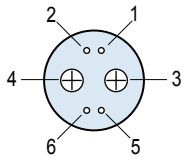
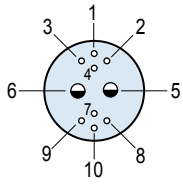
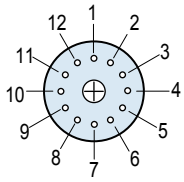
		Contact Size and Quantity				Contact Arrangement					
		#23	#20	#16	#12	Series 800	Series 801	Series 802	Series 803	Series 804	Series 805
Size #23 Contacts 5 Amp Max. Current 500 VAC #22-#28 AWG		3				5-3	5-3	5-3	5-3	5-3	Not Avail.
		4				6-4	6-4	6-4	6-4	6-4	8-4
		7				6-7	6-7	6-7	6-7	6-7	8-7
		10				7-10	7-10	7-10	7-10	7-10	9-10
		13				8-13	8-13	8-13	8-13	8-13	10-13
		19				9-19	9-19	9-19	9-19	9-19	11-19
		26				10-26	10-26	10-26	10-26	10-26	12-26
		37				12-37	13-37	12-37	12-37	12-37	15-37
		55				Not Avail.	16-55	14-55	14-55	14-55	18-55
		85				Not Avail.	17-85	15-85	Not Avail.	15-85	19-85
		130				Not Avail.	21-130	21-130	Not Avail.	Not Avail.	23-130
Size #16 Contacts 13 Amp Max. Current 1800 VAC #16-#20 AWG				1		6-1	6-1	6-1	6-1	6-1	8-1
				2		8-2	8-2	8-2	8-2	8-2	10-2
				4		9-4	9-4	9-4	9-4	9-4	11-4
				5		10-5	10-5	10-5	10-5	10-5	12-5
				7		12-7	13-7	12-7	12-7	12-7	15-7
				12		Not Avail.	16-12	14-12	14-12	14-12	18-12
				14		Not Avail.	17-14	15-14	Not Avail.	15-14	19-14
				22		Not Avail.	21-22	21-22	Not Avail.	21-22	23-22
Size #12 Contacts 23 Amp Max. Current 1800 VAC #12-#14 AWG					1	7-1	7-1	7-1	7-1	7-1	9-1
					2	12-2	13-2	12-2	12-2	12-2	15-2
					3	12-3	13-3	12-3	12-3	12-3	15-3
					5	Not Avail.	16-5	14-5	14-5	14-5	18-5
					7	Not Avail.	17-7	15-7	15-7	15-7	19-7
					12	Not Avail.	21-12	21-12	Not Avail.	Not Avail.	23-12
Contact Arrangements with Mixed Size (Combo) Layouts		4	2			8-200	8-200	8-200	8-200	8-200	10-200
		8	2			9-201	9-201	9-201	9-201	9-201	11-201
		4		2		9-200	9-200	9-200	9-200	9-200	11-200
		8		2		10-202	10-202	10-202	10-202	10-202	12-202
		4			2	10-201	10-201	10-201	10-201	10-201	12-201
		6			2	12-200	13-200	12-200	12-200	12-200	15-200
		10			2	12-201	13-201	12-201	12-201	12-201	15-201
		12			1	10-200	10-200	10-200	10-200	10-200	12-200

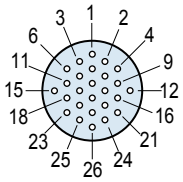
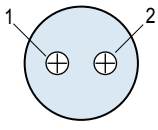
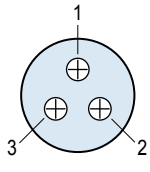
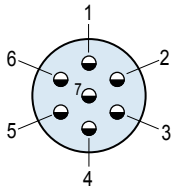
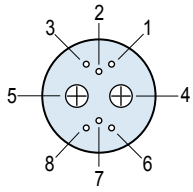
SERIES 80 "MIGHTY MOUSE" CONTACT ARRANGEMENTS

Mating Face View of Pin Connector (socket connector numbers are reversed)

Contact Legend #23 ◦ #20 ● #16 ◒ #12 ⊕							
Series 800, 801, 802, 803, 804	5-3	6-1	6-4	6-7	7-1	7-10	8-2
Series 805	Not Avail.	8-1	8-4	8-7	9-1	9-10	10-2
No. of Contacts	3	1	4	7	1	10	2
Contact Size	#23	#16	#23	#23	#12	#23	#16
DWV Voltage (VAC)	500	1800	500	500	1800	500	1800
Current Rating (Amps)	5 Amps	13	5	5	23	5	13

Contact Legend #23 ◦ #20 ● #16 ◒ #12 ⊕						
Series 800, 801, 802, 803, 804	8-200	8-13	9-4	9-200	9-201	9-19
Series 805	10-200	10-13	11-4	11-200	11-201	11-19
No. of Contacts	2 4	13	4	2 4	2 8	19
Contact Size	#20 #23	#23	#16	#16 #23	#20 #23	#23
DWV Voltage (VAC)	1000 500	500	1800	1800 500	1000 500	500
Current Rating (Amps)	7 5	5	13	13 5	7 5	5

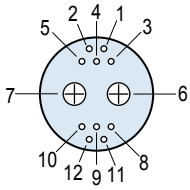
Contact Legend #23 ◦ #20 ● #16 ◒ #12 ⊕					
Series 800, 801, 802, 803, 804	10-2	10-5	10-201	10-202	10-200
Series 805	12-2	12-5	12-201	12-202	12-200
No. of Contacts	2	5	2 4	2 8	1 12
Contact Size	#12	#16	#12 #23	#16 #23	#12 #23
DWV Voltage (VAC)	1800	1800	1800 500	1800 500	1800 500
Current Rating (Amps)	23	13	23 5	13 5	23 5

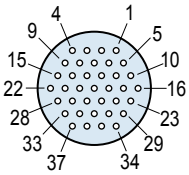
Contact Legend #23 ◦ #20 ● #16 ◒ #12 ⊕					
Series 800, 802, 803, 804	10-26	12-2	12-3	12-7	12-200
Series 801	10-26	13-2	13-3	13-7	13-200
Series 805	12-26	15-2	15-3	15-7	15-200
No. of Contacts	26	2	3	7	2 6
Contact Size	#23	#12	#12	#16	#12 #23
DWV Voltage (VAC)	500	1800	1800	1800	1800 500
Current Rating (Amps)	5	23	23	13	23 5

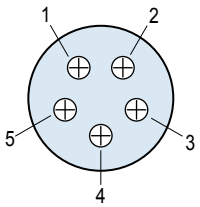
SERIES 80 "MIGHTY MOUSE" CONTACT ARRANGEMENTS

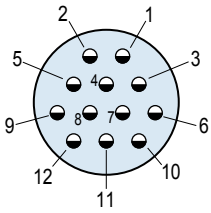
Mating Face View of Pin Connector (socket connector numbers are reversed)

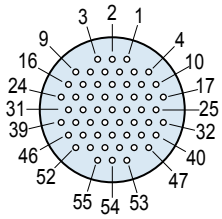
Contact Legend
#23 ○ #20 ● #16 ◒ #12 ⊕





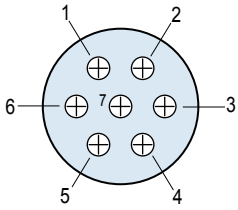


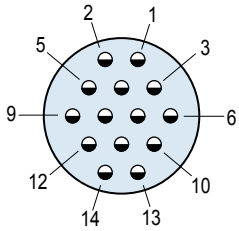


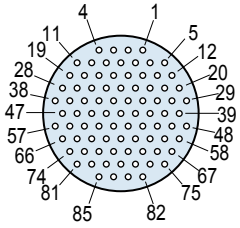


Series 800	12-201		12-37	Not Available	Not Available	Not Available
Series 802, 803, 804	12-201		12-37	14-5	14-12	14-55
Series 801	13-201		13-37	16-5	16-12	16-55
Series 805	15-201		15-37	18-5	18-12	18-55
No. of Contacts	2	10	37	5	12	55
Contact Size	#12	#23	#23	#12	#16	#23
DWV Voltage (VAC)	1800	500	500	1800	1800	500
Current Rating (Amps)	23	5	5	23	13	5

Contact Legend
#23 ○ #20 ● #16 ◒ #12 ⊕

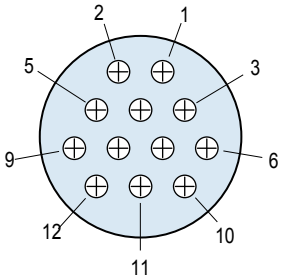


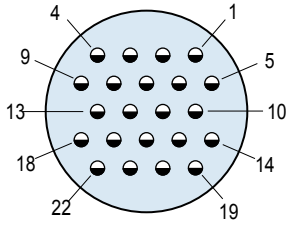


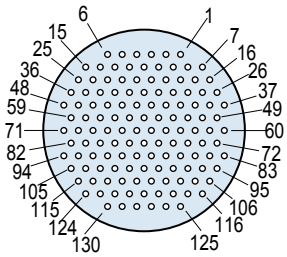


Series 802, 804	15-7	15-14	15-85
Series 801	17-7	17-14	17-85
Series 805	19-7	19-14	19-85
No. of Contacts	7	14	85
Contact Size	#12	#16	#23
DWV Voltage (VAC)	1800	1800	500
Current Rating (Amps)	23	13	5

Contact Legend
#23 ○ #20 ● #16 ◒ #12 ⊕







Series 801, 802	21-12	21-22	21-130
Series 805	23-12	23-22	23-130
No. of Contacts	12	22	130
Contact Size	#12	#16	#23
DWV Voltage (VAC)	1800	1800	500
Current Rating (Amps)	23	13	5

BORN IN THE U.S.A.

Series 80 "Mighty Mouse" Connectors are manufactured at Glenair's Air Way factory (some 450,000 square feet) in Glendale, California. Vertically integrated, Glenair directly manages all connector, cable and accessory fabrication, including precision machining, hermetic firing, component assembly, contact termination, potting and electrical testing. For custom connector and cable applications, we operate a dedicated prototype development shop complete with CNC machining and EDM equipment. In addition, a wide range of electrical, mechanical and environmental tests are completed in-house including dielectric withstanding voltage, contact resistance, contact engagement and separation, mating cycles, pressure testing and outgassing. Glenair is well-versed in connector design and development and has been producing and qualifying military-standard type connectors for over 35 years.

Our Microway facility in Chicago, a 35,000 square foot plant, contributes additional design and tooling resources to the Series 80 "Mighty Mouse." Our UK Factory in Mansfield, England contributes performance testing and assembly of bespoke cable assemblies for UK and other EU customers. Glenair has a reputation for generosity in engineering services and technical support, with dozens of engineers and draftsman dedicated to connector and connector hardware assignments in our main Glendale facility. Application engineering is available free upon request.

Extraordinary Weight Savings

Glenair has qualified thousands of weight saving connectors, backshells, fiber optic components, conduit assemblies and junction-box enclosures to existing and new Mil-Specs. For the Series 80 "Mighty Mouse" Connector however, we followed the D38999 specification as a guideline for benchmarking performance standards, but took a radically different approach from the Mil-Spec when designing the physical envelope of the product.

Glenair can deliver additional size and weight saving technologies for reduced package-size applications—both mil-qualified and COTS. We can, for example, supply an entire interconnect system—connectors, backshells, junction boxes, conduit systems and fittings, EMI shielding and so on—all from weight saving composite thermoplastic materials. Our composite interconnect products are currently in wide use in both military and commercial systems. Glenair is also an innovator in the development of fiber optic systems for use in tactical applications as a weight saving media replacement for copper conductors. Fiber optic "Mighty Mouse" connectors are available.

In addition to weight reduction, composite thermoplastic interconnect components offer superior corrosion protection and better resistance to vibration and shock. Glenair uses the most advanced engineering plastics available for our line of composite connectors and accessories. The components undergo rigorous performance testing and are produced IAW AS85049, MIL-DTL-38999 and other standards regulating strength and durability of interconnect systems.

From our composite and fiber optic products to our new Series 80 "Mighty Mouse," Glenair is ideally positioned to solve your most challenging size or weight reduction requirements. We invite you to select standard catalog products, or to leverage our extensive in-house engineering resources, to develop targeted solutions which address that most difficult of all design requirements: enhancing performance while reducing weight.

A Soldier's Story

Since the Series 80 "Mighty Mouse" has officially become *the* standard connector for modern soldier systems—with their powerful electronic gear, weaponry and other specialized equipment—we thought it would be ironic to recount a soldier story from an era when soldier equipment amounted to little more than a bolt-action rifle, a pair of boots and a helmet.

The Amazing Sergeant Kunze

This is a story from World War I: In February 1916, a change in the top command and a general redeployment of troops was ordered at what was universally considered the strongest fort in the world: *Fort Douaumont* in Verdun. In the confusion of the massive troop transfer, a member of the outgoing General's staff forgot to transmit a final, vital order—the order that would summon a new contingent of French soldiers to re-occupy the fort.

Now it happened that a small group of 10 German "forward troops" had been sent out to that general area to clear barbed wire and other obstacles. Led by an inquisitive Sergeant named Kunze, the ten soldiers found themselves, quite by chance, close to the outer fortifications of *Fort Douaumont.*

Receiving no challenge whatsoever from the fort, The Sergeant ordered his men to form a human pyramid, which allowed Kunze to crawl up into one of the massive gun embrasures that punctuated the outer fortifications. With just two companions, and armed only with single-shot bolt-action rifles, Kunze and his men explored the long, deserted tunnels inside the fort. Later, separated from his two companions, the German Sergeant encountered four French gunners manning a 155mm gun, whom he captured and locked up, followed by another 20 he secured in a barracks room by simply locking the heavy door on them from the outside. The Sergeant made a few more similarly uneventful arrests, and then, finding himself in the officer's mess hall, we are told he sat down to his first square meal in weeks.

And so, in a heroic sequence of events that truly qualifies as "stranger than fiction", the strongest fort in the world was captured intact by a lone German Sergeant—without firing a single shot.

This singular act of bravery has an horrific postscript: *Fort Douaumont,* heavily enforced by the Germans, was retaken by the French ten months later.The stronghold which had fallen to a lone German Sergeant was retaken by Moroccan troops under French command at an estimated cost of 100,000 lives.

QwikConnect takes pause to salute the individual soldier heroically serving his country.

"Mighty Mouse" Goes High Speed

Side by side comparison of two approaches to high-speed Ethernet connectivity for military systems: The Glenair "Mighty Mouse" Cordset (left) provides superior shielding and environmental protection, as well as vibration, shock and mating performance (not to mention reduced size, weight and ease of use).

In response to requests for ruggedized, shielded connectors and cables to replace unshielded systems for high-speed serial data, Glenair introduces its new ASAP "Mighty Mouse" high speed serial data cordsets. Available for 100BASE-T, 1000BASE-T Gigabit Ethernet, IEE 1394, USB 2.0 and CAN Bus applications, these cordsets combine aerospace-grade data cables with Series 80 "Mighty Mouse" harsh environment connectors for maximum performance and minimum size.

Until now, high-speed serial data system designers have had to settle for kludgy RJ45 connectors jammed into large D38999-style housings (see above). "Mighty Mouse" ASAP cordsets offer space and weight savings with superior performance. These miniaturized connectors and cordsets are also ideal for Ethernet data switches requiring high density packaging. "Mighty Mouse" high speed serial data cordsets are already used on commercial avionics programs for sensors and other remote devices. Additionally, Glenair is proud to have these cordsets in operation on Air Force One.

ASAP "Mighty Mouse" cordsets offer many advantages over quadrax contacts. Quadrax contacts require significant termination labor and are housed in large connectors that lack the environmental sealing of "Mighty Mouse" connectors. Further, quadrax solutions are rarely robust enough for long runs in airframes, and they cannot support Gigabit Ethernet. With a large range of layout configurations, "Mighty Mouse" cordsets can easily accommodate data and power applications, and are available in all five "Mighty Mouse" connector series styles.

Cabling options include 100BASE-T Ethernet 4 conductor UTP OAL shielded, 100BASE-T Ethernet Quad shielded, 1000BASE-T Gigabit Ethernet with 8 shielded conductors, IEEE 1394 Hi-Speed Quad 110 Ohm, USB 2.0 with two #22 power conductors and one STP #26, Two STP 100 Ohm shielded conductors, or Four STP 100 Ohm shielded conductors.

Cable jacketing comes in translucent blue FEP fluorocarbon that meets FAA flammability requirements, or black low-smoke/zero halogen polyurethane for mass transit or shipboard applications. Three strain relief options are available–polyamide overmolding, threaded aluminum backshells or low smoke/zero halogen heat-shrink boots. Specify any length of cable. Ordering is simple—there are no minimums and cable and connector components are in stock.

High density data switching in military applications: Glenair ASAP "Mighty Mouse" Cordsets are available now for 1000BASE-T Ethernet and other high-speed data protocols.

High-Speed Data Protocols

Ethernet

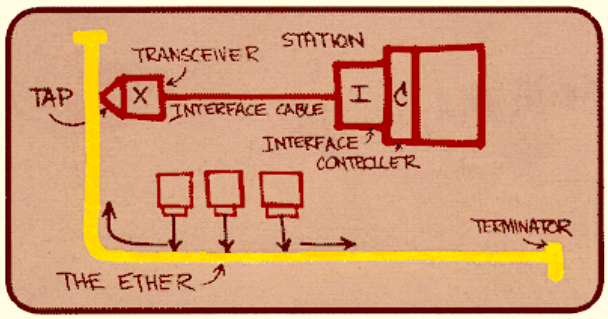
Avionic and other military vehicle data transfer systems are growing increasingly complicated—the number of data paths, data rates and the quantity and sophistication of subsystems continue to escalate. In addition to transmission speed, accuracy and reliability are tremendously important. Ethernet communication technology, with its huge installed base and history of reliability, is ideally suited for military vehicles and other field applications. Although there are many MIL-STD-1553 bus architecture and data link systems in use, applications such as tactical radar require faster data rates than older architectures can deliver.

Basic Ethernet protocol is referred to as "CSMA/DC" (Carrier Sense, Multiple Access and Collision Detection). To define some terms: "Carrier Sense," the hosts can detect whether the medium is idle or busy; "Multiple Access," multiple hosts are connected to the common medium; and "Collision Detection," when a host transmits, the protocols can determine whether its transmission has collided with the transmission of another host. If two or more information packets are sent simultaneously, a collision occurs and neither transmission is successful—collision detection instructs the system to retransmit the colliding packets. Legacy Ethernet is half-duplex, meaning information can move in only one direction at a time, and is less-than-ideal for many avionic applications, as fastest-possible communication is not guaranteed. The collision problem occurs in any bus-oriented architecture, such as MIL-STD-1553.

Full-duplex, switched Ethernet eliminates the collision problem by employing links that are point-to-point (not a bus) with a separate twisted pair for transmission and reception. Full-duplex also has the ability to send and receive data at the same time by employing a network of Ethernet switches able to forward incoming packets to their appropriate destinations. Gigabit Ethernet transfers data on four pairs of wires instead of only two pairs under legacy Ethernet forms. Further, transmission coding is enhanced for Gigabit Ethernet so that the standard clock rate of 125 MHz that produces 100 mbps data transfer rates in so-called "Fast Ethernet" is supercharged to 1,000 mbps. Gigabit Ethernet can fit an order of magnitude more data into the same cable than can Fast Ethernet, but employs the same transmission schemes and frame format as the earlier Ethernet versions.

IEEE 1394

In the early 1990s, Apple Computer and Texas Instruments worked with the Institute of Electrical and Electronics Engineers (IEEE) to establish a very fast serial bus interface standard that supports data transfer rates of up to 400 mbps (in 1394a) and 800 mbps (in 1394b). Products supporting the 1394 standard go under different names, depending on the company. Apple uses the name FireWire, Texas Instrument uses Lynx and Sony uses i.link to describe their 1394 products. A single 1394 port can be used to connect up 63 external devices. In addition to its high speed, 1394 also supports isochronous data, delivering data at a guaranteed rate. This isochronous feature makes it ideal for devices that need to transfer high levels of data in

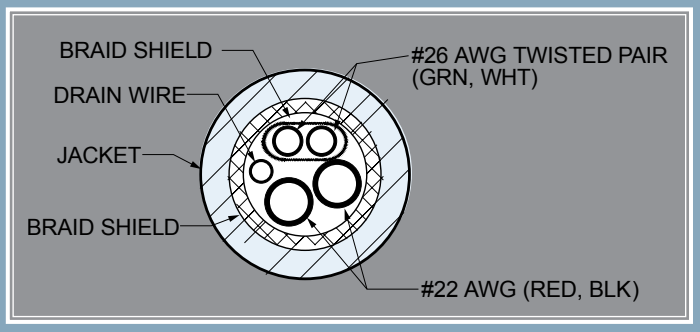


Brainchild of Dr. Robert Metcalfe of Xerox's Palo Alto Research Center (PARC) in 1973, Ethernet was used initially as an experimental networking system within Xerox. Six years later, Xerox joined with Digital Equipment Corporation (DEC) and Intel to determine commercial applications for Ethernet. By 2000, more than 85% of all installed network communications were Ethernet.

real-time, such as video and audio applications. 1394 makes full use of all SCSI (Small Computer System Interface, a parallel interface standard used for attaching peripheral devices to computers) capabilities and, compared to USB 2.0 High Speed, has higher sustained data transfer rates. Like USB, 1394 supports both Plug-and-Play and hot plugging, and also provides power to peripheral devices. A typical 1394 commercial connector is shown above.

MIL-STD-1533

MIL-STD-1533 defines all aspects of the serial digital multiplex data bus for military vehicles. Multiplexing combines two or more information channels on to a common transmission medium. When compared to older analog point-to-point wire bundles, multiplexing allows for weight reduction, simplicity of system design, standardization and flexibility. The 1553 data bus provides integrated, centralized system control and a standard interface for all interconnected equipment. Devices connect using twisted, shielded pairs of wires to maintain message integrity. All devices in the system are connected to a redundant pair of buses to provide a second path of traffic should one of the buses become damaged. Data rates of 1 megabit per second (mbps) are standard under MIL-STD-1553. MIL-STD-1773 contains the requirements for fiber optic cabling systems as a 1553 bus transmission medium.



USB 2.0

USB 2.0 (Universal Serial Bus High Speed) is the most recent revision of USB specifications. Introduced by a consortium of seven computer and telecommunications industry leaders in 1995 (Compaq, DEC, IBM, Intel, Microsoft, NEC and Northern Telecom), USB ports began to appear on personal computers in 1997. Within a few years, USB became popular for connecting nearly every external peripheral device. Along with other desirable features, USB devices are “hot swappable”—they can be connected without turning the computer off, enabling removable devices to be plugged and unplugged as needed.

USB has evolved into a standard technology for personal computers and other consumer electronics. At its introduction, USB 1.0, now called “Low Speed USB,” ran at just 1.5 mbps. USB 1.1, introduced in 1998 and often referred to as “Full Speed USB,” runs at 12 mbps. Released in 2000, USB 2.0 or “High Speed USB,” is the most advanced with a data transfer rate of 480 mbps and is backward compatible with previous versions of USB.

The speeds associated with USB are theoretical maximums; the actual speed a USB-compliant device achieves is not necessarily the speed of the USB specification. Unlike parallel, serial, PS/2 and game port interfaces, USB features a single set of “universal” connections for all USB peripherals to the personal computer. This single set replaces the need for multiple external ports and allows up to 127 peripherals to be connected sequentially into a single external USB port using multiple USB hubs.

Modern Soldier Technology Meets "The Mouse"

Series 80 "Mighty Mouse" products are fast becoming the de facto interconnect for many of the world's armed forces man-wearable data and communications systems. For instance, the US Army has directed Ground Soldier Ensemble contractors to use Glenair "Mighty Mouse" interconnects. The Air Force has similarly specified "Mighty Mouse" on its BAO/BATMAN and BRITES ground warfighter systems. And "Mighty Mouse" continues to play an essential role on Land Warrior programs. Below is a short primer on some of these Modern Soldier programs.

Land Warrior

Photo courtesy General Dynamics

Conceived by the US Army in 1991, Land Warrior integrates small arms with high-tech equipment enabling ground forces to deploy, fight and win on the battlefields of the 21st century. The Land Warrior System integrates lightweight, commercial, off-the-shelf technologies into a complete soldier system that includes several subsystems: the weapon, integrated helmet assembly, protective clothing and individual equipment, computer/radio, and software. Subsystem selection can be customized for specific battlefield conditions. Though officially cancelled in 2007, Land Warrior continues to show signs of life with new units procured in each year following.

Ground Soldier Ensemble (GSE)

Considered the successor to Land Warrior, the Ground Soldier Ensemble (GSE) is a system-of-systems providing dismounted soldiers increased situational awareness, faster reaction, and reduced risk of fratricide. GSE focuses on mature technologies that minimize size, weight and power requirements while providing improved situational awareness and network connectivity. Intended for dismounted Soldiers in enemy engagement missions, GSE's modularity permits tailoring for specific mission requirements.

A key GSE capability is the graphical digital display of individual soldier location against a geo-referenced image as the background. Additional soldier locations are also graphically displayed through the Army battle command system connected through a radio that sends and receives information from one to another and connects each soldier to the network. These radios also connect the soldiers to higher-echelon data to assist in decision making and situational understanding.

Photo courtesy General Dynamics

Physical GSE subcomponents include a head-mounted display, a computer, an interface to allow user interaction with the screen, a power source, an operating system, and a networked radio transmitter/receiver. Worn by the combat soldier, GSE system components must be kept to minimum size and weight with ruggedness suitable for combat operations that include shock, vibration, dust, mud and water immersion.

Another GSE subsystem option for Army aviators is the Electronic Data Manager (EDM), a kneeboard computer the enables the aircrew to quickly plan missions and react to mission changes in flight. Compatible with night-vision goggles and readable in direct sunlight, the EDM features a moving map via global positioning system (GPS), Blue Force Tracking-Aviation capability, and Windows operating system-compatible software.

Battlefield Air Operations Kit - Battlefield Air Targeting Man-Aided Knowledge (BAO/BATMAN)

The Air Force Special Tactics equivalent to the Army's dismounted soldier systems is the BAO/BATMAN. Previously, a Combat Controller might have deployed with 160 pounds of tactical communications and weapons equipment. BAO/BATMAN's objectives are to streamline the number of displays the Controller needs for navigation, sensing, mapping, reconnoitering, and targeting behind enemy lines. The main goals are enhanced information management, fewer errors and increased speed with improved ergonomic design and reduced weight.

Like GSE, the BAO/BATMAN incorporates a number of sub systems to optimize Airman-network interface: head-mounted displays for optimum visual information transfer to the warfighter, improved audio information transfer, wearable computing for crew system integration, wireless transmission systems to reduce weight and cabling, improved cable management, Human Machine Interface to optimize the performance and safety of Combat Control personnel, speech recognition capability, real-time and constant physiological monitoring, and appropriate software controls to maximize human-machine collaboration.

BRITES

Another Air Force initiative, and part of the BAO Kit, is the Battery Renewable Integrated Tactical Energy System (BRITES), a wearable power supply. Special tactics teams, who typically deploy for weeks, are loaded with batteries each weighing about two pounds. Different equipment can require different batteries, and the cost of power in the field is compounded by the cost and risk of resupply flights. Current batteries are also classified as hazardous cargo or waste.

BRITES provides a smaller and lighter, less hazardous, high-performance power supply common to all equipment in BAO/BATMAN subsystems. A zinc-air hybrid power supply recharges BRITES' lithium ion battery.

SOLDIER SIDE-KICKS: ARMED GROUND ROBOTS

Series 80 "Mighty Mouse" interconnects are on board almost every major commercial and military unmanned aerial vehicle (UAV) in service today. Predator, Global Hawk and Firescout—just to name a few—incorporate these ultra-miniature, robust connectors to control and monitor subsystems including avionics, imaging, payload, ground SATCOM datalink boxes and other more. UAV air to ground controllers also take advantage of the Mouse's tremendous space- and weight-savings over traditional military standard type interconnects. "Mighty Mouse" is also broadly specified on robotic systems, used in soldier support roles such as bomb disposal. Typical interconnect performance requirements for robots and other classes of unmanned systems include:

- Durability: Mate and de-mate a minimum number of cycles—sometimes up to 2,000 cycles
- Shell-to-shell conductivity must meet specified maximum millivolt drop requirements
- Connector size and weight maximums
- EMI leakage attenuation and shielding effectiveness dB minimums
- MIL-STD-810 for dust, sand and immersion for 1 hour at 1 meter depth in mated condition.

Few environments are as challenging for interconnect systems as unmanned robotic platforms used in tactical warfare. Glenair's ultra-miniature Series 80 "Mighty Mouse" connectors have become the interconnect solution of choice for a broad range of field deployable robots.

The range of soldier deployable robot and unmanned aerial vehicles includes Micro Air Vehicles (MAV's) which offer unprecedented situational awareness in urban and open terrains. The Small Unmanned Ground Vehicle (SUGV) is a portable, reconnaissance and tactical robot that can enter and secure areas that are inaccessible or too dangerous for soldiers. Larger robots deployable in military or civilian settings include TALON, MAARS and Dragon Runner. All currently incorporate "Mighty Mouse" connectors and cables for subsystems including navigation, controls, imaging and data-linkage.

These larger systems, particularly when armed with weaponry, have the same requirements for improved longevity of service and reliability, but also encounter unique mechanical issues such as resistance to weapons shock, thermal shock and extreme environmental hazards. Again, like their aerial cousins, robotic systems can realize significant benefits from connector systems that deliver highest levels of reliability and performance at reduced size and weight.

SERIES 80 "MIGHTY MOUSE" PERFORMANCE SPECIFICATION

PERFORMANCE SPECIFICATIONS	
Current Rating (Maximum)	Size #23 Contact: 5 A. Size #20 contact: 7.5 A. Size #16 contact: 13 A. Size #12 contact: 23 A.
Test Voltage (Dielectric Withstanding Voltage) Mated Connectors	Size #23 contacts: 500 VAC RMS sea level, 100 VAC RMS 70,000 feet Size #20 contacts: 1800 VAC RMS sea level, 325 VAC RMS 70,000 feet Size #16 contacts: 1800 VAC RMS sea level, 1000 VAC RMS 70,000 feet Size #12 contacts: 1800 VAC RMS sea level, 1000 VAC RMS 70,000 feet
Insulation Resistance	5000 megohms minimum
Contact Resistance	Size #23 Contact: 73 millivolt drop at 5 A. test current Size #20 contact: 55 millivolt drop at 7.5 A. test current Size #16 contact: 49 millivolt drop at 13 A. test current Size #12 contact: 42 millivolt drop at 23 A. test current
Operating Temperature	-55° C. to +150° C.
Immersion	1 meter water immersion for 1 hour (Series 803 splashproof only)
Shock	300 g
Vibration	37 g
Magnetic Permeability	2.0 μ maximum

Please refer to the comprehensive Series 80 Product Specification for additional parameters and test methods. Filter and hermetic versions have performance specifications which differ from this information.

MATERIALS AND FINISHES	
Aluminum Shell, Barrel, and Coupling Nut	Aluminum alloy 6061 T6
Stainless Steel Shell, Barrel Coupling and Jam Nut	Stainless steel per AMS-QQ-S-763
Front and Rear Insulators	Glass-filled liquid crystal polymer (LCP) in accordance with MIL-M-24519, Type GLCP-30F
Contact Retention Clip	Beryllium copper, heat-treated, unplated
Grommet, Peripheral Seal and Interfacial Seal	Blended elastomer, 30% silicone per ZZ-R-765, 70% fluorosilicone per MIL-R-25988
Hermetic Insert	Vitreous glass
Contacts	Copper alloy, 50 microinches gold plated per ASTM B488 Type 3 Code C Class 1,27 over nickel plate per QQ-N-290 Class 2, 50-100 microinches
Pin Contact, Hermetic	Nickel-iron alloy per ASTM F30 (Alloy 52),50 microinches gold plated per ASTM B488 Type 3 Code C Class 1,27 over nickel plate per QQ-N-290 Class 2, 50-100 microinches
Socket Contact Hood	Stainless steel, passivated per AMS-QQ-P-35
Adhesives	Silicone and epoxy
Potting Compound, PCB and Solder Cup Versions	Environmental and Hermetic Connectors: High-strength epoxy, Hysol EE4215. Filter Connectors: Stycast 2850FT/Catalyst 11 thermally conductive epoxy encapsulant.
Filter Element	Multilayer Ceramic Planar Array, ferrite inductors

DESCRIPTION	REQUIREMENT	PROCEDURE
ELECTRICAL		
Contact resistance	SAE AS39029 Table V **Max Wire Size** / **Test Current** / **Voltage Drop** 12 / 23 / 42 14 / 17 / 40 16 / 13 / 49 20 / 7.5 / 55 22 / 5 / 73 24 / 3 / 45 26 / 2 / 52 28 / 1.5 / 54	EIA-364-06 IEC 60512-2-1 Test current in amperes. Voltage drop in millivolts. Silver-coated copper wire, +25°C.
Low level contact resistance	**Wire Size** / **Max. Milliohms** 16 / 5 20 / 9 22 / 15 24 / 20 26 / 31 28 / 50	EIA-364-23 100 milliamperes maximum and 20 millivolts maximum open circuit voltage
Insulation resistance	5000 megohms minimum	EIA-364-21 IEC-60512-3-1 500 volts DC ± 50 volts. Test between adjacent contacts and contacts to shell.
Dielectric withstanding voltage, sea level	No breakdown or flashover #23 contacts 500 volts #20HD contacts 1000 volts #16 contacts 1800 volts #12 contacts 1800 volts	EIA-364-20 IEC-60512-4-1 AC rms 60 Hz. One minute dwell. Unmated or mated
Dielectric withstanding voltage, 70,000 feet altitude	No breakdown or flashover #23 contacts 100 volts #20HD contacts 325 volts #16 contacts 1000 volts #12 contacts 1000 volts	EIA-364-20 IEC-60512-4-1 AC rms 60 Hz. One minute dwell. mated condition

<table>
<tr><th>DESCRIPTION</th><th>REQUIREMENT</th><th>PROCEDURE</th></tr>
<tr><td>Current carrying capacity</td><td>
<table>
<tr><th>Contact Size</th><th>Max Current</th></tr>
<tr><td>12</td><td>23</td></tr>
<tr><td>16</td><td>13</td></tr>
<tr><td>20</td><td>7.5</td></tr>
<tr><td>23</td><td>5</td></tr>
</table>
</td><td>EIA-364-70 Method 1
IEC-60512-5 Test 9b</td></tr>
<tr><td>Shell-to-shell conductivity, initial</td><td>The maximum voltage drop across a mated pair shall not exceed the values shown.
<table>
<tr><th>Series</th><th>Voltage Drop</th></tr>
<tr><td>800</td><td>10</td></tr>
<tr><td>801</td><td>10</td></tr>
<tr><td>802</td><td>10</td></tr>
<tr><td>803</td><td>100</td></tr>
<tr><td>804</td><td>2</td></tr>
<tr><td>805</td><td>2</td></tr>
</table>
</td><td>EIA-364-83
IEC-60512-2-6

Electroless nickel plated connectors.</td></tr>
<tr><td>Shell-to-shell conductivity, after conditioning (48 hours salt spray)</td><td>The maximum voltage drop across a mated pair shall not exceed the values shown.
<table>
<tr><th>Series</th><th>Voltage Drop</th></tr>
<tr><td>800</td><td>20</td></tr>
<tr><td>801</td><td>20</td></tr>
<tr><td>802</td><td>20</td></tr>
<tr><td>803</td><td>200</td></tr>
<tr><td>804</td><td>4</td></tr>
<tr><td>805</td><td>4</td></tr>
</table>
</td><td>EIA-364-83
IEC-60512-2-6

Electroless nickel plated connectors.</td></tr>
<tr><td>Shielding effectiveness, low frequency (100MHz-1000 MHz)</td><td>
<table>
<tr><th rowspan="2">Frequency</th><th colspan="2">dB Min. Attenuation</th></tr>
<tr><th>Series 800, 801, 802, 804, 805</th><th>Series 803</th></tr>
<tr><td>100 MHz</td><td>75</td><td>60</td></tr>
<tr><td>200 MHz</td><td>70</td><td>55</td></tr>
<tr><td>300 MHz</td><td>65</td><td>55</td></tr>
<tr><td>400 MHz</td><td>63</td><td>50</td></tr>
<tr><td>800 MHz</td><td>58</td><td>45</td></tr>
<tr><td>1000 MHz</td><td>55</td><td>40</td></tr>
</table>
</td><td>MIL-DTL-38999 para. 4.5.28.1

Electroless nickel plated connectors</td></tr>
</table>

<table>
<tr><th>DESCRIPTION</th><th>REQUIREMENT</th><th>PROCEDURE</th></tr>
<tr><td>Shielding effectiveness, high frequency (1Ghz-10GHz)</td><td>
<table>
<tr><th rowspan="2">Frequency</th><th colspan="2">dB Min. Attenuation</th></tr>
<tr><th>Series 800, 801, 802, 804</th><th>Series 805</th></tr>
<tr><td>1 GHz</td><td>55</td><td>85</td></tr>
<tr><td>3 GHz</td><td>50</td><td>69</td></tr>
<tr><td>5 GHz</td><td>45</td><td>66</td></tr>
<tr><td>19 GHz</td><td>40</td><td>65</td></tr>
</table>
</td><td>EIA-364-66

IEC-60512-23-3

Electroless nickel plated connectors</td></tr>
<tr><td colspan="3">MECHANICAL</td></tr>
<tr><td>Vibration, sine</td><td>No discontinuity of greater than 1 microseconds, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.</td><td>MIL-STD-202 Method 204, test Condition G

30 g’s, 3 axes, 4 hours per axis</td></tr>
<tr><td>Vibration, random</td><td>No discontinuity of greater than 1 microseconds, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.</td><td>EIA-364-28 Test Condition V Letter I
IEC-60512-6-4

100 milliamp test current

50- 2,000 Hz

37.80 g rms</td></tr>
<tr><td>Gunfire vibration</td><td>No discontinuity of greater than 1 microseconds, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after vibration test.</td><td>MIL-STD-810F Method 519.5</td></tr>
<tr><td>Mechanical shock</td><td>No discontinuity of greater than 1 microsecond, no cracking, breaking or loosening of parts, plug shall not become disengaged from receptacle. Connectors shall meet electrical requirements after shock test.</td><td>EIA-364-27 Condition D
IEC-60512-6-3
3 shocks X 3 axes X 2 directions = 18 shocks 2941 m/s^2 (300 g’s), 3 ms, half-sine</td></tr>
</table>

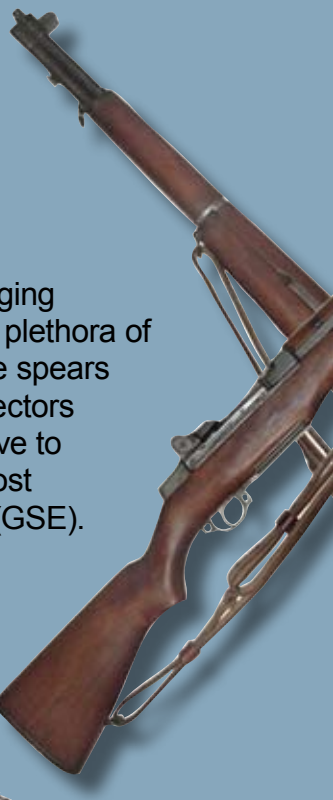
DESCRIPTION	REQUIREMENT	PROCEDURE
Mechanical durability, at ambient temperature	No deterioration which will adversely affect the connector after 2000 cycles of mating and unmating. Connectors shall meet contact resistance, insulation resistance, shell-to-shell resistance, DWV, and mating and unmating force.	EIA-364-09 IEC-60512-5 Test 9a
Solderability, PC tail contacts	95% solder coverage. Smooth, bright and even finish.	EIA-364-52 Category 3 IEC-60512-12-1 IEC-68-2-20 Test Ta, method 1 8 hours steam aging prior to test 245° C, 4-5 sec. dwell 10X magnification
Resistance to soldering heat	No damage to connector. Connectors shall meet insulation resistance and waterproof sealing requirements.	EIA-364-56 IEC-60512-12-5 Test 12e 260° C, 10 seconds (PC tail)
Impact	No impairment of function. Connector shall meet contact resistance, insulation resistance and waterproof sealing.	EIA-364-42 IEC-60512-5 test 7b 1 meter 8 drops
Contact retention	**Contact Size / Min. Pounds / Min. Newtons** 23 / 6 / 27 20 / 15 / 67 16 / 25 / 111 12 / 25 / 111	EIA-364-29
Contact separation force	**Contact Size / Min. Ounces / Min. Newtons** 23 / 0.5 / 0.14 20 / 0.7 / 0.19 16 / 2.0 / 0.56 12 / 3.0 / 0.83	SAE AS39029

<table>
<tr><th>DESCRIPTION</th><th>REQUIREMENT</th><th>PROCEDURE</th></tr>
<tr><td>Coupling torque</td><td>Threaded coupling connector coupling torque shall not exceed the following requirements.
<table>
<tr><th colspan="2">Shell Size</th><th rowspan="2">Inch Pound</th></tr>
<tr><th>Series 800, 801</th><th>Series 805</th></tr>
<tr><td>5, 6, 7</td><td>8, 9</td><td>8</td></tr>
<tr><td>8,9</td><td>10, 11</td><td>9</td></tr>
<tr><td>10</td><td>12</td><td>12</td></tr>
<tr><td>12, 13</td><td>15</td><td>16</td></tr>
<tr><td>14, 15,</td><td>18</td><td>28</td></tr>
<tr><td>16, 17</td><td>19</td><td>24</td></tr>
<tr><td>21</td><td></td><td>32</td></tr>
<tr><td></td><td>23</td><td>36</td></tr>
</table></td><td></td></tr>
<tr><td>Unmating force (Series 804)</td><td>Series 804 quick-disconnect connectors
<table>
<tr><th>Contact Arrangement</th><th>Inch Pound</th></tr>
<tr><td>5-3</td><td>10.6</td></tr>
<tr><td>6-4</td><td>10.8</td></tr>
<tr><td>6-7</td><td>11.4</td></tr>
<tr><td>7-10</td><td>12.0</td></tr>
<tr><td>8-13</td><td>12.6</td></tr>
<tr><td>9-19</td><td>13.8</td></tr>
<tr><td>10-26</td><td>15.2</td></tr>
<tr><td>12-37</td><td>17.4</td></tr>
<tr><td>14-55</td><td>21.0</td></tr>
<tr><td>15-85</td><td>27.0</td></tr>
</table></td><td></td></tr>
<tr><td>Insert retention</td><td>Unmated connectors shall retain their inserts in their proper location in the shell and there shall be no evidence of cracking, breaking, separation from the shell, or loosening of parts.
<table>
<tr><th colspan="3">Shell Size</th><th rowspan="2">Min. Force in Pounds</th></tr>
<tr><th>Ser. 800, 803. 804</th><th>Ser. 801</th><th>Ser. 805</th></tr>
<tr><td>5</td><td>5</td><td></td><td>25</td></tr>
<tr><td>6</td><td>6</td><td>8</td><td>25</td></tr>
<tr><td>7</td><td>7</td><td>9</td><td>25</td></tr>
<tr><td>8</td><td>8</td><td>10</td><td>25</td></tr>
<tr><td>9</td><td>9</td><td>11</td><td>25</td></tr>
<tr><td>10</td><td>10</td><td>12</td><td>25</td></tr>
<tr><td>12</td><td>13</td><td>15</td><td>25</td></tr>
<tr><td>14</td><td>16</td><td>18</td><td>40</td></tr>
<tr><td>15</td><td>17</td><td>19</td><td>50</td></tr>
<tr><td></td><td>21</td><td>23</td><td>80</td></tr>
</table></td><td>EIA-365-35</td></tr>
</table>

DESCRIPTION	REQUIREMENT	PROCEDURE
Impact	No impairment of function. Connector shall meet contact resistance, insulation resistance and waterproof sealing.	EIA-364-42 IEC-60512-5 test 7b 1 meter 8 drops
Residual magnetism	2 μ maximum.	EIA-364-54
ENVIRONMENTAL		
Operating temperature	-65° to +150°C	
Water immersion, mated	No evidence of water penetration into mated connectors. ≥ 100 MΩ insulation resistance.	MIL-STD-810F Method 512.4 1 meter immersion 1 hour
Water immersion, open face panel mount receptacles with non-removable printed circuit board or solder cup contacts	Connectors with waterblock potting process (Glenair Modification Code 518 required). 1 X 10^{-4} cc/second maximum helium leak rate at 1 atmosphere pressure differential following thermal shock conditioning.	EIA-365-02 3 cycles thermal shock -57°C to +71°C 75 min. dwell 5 minute transfer rate
Humidity, cyclic (damp heat, cyclic) (moisture resistance)	No deterioration which will adversely affect the connector. 100 megohms minimum insulation resistance during the final cycle. Following the recovery period, connectors shall meet contact resistance, shell-to-shell resistance and DWV requirements.	EIA-364-31 Condition B Method III IEC-60512-11-12 80-98% RH 10 cycles (10 days) +25° C to +65° C Step 7b vibration deleted. 24 hour recovery period.
21 day humidity (damp heat, long term)	No deterioration which will adversely affect the connector. Following the drying period, connectors shall meet 100 megohms minimum, contact resistance, shell-to-shell resistance, DWV, mating and unmating requirements.	EIA-364-31 Condition C Method II IEC-60512-11-3 Severity C 90-95% RH 40° C Apply 100 volts DC during test. 4 hours drying time at ambient temperature prior to final measurements.

DESCRIPTION	REQUIREMENT	PROCEDURE
Thermal shock	No mechanical damage or loosening of parts. Following thermal shock, connector shall meet contact resistance, DWV, insulation resistance and shell-to-shell resistance requirements.	EIA-364-32 Test Condition IV IEC-60512-11-4 5 cycles consisting of -65° C 30 minutes, +25° C 5 minutes max., +150° C 30 minutes, +25° C 5 minutes max.
Corrosion (salt mist)	No exposure of base metal. Connectors shall meet DWV and contact resistance requirements following the test.	EIA-364-26 IEC 60512-11-6 5% salt solution 35° C Unmated connectors **Code C**: 48 hours **Code M**: 48hours **Code MT**: 500 hours **Code NF**: 500 hours **Code ZN**: 500 hours **Code ZNU**: 500 hours **Code UCR**: 500 hours
Sand and dust	Mated connectors shall withstand the effects of blowing sand and dust	MIL-STD-810F, Method 510.4
Fungus	Connector materials shall be fungus inert.	MIL-STD-810F, Method 508.5
Fluid immersion	No visible damage from immersion in various fuels and oils. Connector shall meet coupling torque and dielectric withstanding voltage requirements.	EIA-364-10 Unmated connectors
Altitude immersion	No evidence of moisture on connector interface or contacts. Connector shall meet dielectric withstanding voltage.	EIA-364-03 Wired crimp connectors with supplemental potting. Printed circuit board and solder cup connectors with standard factory-installed potting.
Outgassing	The entire connector assembly shall be capable of meeting a maximum Total Mass Loss (TML) of 1% and a Total Collected Volatile Material Loss (TCVML) of 0.1% following additional processing for outgassing control. Fully assembled connectors shall be baked out for 24 hours at a temperature of +125°C and a vacuum of 10-6 Torr.	ASTM-E595

FROM ROCKS TO RIFLES TO ROCKETS



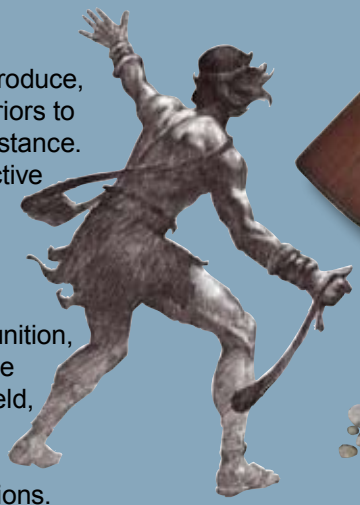
The history of warfare is punctuated with the periodic introduction of game-changing weaponry. Today's battle space relies on modular weaponry augmented with a plethora of electronic sensors, scopes and data sharing devices—a far cry from the simple spears used by ancient warriors. To supplement this issue's cover story on miniaturized connectors for mission-critical systems, your editors at *QwikConnect* thought it would be informative to trace the development of the soldier's arsenal—from the war clubs of old to today's most sophisticated future soldier systems: Land Warrior and the Ground Soldier Ensemble (GSE).

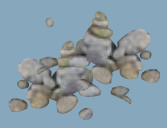
1. The Club or Cudgel is the most ancient of all weapons.

Small enough to be wielded with one hand, but tough enough to inflict the desired bludgeoning, the club has taken on many forms throughout the history of warfare. Famous versions include the two-handed quarterstaff, the stone tomahawk and the Medieval mace.

2. The Simple Sling

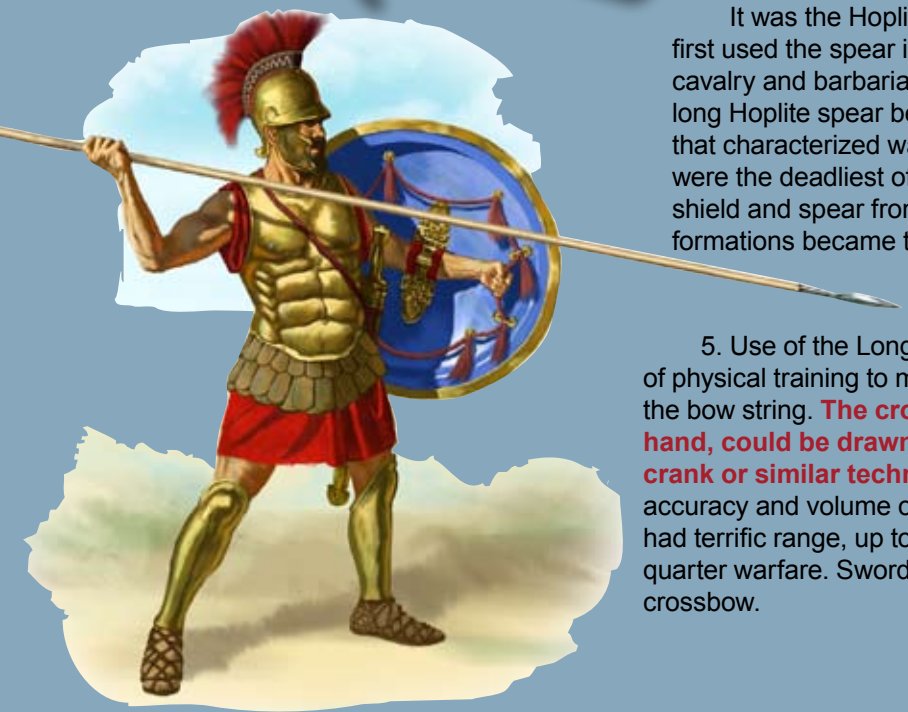
Light to carry and cheap to produce, the simple sling enabled warriors to launch attacks from a safe distance. Authorities estimate the effective range of ancient slingers, such as those that besieged the Iron Age hill forts of 8th Century BC Europe, was in excess of 500 meters. Ammunition, in the form of stones, could be easily foraged on the battlefield, making the sling a suitable weapon for armies hastily pressed from civilian populations.





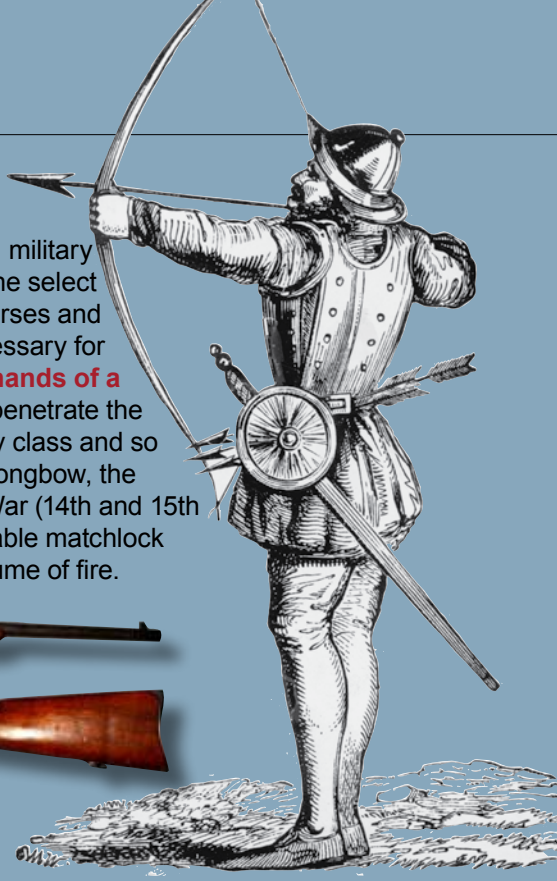
3. Man has been constructing spears since he first banded together to hunt for game and defend hearth and home.

It was the Hoplites (citizen-soldiers of the ancient Greek states) that first used the spear in an organized manner to defend against mounted cavalry and barbarian hordes. Deployed in a phalanx of spearmen, the long Hoplite spear became an essential tool in the large, set-piece battles that characterized warfare at the time (7th Century BC). The Spartans were the deadliest of the Hoplite spearmen. Spartan men would train with shield and spear from early childhood. Historians say the Spartan phalanx formations became the basis for the modern infantry regiment.



5. Use of the Longbow required many years of physical training to manage the heavy draw of the bow string. **The crossbow, on the other hand, could be drawn with the aid of a hand-crank or similar technology,** bringing their accuracy and volume of fire to a lesser caliber of soldier. The crossbow had terrific range, up to 400 yards, allowing soldiers to avoid close-quarter warfare. Swords, war clubs and spears were no match for the crossbow.

8. General George S. Patton called it "the greatest implement of battle ever devised." **He was talking about the MI Garand,** the first semi-automatic rifle to be generally issued to an infantry force in time of war. In WW II The M1's semiautomatic operation gave United States forces a significant advantage in firepower compared to German, Italian and Japanese soldiers equipped with conventional bolt-action rifles.



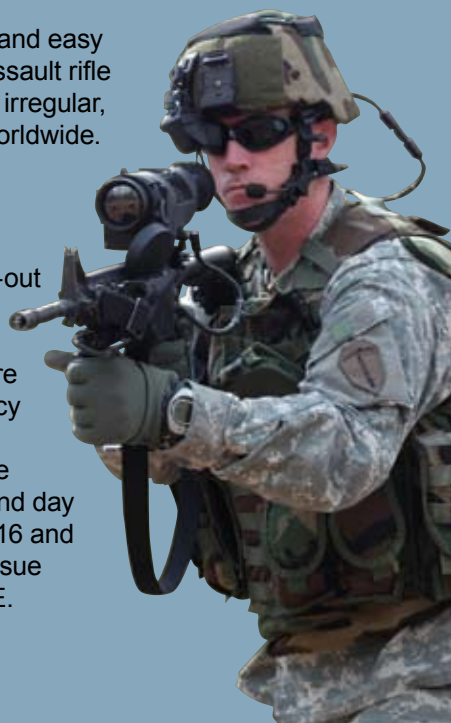
4. After the fall of the Roman Empire, military power was concentrated in the hands of the select few who could afford heavy armor, war horses and the retinue of squires and attendants necessary for mounted warfare. **The Longbow, in the hands of a trained archer,** was powerful enough to penetrate the heavy armor and chain mail of the knightly class and so changed the very nature of warfare. The longbow, the weapon of choice of the Hundred Years War (14th and 15th Centuries), was even preferred over available matchlock firearms due to its cost, accuracy and volume of fire.

7. Developed during the American Civil War, the **Spencer Carbine was the first true repeating rifle,** capable of firing up to 20 rounds a minute. The 1865 Spencer .50 caliber, and later weapons modeled after it, precipitated the fielding of smaller units of soldiers deployed in more agile and flexible formations. The increased volume of fire and deadly accuracy of the Spencer put an end to the 19th Century tactics of massed troops fighting in formation.

6. Black-powder firearms had already been in use for several Centuries when British Major Patrick Ferguson designed a weapon with breech loading and a rifled barrel. Rifling dramatically increases range and accuracy due to the spin imparted on the bullet as it leaves the barrel. **The twin innovations of the Ferguson Rifle changed firearm technology—and the battlefield—forever.**

9. From the Warsaw Pact to the jungles of Panama, **nothing says "¡Viva la Revolución!" quite like an AK-47.** Famously resistant to jamming and easy to clean, the selective fire, gas operated assault rifle brought affordable, massed-infantry fire to irregular, revolutionary and terrorist organizations worldwide.

10. The simplicity and low-cost of the RPG-7 man-portable rocket-propelled-grenade launcher make it the most ubiquitous weapon of its type in the world, offering both regular and irregular forces a modicum of explosive power in tank and armored vehicle attacks.



11. The M-16 offers soldiers a lightweight, rapid fire weapon that withstands the rigors of day-in, day-out field usage. The M-16's smaller and lighter 5.56 x 45mm NATO round enables soldiers to carry more ammunition, with increased accuracy and a higher rate of fire. Modular variations of the M-16 offer alternate barrel lengths, collapsible stocks, and day and night sighting systems. The M-16 and the M-4 carbine are the standard issue weapons for Land Warrior and GSE.

SERIES 80 "MIGHTY MOUSE" SHELL MATERIALS AND FINISHES

Code	Material	Finish	Finish Specification	Hrs. Salt Spray	Electrical Conductivity	Operating Temp. Range	RoHS Compliance
AB	Marine Bronze	Unplated		1000	Conductive	-65 to +200°C	✓
AL	Aluminum	AlumiPlate	MIL-DTL-83488	1000	Conductive	-65 to +175°C	✓
C	Aluminum	Anodize, Black	AMS-A-8625	336	Non-Conductive	-65 to +175°C	✓
E	Aluminum	Chem Film	MIL-DTL-5541	168	Conductive	-65 to +175°C	
G2	Aluminum	Anodize, Hardcoat	AMS-A-8625	336	Non-Conductive	-65 to +200°C	✓
JF	Aluminum	Cadmium, Gold	SAE-AMS-QQ-P-416	1000	Conductive	-65 to +175°C	
LF	Aluminum	Cadmium, Clear	SAE-AMS-QQ-P-416	1000	Conductive	-65 to +175°C	
M	Aluminum	Electroless Nickel	AMS-C-26074	48	Conductive	-65 to +200°C	✓
MT	Aluminum	Nickel-PTFE	GMF-002	1000	Conductive	-65 to +175°C	✓
NC	Aluminum	Zinc-Cobalt, Olive Drab	ASTM B 840	350	Conductive	-65 to +175°C	
NF	Aluminum	Cadmium, Olive Drab	SAE-AMS-QQ-P-416	1000	Conductive	-65 to +175°C	
P	Stainless Steel	Electrodeposited Nickel	SAE-AMS-QQ-N-290	500	Conductive	-65 to +200°C	✓
UC	Aluminum	Zinc-Cobalt, Black	ASTM B 840	350	Conductive	-65 to +175°C	
UCR	Aluminum	Zinc-Cobalt, Black (RoHS)	ASTM B 840	350	Conductive	-65 to +175°C	✓
Z1	Stainless Steel	Passivate	SAE-AMS-QQ-P-35	1000	Conductive	-65 to +200°C	✓
Z2	Aluminum	Gold	MIL-DTL-45204	48	Conductive	-65 to +200°C	✓
ZC	Stainless Steel	Zinc-Cobalt, Black	ASTM-B840	1000	Conductive	-65 to +175°C	
ZCR	Stainless Steel	Zinc-Cobalt, Black (RoHS)	ASTM-B840	1000	Conductive	-65 to +175°C	✓
ZL	Stainless Steel	Electrodeposited Nickel	SAE-AMS-QQ-N-290	1000	Conductive	-65 to +200°C	✓
ZM	Stainless Steel	Electroless Nickel	AMS-C-26074	1000	Conductive	-65 to +200°C	✓
ZMT	Stainless Steel	Nickel-PTFE	GMF-002	1000	Conductive	-65 to +175°C	✓
ZN	Aluminum	Zinc-Nickel, Olive Drab	ASTM B841	1000	Conductive	-65 to +175°C	
ZNU	Aluminum	Zinc-Nickel, Black	ASTM B841	1000	Conductive	-65 to +175°C	
ZU	Stainless Steel	Cadmium, Black	SAE-AMS-QQ-P-416	1000	Conductive	-65 to +175°C	
ZW	Stainless Steel	Cadmium, Olive Drab	SAE-AMS-QQ-P-416	2000	Conductive	-65 to +175°C	

SERIES 80 "MIGHTY MOUSE" TEST REPORT

1 INTRODUCTION

1.1 Purpose

Testing was performed on Glenair Series 80 connectors to determine conformance to the requirements of Product Specification 809-009 and MIL-DTL-38999.

1.2 Scope

This report covers electrical, mechanical and environmental performance testing of Glenair Series 80 connectors. The information in this report was obtained from a series of tests conducted by Environmental Associates, Santa Ana, California, National Technical Systems, Fullerton, California, and DNB Engineering, Fullerton, California. Additional tests were conducted at NuSil Technology, Carpenteria, California, Glenair UK Ltd., Mansfield, England and Glenair Inc., Glendale, California. These documents are on file at Glenair, Glendale California and are available upon request.

Testing Agency	Location	Date	Description of Test	Document Reference
NuSil Technology	Carpenteria, CA	October 17, to October 27, 2003	Outgassing property of fluorosilicone rubber seals	52558
Glenair UK Ltd.	Mansfield, England	June 17, 2002	Gunfire Vibration	TR32-0502
Glenair UK Ltd.	Mansfield, England	June 12,2002	Breakdown Voltage at 70K ft	TR43-0602
National Technical Systems	Fullerton, CA	October 3, 2006	Series 803 Qualification	679-4971-2 91906188
Environment Associates	Santa Ana, CA	October 2, 2006	Series 804 Qualification	OC18224-0412997 91906189
Environment Associates	Santa Ana, CA	October 5, 2006	Series 801 Qualification	OC18222-0412996 91906187
National Technical Systems	Fullerton, CA	September 20, 2006	High Frequency EMI Shielding Effectiveness	679-4971-1
DNB Engineering, Inc.	Fullerton, CA	January 15, 2007	Shielding Effectiveness Test report for Series 801, 804, and 805 Connectors	TR055797/70095
Environment Associates	Santa Ana, CA	June 22, 2007	Series 805 Qualification	6220701 OC18985-0213529

1.3 Conclusion

The Series 80 connectors have been shown to be capable of meeting the requirements of Glenair Product Specification 809-009.

1.4 Product Description

The Series 80 connector is a multi-pin circular electrical connector intended for application on aerospace equipment, tactical military equipment, and harsh environment commercial equipment. The Series 80 connector family includes Series 800 threaded coupling (UNF threads), Series 801 threaded coupling (ACME double-start threads), Series 802 submersible with threaded coupling, Series 803 bayonet coupling, Series 804 push-pull coupling and Series 805 triple-start ACME threaded coupling. The contact system and retention system conform to aerospace grade design practice, with rigid dielectric insulators captivating metal contact retaining clips. Rubber face seals and grommets are bonded to the rigid dielectric.

1.5 Test Specimens

Two mated pairs of three connector sizes (small, medium and large) for Groups 1, 2 and 3. Group 2 test specimens split into two sets, one set for random vibration and one set for sine vibration. One mated pair of small and large connectors for Group 4 EMI testing.

GLENAIR TEST NO.	91906187				91906188			91906189				6220701			
PRODUCT	SERIES 801				SERIES 803			SERIES 804				SERIES 805			
	TEST GROUP				TEST GROUP			TEST GROUP				TEST GROUP			
PART NUMBER	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4
801-008-16M6-7SA	2	2	2	1											
801-009-07M6-7PA	2	2	2	1											
801-008-16M9-19PA	2	2	2												
801-009-07M9-19SA	2	2	2												
801-008-16M16-55SA	2	2	2	1											
801-009-07M16-55PA	2	2	2	1											
803-002-06M6-7SN					2	2	2								
803-004-07M6-7PN					2	2	2								
803-002-06M9-19PN					2	2	2								
803-004-07M9-19SN					2	2	2								
803-002-06M14-55SN					2	2	2								
803-004-07M14-55PN					2	2	2								
804-002-06M6-7S								2	2	2	1				
804-004-07M6-7P								2	2	2	1				
804-002-06M9-19P								2	2	2					
804-004-07M9-19S								2	2	2					
804-002-06M14-55S								2	2	2	1				
804-004-07M14-55P								2	2	2	1				
805-001-16M8-7PA												2	2	2	
805-003-07M8-7SA												2	2	2	
805-001-16M11-19PA												2	2	2	
805-003-07M11-19SA												2	2	2	
805-001-16M18-55PA												2	2	2	
805-003-07M18-55SA												2	2	2	
805-001-16M9-10SA															2
805-003-07M9-10PA															2

1.6 Test Specimen Preparation

All connectors were terminated with M22759/11-24 wire. Group 3 specimens were potted with epoxy prior to immersion testing per MIL-STD-810, method 512.4.

1.7 Inspection Conditions

All tests were performed with the test specimens at standard laboratory conditions as defined below unless otherwise required by the procedure.

1. Temperature between 15° C. and 35° C.
2. Relative humidity between 20% and 90%.
3. Barometric pressure between 700 mm and 800 mm of mercury absolute.

1.8 Qualification Test Sequence

GLENAIR TEST NO.	91906187				91906188			91906189				6220701			
PRODUCT	SERIES 801				SERIES 803			SERIES 804				SERIES 805			
	TEST GROUP				TEST GROUP			TEST GROUP				TEST GROUP			
	1	2	3	4	1	2	3	1	2	3	4	1	2	3	4
TEST	TEST SEQUENCE				TEST SEQUENCE			TEST SEQUENCE				TEST SEQUENCE			
Visual and mechanical examination	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Magnetic permeability	2											2			
Altitude immersion	3														
Insulation resistance at ambient temp.					2	3		4	5			5	3,13		
Dielectric withstanding voltage, sea level					3	4		5	6			6	4,14		
Insert retention	4											7			
Durability (500 cycles)	5	7						6	7					2	
Durability (50 cycles)						5									
Shell-to-shell conductivity	6, 8				4,6			2,7,10	2,8,13			8,11		4,6	
Mating/Unmating Force								3,8,11	3,9,14						
Salt spray	7				5			9				9			
Electrical engagement	9				7			12				12			
Contact retention		2											2		
Altitude-low temperature		3													
Thermal cycling		4				2			4			3	5		
Insulation resistance at elevated temperature		5											7		
Dielectric withstanding voltage at altitude		6											8		
Random vibration		8				6			11				9		
Sine vibration		9				7			10				10		
Shock		10				8			12				11		
Humidity		11				9			15				12		
Sand and Dust			2				1			2					
Immersion			3				2			3					
Coupling torque												4,10	6	5	
Spring finger force														3	
EMI shielding effectiveness				2							2				2
Final examination	10	12	4		8	10	3	13	16	4		13	15	7	

2 SUMMARY OF QUALIFICATION TESTING

2.1 Initial Examination of Product

All specimens submitted for testing were representative of standard production lots. All specimens were accepted by Glenair Quality Assurance prior to submittal to testing. Testing agencies visually examined specimens for mechanical damage, workmanship and markings.

2.2 Magnetic Permeability

2.2.1 Test Method
EIA-364-54A.

2.2.2 Requirement
A permeability indicator with a 2 Mu pellet shall not deflect when applied to the test specimens

2.2.3 Results
All specimens met the requirement.

2.3 Altitude Immersion

2.3.1 Test Method
EIA-364-03B.

2.3.2 Requirement
Specimens shall meet DWV and IR specifications when subjected to immersion at a simulated altitude of 40,000 feet.

2.3.3 Results
Four of 12 insulation resistance measurements indicated a short. Eight of 15 DWV measurements did not meet 500 VAC. Specimens were removed from test and replaced. The replacement specimens met the requirement with all insulation resistance readings greater than 1000 megohm.

2.4 Insulation Resistance at Ambient Temperature

2.4.1 Test Method
EIA-364-21.

2.4.2 Requirement
5000 megohms minimum insulation resistance.

2.4.3 Results
All specimens tested met the requirement.

2.5 **Dielectric Withstanding Voltage at Sea Level**

2.5.1 Test Method
EIA-364-20

2.5.2 Requirement
500 VAC

2.5.3 Results
No evidence of breakdown or flashover

2.6 **Insert Retention**

2.6.1 Test Method
EIA-364-35B. An axial load was applied to the unmated connector inserts in both directions. The rate of application was approximately 10 psi/second. The peak load was maintained for a period of 5-10 seconds.

SERIES 801 PART NUMBER	SERIES 805 PART NUMBER	Axial Load (lbs.)
801-008-16M6-7SA	805-001-16M8-7PA	25
801-009-07M6-7PA	805-003-07M8-7SA	25
801-008-16M9-19PA	805-001-16M11-19PA	30
801-009-07M9-19SA	805-003-07M11-19SA	30
801-008-16M16-55SA	805-001-16M18-55PA	50
801-009-07M16-55PA	805-003-07M18-55SA	50

2.6.2 Results
There was no visible evidence of cracking, breaking, separation from shell or loosening of parts. The inserts were retained in their proper location.

2.7 **Durability (500 Cycles)**

2.7.1 Test Method
EIA-364-09C.
Series 801, Series 804 and Series 805 connectors were subjected to 500 cycles of mating and unmating at a maximum rate of 300 cycles per hour. The test specimens were subjected to a visual examination.

2.7.2 Results
There was no evidence of physical degradation noted.

2.8 Durability (50 Cycles)

2.8.1 Test Method

EIA-364-09C.
Series 803 connectors were subjected to 50 cycles of mating and unmating at a maximum rate of 300 cycles per hour. The test specimens were subjected to a visual examination at 25 and 50 cycles.

2.8.2 Results

There was no evidence of physical degradation noted.

2.9 Shell-to-Shell Conductivity

2.9.1 Test Method

EIA-364-83. Open circuit test voltage of 1.5 VDC (maximum) was applied across the mated connector. The test current was 1.0 A. The voltage drop was measured from a point on the rear accessory thread on the plug to the point adjacent to the o-ring on the mounting flange of the receptacle using a .05” minimum spherical end radius test probe.

2.9.2 Results

PLUG	MATING RECEPTACLE	INITIAL VOLTAGE DROP (Mv)	VOLTAGE DROP (Mv) AFTER MATING / UNMATING	VOLTAGE DROP FOLLOWING SALT SPRAY	TEST REPORT NUMBER
801-008-16M6-7SA	801-009-07M6-7PA	13.7[1]		16.4	91906187
801-008-16M6-7SA	801-009-07M6-7PA	6.7		21.7	91906187
801-008-16M9-19PA	801-009-07M9-19SA	7.9		9.8	91906187
801-008-16M9-19PA	801-009-07M9-19SA	6.1		4.8	91906187
801-008-16M16-55SA	801-009-07M16-55PA	52.2[1]		5.6	91906187
801-008-16M16-55SA	801-009-07M16-55PA	31.3[1]		4.3	91906187
803-002-06M6-7SN	803-004-07M6-7PN	20.50		21.53	91906188
803-002-06M6-7SN	803-004-07M6-7PN	15.41		44.55	91906188
803-002-06M9-19PN	803-004-07M9-19SN	16.48		10.98	91906188
803-002-06M9-19PN	803-004-07M9-19SN	20.34		7.17	91906188
803-002-06M16-55SN	803-004-07M14-55PN	33.60		9.60	91906188
803-002-06M16-55SN	803-004-07M14-55PN	30.59		59.20	91906188
804-002-06M6-7S	804-004-07M6-7P	11	1.2	1.8	91906189
804-002-06M6-7S	804-004-07M6-7P	12	1.5	2.1	91906189
804-002-06M9-19P	804-004-07M9-19S	5	1.1	1.1	91906189
804-002-06M9-19P	804-004-07M9-19S	13	1.0	1.2	91906189
804-002-06M14-55S	804-004-07M14-55P	13	1.1	1.4	91906189
804-002-06M14-55S	804-004-07M14-55P	8	1.6	1.7	91906189
805-001-16M8-7PN	805-003-07M8-7SA	4.6		4.6	6220701
805-001-16M8-7PN	805-003-07M8-7SA	7.2		7.2	6220701
805-001-16M11-19PA	805-003-07M11-19SA	12.1		3.7	6220701
805-001-16M11-19PA	805-003-07M11-19SA	11.2		3.8	6220701
805-001-16M18-55PA	805-003-07M18-55SA	2.4		0.77	6220701
805-001-16M18-55PA	805-003-07M18-55SA	3.6		1.23	6220701

[1] These readings are assumed to be inaccurate. Following completion of the test, the samples were re-checked at Glenair using a micro-ohmmeter and all were found to be under 10 milliohms following salt spray. Other in-house tests have repeatedly shown Series 801 connectors to be under 10 milliohms resistance.

PLUG	MATING RECEPTACLE	INITIAL VOLTAGE DROP (Mv)	VOLTAGE DROP AFTER 500 CYCLES DURABILITY	VOLTAGE DROP FOLLOWING SHOCK AND VIBRATION	TEST REPORT NUMBER
804-002-06M6-7S	804-004-07M6-7P	11	1.9	1.3	91906189
804-002-06M6-7S	804-004-07M6-7P	12	1.7	2.0	91906189
804-002-06M9-19P	804-004-07M9-19S	5	1.0	1.0	91906189
804-002-06M9-19P	804-004-07M9-19S	13	0.8	1.9	91906189
804-002-06M14-55S	804-004-07M14-55P	13	0.9	0.7	91906189
804-002-06M14-55S	804-004-07M14-55P	8	1.1	1.7	91906189

2.10 **Mating/Unmating Force**

2.10.1 Method

EIA-364-13B. The connector halves were mounted in a holding fixture and carefully aligned in all three planes.The plug and receptacle of each connector pair was mated/unmated at an approximate rate of 50 mm/minute.

2.10.2 Results

PLUG	MATING RECEPTACLE	INITIAL MATING FORCE IN POUNDS	INITIAL UNMATING FORCE IN POUNDS	TEST REPORT NUMBER
804-002-06M6-7S	804-004-07M6-7P	6.0	8.0	91906189
804-002-06M6-7S	804-004-07M6-7P	6.5	8.0	91906189
804-002-06M9-19P	804-004-07M9-19S	9.0	15.0	91906189
804-002-06M9-19P	804-004-07M9-19S	11.5	16.0	91906189
804-002-06M14-55S	804-004-07M14-55P	22.5	20.5	91906189
804-002-06M14-55S	804-004-07M14-55P	21.0	21.5	91906189
		MATING FORCE AFTER 500 CYCLES	UNMATING FORCE AFTER 500 CYCLES	
804-002-06M6-7S	804-004-07M6-7P	6.8	8.8	91906189
804-002-06M6-7S	804-004-07M6-7P	5.6	8.4	91906189
804-002-06M9-19P	804-004-07M9-19S	9.6	16.0	91906189
804-002-06M9-19P	804-004-07M9-19S	11.2	14.8	91906189
804-002-06M14-55S	804-004-07M14-55P	26.5	24.5	91906189
804-002-06M14-55S	804-004-07M14-55P	24.5	28.0	91906189
		MATING FORCE AFTER 500 CYCLES AND SHOCK/ VIBRATION	UNMATING FORCE AFTER 500 CYCLES AND SHOCK/ VIBRATION	
804-002-06M6-7S	804-004-07M6-7P	5.0	9.5	91906189
804-002-06M6-7S	804-004-07M6-7P	6.0	11.0	91906189
804-002-06M9-19P	804-004-07M9-19S	9.5	15.5	91906189
804-002-06M9-19P	804-004-07M9-19S	13.0	22.0	91906189
804-002-06M14-55S	804-004-07M14-55P	20.5	25.0	91906189
804-002-06M14-55S	804-004-07M14-55P	20.5	22.0	91906189

2.11 Salt Spray

2.11.1 Method

EIA-364-26B. The unmated connectors were subjected to 48 hours salt fog. Connectors were placed horizontally in the salt spray chamber, on a plastic bar with the mating faces pointing downward. The ends of the wires were routed outside the chamber. Following 48 hours exposure at +35° C to an atmosphere of 5% NaCl and 95% deionized water, specimens were removed from the test chamber, thoroughly rinsed with deionized water and allowed to dry at ambient conditions.

2.11.2 Results

Visual examination showed no visible evidence of physical damage.

2.12 Electrical Engagement

2.12.1 Method

MIL-DTL-38999K, Paragraph 4.5.14. The connectors were wired to provide a complete series circuit through all contacts of the mated connectors. The test sample was slowly mated until the first indication of a completed circuit through the contacts was observed with an ohmmeter. The mating operation was stopped and the overall length was measured from solid reference points on the connector halves. The mating process was then resumed until the connectors were completely mated. The overall length was again measured from the same reference points. The electrical engagement was then calculated by subtracting the fully mated overall length from the overall length when the completed circuit was first energized.

2.12.2 Results

PLUG	MATING RECEPTACLE	CALCULATED ELECTRICAL ENGAGEMENT (INCH)	TEST REPORT NUMBER
801-008-16M6-7SA	801-009-07M6-7PA	.098	91906187
801-008-16M6-7SA	801-009-07M6-7PA	.097	91906187
801-008-16M9-19PA	801-009-07M9-19SA	.097	91906187
801-008-16M9-19PA	801-009-07M9-19SA	.091	91906187
801-008-16M16-55SA	801-009-07M16-55PA	.074	91906187
801-008-16M16-55SA	801-009-07M16-55PA	.065	91906187
803-002-06M6-7SN	803-004-07M6-7PN	.074	91906188
803-002-06M6-7SN	803-004-07M6-7PN	.066	91906188
803-002-06M9-19PN	803-004-07M9-19SN	.041	91906188
803-002-06M9-19PN	803-004-07M9-19SN	.049	91906188
803-002-06M16-55SN	803-004-07M14-55PN	.053	91906188
803-002-06M16-55SN	803-004-07M14-55PN	.044	91906188
804-002-06M6-7S	804-004-07M6-7P	.095	91906189
804-002-06M6-7S	804-004-07M6-7P	.096	91906189
804-002-06M9-19P	804-004-07M9-19S	.097	91906189
804-002-06M9-19P	804-004-07M9-19S	.094	91906189
804-002-06M14-55S	804-004-07M14-55P	.092	91906189
804-002-06M14-55S	804-004-07M14-55P	.093	91906189
805-001-16M8-7PN	805-003-07M8-7SA	.076	6220701
805-001-16M8-7PN	805-003-07M8-7SA	.069	6220701
805-001-16M11-19PA	805-003-07M11-19SA	.061	6220701
805-001-16M11-19PA	805-003-07M11-19SA	.079	6220701
805-001-16M18-55PA	805-003-07M18-55SA	.062	6220701
805-001-16M18-55PA	805-003-07M18-55SA	.071	6220701

2.13 Contact Retention

2.13.1 Method

EIA-364-29B. An axial load of 6.0 pounds was applied to the mating end of the contact under test. 20%, but not less than 3, of the contacts were tested.

2.13.2 Results

PRODUCT	CONTACT ARRANGEMENT	TOTAL NUMBER OF CONTACTS TESTED	MINIMUM DISPLACEMENT	MAXIMUM DISPLACEMENT	AVERAGE
SERIES 801	7 CONTACTS	12	.002	.008	.005
SERIES 801	19 CONTACTS	16	.000	.008	.003
SERIES 801	55 CONTACTS	44	.000	.007	.004
SERIES 805	7 CONTACTS	12	.001	.003	.002
SERIES 805	19 CONTACTS	16	.001	.007	.003
SERIES 805	55 CONTACTS	44	.001	.008	.003

2.14 Altitude-Low Temperature

2.14.1 Method

EIA-364-105. Mated connectors were wired in series and placed in a temperature/altitude chamber. The chamber temperature was increased to 50° C. The test samples were conditioned at +50° C for 8 hours. The chamber temperature was reduced to -65° C and stabilized. The chamber pressure was reduced to simulate an altitude of 40,000 feet (2.72 PSIA). The test specimens were subjected to a one hour dwell. Upon completion of the 1 hour dwell, a voltage of 100 VAC (rms) 60 Hz was applied between the series circuit and the connector shell, for a period of 1 minute. The chamber was returned to ambient temperature and pressure. Samples were removed and visually examined.

2.14.2 Results

There was no evidence of breakdown during the voltage application. There was no visible evidence of physical damage noted.

2.15 Thermal Cycling

2.15.1 Method

EIA-364-32. The low temperature chamber was pre-conditioned and stabilized at -65° C. The high temperature chamber was pre-conditioned and stabilized at +150° C. Mated connectors were placed in the cold temperature chamber and subjected to a 60 minute dwell. Specimens were automatically transferred to the high temperature chamber within a maximum of 2 minutes. The specimens were subjected to a 60 minute dwell at +150° C. The specimens were automatically transferred to the low temperature chamber within a maximum period of 2 minutes. This cycle was repeated four additional times for a total of five cycles. The specimens were removed from the chamber and visually examined.

2.15.2 Results

Visual examination did not reveal any evidence of physical damage. Specimens successfully completed subsequent shock and vibration and humidity testing.

PLUG	MATING RECEPTACLE	NUMBER OF THERMAL CYCLES	RESULTS	TEST REPORT NUMBER	GROUP NUMBER
801-008-16M6-7SA	801-009-07M6-7PA	5	PASS	91906187	2
801-008-16M9-19PA	801-009-07M9-19SA	5	PASS	91906187	2
801-008-16M16-55SA	801-009-07M16-55PA	5	PASS	91906187	2
803-002-06M6-7SN	803-004-07M6-7PN	5	PASS	91906188	2
803-002-06M9-19PN	803-004-07M9-19SN	5	PASS	91906188	2
803-002-06M16-55SN	803-004-07M14-55PN	5	PASS	91906188	2
804-002-06M6-7S	804-004-07M6-7P	5	PASS	91906189	2
804-002-06M9-19P	804-004-07M9-19S	5	PASS	91906189	2
804-002-06M14-55S	804-004-07M14-55P	5	PASS	91906189	2
805-001-16M8-7PA	805-003-07M8-7SA	5	PASS	6220701	1
805-001-16M11-19PA	805-003-07M11-19SA	5	PASS	6220701	1
805-001-16M18-55PA	805-003-07M18-55SA	5	PASS	6220701	1

2.16 **Insulation Resistance at Elevated Temperature**

2.16.1 Method

EIA-364-21. Mated test specimens were placed in a temperature chamber. The chamber temperature was increased to +150° C and stabilized. Resistance readings were recorded.

2.16.2 Results

PLUG	MATING RECEPTACLE	NO. OF CONTACTS TESTED	MIN-MAX INS RESIST. GΩ	TEST REPORT NO.
801-008-16M6-7SA	801-009-07M6-7PA	6	20-700	91906187
801-008-16M6-7SA	801-009-07M6-7PA	6	5-30	91906187
801-008-16M9-19PA	801-009-07M9-19SA	6	20-3000	91906187
801-008-16M9-19PA	801-009-07M9-19SA	6	20-150	91906187
801-008-16M16-55SA	801-009-07M16-55PA	6	10-500	91906187
801-008-16M16-55SA	801-009-07M16-55PA	6	15-100	91906187
805-001-16M8-7PN	805-003-07M8-7SA	6	5-1000	6220701
805-001-16M8-7PN	805-003-07M8-7SA	6	15-2000	6220701
805-001-16M11-19PA	805-003-07M11-19SA	6	80-8000	6220701
805-001-16M11-19PA	805-003-07M11-19SA	6	20-4000	6220701
805-001-16M18-55PA	805-003-07M18-55SA	6	20-4000	6220701
805-001-16M18-55PA	805-003-07M18-55SA	6	20-5000	6220701

2.17 Dielectric Withstanding Voltage at Altitude

2.17.1 Method

EIA-364-20C. The test specimens were placed in an altitude chamber. The chamber pressure was reduced to simulate an altitude of 40,000 feet (2.72 PSIA) and stabilized. A voltage of 100 VAC (rms) 60 Hz was applied between adjacent contacts and the connector shell. The voltage was applied for 2 seconds minimum.

2.17.2 Results

No breakdown or flashover.

2.18 Random Vibration

2.18.1 Method

EIA-364-28 Condition V Letter I, 37.8 g's, 4 hours sequentially in each of three axes, ambient temperature. Group 2 specimens were divided into two sets, one mated pair of each size for random vibration and one pair for sine vibration.

2.18.2 Results
No discontinuities were detected. Following vibration testing, visual inspection did not reveal evidence of physical damage.

2.19 **Sine Vibration**

2.19.1 Method
MIL-DTL-38999K,Paragraph 4.5.22.2.1, modified.

Frequency	Level
10 – 100 Hz	0.06 inch double amplitude
100 – 2000 Hz	30 g's peak

logarithmic sweep, 10 Hz to 2000 Hz, 10 minutes/sweep
Ambient temperature
24 sweeps (4 hours) in each of three axes

2.19.2 Results
No discontinuities were detected. Following vibration testing, visual inspection did not reveal evidence of physical damage.

2.19.3 **Shock**

2.19.4 Method
EIA-364-27B, Condition D. 300 g's peak, 3 millisecond duration, half sine pulse. 3 shocks in the positive direction, 3 shocks in the negative direction, repeated in each of three axes for a total of 18 shocks per specimen.

2.19.5 Results
No discontinuities were detected. Following vibration testing, visual inspection did not reveal evidence of physical damage.

2.19.6 **Humidity**

2.19.7 Method
EIA-364-31B, Method IV
Test group 2 mated specimens were mounted in a horizontal position in a temperature/ humidity chamber. The wire ends were routed out of the chamber through a port. He test samples were subjected to 24 hours drying at +50° C, humidity uncontrolled. Specimens were subjected to five 24 hour cycles of varying temperature and humidity. Following completion of step 7a of the final cycle, insulation resistance and DWV measurements were performed.

2.19.8 Results
All insulation resistance measurements exceeded the 100 megohm requirement. All DWV tests showed no evidence of breakdown or flashover at 500 VAC (rms) 60 Hz.

2.20 Sand and Dust

2.20.1 Method
MIL-STD-810F, Method 510.4

2.20.2 Results
Following exposure to sand and dust, specimens successfully passed immersion testing and final examination.

2.21 Immersion

2.21.1 Method
MIL-STD-810F, Method 512.4. Specimens were backpotted with epoxy to seal the wires. Mated specimens at ambient temperature were immersed in 1 meter of fresh water, removed from immersion and allowed to dry. Insulation resistance measurements and DWV measurements were made to verify that moisture had not penetrated into the connectors.

2.21.2 Results
Series 801 and 804 specimens met electrical requirements following immersion. Specimens passed 200 megohms insulation resistance and 500 VAC DWV.
Series 803 specimens failed to prevent the intrusion of water.

2.21.3 Coupling Torque, Series 805

2.21.3.1 Coupling Torque, Initial

PLUG	MATING RECEPTACLE	COUPLING FORCE (LB.-IN.)	UNCOUPLING FORCE (LB.-IN.)	TEST REPORT NO.
805-001-16M8-7PN	805-003-07M8-7SA	4.0	2.5	6220701
805-001-16M8-7PN	805-003-07M8-7SA	4.5	3.0	6220701
805-001-16M11-19PA	805-003-07M11-19SA	8.5	3.5	6220701
805-001-16M11-19PA	805-003-07M11-19SA	8.0	3.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	22.0	11.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	24.0	13.0	6220701

2.21.3.2 Coupling Torque, After Salt Spray

PLUG	MATING RECEPTACLE	COUPLING FORCE (LB.-IN.)	UNCOUPLING FORCE (LB.-IN.)	TEST REPORT NO.
805-001-16M8-7PN	805-003-07M8-7SA	4.5	4.5	6220701
805-001-16M8-7PN	805-003-07M8-7SA	5.0	6.0	6220701
805-001-16M11-19PA	805-003-07M11-19SA	6.0	7.5	6220701
805-001-16M11-19PA	805-003-07M11-19SA	8.5	7.5	6220701
805-001-16M18-55PA	805-003-07M18-55SA	26.0	13.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	25.0	14.0	6220701

2.21.3.3 Coupling Torque, After 500 Cycles Mating

PLUG	MATING RECEPTACLE	COUPLING FORCE (LB.-IN.)	UNCOUPLING FORCE (LB.-IN.)	TEST REPORT NO.
805-001-16M8-7PN	805-003-07M8-7SA	3.0	2.0	6220701
805-001-16M8-7PN	805-003-07M8-7SA	4.0	3.0	6220701
805-001-16M11-19PA	805-003-07M11-19SA	9.0	5.0	6220701
805-001-16M11-19PA	805-003-07M11-19SA	8.0	4.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	18.5	15.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	20.5	15.5	6220701

2.22 Shell Spring Finger Force

PLUG	MATING RECEPTACLE	INITIAL SPRING FORCE (POUNDS)	10TH CYCLE SPRING FORCE (POUNDS)	TEST REPORT NO.
805-001-16M8-7PN	805-003-07M8-7SA	3.4	2.2	6220701
805-001-16M8-7PN	805-003-07M8-7SA	2.7	2.5	6220701
805-001-16M11-19PA	805-003-07M11-19SA	4.0	2.6	6220701
805-001-16M11-19PA	805-003-07M11-19SA	4.2	2.7	6220701
805-001-16M18-55PA	805-003-07M18-55SA	6.9	4.0	6220701
805-001-16M18-55PA	805-003-07M18-55SA	6.5	3.4	6220701

2.23 EMI Shielding Effectiveness

2.23.1 EMI Shielding Effectiveness: High Frequency (1GHz-18GHz.
Testing Agency: National Technical Institute (NTS)
Test report Number: 679-4971-1
Date: September 20, 2006

2.23.1.4 Method
IEEE-299, modified. A transmitter and receiver were set up in separate chambers with an opening between the chambers. A reference measurement was taken in logarithmic units and recorded as RXref. A feedthrough panel was installed over the opening between the chambers and the connector was mounted per Figure 1. Power was recorded in logarithmic units as RXdut. Shielding effectiveness (SE) = RXref – Rxdut.

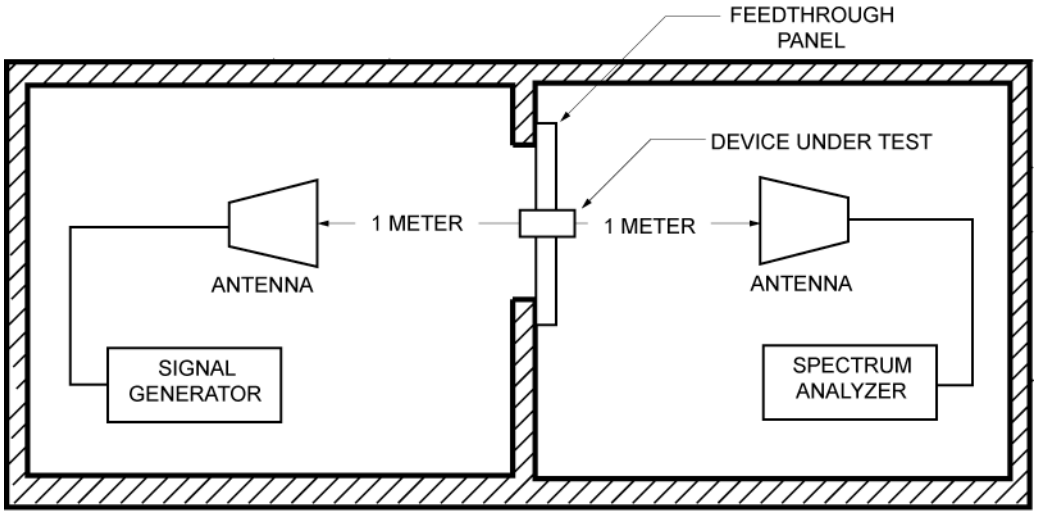


FIGURE 1
SHIELDING EFFECTIVENESS TEST SETUP

2.23.1.5 Test Specimens for Shielding Effectiveness

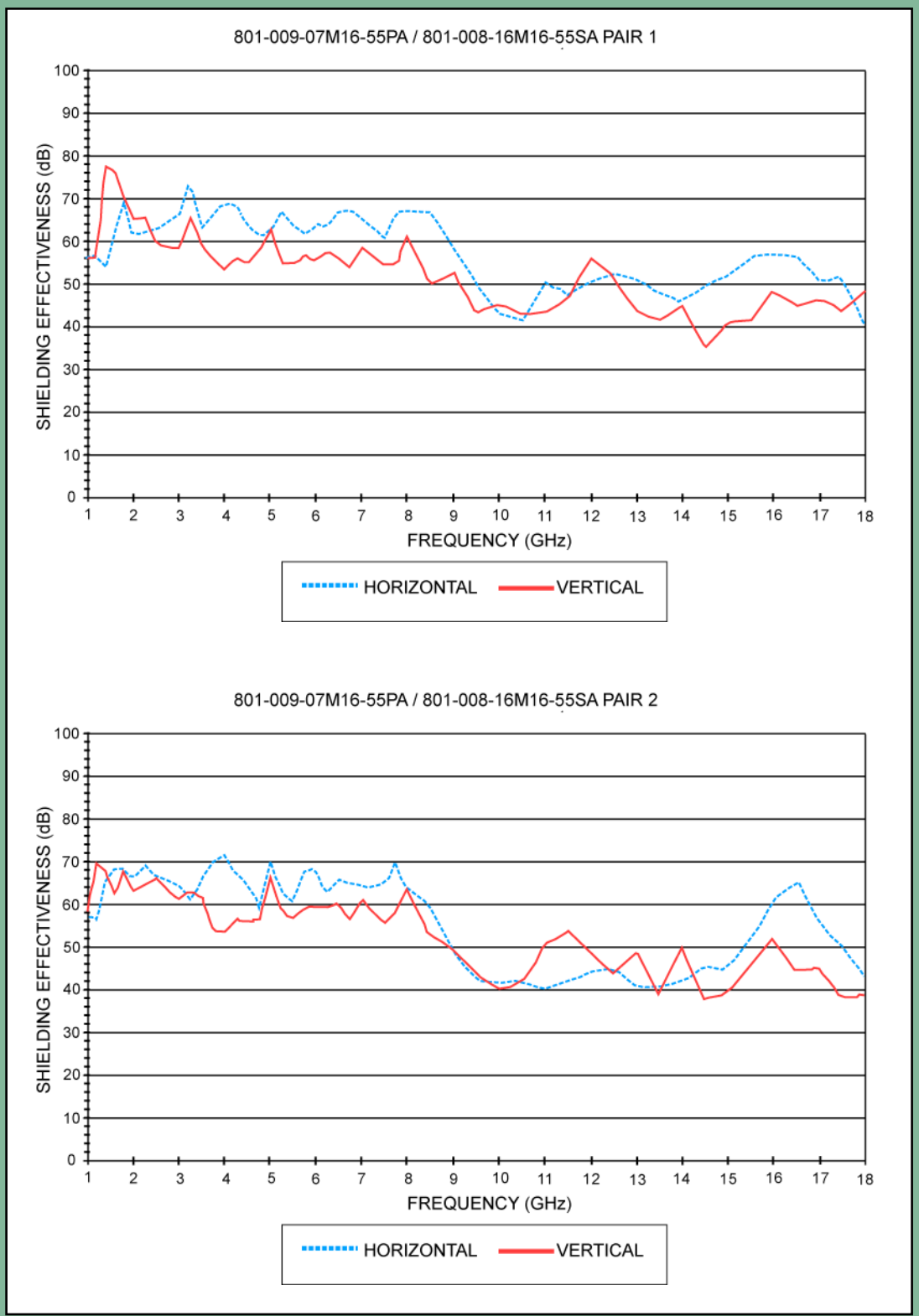
PLUG	MATING RECEPTACLE	QUANTITY
801-008-16M6-7SA	801-009-07M6-7PA	2 PAIRS
801-008-16M16-55SA	801-009-07M16-55PA	2 PAIRS
804-002-06M6-7S	804-004-07M6-7P	1 PAIR
804-002-06M14-55S	804-004-07M14-55P	1 PAIR
805-001-16M9-10SA	805-003-07M9-10PA	2 PAIRS

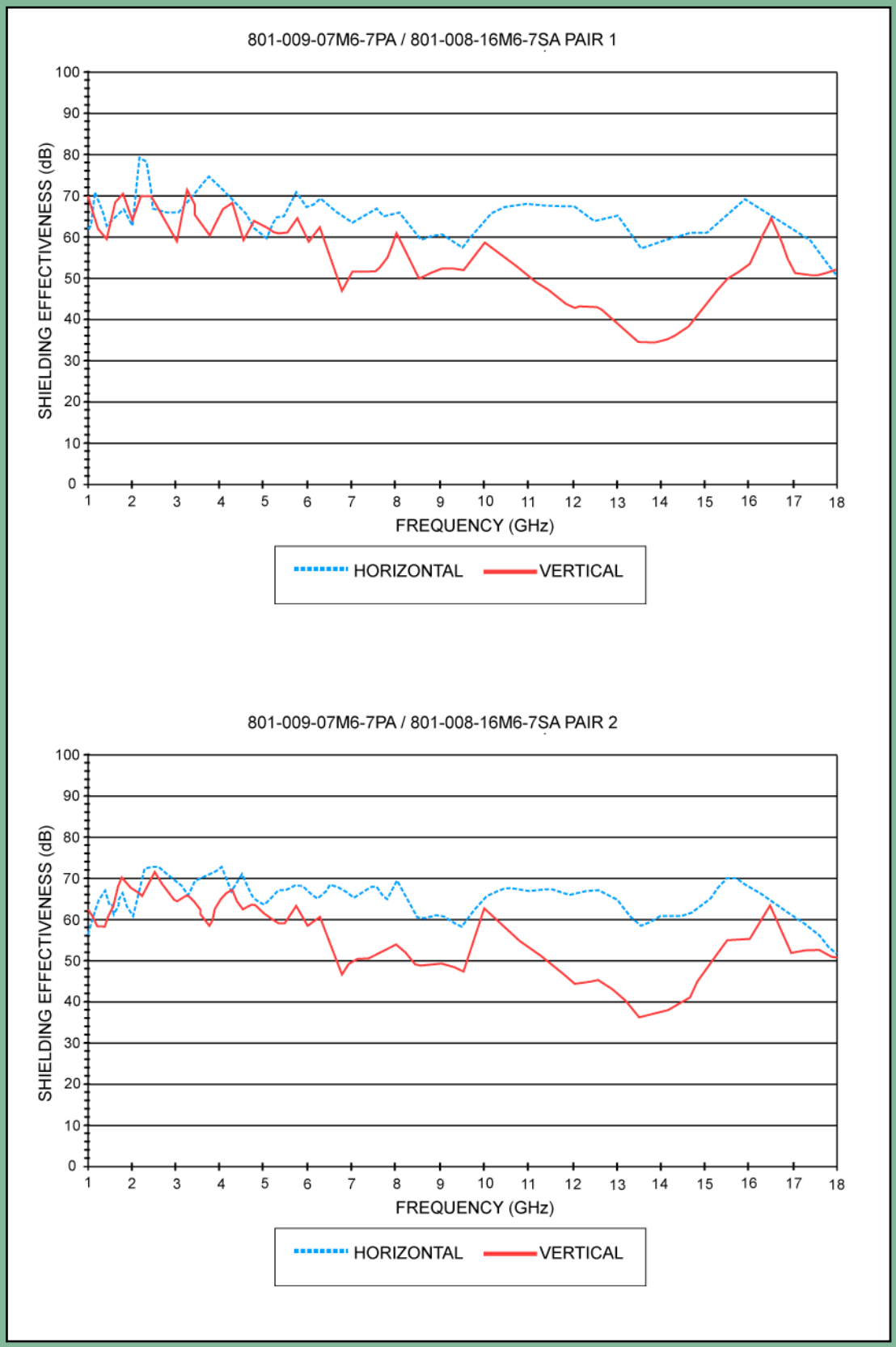
2.23.1.6 Description of Test Apparatus

HP Signal Generator Model 8673C 50 MHz- 18.6 GHz
Agilent Spectrum Analyzer Model E446A 3Hz- 44 GHz
EMCO Double Ridge Guided Horn Antenna Model 3115 1 GHz – 18 GHz
Eaton Double Ridged Guide Antenna Model 96001 1 GHz – 18 GHz
HP Microwave Amplifier Model 8349B 1 GHz- 20 GHz

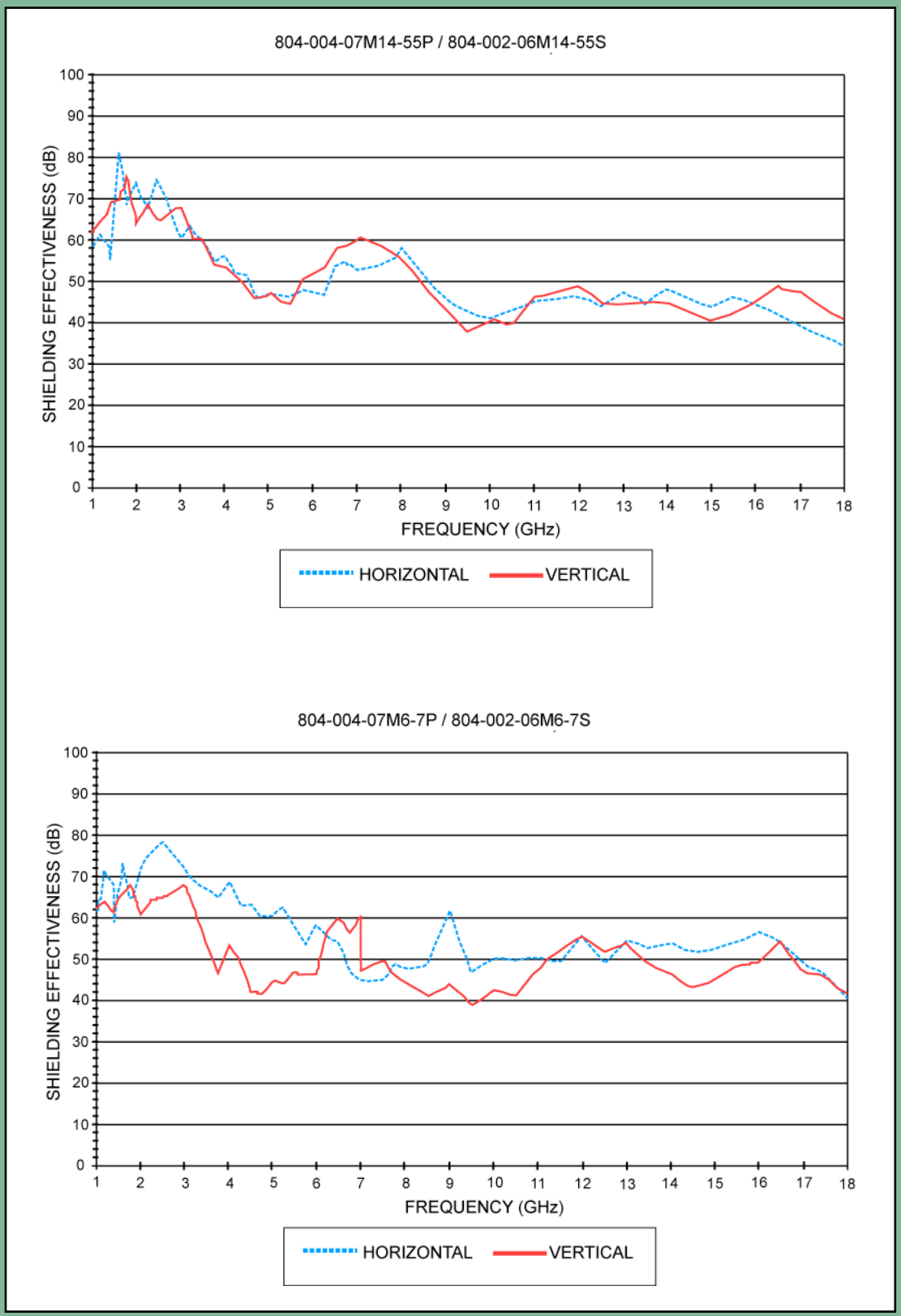
2.23.1.7 Results

2.23.1.8 Results for Series 801

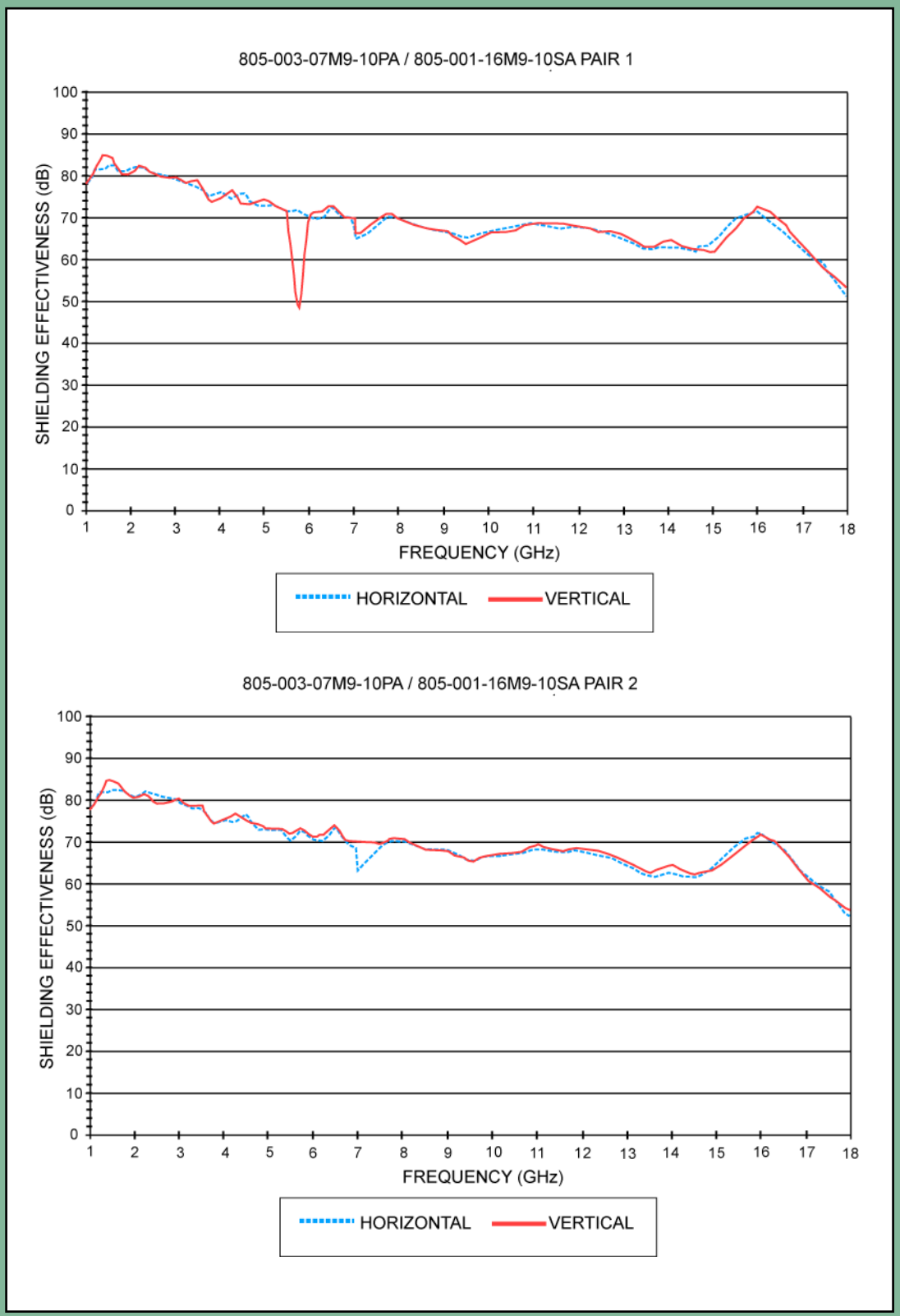



801-009-07M6-7PA / 801-008-16M6-7SA PAIR 1
SHIELDING EFFECTIVENESS (dB)
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
FREQUENCY (GHz)
HORIZONTAL
VERTICAL
801-009-07M6-7PA / 801-008-16M6-7SA PAIR 2
SHIELDING EFFECTIVENESS (dB)
100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
FREQUENCY (GHz)
HORIZONTAL
VERTICAL

2.23.1.8.1 Results for Series 804



2.23.1.8.2 Results for Series 805



2.23.1.9 Final Examination

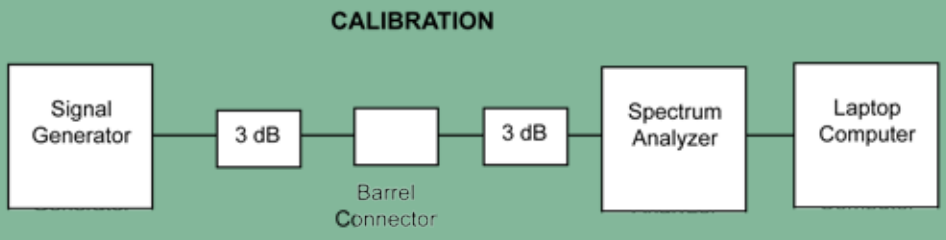
2.23.1.9.1 Method
MIL-DTL-38999K, Paragraph 4.5.1. Specimens were visually examined for mechanical damage, workmanship and markings.

2.23.1.9.2 Results
No visible evidence of damage was noted. No evidence of poor workmanship was noted. Markings were clear and legible.

2.23.2 EMI Shielding Effectiveness: Low Frequency (100 MHz-1000MHz)
Testing Agency: DNB Engineering, Fullerton, CA
Test report Number: 91906187 (TR055787/70095)
Date: January 15, 2007

2.23.2.1 Requirement: Shielding effectiveness testing in accordance with MIL-DTL-38999K, Paragraph 4.5.27.1.

2.23.2.10 Test Method
A triaxial RFI leakage test fixture per MIL-DTL-38999K, Figure 26, was used to test mated pairs of Series 80 connectors.



2.23.2.11 Test Specimens

Pair Number	PLUG	MATING RECEPTACLE	QUANTITY
CP1	804-002-06M6-M14-55S	804-004-07M14-55P	1 PAIR
CP2	801-008-16M16-55SA	801-009-07M16-55PA	1 PAIR
CP3A,B	805-002-16M11-19PA	805-004-07M11-19SA	2 PAIR
CP4A,B	805-002-16M8-7SA	805-004-07M8-7PA	2 PAIR
CP5A,B	801-008-16M6-7SA	801-009-07M6-7PA	2 PAIR
CP6A,B	804-002-06M6-7S	804-004-07M6-7P	2 PAIR

2.23.2.12 Description of Test Apparatus

Marconi Signal Generator Model 2024
Agilent Spectrum Analyzer Model E4402B
DNB Triaxial Fixture Model TF001
Midwest Microwave Attenuator, 3 dB
Armored Workhorse Coaxial Cable #11832 and 11830

2.23.2.13 EMI Test Results

dB Shielding Effectiveness
Frequency in MHz

SERIES	SAMPLE	100	200	300	400	800	1000
804 55 PIN	CP1	92.8	90.1	94.7	94.5	92.7	92.4
801 55 PIN	CP2	92.2	89.0	93.8	88.4	85.9	86.5
805 19 PIN	CP3A	81.7	77.6	78.4	78.7	77.1	61.4
805 19 PIN	CP3B	82.3	76.1	77.0	77.8	75.9	61.3
805 7 PIN	CP4A	84.9	78.4	81.9	91.1	82.5	76.5
805 7 PIN	CP4B	86.0	83.1	84.9	82.7	84.4	77.8
801 7 PIN	CP5A	83.8	78.2	80.3	77.7	79.1	74.3
801 7 PIN	CP5B	82.7	76.9	79.1	71.6	75.0	70.8
804 7 PIN	CP6A	83.8	77.6	79.6	78.7	78.8	71.4
804 7 PIN	CP6B	82.8	77.7	79.9	78.3	78.6	73.4

3 SUMMARY OF PRODUCT EVALUATION TESTS

3.1 Outgassing Testing on Fluorosilicone Rubber Used on Series 80 Connectors

Testing Agency: NuSil Technology, Carpenteria, California
Date: October 17 to October 27, 2003
Report Number 52558

3.1.1 Method

ASTM-E595.
Three tests:
1. “AS IS” parts pulled from stock in their original state.
2. “BAKED” parts were subjected to 8 hours bakeout at 400° F.
3. “THERMAL VACUUM OUTGASSED”. Parts were subjected to 24 hours vacuum bakeout at +125° C.

3.1.2 Test Specimens

37 pin grommet, P/N 89N-25004-12-37

3.1.3 Results

PROCESSING METHOD	TOTAL MASS LOSS TML	PASS/FAIL	COLLECTED VOLATILE CONDENSABLE MATERIAL CVCM	PASS/ FAIL
NO SPECIAL PROCESSING	0.97%	PASS	0.14	FAIL
8 HOUR BAKE, 400° F	0.10%	PASS	0.03%	PASS
24 HOUR THERMAL VACUUM OUTGAS , 125°C	0.17%	PASS	0.04%	PASS

3.2 **Gunfire Vibration Testing On Series 800 “Mighty Mouse” Connectors**
Testing Agency: Glenair UK Ltd., Mansfield England
Date: June 17, 2002
Test report number: TR32-0502

3.2.1 Object of Test
To conduct Random and Gunfire Vibration on Series 800 “Mighty Mouse” Connectors to JN1003 (Eurofighter) with reference to MIL-STD-810

3.2.2 Test Specimens
2 each 800-010-07NF6-7PN and mate 800-006-06M6-7SN
2 each 800-009-16NF15-85PN and mate 800-011-07NF15-85SN

3.2.3 Method
MIL-STD-810D Method 514.3 Random Vibration 33 g.’s, one hour in each axis.
MIL-STD-810D Method 519.3 Gunfire Vibration 57 g’s

3.2.4 Results
No discontinuities greater than 1 microsecond, no damage or loosening of connectors.

3.3 **Breakdown Voltage of Series 800 “Mighty Mouse” connectors at Altitude**
Testing Agency: Glenair UK Ltd.
Date: June 12, 2002
Test Report Number TR43-0602

3.3.1 Method
Wired connectors were placed in an altitude chamber and pressurized to 33 millibar (equivalent to 70,000 feet) with the sample in both the mated and unmated condition. DC voltage was increased at approximately 100 V/sec until breakdown occurred, with the current trp set to 0.3 mA.

3.3.2 Test Specimens
800-006-06M5-7SN mated to 800-010-07NF6-7PN

3.3.3 Results
Breakdown occurred at 550, 800, 400, 600, 400 and 450 VDC

Outlook

On Being Human

Some of you may know that one of my favorite pastimes is reading the biographies and memoirs of US presidents and other notables. I recently came across an observation on civility that deserves to be shared and discussed. Will Rogers, a much beloved humorist and entertainer from the 1930's, was by far the nation's most widely read newspaper columnist, most popular radio show host and highest grossing movie box-office star. When Rogers was killed in a plane crash in 1935, the outpouring of national grief equalled the level of mourning at president Lincoln's funeral 70 years earlier.

That Rogers was truly great in his chosen fields is undisputed. That he was also much *beloved* is a testament to his philosophy that, "It's great to be great, but it's better to be human." Lady Montagu espoused this same value when she said, "Civility costs nothing and buys everything." And Samuel Johnson echoed this wisdom when he said, "The true measure of a man is how he treats someone who can do him no good."

There is obviously a common thread in these sentiments: that being human—happy, kind, courteous and humble—can elevate one's reputation—earned through business, professional, social or athletic achievement—into the lofty realm of "beloved." Unfortunately, it follows that the opposite is true. Think of the sports figures and movie stars who do outstanding work yet are personally disliked because they lack civility. To bring this topic around to the business world, consider the many companies that produce perfectly fine products yet are disliked in the marketplace due to their lack of sincere courtesy and consideration for their customers and employees.

How we treat one another—our colleagues, our customers, our suppliers, our partners and others—impacts how well we do as an organization. Being "human" earns us lifelong dividends of trust and respect impossible to attain simply by reducing late shipments or improving quality. When we treat our customers and co-workers with civility—no matter how difficult that task may seem at the time—we earn a bit of that "beloved" status that Rogers enjoyed in abundance.

I'll leave you with one final quote from the late great Bostonian and jurist Oliver Wendell Holmes Jr., delivering an unguarded assessment of Franklin Delano Roosevelt: "He has a second rate intellect, but a first rate temperament". A bit harsh. But wouldn't you agree that, if true, Roosevelt had the better end of the deal?

Christopher J. Toomey
President

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