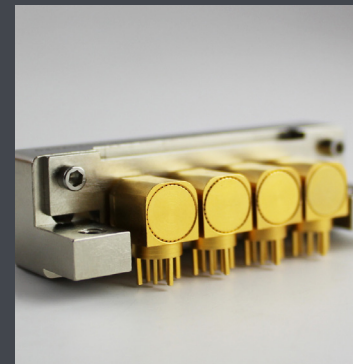


# High-Speed Products

CONTACTS, CONNECTORS, AND CABLE ASSEMBLIES

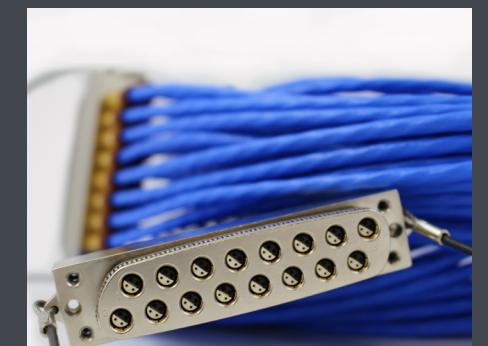
3-2024



**Contacts**



**Connectors**



**Cables Assemblies**

**AMPHENOL CORPORATION**

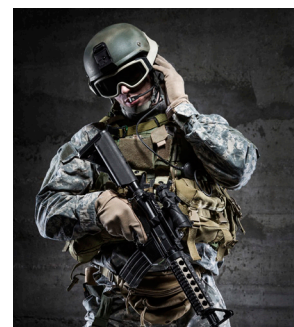
40-60 Delaware Avenue, Sidney, NY 13838-1395 • 800-678-0141  
[www.amphenol-aerospace.com](http://www.amphenol-aerospace.com) • [www.amphenolmao.com](http://www.amphenolmao.com)

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## High-Speed Contacts Typical Markets:

**Military & Commercial Aviation, Military Vehicles, Missiles & Ordnance, C4ISR**





# High-Speed Contacts

## Overview

Amphenol has the broadest and most reliable contact solutions when you need superior electrical performance, plus shielding to eliminate interference from outside electrical sources, in a connector. Our expertise in connector and cable solutions ensures that your contacts will mate and perform to the proper application specifications.

Contact Options	Product	Page	Description
	<b>Oval Contact System</b>	4-10	Our newest contact for high-speed data transmission up to 10 Gbps per pair. Applications include: 10G Base T, 40G Base T, HDMI, Fibre Channel (AI), SATA 2.0, 3.0, and others.
	<b>Octonet Contacts</b>	13-20	Size 8 pin and socket contacts. 8 strategically-spaced inner contacts form 4 100 Ohm matched impedance differential pairs.
	<b>CTF-Quad</b>	21-29	The CTF-QUAD product line is fiber to copper and copper to fiber media conversion in quadrax form factor pins for standard D38999 quadrax insert arrangements.
	<b>Quadrax Contacts</b>	30-35	Size 8 pin and socket contacts. An outer contact with 4 strategically spaced inner contacts forming two 100 or 150 Ohm matched impedance differential pairs.
	<b>Transition Adapters</b>	36-39	Matched impedance quadrax and twinax transition adapters provide a method of launching from the high speed connectors to PCB boards.
	<b>Rectangular with Quadrax Contacts</b>	40	Compliant Pin Quadrax Board Level Connector
	<b>Split Pair Quadrax</b>	41-50	Split-Pair Quadrax contacts, cables, PCB contacts, transition adapters contact and rectangular connectos with Split-Pair Quadrax Contacts
	<b>Differential Twinax Contacts</b>	51-55	Size 8 pin and socket contacts. An outer contact with 2 inner contacts spaced to form one 100 or 150 Ohm matched impedance differential pair.
	<b>Coaxial Contacts</b>	63-72	Sizes 4, 8, 12 & 16 pin and socket contacts designed for RF/microwave and shielded wire applications.
	<b>Concentric Twinax Contacts</b>	73-76	Sizes 8 & 12 pin and socket contacts designed for protection from magnetic and electro-static interference including nuclear electromagnetic pulse.
	<b>Triax Contacts</b>	77-78	Sizes 8, 10 & 12 pin and socket contacts designed for shielded wire applications with 3 conductors.
	<b>Coax, Twinax &amp; Triax PC Tail Contacts</b>	79-81	PC Tail shielded contacts provide a cost effective packaging solution for limited space applications where connectors are attached to printed circuit boards.
	<b>MRC</b>	82-91	MRC is a micro-miniature connector ideal for Commercial, Industrial and Military Communication Systems. This series is capable of running Gigabit Ethernet, USB 2.0/USB 3.0, HDMI and 10 Gigabit Ethernet when specified and designated to a specific configuration.

### GENERAL ORDERING INFORMATION

This catalog is primarily for high-speed contact solutions used in MIL-DTL-38999 Series, I, II, and III connectors. Other connectors that incorporate high-speed contacts include:

- MIL-DTL-22992 Heavy Duty Circular Connectors: Coax contacts
- Low-Mating Force Rectangular Connectors: Coax contacts in hybrid arrangements
- LRM Interconnects – Rectangular module and backplane connectors: Coax contacts in hybrid arrangements
- ARINC 600 and R27 Rack & Panel Connectors: Quadrax, Twinax, Differential Twinax, and Coax contacts
- MIL-DTL-26482 Series 1 Connectors: Coax contacts
- MIL-DTL-5015 Connectors: Coax contacts

# How to Choose, Cable Usage Guide, Capabilities & Testing

## HOW TO CHOOSE HIGH-SPEED PRODUCTS

3-Step process to select the right solution for your design needs

**1.**

### FIND YOUR CABLE AND CORRESPONDING HIGH-SPEED CONTACT

Locate your cable using our Cable Guide in each high-speed contact section. Match the cable to the proper specifications needed, such as contact size and impedance, then choose the correct contact part number.

**2.**

### CHOOSE THE DESIRED INSERT PATTERN

D38999 Series III Insert arrangements for Quadrax and Differential Twinax contacts are shown on pgs. 11-12. D38999 Series I, II, and III insert arrangements for Coax, Twinax, and Triax contacts are shown on pgs. 60-63.

**3.**

### CONTACT AMPHENOL FOR THE CONNECTOR OR CABLE PART NUMBER

Once the contact and the insert arrangement have been selected, contact Amphenol Aerospace to get the proper connector or cable assembly part number.

## CABLE USAGE GUIDE

In general, for D38999 Connectors, the size 8, 12 and 16 Coax, Quadrax, Twinax and Triax will terminate cable in the following ranges.

### SIZE 8

.012 / .0395 Center Conductor (Stranded)
.055 / .133 Dielectric
.180 Max Outer braid (must be round for crimp termination)
.201 Max. Jacket

### SIZE 16

.012 / .0215 Center Conductor (Stranded)
.031 / .066 Dielectric
.085 Max Outer braid (must be round for crimp termination)
.102 Max. Jacket

### SIZE 12

.012 / .0215 Center Conductor (Stranded)
.031 / .105 Dielectric
.126 Max Outer braid (must be round for crimp termination)
.145 Max. Jacket

Special coax contacts may be available for cables outside of ranges shown. Consult Amphenol Aerospace for further assistance in selection of coax contact cables.



## CABLE CAPABILITIES

Amphenol provides a large array of cable assemblies with high-speed quadrax and differential twinax contacts, as well as coax and concentric twinax contacts. Amphenol offers customers the most up-to-date range of cable assemblies in the market. Amphenol can design and supply your cable needs for high speed contacts and connector, from a simple point-to-point cable to a multi-branch cable system. Contact Amphenol Aerospace for assistance in designing the best cable assembly to fit your design needs.

## CABLE TESTING

Rigid testing is performed on 100% of the cable assemblies at Amphenol before they're shipped, to make sure they meet customer requirements, including DWV, insulation resistance, and continuity. Amphenol has the background experience and understanding of harsh environmental testing to assure reliable "end-to-end" interconnect solutions.

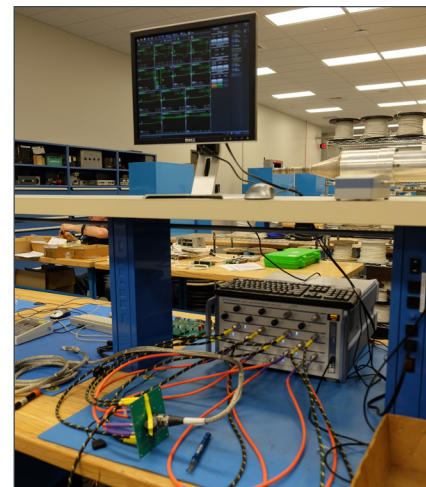
## TESTING CAPABILITIES

**Single-Ended (50 ohm) measurements to 20 GHz include:**

- Insertion loss
- Return loss
- VSWR
- Electrical length
- Phase-matching capability
- Impedance
- Touchstone files

**Differential measurement to 20 GHz include:**

- Insertion loss
- Return loss
- Intra-pair skew
- Inter-pair skew
- Differential impedance
- Common mode conversion
- Touchstone files





# OCS (Oval Contact System) Connectors

## OVERVIEW

The OCS (Oval Contact System) is the newest 38999 Interconnect Product offering that provides many advantages for high speed data transmission.

### OCS MECHANICAL/PHYSICAL PROPERTIES

- Mating Cycles 500 (min.)
- Operating temperature -65C to 175C
- Contact materials and platings consistent w/AS39029
- IR 500 VDC
- DWV 500 VAC rms

Max Current Rating:

- 1.5 amps inner contacts
- 3.0 amps outer contacts

### OCS SIGNAL INTEGRITY PERFORMANCE

- Data rate:** 10Gbps per pair  
**Insertion loss:** <0.3 dB up to 5 GHz  
**Return loss:** >20 dB up to 5 GHz  
**NEXT and FEXT:** >40 dB up to 5 GHz  
**Differential to common mode conversion:** >50 dB up to 5 GHz



Plug



Receptacle



Four of Amphenol's OCS Contacts fit into the 38999 Connector shell size 13

### FEATURES AND BENEFITS

- A wide variety of insert arrangements available
- Patterns range from (1) to (21), 100 Ohm differential pairs capable of delivering data transfer speeds of 10Gbps per pair
- MIL-DTL-38999 shell styles available from size 9 to 25
- Front-release, rear-removable contact system for easy repair
- Meets environmental requirements of MIL-DTL-38999
- Uses off-the-shelf Mil Spec backshells
- PCB Tails contacts available, sockets only, epoxy backfilled.

### APPLICATIONS

High Speed Applications-for use with, but not limited to, the following electrical protocols\*:

- 10G Base T
- HDMI
- Fibre Channel (AI)
- 40G Base-T
- SATA 2.0
- SATA 3.0 (limited to 3 meters max)
- Serial RapidIO
- PCI Express 3.0

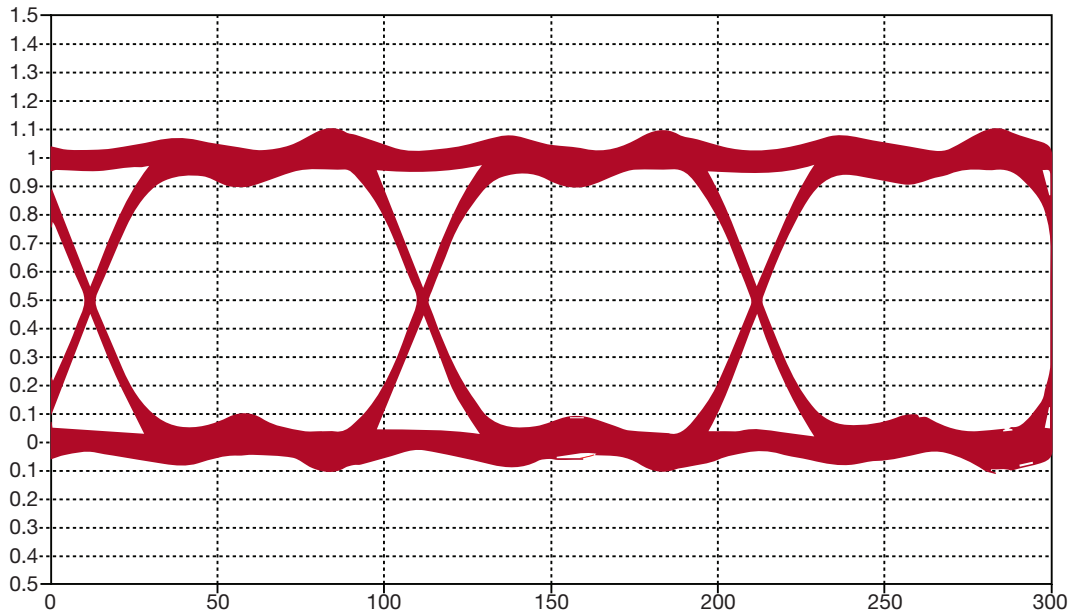
\* Cable selection may limit data rate of protocols.



# OCS (Oval Contact System) Connectors

Contact Eye Pattern at 10 Gbps

## EYE DIAGRAM (REAL PART)



Individually Shielded Twinax cable is recommended for use with the OCS connectors. Other type of wires can be used, but will not be compatible with the rear accessory supplied with the connectors. Below is a list of recommended cables. Additional cables can be used if they meet specifications.

The provided grommet assembly will accommodate cable diameters ranging from Ø.124 to Ø.175 per differential pair. Larger diameters may work based on cable construction.

Impedance (Ohms)	Conductor (AWG)	Pairs	Cable Part Number
100	24	1	Tensolite 24463/9P025X-2(LD)
			Thermax MX100-24
			PIC E10224
			Gore GSC-05-82559-00 (space rated) GSC-05-84308-00 (space rated)
			Gore DXN2602
	24	4	Gore RCN 9034-24 (CAT6A Ethernet)*
	26	4	Gore RCN 9047-26 (CAT6A Ethernet)*
		1	Spectra Strip 160-2699-952
1		Gore DXN 2603	

\*Optimized for 13-53 insert pattern.

OCS cable assemblies available, please consult Amphenol Aerospace for details.

# OCS (Oval Contact System) Connectors

## How to Order

1.	2.	3.	4.	5.	6.
Connector Type and Shell Style	Service Class	Shell Size – Insert Arrangement	Contact Type	Alternate Keying Position	Suffix Code
<b>TVP00</b>	<b>RZW</b>	<b>13-53</b>	<b>P</b>	<b>B</b>	<b>(595)</b>

1. CONNECTOR TYPE	
<b>TVP00</b>	Wall Mount Back panel mounted receptacle with metal shells
<b>CTVP00</b>	Wall Mount Back panel mounted receptacle with composite shells
<b>TV06</b>	Straight Plug
<b>CTV06</b>	Straight Plug composite shells
<b>TV07</b>	Jam Nut
<b>CTV07</b>	Jam Nut composite shells

2. SERVICE CLASS		
(Z) Threaded Backshell Style	(W) Integral Backshell Style*	Description
<b>RZF</b>	<b>RWF</b>	Electroless nickel plated
<b>RGZF</b>	<b>RGWF</b>	Electroless nickel plated ground plane
<b>RZW</b>	<b>RWW</b>	Olive drab cadmium plate
<b>RGZW</b>	<b>RGWW</b>	Olive drab cadmium plated ground plane
<b>RZB</b>	<b>RWB</b>	NiAlBronze
<b>RGZB</b>	<b>RGWB</b>	NiAlBronze ground plane
<b>RZK</b>	<b>RWK</b>	Corrosion resistance stainless steel
<b>RGZK</b>	<b>RGWK</b>	Stainless steel ground plane
<b>ZDT</b>	<b>WDT</b>	Durmalon plated, Nickel-PTFE alternative to cadmium
<b>GZDT</b>	<b>GWDT</b>	Groundplane Durmalon
<b>ZDZ</b>	<b>WDZ</b>	Black Zinc

\* Integral Backshell - an integral backshell style eliminates the need for costly backshell accessories, and allows the user to attach the shield of their cable directly to the backshell. The integral shell style also provides superior EMI shielding and ease for overmold applications.

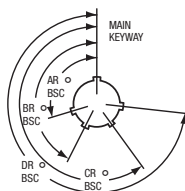


For unused OCS connector cavities:

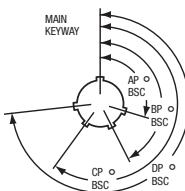
- Leave the contact insert cavity empty in the connector.
- Size 12 MS27488-12-2 (orange color) sealing plug can be installed into the grommet of the backshell large end first.



RECEPTACLE (front face shown)



PLUG (front face shown)



### 3. Select a Shell Size and Insert Arrangement

Shell Size and Insert Arrangement are together. First number represents Shell Size, second number is the Insert Arrangement. See page 7 for Insert Arrangements.

4. CONTACT TYPE	
<b>P</b>	Pin contacts 21-033585-001
<b>S</b>	Socket contacts 21-033586-001

Inner contacts accept 28, 26, and 24 awg cable.

### 5. Select an Alternate Keying Position

Alternate Positions below "N" not required for normal position

#### Tri-Start Alternate Positions:

A plug with a given rotation letter will mate with a receptacle with the same rotation letter.

SHELL SIZE	KEY & KEYWAY ARRANGEMENT IDENTIFICATION LETTER	AR° OR AP° BSC	BR° OR BP° BSC	CR° OR CP° BSC	DR° OR DP° BSC
9	<b>N*</b>	105	140	215	265
	<b>A</b>	102	132	248	320
	<b>B</b>	80	118	230	312
	<b>C</b>	35	140	205	275
	<b>D</b>	64	155	234	304
11, 13, and 15	<b>N*</b>	91	131	197	240
	<b>A</b>	95	141	208	236
	<b>B</b>	113	156	182	292
	<b>C</b>	90	145	195	252
	<b>D</b>	53	156	220	255
17 and 19	<b>N*</b>	119	146	176	298
	<b>A</b>	51	141	184	242
	<b>B</b>	80	142	196	293
	<b>C</b>	135	170	200	310
	<b>D</b>	49	169	200	244
21, 23, and 25	<b>N*</b>	66	140	200	257
	<b>A</b>	62	145	180	280
	<b>B</b>	79	153	197	272
	<b>C</b>	80	142	196	293
	<b>D</b>	135	170	200	310

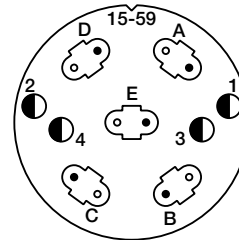
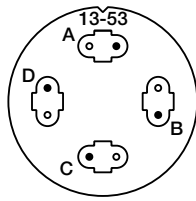
6. SUFFIX CODE	
<b>595</b>	Space Grade
<b>591</b>	Space Grade with critical dimensions verified at 100%

Order information for Removal Tool OCS Contact  
**10-6460C1-001**

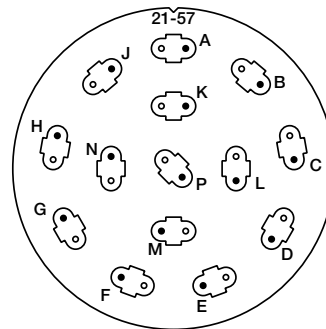
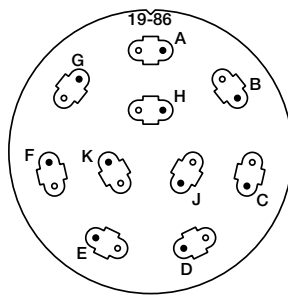


# OCS (Oval Contact System) Connectors

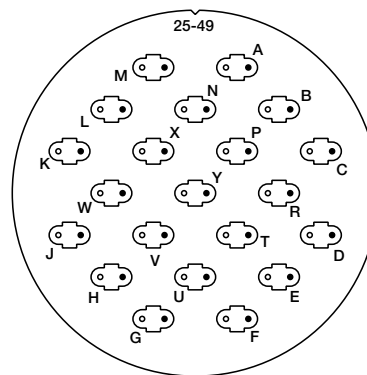
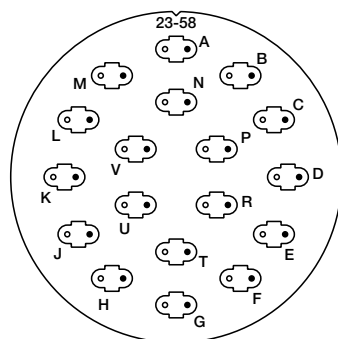
Insert Arrangements - Front face of pins illustrated



Insert Arrangement	13-53	15-59
Number of Contacts	4	5 OCS, 4 22D



Insert Arrangement	19-86	21-57
Number of Contacts	10	14

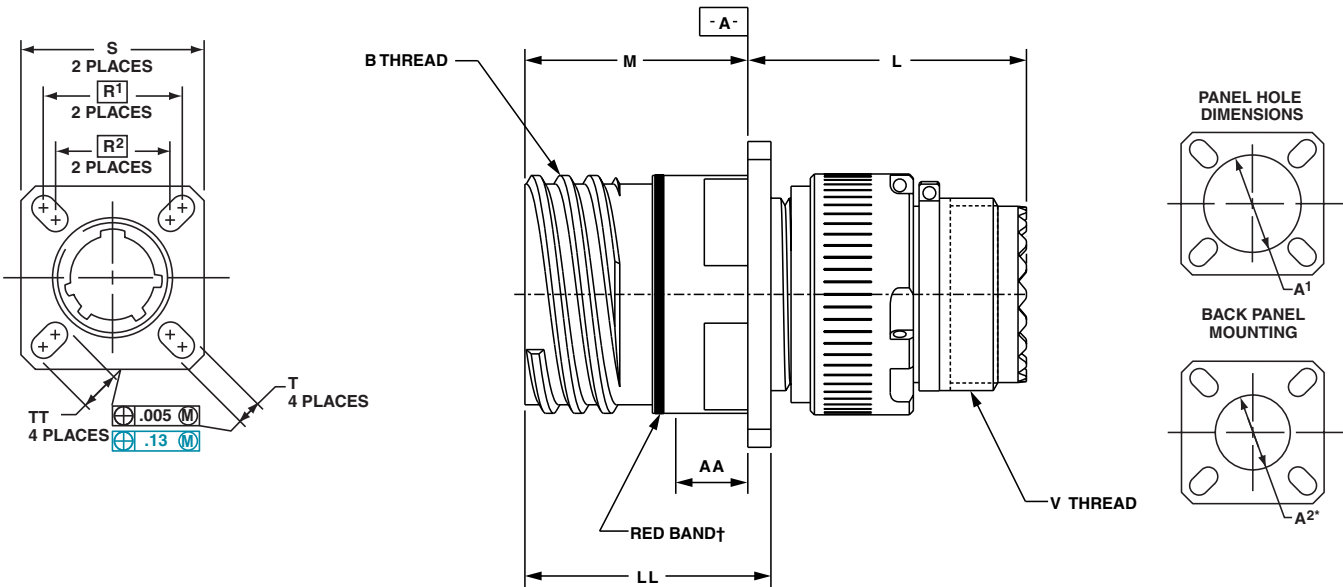


Insert Arrangement	23-58	25-49
Number of Contacts	18	21

• Designates pin 1 location within the OCS contact assembly

# OCS (Oval Contact System) Connectors

TVP00 - Crimp, Metal & CTVP00 - Crimp, Composite Wall Mounting



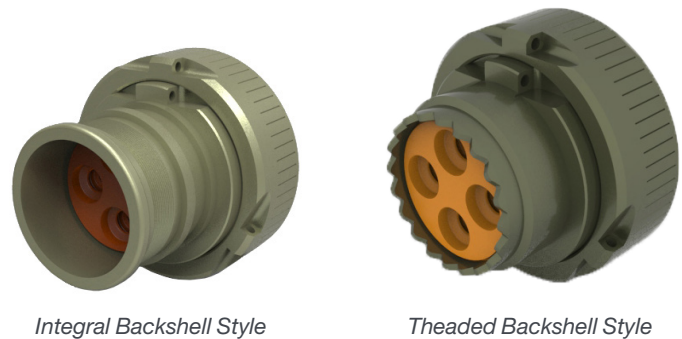
Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	L Max. (TV)	L' Max. (CTV)	M +.000 - .005 (TV)	M' +.000 - .005 (CTV)	R <sup>1</sup>	R <sup>2</sup>	S Max.	T ±.008	A <sup>1</sup> Back Panel Mount	A <sup>2</sup> Front Panel Mount	AA Max. Panel Thickness	LL +.006 - .000 (TV)	LL ±.005 (CTV)	TT ±.008	V Thread Metric
9	.6250	1.039	1.086	.820	.773	.719	.594	.948	.128	.655	.845	.234	.905	.908	.216	M12X1-6g
11	.7500	1.039	1.086	.820	.773	.812	.719	1.043	.128	.796	.963	.234	.905	.908	.194	M15X1-6g
13	.8750	1.039	1.086	.820	.773	.906	.812	1.137	.128	.922	1.081	.234	.905	.908	.194	M18X1-6g
15	1.0000	1.039	1.086	.820	.773	.969	.906	1.232	.128	1.047	1.239	.234	.905	.908	.173	M22X1-6g
17	1.1875	1.039	1.086	.820	.773	1.062	.969	1.323	.128	1.219	1.357	.234	.905	.908	.194	M25X1-6g
19	1.2500	1.039	1.086	.820	.773	1.156	1.062	1.449	.128	1.297	1.475	.234	.905	.908	.194	M28X1-6g
21	1.3750	1.069	1.118	.790	.741	1.250	1.156	1.575	.128	1.442	1.593	.204	.905	.904	.194	M31X1-6g
23	1.5000	1.069	1.118	.790	.741	1.375	1.250	1.701	.154	1.547	1.711	.204	.905	.904	.242	M34X1-6g
25	1.6250	1.069	1.118	.790	.741	1.500	1.375	1.823	.154	1.672	1.829	.204	.905	.904	.242	M37X1-6g

† Red band indicates fully mated

\* A2 dimensions are larger than standard D38999 dimensions to accommodate backshell. All dimensions for reference only.

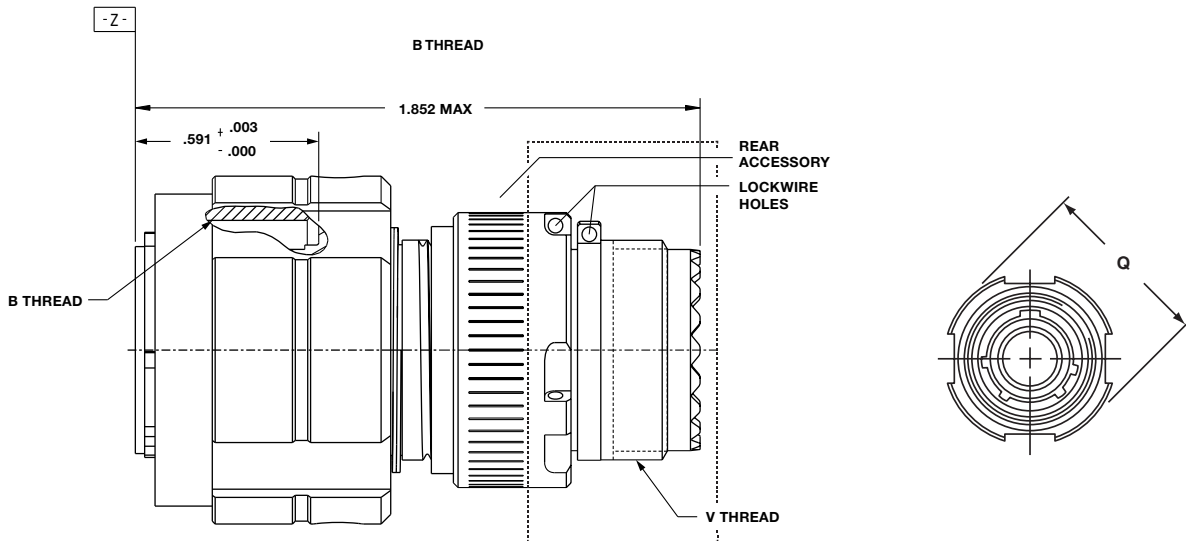
The rear accessory shown above is provided kitted with each connector and is for environmental sealing. The grommet included is insert arrangement specific, shown at right is the 13-53 pattern.

The provided grommet assembly will accommodate cable diameters ranging from Ø.124 to Ø.175. Larger diameters may work based on cable construction.



# OCS (Oval Contact System) Connectors

TV06 - Crimp, Metal & CTV06R - Crimp, Composite Straight Plug

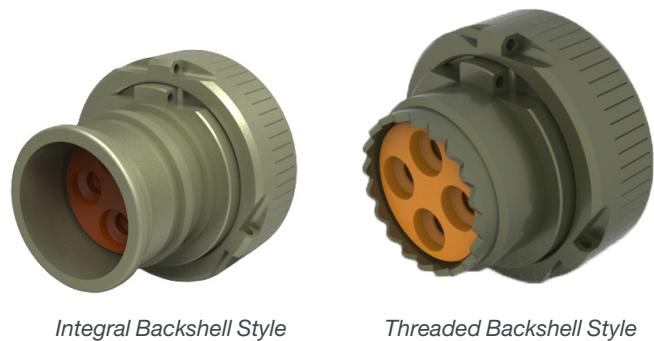


Shell Size	B Thread 0.1P-0.3L-TS-2B (Plated)	Q Dia. Max.	V Thread Metric
9	.6250	.858	M12X1-6g
11	.7500	.984	M15X1-6g
13	.8750	1.157	M18X1-6g
15	1.0000	1.280	M22X1-6g
17	1.1875	1.406	M25X1-6g
19	1.2500	1.516	M28X1-6g
21	1.3750	1.642	M31X1-6g
23	1.5000	1.768	M34X1-6g
25	1.6250	1.890	M37X1-6g

All dimensions for reference only.

The rear accessory shown above is provided kitted with each connector and is for environmental sealing. The grommet included is insert arrangement specific, shown at right is the 13-53 pattern.

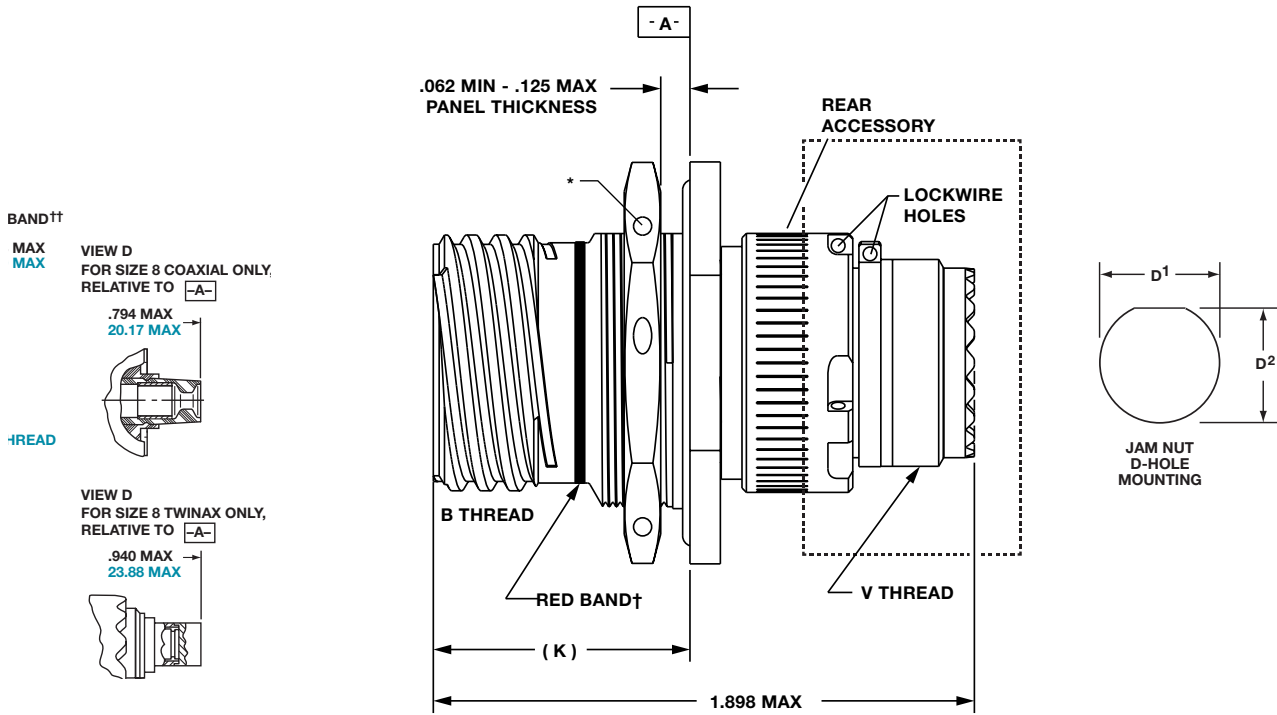
The provided grommet assembly will accommodate cable diameters ranging from Ø.124 to Ø.175. Larger diameters may work based on cable construction.





# OCS (Oval Contact System) Connectors

TV07R - Crimp, Metal & CTV07R - Crimp, Composite Jam Nut Receptacle



All dimensions for reference only.

Shell Size	B Thread Class 2A 0.1P-0.3L-TS (Plated)	C Max.	D <sup>1</sup> +.010 - .000	D <sup>2</sup> +.000 - .010	H Hex +.017 - .016	K Ref.	S ±.010	V Thread Metric
9	.6250	1.199	.693	.657	.875	.871	1.062	M12X1-6g
11	.7500	1.386	.825	.770	1.000	.871	1.250	M15X1-6g
13	.8750	1.511	1.010	.955	1.188	.878	1.375	M18X1-6g
15	1.0000	1.636	1.135	1.085	1.312	.878	1.500	M22X1-6g
17	1.1875	1.761	1.260	1.210	1.438	.878	1.625	M25X1-6g
19	1.2500	1.949	1.385	1.335	1.562	.878	1.812	M28X1-6g
21	1.3750	2.073	1.510	1.460	1.688	.878	1.938	M31X1-6g
23	1.5000	2.199	1.635	1.585	1.812	.878	2.062	M34X1-6g
25	1.6250	2.323	1.760	1.710	2.000	.878	2.188	M37X1-6g

† Red band indicates fully mated  
 \* .059 dia min., 3 lockwire holes, Formed lockwire hole design (6 holes) is optional

The rear accessory shown above is provided kitted with each connector and is for environmental sealing. The grommet included is insert arrangement specific, shown at right is the 13-53 pattern.

The provided grommet assembly will accommodate cable diameters ranging from Ø.124 to Ø.175. Larger diameters may work based on cable construction.



Integral Backshell Style



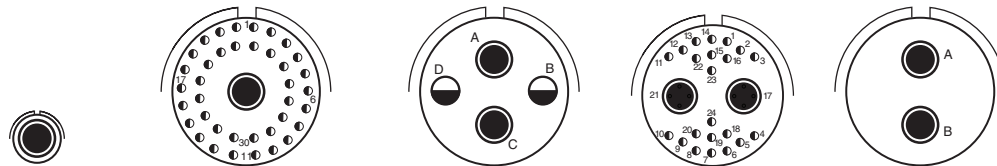
Threaded Backshell Style

# Insert Arrangements-MIL-DTL-38999, Series III

Incorporating Octonet, Quadrax & Differential Twinax Contacts

This illustrated listing represents the most readily available patterns incorporating Octonet, Quadrax and Differential Twinax contacts within D38999, Series III connectors. If you require other arrangements than what are shown here, consult Amphenol for further availability. In most cases, unless otherwise stated, size 8 cavities can be filled with Quadrax or Differential Twinax contacts. Arrangements can be mixed with any size 8 coax, and/or Concentric Twinax or Triax contacts.

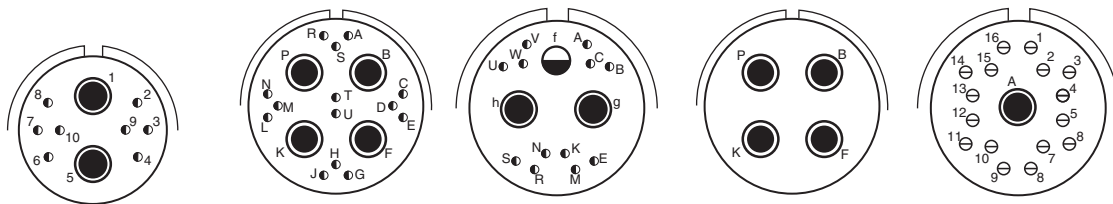
## Front face of pin inserts illustrated



Insert Arrangement	9-5	17-2   17-3	17-22	17-25	17-52
Number of Contacts	1	38	2	2	2
Contact Size	8	22D	12	8	8

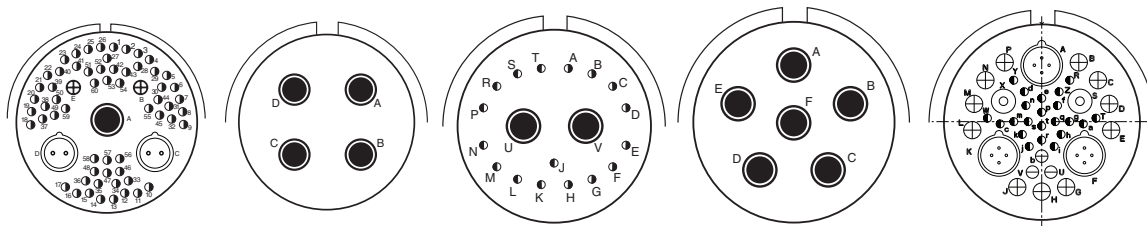
Grounded

Meets Boeing Specification



Insert Arrangement	17-60	19-18   19-19	19-31	19-AB	19-AD
Number of Contacts	8	14	12	4	16
Contact Size	22D	22D	22D	8	20

Note: 19-AB same as 19-18 but no 22D contacts.  
Ground plane only.



Insert Arrangement	21-65	21-75   21-76	21-79	23-6	25-41
Number of Contacts	1	4	17	6	3
Contact Size	8	8	22D	8	8

### CONTACT LEGEND

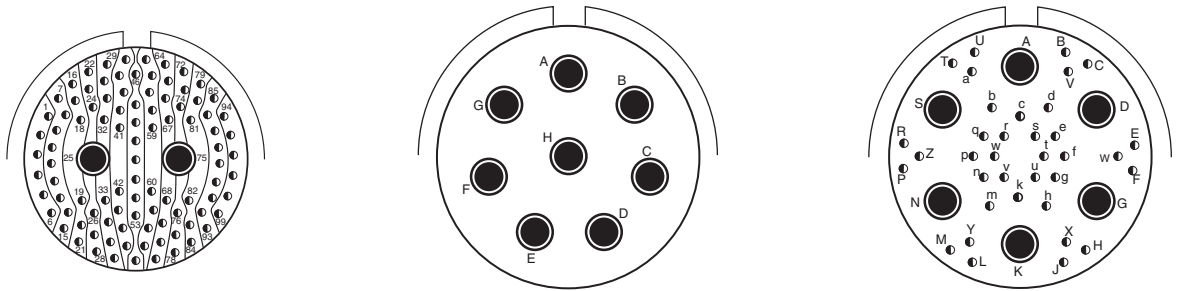


Quadrax or Differential Twinax

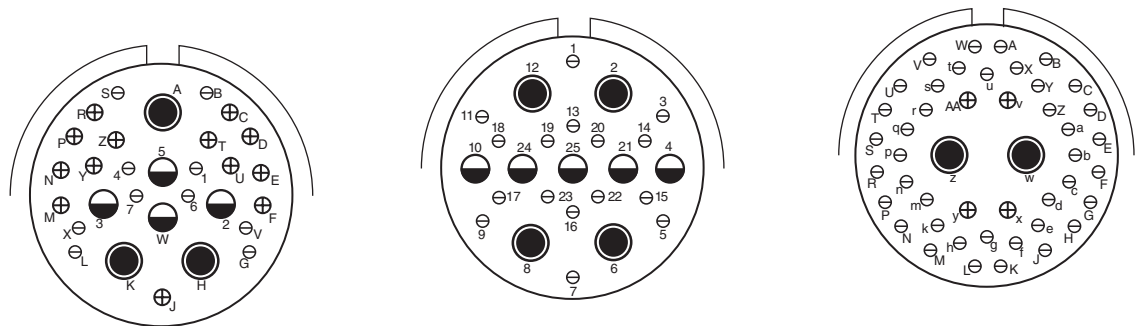
# Insert Arrangements - for MIL-DTL-38999

Incorporating Octonet, Quadrax & Differential Twinax Contacts

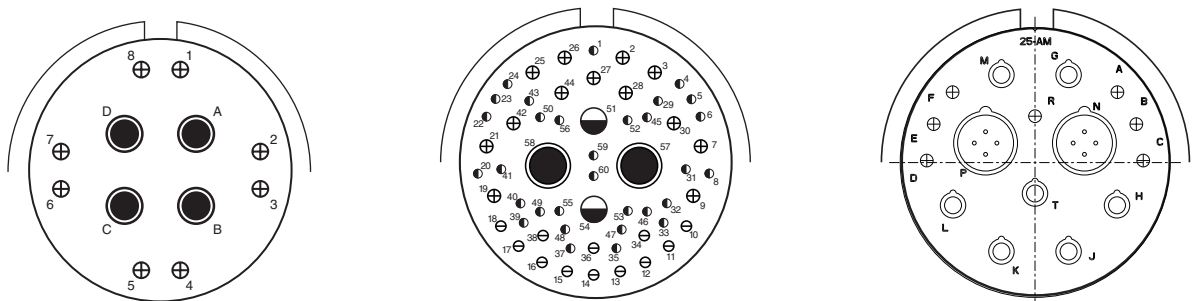
Front face of pin inserts illustrated



Insert Arrangement	25-7   25-9		25-8   25-10		25-17	
Number of Contacts	97	2	8		36	6
Contact Size	22D	8	8		22D	8



Insert Arrangement	25-20   25-21				25-26			25-46   25-47		
Number of Contacts	10	13	3	4	16	5	4	40	4	2
Contact Size	20	16	8	12	20	12	8	20	16	8



Insert Arrangement	25-62		25-AT					25-AM		
Number of Contacts	8	4	2	2	13	12	31	2	7	7
Contact Size	16	8	8	12	16	20	22D	8	10	16

Ground plane only

Ground plane only

### CONTACT LEGEND





# Octonet Contacts

Superior Ethernet Contact System for MIL-DTL-38999, Series III

**Amphenol**  
MILITARY HIGH SPEED

## OVERVIEW

Eight strategically spaced inner contacts form four 100 Ohm matched impedance differential pairs.



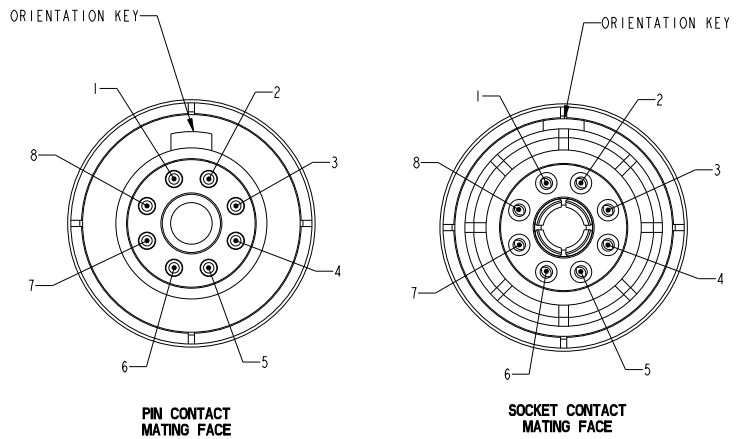
### FEATURES

- Available in size 8 crimp termination style
- Also available in PC Tails
- Can be installed in existing size 8 Quadrax cavities
- Meets performance specifications of CAT-6A cable
- 10G Ethernet compliant
- Overall higher bandwidth than standard CAT5E Quadrax-supports up to 4.0 Gbps per pair
- Enhanced crosstalk performance (compared to standard Quadrax)
- Supports wire ranges 26 to 24 gauge
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts
- Operating Temp -65°C to 175°C
- Recommended to use extender backshell.

### BENEFITS

- Easy drop-in replacement to installed connectors no need to redesign

### SUGGESTED DIFFERENTIAL PAIR NUMBERING



### SPECS

- Environmental Sealing:** IAW connector specification
- Corrosion Resistance:** 500 hours salt spray
- EMI Shielding:** 360 degree shielding on each pair
- Mating Cycles:** 500 cycles
- Voltage Rating:** 500 Vrms max @ sea level
- Dielectric Withstanding Voltage:** 500 VAC RMS sea level

Differential Pairing	
Pair #	Contact ID
1	1-2
2	3-4
3	5-6
4	7-8

### OCTONET CABLE DIMENSIONAL RESTRICTIONS

- OD over cable jacket - .309 inch max
- OD over braid - .268 inch max
- Inner conductor insulation OD - .050 inch max



# Octonet Contacts

Superior Ethernet Contact System for MIL-DTL-38999, Series III

## FEATURES

- Integral removal tool
- Mates with Octonet II design
- Hex outer crimp



Pin

Socket

\*Not limited to cables shown

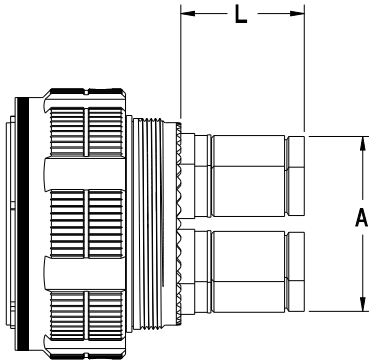
Pin	Socket	*Cable
21-032904-001	21-032905-001	Thermax: MX10G-24HP
21-032904-011	21-032905-011	W.L.Gore: RCN8966-24
21-032904-021	21-032905-021	PIC E6A3824, Harbour E10024065, E10024064, E6A6824, Gigafliight GF824B-6A, PIC E6A0824
21-032904-031	21-032905-031	W.L.Gore: GSC-03-84043-01
21-032904-041	21-032905-041	Axon P542810, W.L.Gore: RCN9235-26 (Cat8)
21-032904-061	21-032905-061	Thermax MX10G-24FLX4
21-032904-051	21-032905-051	PIC E6A3826, MX10G-26, PIC E74826
21-032904-071	21-032905-071	W.L.Gore: RCN9047-26, RCN8966-26, Quabbin 5710 QWC0042-03
21-032904-081	21-032905-081	TE C6A-26C444XB2MA
21-032904-111	21-032905-111	Marmon DL-CAT5E-26ENECT80.1
21-032904-131	21-032905-131	PIC E84824 (Cat6A)

\*Not limited to cables shown

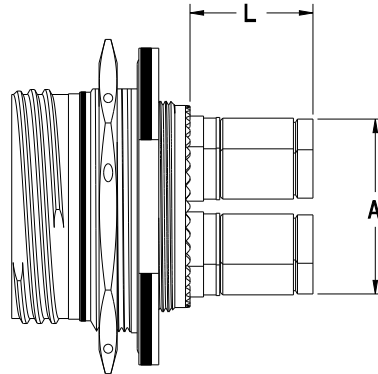
## CRIMP TOOLS

Inner Crimp Tool		Outer Crimp Tool	
Tool	Positioner	Tool	Die Set
M22520/2-01	DANIELS K1958	M22520/5-01	DANIELS Y039 or Y2242

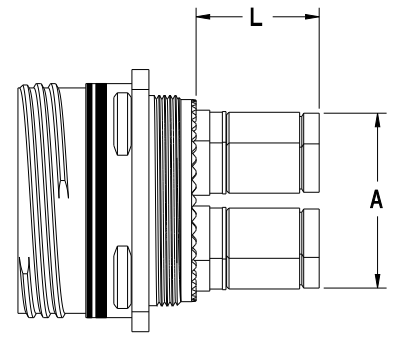
## CONTACT PROTRUSION - REAR OF GROMMET



Plug



Jam Nut Receptacle



Wall Mount Receptacle

Shell Size	A DIA MIN	L MN
9	.360	.840
17	.734	.840
19	.869	.840
21	.869	.840
23	1.088	.840
25	1.234	.840

# Octonet II Contacts

Superior Ethernet Contact System for MIL-DTL-38999, Series III

## FEATURES

- Uses removal tool M81969/14-12
- Shorten overall length
- Smaller overall diameter
- Circular outer crimp



Pin



Socket

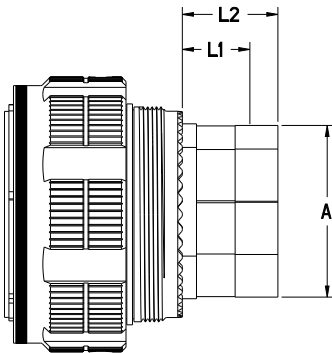
## CRIMP TOOLS

Pin	Socket	*Cable
21-032904-121	21-032905-121	W.L.Gore: RCN8966-24, PIC E6A3824, W.L.Gore: GSC-03-84043-01, Axon P542810, Thermax MX10G-24FLX4, PIC E6A3826, MX10G-26, W.L.Gore: RCN9047-26, RCN8966-26, TE C6A-26C444XB2MA, Marmon DL-CAT5E-26EN-ECT80.1, Gigafight GF824B-6A, W.L.Gore: RCN9235-26 (Cat8)

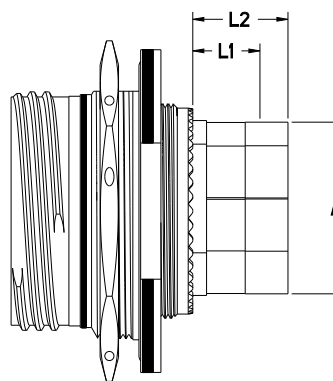
\*Not limited to cables shown

Inner Crimp Tool		Outer Crimp Tool	
Tool	Positioner	Tool	Die Set
M22520/2-01	DANIELS K1958	DANIELS GS206	DANIELS G2P1907

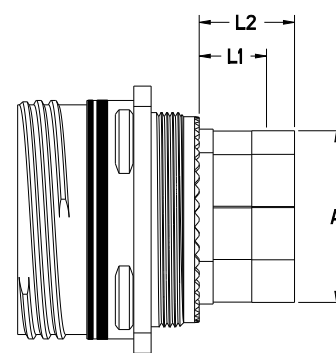
## CONTACT PROTRUSION - REAR OF GROMMET



Plug



Jam Nut Receptacle



Wall Mount Receptacle

Shell Size	A DIA MIN	L1 MN (End of shell to end of contact)	L2 MN (End of shell to end of seal)
9	.360	.440	.628
17	.734	.440	.628
19	.869	.440	.628
21	.869	.440	.628
23	1.088	.440	.628
25	1.234	.440	.628



# Octonet Contacts

PCB intermatable with Octonet and Octonet II

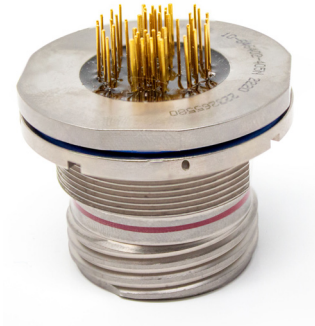


Pin PCB Tail



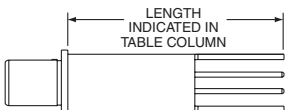
Socket PCB Tail

PCB Pin	PCB Socket	*Cable
		L Dimension + or - 15
21-032906-001	21-032907-001	Pin .884 / Socket 1.024
21-032906-011	21-032907-011	.884
21-032906-021	21-032907-021	.884
21-032906-031	21-032907-031	.950
21-032906-041	21-032907-041	.859
21-032906-051	21-032907-051	.518
21-032906-061	21-032907-061	.788
21-032906-071	21-032907-071	.740
21-032906-081	21-032907-081	.525
21-032906-091	21-032907-091	.918
21-032906-111	21-032907-111	.848
21-032906-121	21-032907-121	.976
21-032906-131	21-032907-131	1.024
21-032906-141	21-032907-141	1.035
21-032906-151	21-032907-151	.564
21-032906-161	21-032907-161	.594
21-032906-171	21-032907-171	1.110
21-032906-181	21-032907-181	.622
21-032906-191	21-032907-191	.771
21-032906-201	21-032907-201	.815
21-032906-211	21-032907-211	.580
21-032906-221	21-032907-221	.800
21-032906-231	21-032907-231	.740
21-032906-241	21-032907-241	.960



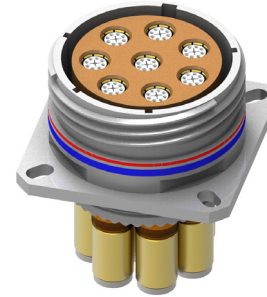
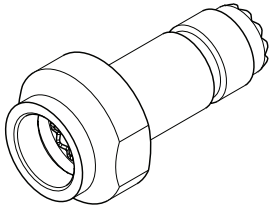
Stabilizer-To be used on all PCB Pins & Sockets. 21-033323-023

PCB L dimension length given in chart is the distance from the rear of the contact retention shoulder to the tip of the PCB tails.



Note: it does not indicate stickout length when installed in D38999 connector.

OCTONET TRANSITION ADAPTERS			
	Plug	21-032915-001	Thermax MX10G-24HP
	Plug	21-032915-011	GORE RCN 8966-26
	PCB Straight	21-032916-001	PCB length .135 inch
	PCB Straight	21-032916-021	PCB length .225 inch



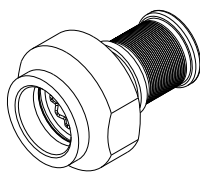
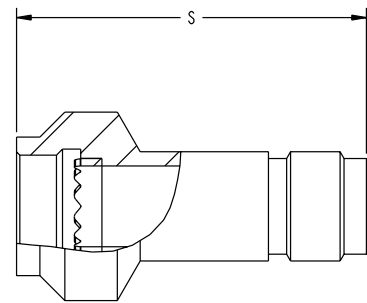
### BACKSHELL EXTENDER

Due to the protrusion of the Octonet Contacts through the rear of the grommet, a Backshell Extender must be used. The Extender is compatible with any Mil-Spec Backshell. Consult the factory for more information.

Part Number	Shell Size
FX-646409-01 ( )	9
FX-646409-02 ( )	11
FX-646409-03 ( )	13
FX-646409-04 ( )	15
FX-646409-05 ( )	17
FX-646409-06 ( )	19
FX-646409-07 ( )	21
FX-646409-08 ( )	23
FX-646409-09 ( )	25

FINISH TABLE	
Prefix	Description
F2	Black Zinc Nickel
F4	Green Zinc Nickel
F7	Durmalon
F9	Thick OD Cadmium plate, Nickel Base
FH	Thick Electroless Nickel
FJ	Black Electroless Nickel

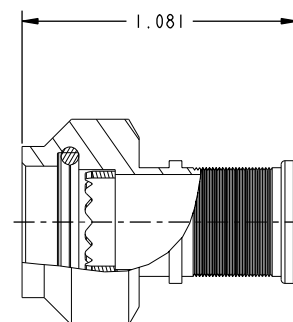
LENGTH TABLE	
Prefix	S ±.060
A	1.200
3	1.500
4	2.000
5	2.500
6	3.000
7	3.500
8	4.000
9	4.500



### BANDING BACKSHELL

Part Number	Shell Size
FX-646409-500 ( )	07
FX-646409-510 ( )	09
FX-646409-520 ( )	11
FX-646409-530 ( )	13
FX-646409-540 ( )	15
FX-646409-550 ( )	17
FX-646409-560 ( )	19
FX-646409-570 ( )	21
FX-646409-580 ( )	23
FX-646409-590 ( )	25

FINISH TABLE	
Prefix	Description
F2	Black Zinc Nickel
F4	Green Zinc Nickel
F7	Durmalon
F9	Thick OD Cadmium plate, Nickel Base
FH	Thick Electroless Nickel
FJ	Black Electroless Nickel



# Rectangular D-Sub Type Connectors with Octonet Contacts



Machined aluminum shells. Scoop proof interface, Military grade performance and construction. Connectors contain a spiral shield for EMI protection/grounding to the panel or box.

### FEATURES:

- Overall higher bandwidth than standard CAT5E Quadrx-supports up to 4.0 Gbps per pair
- Enhanced crosstalk performance (compared to standard Quadrx)
- Supports wire ranges 26 to 24 gauge
- Operating Temp -65°C to 175°C

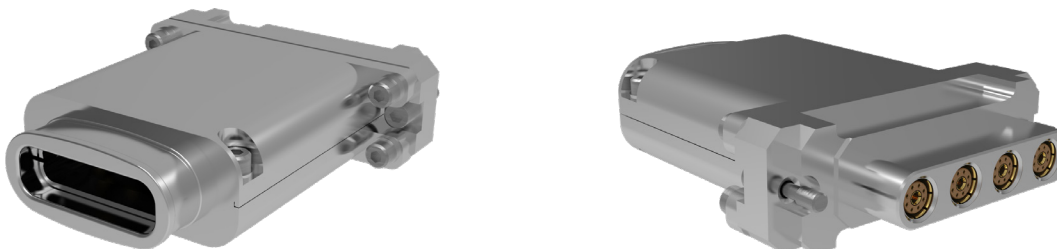
### PROTOCOLS:

- 10G Base-T Ethernet
- ADVI 1.0 Single Link
- DVI 1.0 Single Link
- DVI 1.0 Dual link
- HDMI 1.3a
- HDMI 1.4
- DisplayPort v1.2
- USB3.0
- RapidIO 1.25 and 2.5 Gbaud
- ARINC 818

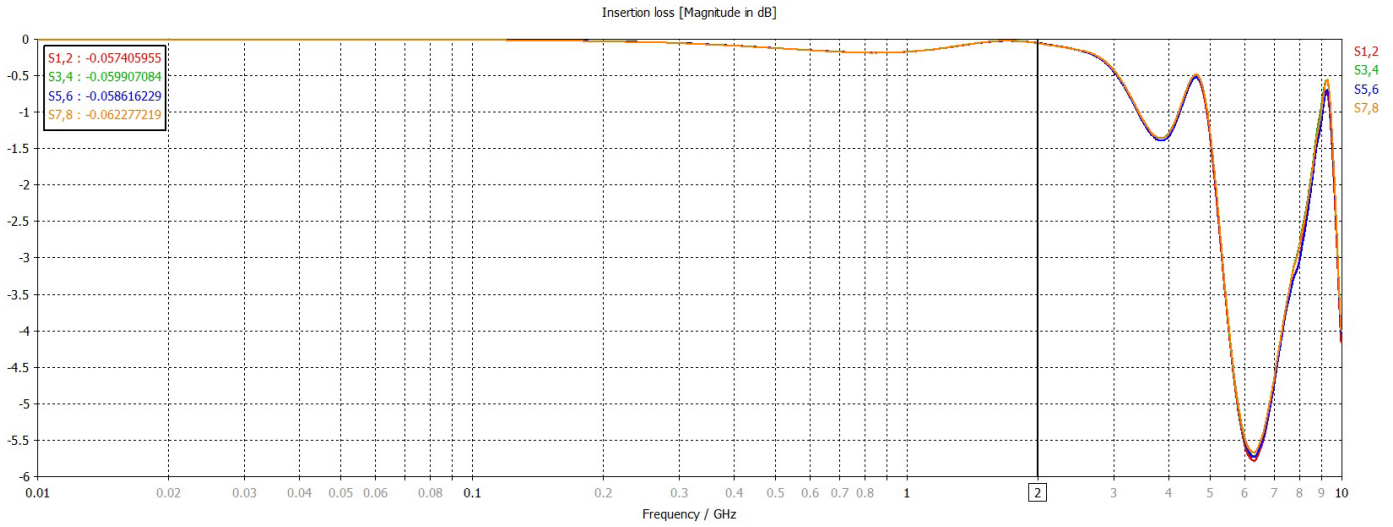
Connector Part Number	Contact	Type Contact	Number of Contacts	Mating Connector part number	Comments (sold separately)	Backshell * (sold separately) See chart below
91-646136-A01	PIN	PCB TAIL	1	91-646137-A01	SOCKET	10-6462R8-210 ( )
91-646136-A02	PIN	PCB TAIL	2	91-646137-A02	SOCKET	10-6462R8-220 ( )
91-646136-A03	PIN	PCB TAIL	3	91-646137-A03	SOCKET	10-6462R8-230 ( )
91-646136-A04	PIN	PCB TAIL	4	91-646137-A04	SOCKET	10-6462R8-240 ( )
91-646136-A05	PIN	PCB TAIL	5	91-646137-A05	SOCKET	10-6462R8-250 ( )

\*To complete part number add suffix. See below chart

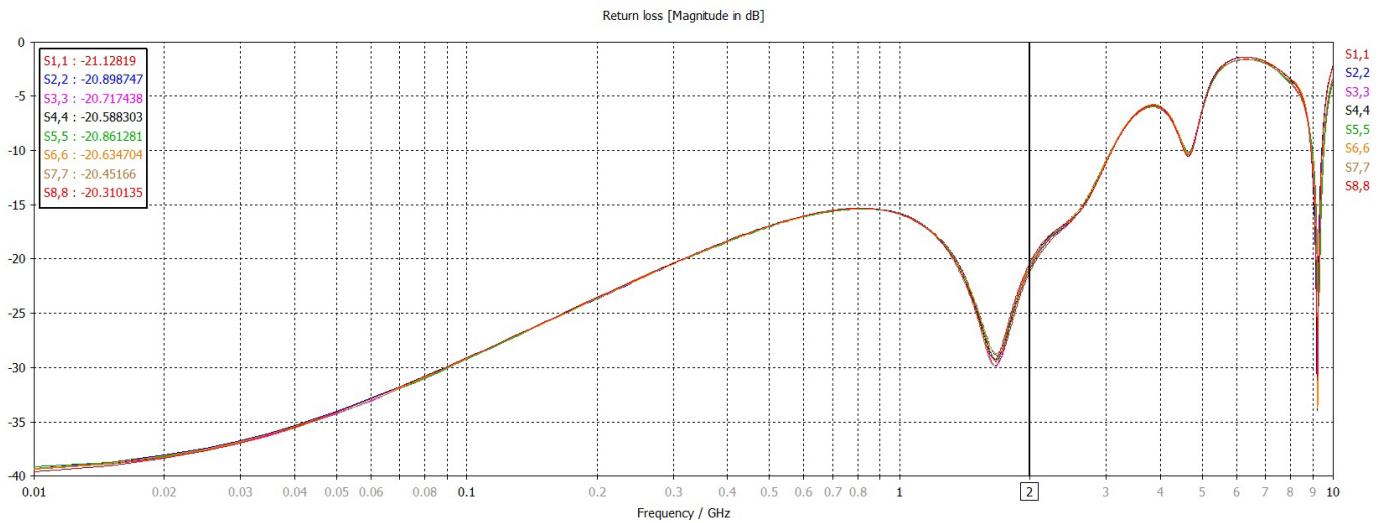
BACKSHELL*	
Variable	Space Rated Vacuum Degassed
T	No
S	Yes



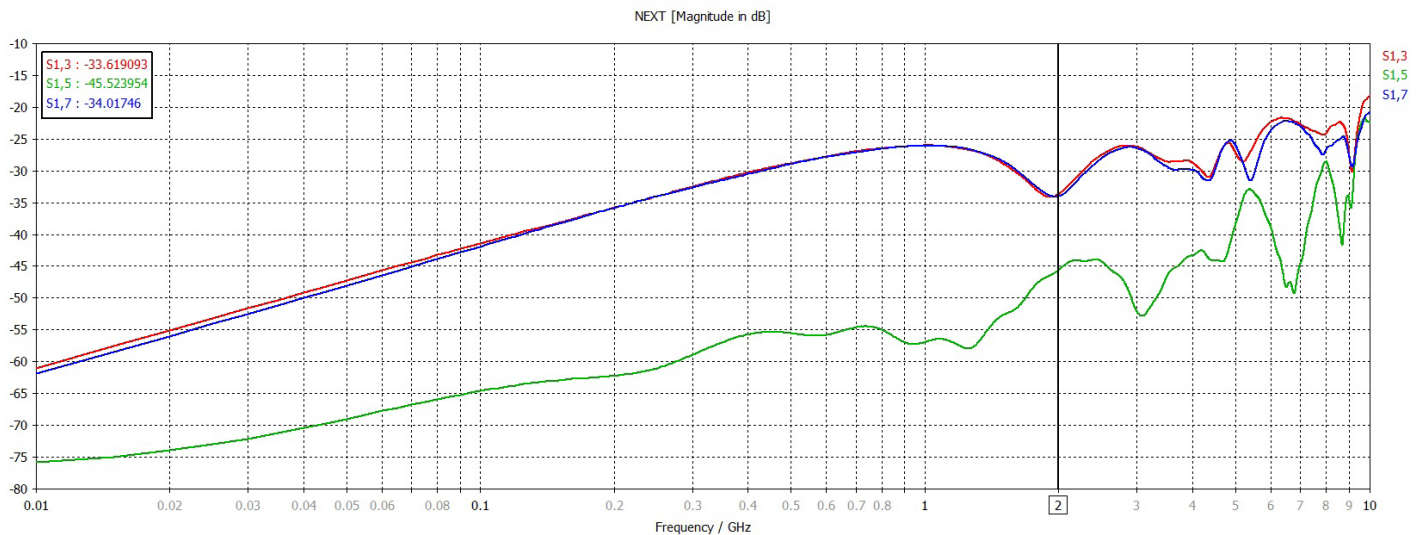
### CONTACT DIFFERENTIAL INSERTION LOSS



### CONTACT DIFFERENTIAL RETURN LOSS



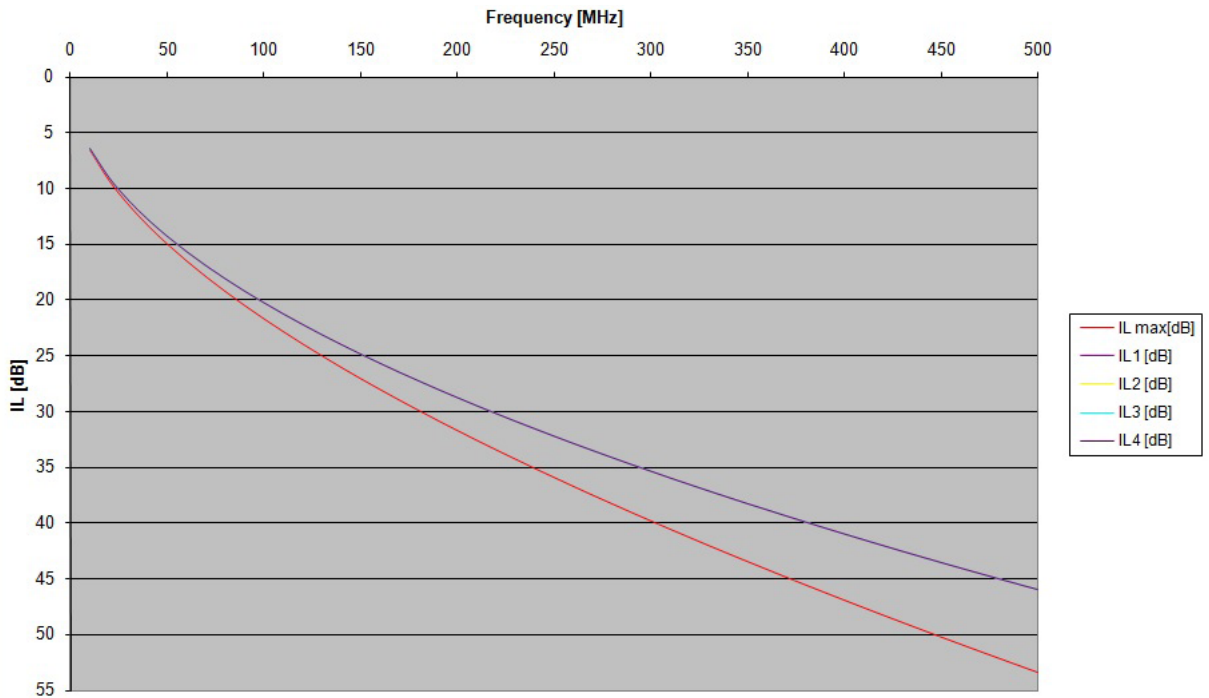
### CONTACT DIFFERENTIAL REAR-END CROSSTALK





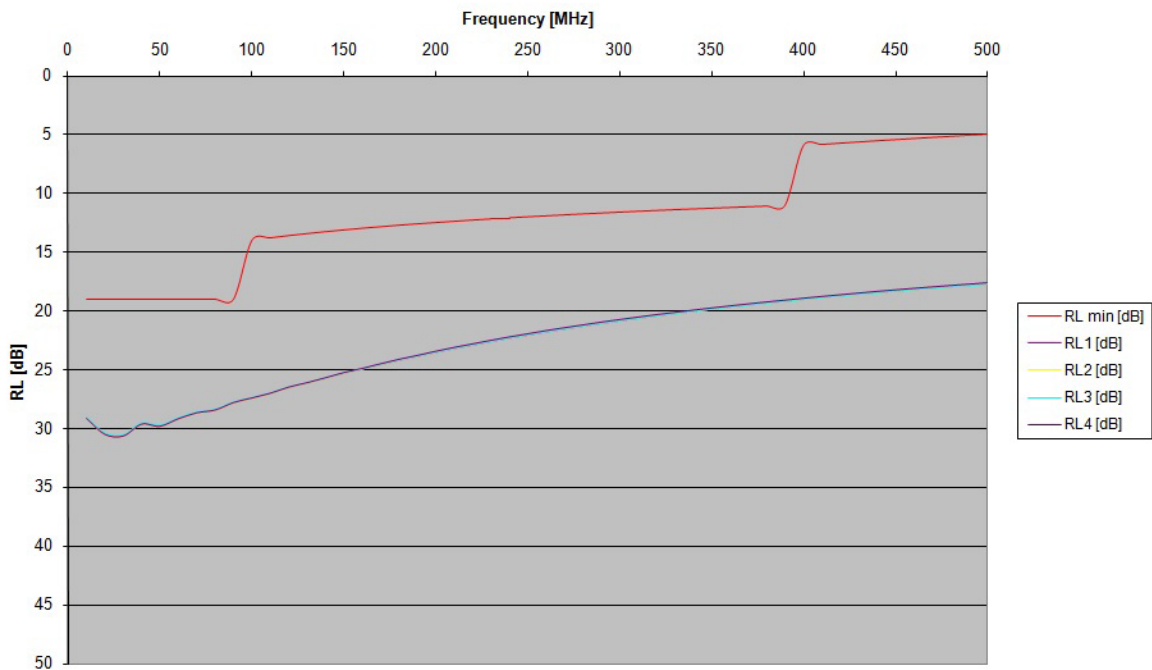
# Signal Integrity Contact Data

## 10GBASE-T DATA (TWO MATED CONTACTS ON EACH END OF 100 METER CAT6A CABLE) INSERTION LOSS



Cable assembly near-end crosstalk

## RETURN LOSS



Cable assembly return loss



### DESCRIPTION

Amphenol provides a high performance ruggedized Quadrax contact, known as FiberQuad, that embeds a fiber optic transmitter or receiver within the contact itself, along with the support electronics to provide a plug-and-play solution to our customers.

The contact is flexible enough to be a transmitter or receiver, support many wavelengths and modes, and support multiple protocols, including those which encoded and pathological. The contact fits within a standard Quadrax contact and can be installed in plugs and receptacles meant for Amphenol Quadrax 38999 connectors.

### FEATURES & BENEFITS

- Each Quadrax contact can contain a fiber optic transmitter or receiver
- Support for speeds up to 10.3125 Gbps
- Support for 1300 multi-mode (for legacy protocols such as 100-Base-FX), 1310nm single-mode, and 850nm multi-mode wavelengths
- Support for encoded data as well as pathological data
- Each contact can be installed in any Amphenol Quadrax 38999 Connector
- Onboard diagnostics and control
- Operating temperatures: -40C to +85C
- Transmit enable pin for transmitters
- Loss of signal pin for receivers

### SUPPORTED PROTOCOLS

- Ethernet
- Fibre Channel
- ARINC-818
- PCI-Express
- Infiniband
- SDI / HD-SDI / 3G-HD-SDI
- Many others

Part Number	Tx or Rx	Wavelength/Mode	Speed	Interface Type
CF-170900-034	Transmitter	850nm Multi-Mode	Up to 4.25 Gbps	Encoded Data
CF-170900-035	Receiver	850nm Multi-Mode	Up to 4.25 Gbps	Encoded Data
CF-170900-EXX (1)	Transmitter	850nm Multi-Mode	Up to 10.3125 Gbps	Encoded Data
CF-170900-FXX (1)	Receiver	850nm Multi-mode	Up to 10.3125 Gbps	Encoded Data
1310nm Variants	*	*	*	*
1550nm Variants	*	*	*	*
Pathological Data	*	*	*	*

\* Please contact factory

(1) See final part number configuration under the 10G dimension page

# CF-170900-034 AND CF-170900-035 SPECIFICATIONS

## General

Parameter	Min	Nom	Max	Units	Notes
Supply Voltage	2.9	3.3	3.6	V	-40°C to +85°C
Data Rate	0.155		4.25	Gbps	-40°C to +85°C
Operating Temperature	-40		85	Deg C	

## Electrical

Parameter	Min	Nom	Max	Units	Notes
<b>Transmitter</b>					
Input Differential Impedance		100		Ohms	Differential
Differential Input Voltage Swing	150	1000	1200	mVpp	-40°C to +85°C
<b>Receiver</b>					
Differential Output Voltage Swing	520	760	1200	mVpp	-40°C to +85°C

## Optical

Parameter	Min	Nom	Max	Units	Notes
<b>Transmitter</b>					
Output Optical Power	-2			dBm	-40°C to +85°C
Optical Wavelength		850		nm	
<b>Receiver</b>					
Sensitivity			-24	dBm	-40°C to +85°C

## Transmitter :

TOSA Contact I/O Chart	
PIN ID	Function
1	DISABLE
2	VCC
3	GND
4	FAULT
5	INPUT-
6	INPUT+

Mating Electrical Connector Pinout	
Signal Name	Description
Input +/-	High speed AC coupled differential input signals
DISABLE	Optical transmit disable pin. To enable the optical transmitter, apply 0VDC. To disable the optical transmitter, apply 3.3VDC or leave floating.
FAULT	Fiber optic transmitter fault
VCC	3.3 VDC
GND	Ground Return

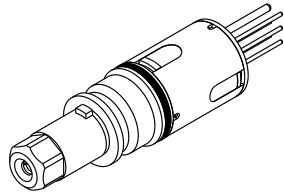
## Receiver :

ROSA Contact I/O Chart	
PIN ID	Function
1	GND
2	VCC
3	GND
4	LOS
5	OUTPUT-
6	OUTPUT+

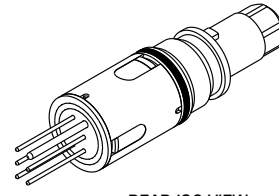
Mating Electrical Connector Pinout	
Signal Name	Description
Output +/-	High speed AC coupled differential output signals
LOS	Optical receive loss of signal indicator. High level indicates the amplitude is below the programmed threshold level.
VCC	3.3 VDC
GND	Ground Return



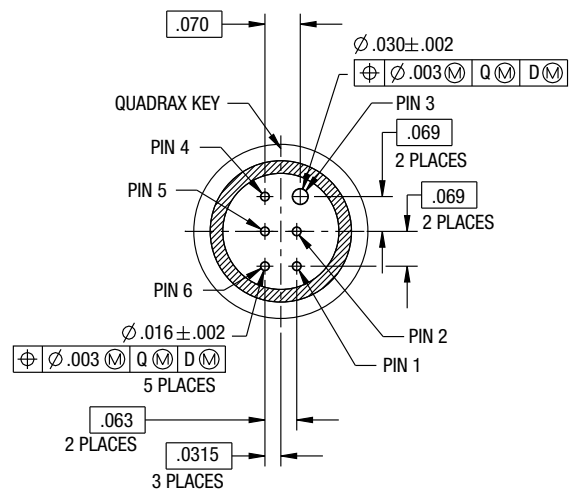
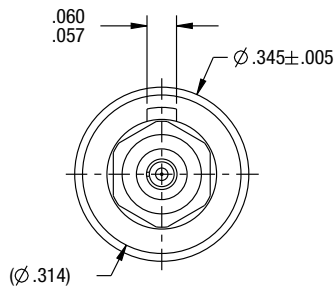
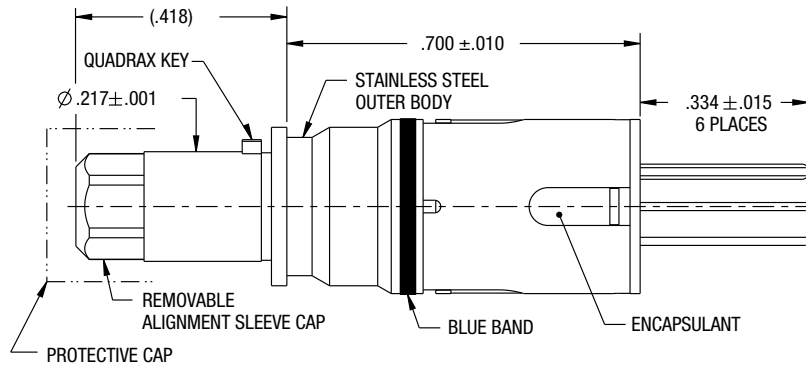
# CF-170900-034 /035 4.25GBPS DIMENSIONS



FRONT ISO VIEW



REAR ISO VIEW



## General

Parameter	Min	Nom	Max	Units	Notes
Supply Voltage	2.9	3.3	3.6	V	-40°C to +85°C
Data Rate	1		10	Gbps	-40°C to +85°C
Operating Temperature	-40		85	Deg C	

## Electrical

Parameter	Min	Nom	Max	Units	Notes
<b>Transmitter</b>					
Input Differential Impedance	75	100	125	Ohms	Differential
Differential Input Voltage Swing	200		800	mVpp	-40°C to +85°C
<b>Receiver</b>					
Differential Output Voltage Swing	595	800	1005	mVpp	-40°C to +85°C

## Optical

Parameter	Min	Nom	Max	Units	Notes
<b>Transmitter</b>					
Output Optical Power	-4			dBm	-40°C to +85°C
Optical Wavelength		850		nm	
<b>Receiver</b>					
Sensitivity			-18	dBm	-40°C to +85°C

# CF-170900-EXX/FXX PINOUT AND DESCRIPTION

## Transmitter :

TOSA Contact I/O Chart	
PIN ID	Function
1	DISABLE
2	VCC
3	GND
4	FAULT
5	INPUT-
6	INPUT+

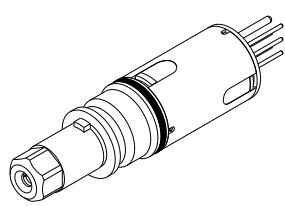
Mating Electrical Connector Pinout	
Signal Name	Description
Input +/-	High speed AC coupled differential input signals
DISABLE	Optical transmit disable pin. To enable the optical transmitter, apply 0VDC. To disable the optical transmitter, apply 3.3VDC or leave floating.
FAULT	Fiber optic transmitter fault
VCC	3.3 VDC
GND	Ground Return

## Receiver :

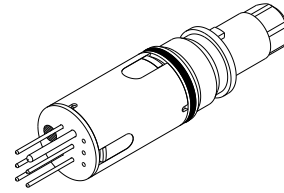
ROSA Contact I/O Chart	
PIN ID	Function
1	GND
2	VCC
3	GND
4	LOS
5	OUTPUT-
6	OUTPUT+

Mating Electrical Connector Pinout	
Signal Name	Description
Output +/-	High speed AC coupled differential output signals
LOS	Optical receive loss of signal indicator. High level indicates the amplitude is below the programmed threshold level.
VCC	3.3 VDC
GND	Ground Return

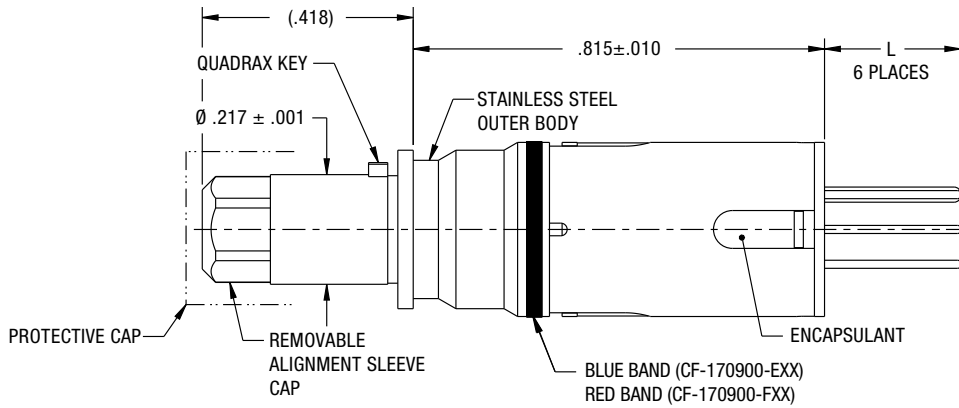
# CF-170900-E01/F01 DIMENSIONS



FRONT ISO VIEW

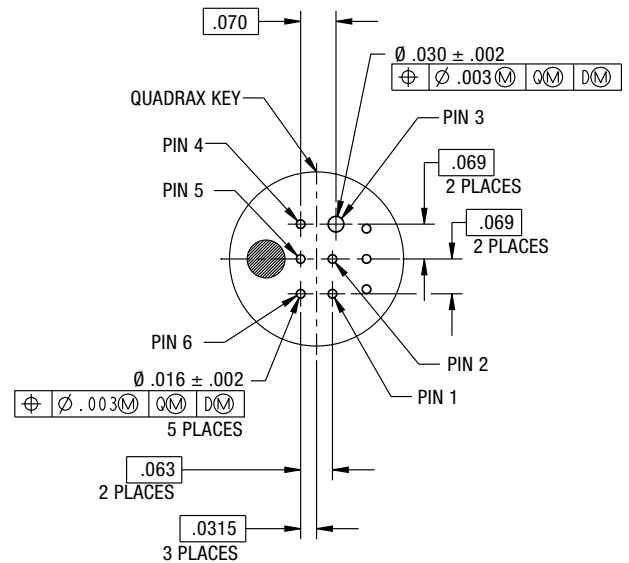
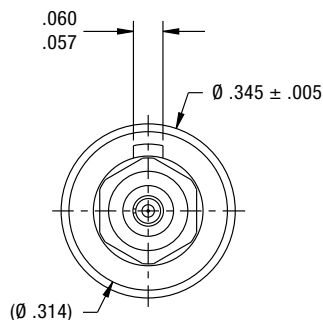


REAR ISO VIEW



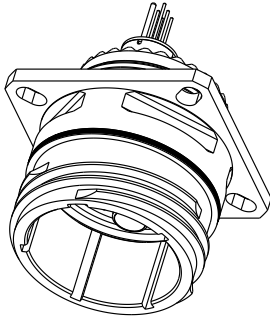
Part Number	L ± .015
CF-170900-F01	.333
CF-170900-F02	.270
CF-170900-F03	.158

Part Number	L ± .015
CF-170900-E01	.333
CF-170900-E02	.270
CF-170900-E03	.158

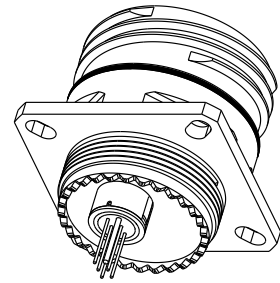




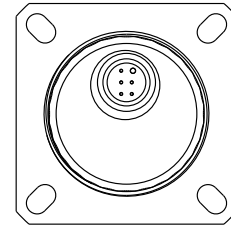
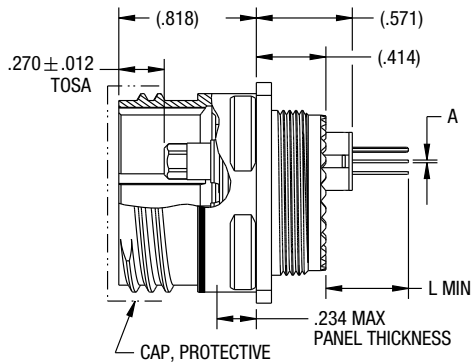
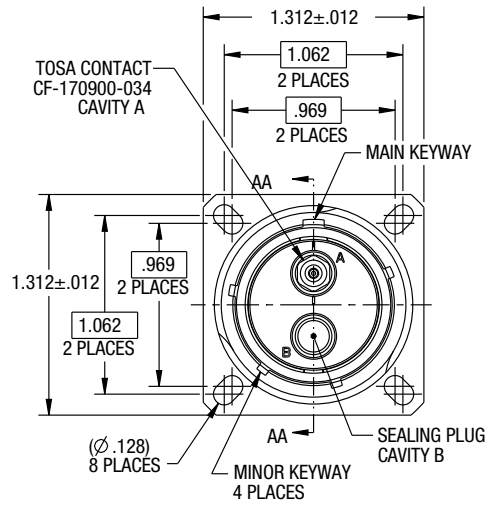
# EXAMPLE CONNECTOR WITH FIBERQUAD CONTACTS 1



FRONT

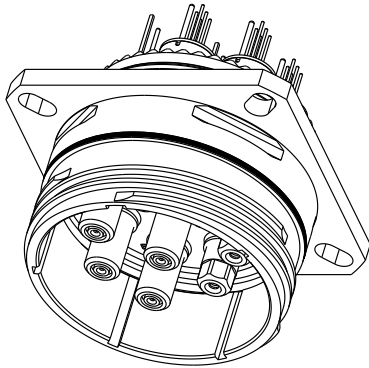


REAR

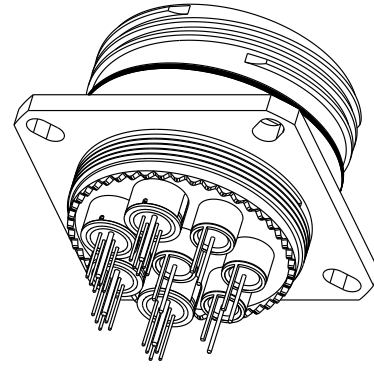


# EXAMPLE CONNECTOR WITH FIBERQUAD CONTACTS 2 **Amphenol**

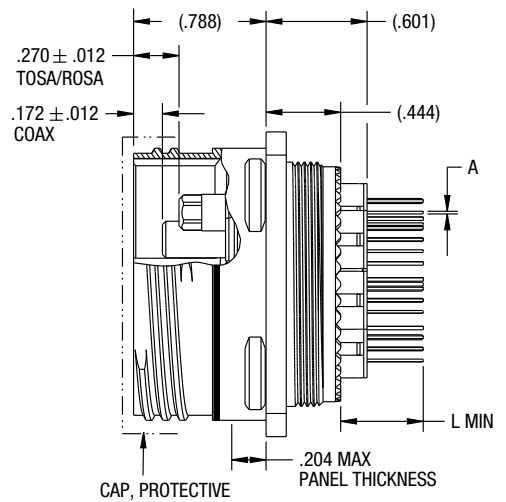
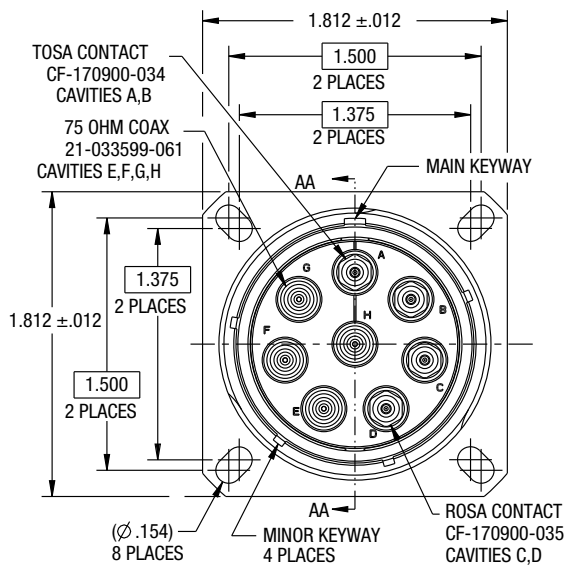
MILITARY HIGH SPEED



FRONT



REAR

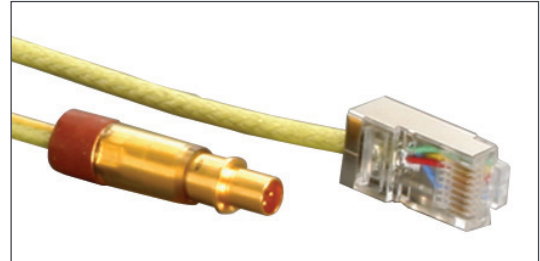


# Quadrax Contacts

MIL-DTL-38999, Series III, General Description

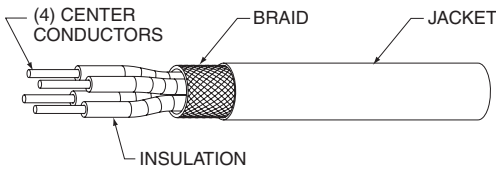
## AMPHENOL QUADRAX CONTACTS

Offers several advantages for high data transfer rates, low power consumption, and excellent EMI compatibility. Four strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs. The Outer contact has a rugged wall section for durability. Available in size 8 crimp termination styles, and in size 8 with PC tails. Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts. Any non-keyed size 8 contact (Coax, Triax concentric Twinax) can be used/ or mixed with keyed contacts within these modified housings.



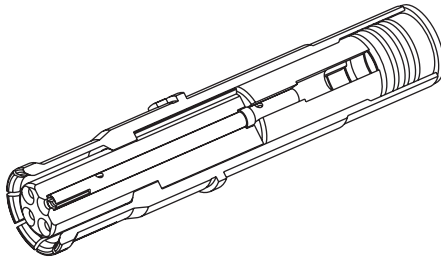
Quadrax Pin with 8P8C "RJ45" Jack

### CABLE ILLUSTRATION - QUADRAX CONTACT



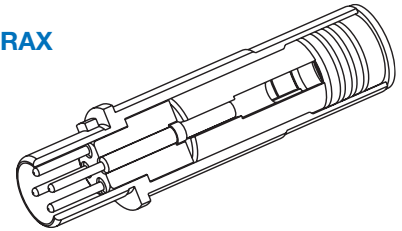
### TYPICAL QUADRAX SOCKET CONTACT

Has socket outer contact with a socket inner contact



### TYPICAL QUADRAX PIN CONTACT

Has pin outer contact with a pin inner contact



### QUADRAX CONTACTS ARE GOLD PLATED, CRIMP TERMINATION

Finish of mating contact parts: supplied with 0.000050 min. gold over nickel on mating interface.

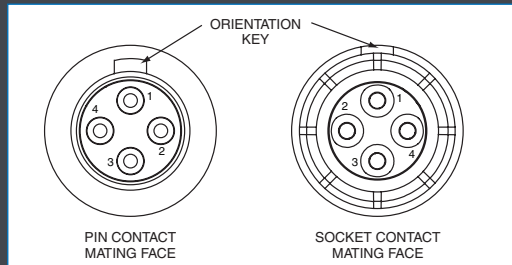
### QUADRAX SIZE 8 CONTACT PERFORMANCE:

**Bandwidth:** Up to 1.25 GHz  
**Data Rate:** Exceeding 2.5 Gbps.  
**Voltage Rating:** 500 Vrms max. @ sea level

### Dielectric Withstanding Voltage:

1000 VAC rms between all inner contacts @ sea level, 500 VAC rms between inner and outer contacts @ sea level

### Suggested Numbering for Quadrax Contacts



Differential Pairs, contacts 1-3, 2-4.

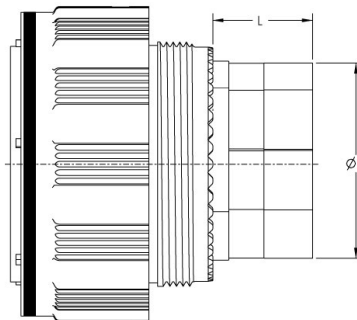
Quadrax differential pairs are 1 and 3, 2 and 4.

See page 32-33 for part number ordering of popularly used 38999 Series III connectors with 100 ohm quadrax contacts.

### GUIDE FOR SELECTING A BACKSHELL:

See required backshell dimensions to avoid interference between piggyback grommets used on size 8 cavities and the backshell.

Backshell extender is also available see page 17. This can be used with any mil-spec backshell.



Size	A Dia Min	L Min
17	.734	.540
19	.869	.540
21	.869	.540
23	1.088	.540
25	1.234	.540

# How to Order D38999, Series III Connectors with Standard 100 Ohm Quadrax Contacts

21-033385-051 Socket, 21-033384-051 Pin Contacts\*

For all other quadrax contacts or differential twinax contacts, please consult Amphenol Aerospace for part numbers.

1.	2.	3.	4.	5.	6.
Connector Type	Shell Type	Service Class	Shell Size – Insert Arrangement	Contact Type	Alternate Keying Position
<b>TVP</b>	<b>00</b>	<b>RQW</b>	<b>21-75</b>	<b>P</b>	<b>B</b>

1. CONNECTOR TYPE	
<b>TV</b>	Tri-Start series connector with metal shells
<b>TVP</b>	Back panel mounted receptacle with metal shells
<b>CTV</b>	Tri-Start series connector with composite shells
<b>CTVP</b>	Back panel mounted receptacle with composite shells

2. SHELL STYLE	
<b>00</b>	Wall mount receptacle
<b>02</b>	Box mount receptacle available only with the PCB tails and epoxy backfilled (non-removable)
<b>06</b>	Straight plug
<b>07</b>	Jam nut receptacle
<b>10</b>	PCB Wall Mounting Receptacle with Clinch Nuts
<b>40</b>	PCB Wall Mounting Double Flange Receptacle
<b>87</b>	Jam Nut with Integral Banding Platform
<b>97</b>	Reduced Flange Jam Nut
<b>56</b>	Dualok Plug

3. SERVICE CLASS WITH QUADRAX	
<b>RQF</b>	Electroless nickel plated
<b>RGQF</b>	Electroless nickel plated ground plane
<b>RQW</b>	Olive drab cadmium plate
<b>RGQW</b>	Olive drab cadmium plated ground plane
<b>RQK</b>	Corrosion resistance stainless steel
<b>RGQK</b>	Stainless steel ground plane
<b>QDT</b>	Duralon plated, Nickel-PTFE alternative to cadmium
<b>GQDT</b>	Groundplane Duralon
<b>QDZ</b>	Zinc nickel black conductive
<b>GQDZ</b>	Zinc nickel black conductive Ground Plane
<b>RQS</b>	Stainless steel
<b>RGQS</b>	Stainless steel Ground Plane
<b>RQB</b>	Aluminum Bronze
<b>QDS</b>	AP93 Plating

#### 4. Select a Shell Size and Insert Arrangement

See insert arrangements available with Quadrax contacts on pages 11-12. Shell size and insert arrangements are together in one chart. First number represents shell size, second number is the insert arrangement.

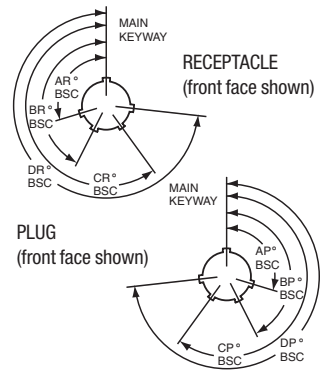
5. CONTACT TYPE	
<b>P</b>	Pin contacts
<b>S</b>	Socket contacts

#### 6. Alternate Keying Position

Locksmith keying—rotation of minor keys. See Series III alternate positions below “N” not required for normal position.

#### Tri-Start Alternate Positions

A plug with a given rotation letter will mate with a receptacle with the same rotation letter. The angles for a given connector are the same whether it contains pins or sockets. Inserts are not rotated in conjunction with the master key/keyway.



Shell Size	Key & Keyway Arrangement Identification Letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	<b>N</b>	105	140	215	265
	<b>A</b>	102	132	248	320
	<b>B</b>	80	118	230	312
	<b>C</b>	35	140	205	275
	<b>D</b>	64	155	234	304
11, 13, and 15	<b>E</b>	91	131	197	240
	<b>N</b>	95	141	208	236
	<b>A</b>	113	156	182	292
	<b>B</b>	90	145	195	252
	<b>C</b>	53	156	220	255
17 and 19	<b>D</b>	119	146	176	298
	<b>E</b>	51	141	184	242
	<b>N</b>	80	142	196	293
	<b>A</b>	135	170	200	310
	<b>B</b>	49	169	200	244
21, 23, and 25	<b>C</b>	66	140	200	257
	<b>D</b>	62	145	180	280
	<b>E</b>	79	153	197	272
	<b>N</b>	80	142	196	293
	<b>A</b>	135	170	200	310
25L, 33, and 37	<b>B</b>	49	169	188	244
	<b>C</b>	66	140	188	257
	<b>D</b>	62	145	188	280
	<b>E</b>	79	153	188	272
			80	142	188

\* The incorporation of Quadrax or Differential Twinax contacts requires a modified connector to accommodate keyed contacts.

# Quadrax Contacts

MIL-DTL-38999, Series III\*, Contact Part Number Guide by Cable

QUADRAX Contacts

## QUADRAX CONTACTS FOR USE IN TV-R CONNECTORS

Impedance (Ohms)	Inner Conductor (AWG)	Electrical Protocol††	Cable	Contact Part Number (Termination Instruction Sheet)**		
				Pin	Socket	
90	24	USB2.0 (480 Mbps)	USB2 (28433/02171LX-4)	21-033384-101† (L-2119-EK)	21-033385-101† (L-2119-EK)	
			PIC USB2422	21-033384-381 (L-2119-EU)	21-033385-381 (L-2119-EU)	
100	22	Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)	GORE RCN 7688	21-033384-061 (L-2119-H)	21-033385-061 (L-2119-H)	
			NF22Q100-01			
			Tensolite NF22Q100			
100	22	Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)	Thermax 956-5	21-033384-171 (L-2119-BN)	21-033385-171 (L-2119-BN)	
			GigaFlight GF100-22QUAD			
			Gore RCN8513			
100	22	Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)	JSFY18-3	21-033384-181 (L-2119-BP)	21-033385-181 (L-2119-BP)	
			Tensolite NF22Q100 Special Box pattern, only mates with 21-0333 ( )-181			
			S280W502-4/BMS13-72T03C04G024			
100	24	Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)	Tensolite NF24Q100-01 (same as 21-03338( )-51, uses EMI Piggyback)	21-033384-141 (BACC47GM1)	21-033385-141 (BACC47GN1)	
			Ethernet, 1000 Base-T Gigabit Ethernet	ABS0972 KB24	21-033384-161 (L-2119-BE)	21-033385-161 (L-2119-BE)
				ABS1503 KD 24		
Draka Fileca F-4703-3						
Draka Fileca F-4704-5						
F4704-4						
Filotex ET 2PC236						
Filotex ET 2PF870						
PIC Wire E50424						
Tensolite 23450/04090X-4(LD)						
100	24	Ethernet, 1000 Base-T Gigabit Ethernet	24443/03130X-4(LD)	21-033384-051 (L-2119-D)	21-033385-051 (L-2119-D)	
			24443/03166X-4(LD)			
			24443/9P025X-4(LD)			
			24443/C20714X-4(LD)	21-033384-161 (L-2119-BE)	21-033385-161 (L-2119-BE)	
			24450/0120X-4(LD)			
			BMS13-72T03C04G024			
			GORE GSC-01-81869-01	Same as -051 except EMI Piggyback seal	Same as -051 except EMI Piggyback seal	
			NF24-2Q100			
			NF24Q100-01			
			NF24Q100-01-200C (Space)	21-033384-331 (L-2119-EB)	21-033385-331 (L-2119-EB)	
			Pic Wire E51424			
			S280W502-4			
			GORE GSC-05-84513-00 Space Grade	21-033384-401 (L-2119-FU) (Space Rated)	21-033385-401 (L-2119-FU) (Space Rated)	
			Tensolite NF24Q100			
			Thermax MX100Q-24			
			Thermax T956-4T200	21-033384-111 (L-2119-AK)	21-033385-111 (L-2119-AK)	
			TYCO CEC-RWC-18664			
			GigaFlight GF 100-24QUAD			
Harbour Q10024016	21-033384-191 (L-2119-BS)	21-033385-191 (L-2119-BS)				
GORE RCN8977						
Serial FPDP Applications (2.5 Gbps) (Typical app run at 150 Ohms) HDMI 1.3						
Meets EN3155-074	24	Ethernet, 1000 Base-T Gigabit Ethernet	Tensolite NF24Q100	21-033384-281 (L-2119-DL)	21-033385-281 (L-2119-DL)	
			NF24Q100-01 for 2.5 Gbps applications			
Meets EN3155-074	24	Ethernet, 1000 Base-T Gigabit Ethernet	ABS1503KD24	21-033384-391 (L-2119-EY)	21-033385-391 (L-2119-EY)	
			F-4703			
Meets EN3155-074	24	Ethernet, 1000 Base-T Gigabit Ethernet	Gore RCN9034	21-033384-421	21-033385-421	
			NF24Q100-01			
Meets EN3155-074	24	Ethernet, 1000 Base-T Gigabit Ethernet	Gore RCN8752	21-033384-431	21-033385-431	
			Madison 1016423			
Meets EN3155-074	24	Ethernet, 1000 Base-T Gigabit Ethernet	Carlisle NF24P100	21-033384-501	21-033385-501	
			Thermax 1536-224			



QUADRAX CONTACTS FOR USE IN TV-R CONNECTORS							
Impedance (Ohms)	Inner Conductor (AWG)	Electrical Protocol††	Cable	Contact Part Number (Termination Instruction Sheet)**			
				Pin	Socket		
100	26	Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)	PIC E51426	21-033384-071 (L-2119-AB)	21-033385-071 (L-2119-AB)		
			Tensolite NF26-2Q100				
			Tensolite NF26Q100				
			Tensolite NF26Q100-01				
			Wirenetics W-3714-379				
			Gore GSC-01-85920-00				
			Gore FZ-03-84820-00				
			Draka Fileca F-4704-6			21-033384-151 (L-2119-AW)	21-033385-151 (L-2119-AW)
			Gore RCN 8672			21-033384-461	21-033385-461
			Whitmore W-3714-379			21-033384-471	21-033385-471
			Whitmore W-6147-4830			21-033384-511	21-033385-511
Thermax 1536-224 (Box Pattern) Space Rated							
110	24	IEEE 1394B Firewire	JSFY18-3, GORE RCN 8645	21-033384-171 (L-2119-BN)	21-033385-171 (L-2119-BN)		
			Cable RCN 8422	21-033384-291 (L-2119-DR)	21-033385-291 (L-2119-DR)		
			Gore RCN 8647	21-033384-301 (L-2119-DR)	21-033385-301 (L-2119-DR)		
			Gore RCN 8687	21-033384-211 (L-2119-CD)	21-033385-211 (L-2119-CD)		
			Gore RCN8647	21-033384-221 (L-2119-FF)	21-033385-221 (L-2119-FF)		
			Tensolite 24450/03089X-4(LD)	21-033384-231 (L-2119-CR)	21-033385-231 (L-2119-CR)		
			JSFY02-1	21-033384-241†	21-033385-241†		
			JSFY18	21-033384-481	21-033385-481		
			Gore RCN8487	21-033384-491	21-033385-491		
			JSFY18				
			Tensolite 24450/03089X-4(LD) Same as 21-03338(-)-211 but Box pattern, mates with 21-03338(-)-241 only				
			JSFY18-3, GORE RCN 8645 Note: uses ferrule with longer wire support				
	RCN 8652						
150	24		Harbour Data Master Q150-24 (19)	21-033450-051 (L-2119-DV)	21-033451-051 (L-2119-DV)		
			Tensolite 24483/02006X-4 (LD)	21-033384-031 (L-2119-B)	21-033385-031 (L-2119-B)		
			Tensolite 26473/02006X-4(LD)/Gore RCN8328 (not for new designs, use 21-033450/1 series)	21-033384-201†	21-033385-201†		
			Gore RCN8328	21-033384-271 (L-2119-CT)	21-033385-271 (L-2119-CT)		
			Tensolite 26473/02006X-4(LD) Same as 21-033384/5-31 but box pattern (not for new designs, use 21-033450/1 series) Gore RCN8328				
	26	Fibre-Channel (1 GBPS, 2 GBPS, 1G/2G), 1000 Base-CX (1.25 GBPS), SCSI-2 (3.2 GBPS)	Gore RCN8328	21-033450-001 (L-2119-BW)	21-033451-001 (L-2119-BW)		
			Tensolite 26473/02006X-4(LD)	21-033450-011† (L-2119-CS)	21-033451-011† (L-2119-CS)		
			Gore RCN8328 (same as 21-033450/1-1 except box pattern). Mates with 21-033450/1-11 only.	21-033450-051 (L-2119-DV)	21-033451-051 (L-2119-DV)		
			Tensolite 26473/02006X-4(LD)	21-033450-061 (L-2119-GH)	21-033451-061 (L-2119-GH)		
			Harbour Data Master Q150-24(19)SS				
	Gore RCN7625						

Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

\* Requires modified connector to accommodate keyed contacts.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

†† Test reports available for indicated protocols. Consult Amphenol Aerospace.

# Quadrax Contacts

MIL-DTL-38999, Series III\*, Contact Part Number Guide for PCB Contacts

QUADRAX PCB

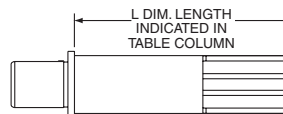
QUADRAX PCB CONTACTS					
Impedance (Ohms)	L Dim	Pretinned	Contact Part Number		
			Pin	Socket	
100	.36		21-033398-391	21-033397-391	
	.418		21-033398-491	21-033397-491	
	.428		21-033398-751	21-033397-751	
	.494		21-033398-231	21-033397-231	
	.552		21-033398-741	21-033397-741	
	.582		21-033398-521	21-033397-521	
	.564		21-033398-791	21-033397-791	
	.580		21-033398-661	21-033397-661	
	.605		21-033398-191	21-033397-191	
	.615		21-033398-141	21-033397-141	
	.621		21-033398-781	21-033397-781	
	.647		21-033398-761	21-033397-761	
	.666		21-033398-531	21-033397-531	
	.672		21-033398-371	21-033397-371	
	.689		21-033398-721	21-033397-721	
	100/150	.699		21-033398-511	21-033397-511
	100	.708		21-033398-111	21-033397-111
		.721		21-033398-581	21-033397-581
.740			21-033398-771	21-033397-771	
.741			21-033398-241	21-033397-241	
.741			21-033398-271	21-033397-271	
.761			21-033398-461	21-033397-461	
.770			21-033398-691	21-033397-691	
.775			21-033398-221	21-033397-221	
.788		X	21-033398-551	21-033397-551	
.788			21-033398-251	21-033397-251	
.788			21-033398-731	21-033397-731	
.806			21-033398-281	21-033397-281	
.815			21-033398-561	21-033397-561	
.815			21-033398-631	21-033397-631	
.819			21-033398-431	21-033397-431	
.836			21-033398-301	21-033397-301	
.84		X	21-033398-091	21-033397-091	
.859			21-033398-121	21-033397-121	
.866			21-033398-031	21-033397-031	
.866			21-033398-681	21-033397-681	
.871			21-033398-351	21-033397-351	
.875			21-033398-501	21-033397-501	
.885			21-033398-831	21-033397-831	
.889			21-033398-471	21-033397-471	

QUADRAX PCB CONTACTS				
Impedance (Ohms)	L Dim	Pretinned	Contact Part Number	
			Pin	Socket
100	.901		21-033398-341	21-033397-341
	.914		21-033398-381	21-033397-381
	.928		21-033398-641	21-033397-641
	.928		21-033398-671	21-033397-671
	.939		21-033398-601	21-033397-601
	.939		21-033398-361	21-033397-361
	100/150	.939		21-033398-591
100	.94		21-033398-311	21-033397-311
	.946		21-033398-541	21-033397-541
	.971		21-033398-481	21-033397-481
	.991		21-033398-701	21-033397-701
	1.009		21-033398-401	21-033397-401
	1.035	X	21-033398-021	21-033397-021
	1.035		21-033398-291	21-033397-291
	1.035		21-033398-651	21-033397-651
	1.050		21-033398-841	21-033397-841
	1.169		21-033398-421	21-033397-421
	1.196		21-033398-621	21-033397-621
1.366		21-033398-611	21-033397-611	
110	TBD		21-033398-711	21-033397-711

Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

\* Requires modified connector to accommodate keyed contacts.

Indicated length given in chart is the distance from the rear of the contact retention shoulder to the tip of the PCB tails.



Note: It does not indicate stickout length when installed in D38999 connector.

Stabilizer-To be used on all PCB Pins & Sockets. 21-033323-023

QUADRAX PCB CONTACTS				
Impedance (Ohms)	L Dim	Pretinned	Contact Part Number	
			Pin	Socket
150	.494 (mates to 21-033450/51 series)		21-033452-051	21-033453-051
	.494		21-033398-451	21-033397-451
	.494	X	21-033398-071	21-033397-071
	.582 (mates to 21-033450/51 series)		21-033452-061	21-033453-061
	.699		21-033398-511	21-033397-511
	.780	X	21-033398-081	21-033397-081
	.780	X	21-033398-131	21-033397-131
	.815		21-033398-151	21-033397-151
	.815	X	21-033398-211	21-033397-211
	.815 (mates to 21-033450/51 series)		21-033452-021	21-033453-021
	.815 (mates to 21-033450/51 series)	X	21-033452-031	21-033453-031
	.866		21-033398-411	21-033397-411
	.866 (mates to 21-033450/51 series)		21-033452-041	21-033453-041
	.939		21-033398-591	21-033397-591
	.939 (mates to 21-033450/51 series)		21-033452-071	21-033453-071
	1.035 (mates to 21-033450/51 series)		21-033452-011	21-033453-011
	1.035		21-033398-061	21-033397-061

Daniels crimping tools are available from  
Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

\* Requires modified connector to accommodate keyed contacts.

\*\*\* Must be used with 21-033321-005 piggyback grommet seal.

Stabilizer-To be used on all PCB Pins & Sockets. 21-033323-023

SEALING PLUGS	
Sealing Plugs for use with D38999 Connectors using Quadrax Contacts - Size 8 Cavities	Part Number
***Standard Plastic (Not recommended for Pin Connectors)	T3-4008-59P
Standard Plastic to be used with PCB tails (shorter tail length)	T3-4008-59P1
***Metal sealing plug - can be used when mating with contacts on mating half	21-033899-8Q1
Metal sealing plug used with PCB's and mating contact on mating half	21-033899-8Q2

PIGGYBACK GROMMET	
Grommet for use with D38999 using Quadrax Contacts	Part Number
Metallized piggyback grommet*	21-033321-023
Metallized piggyback grommet for Rectangular	10-6460F0-012

\*Floating metal concern for space applications, please consult the factor.

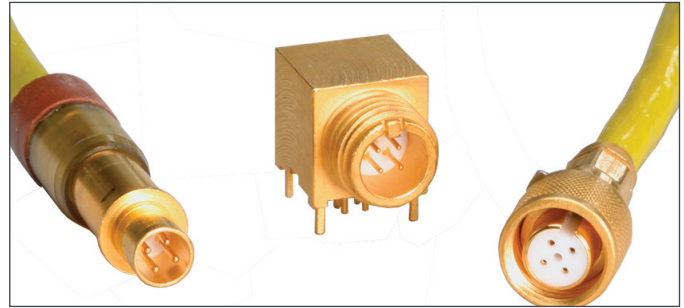
# Quadrax Transition Adapters

## General Description

### AMPHENOL TRANSITION ADAPTERS

Are used to facilitate launching of controlled impedance signals to printed circuit boards. Amphenol provides transition adapters in both contact types:

- Quadrax transition adapters, 90° or straight receptacles threaded or cable to board style



90° Quadrax Receptacle and Plug Transition Adapter

### 100 OHM QUADRAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS

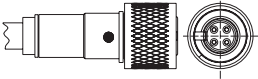
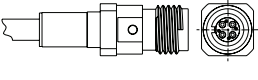
Illustration of Adapter	Impedance (Ohms)	Quadrax Type Adapter/ Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**			
				Plug	Receptacle		
	100	Quadrax Plug Adapter/ 24443/03130X-4(LD)	.375	21-033836-031 (L-2119-U)			
		24443/9P025X-4(LD)					
		NF24Q100-01					
		S280W502-4					
		Tensolite NF24Q100					
		Thermax 956-4TN					
		Quadrax Plug Adapter/ Draka Fileca F-4704-5		21-033836-041 (L-2119-W)†			
		NF22Q100-01					
		Tensolite NF22Q100					
		Tensolite 24450/030894-4(LD)					
		Thermax 956-5					
		Quadrax Plug Adapter/ Draka Fileca F-4703-3, F-4704-4, ABS 1503 KD 24				21-033836-051 (L-2119-Y)	
		Quadrax Plug Adapter/ NF26Q100					
		Gore ACN1042 (28 awg)		21-033836-101 21-033836-201 (nut flats and lock wire hole)			
		Gore RCN8973					
		Draka Fileca F4703-3, F-4704-4		21-033836-121			
		Gore RCN8647		21-033836-131			
		Gore RCN8982		21-033836-141			
		Draka Fileca F4704-06		21-033836-151			
		24463/9P025X-2(LD)		21-033836-171			
		Gore RCN9200		21-033836-181			
		Gore RCN8752		21-033836-191			

†† Test reports available for indicated protocols; consult Amphenol Aerospace.

\*Recommended torque: 30-36 in-oz.

# Quadrax Transition Adapters

MIL-DTL-38999, Series III, Part Number Guide

100 OHM QUADRAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS						
Illustration of Adapter	Impedance (Ohms)	Quadrax Type Adapter/ Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**		
				Plug	Receptacle	
	110	Quadrax Plug Adapter/ Hexnut with Lock Wire Holes RCN8647	.375	21-033836-081		
		Tensolite NF24Q100-01		21-033836-111		
		Gore RCN8752		21-033836-191		
	100	Quadrax Receptacle Straight Adapter in-line jam nut (threaded)/ GSC-10- 8273900			21-033837-081 (L-2119-AR)†	
		Quadrax Receptacle Straight Adapter in-line jam nut (threaded)/ Tensolite NF24Q100-01			21-033837-261	
		Quadrax Receptacle Straight Adapter in-line (threaded)/ NF24Q100			21-033837-091 (L-2119-BL)	
		S280W502-4				
		Tensolite 24443/03130X-4 (LD)				
		Tensolite 24443/9P025X -4 (LD)				
		Tensolite NF24Q100-01				
		Thermax 956-4TN				
NF26Q100-01		21-033837-341				

Mating plugs and receptacles

**QUADRAX** Adapters

Daniels crimping tools are available from  
Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

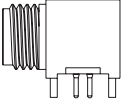
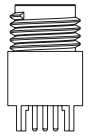
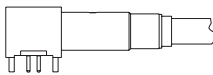
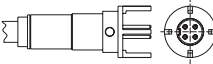
† Consult Amphenol Aerospace for current release of this adapter & instruction sheet if applicable.

\*\* Termination instructions are packaged with each contact and can be found on-line at:  
<https://www.amphenol-aerospace.com/resources/terminationinstructions>

# Quadrap Transition Adapters

MIL-DTL-38999, Series III, Part Number Guide

QUADRAX Adapters

100 OHM QUADRAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS						
Illustration of Adapter	Impedance (Ohms)	Quadrap Type Adapter/ Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**		
				Plug	Receptacle	
 	100	PCB Quadrap Receptacle 90 Degree Adapter/ Tail Length .110	.375		21-033837-041	
		PCB Quadrap Receptacle 90 Degree Adapter/ Tail Length .200			21-033837-201	
		PCB Quadrap Receptacle Straight Adapter/ Tail Length .110			21-033837-051 21-033837-271 (degassed)	
		PCB Quadrap Receptacle Straight Adapter/ Special Tail Length (.200)			21-033837-061	
		Straight adapter/ Tail Length .175			21-033837-131	
		PCB Quadrap Receptacle Straight Adapter/ Tail Length .110 except .019" diameter inner contact tails			21-033837-291	
	100	Quadrap Receptacle 90 degree Adapter with cable to board/ NF24Q100 Tail Length .110			21-033837-141 (L-2119-BB)†	
		Quadrap Receptacle 90 degree Adapter with cable to board/			21-033837-231	
		ABS1503KD24 Tail Length .110				
		Tensolite NF22Q100-01				
		Thermax 956-5				
		Draka Fileca F4704-5				
	NF24Q100 Tail Length .250				21-033837-281	
110	Tensolite 24450/03089X-4 (LD)				21-033837-231	
	100	Quadrap Receptacle Straight Adapter with cable to board/ NF24Q100, NF24Q100-01 Tail Length .195			21-033837-101 (L-2119-AN)	
		Quadrap receptacle straight adapter w/ cable to board/ Tail length .195 Draka Fileca F-4703-3, F-4703-4			21-033837-241	
		PIC E10424 Tail length .195			21-033837-321	
		Gore RCN8647			21-033837-331	

Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

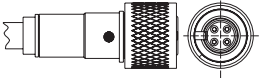



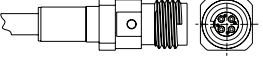
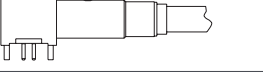
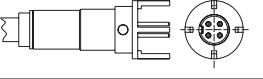
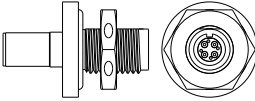
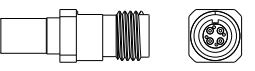
\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable.



# Quadrap Transition Adapters

MIL-DTL-38999, Series III, Part Number Guide

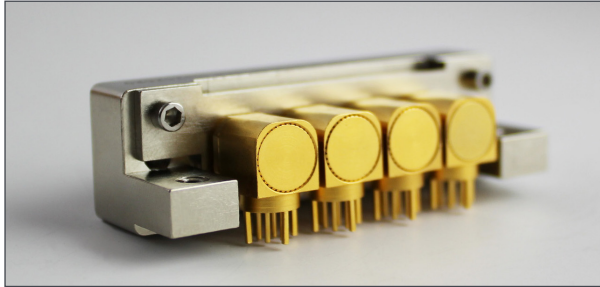
150 OHM QUADRAP TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS						
Illustration of Adapter	Impedance (Ohms)	Quadrap Type Adapter/ Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**		
				Plug	Receptacle	
   	150	Quadrap Plug Adapter/ Tensolite 26473/02006X-4(LD), Gore RCN8328	.375	21-033836-021 (L-2119-S)		
		PCB Quadrap Receptacle 90 Degree Adapter/ Tail Length .110			21-033837-021	
		PCB Receptacle 90 Degree Adapter/ Tail Length .200			21-033837-251	
		PCB Quadrap Receptacle Straight Adapter/ Tail Length .110			21-033837-031	
  	150	Quadrap Receptacle Straight Adapter in-line Jam Nut (threaded)/ Tensolite 26473/02006X- 4 (LD), Gore RCN8328			21-033837-211 (L-2119-BY)	
Quadrap Receptacle 90 degree Adapter with cable to board/ Tensolite 26473/02006X-4				21-033837-071 (L-2119-AI)†		
Quadrap Receptacle Straight Adapter with cable to board/ Tensolite 26473/02006X-4 (LD)				21-033837-111 (L-2119-AP)		
 	100	Quadrap Receptacle Straight Adapter Jam Nut (threaded)/ Tensolite NF24Q100-01			21-033837-261	
		NF26Q100-01			21-033837-341	
		100	NF24Q100, NF24Q100-01, 24473/9P025X- 4(LD), ST80W502-4, 24433/03130X-4(LD), Thermax 956-4TN			21-033837-091

Daniels crimping tools are available from  
21-033836-211 90deg  
Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

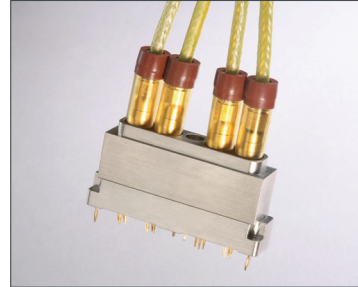
\*\* Termination instructions are packaged with each contact and can be found on-line at:  
<https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this adapter and instruction sheet  
if applicable.

# Rectangular D-Sub Type Connectors with Quadrax Contacts



*Compliant Pin Quadrax  
Board Level Connector*



Connector Part Number	Contact	Type Contact	"Number of Contacts"	Mating Connector Part Number (not limited to)	Comments
91-646132-048	Pin	Crimp	4	91-646132-054, 91-646132-049, 91-646132-091	Supplied Less Contacts
91-646132-049	Socket	Straight Compliant PCB	4	91-646132-048	PCB Installed
91-646132-052	Pin	Crimp	8	91-646132-053	Supplied Less Contacts
91-646132-053	Socket	Straight Compliant PCB	8	91-646132-052	PCB Installed
91-646132-054	Socket	Crimp	4	91-646132-048	Supplied Less Contacts
91-646132-062	Socket	Straight Compliant PCB	8	Various	Star Quadrax/Differential Twinax Installed
91-646132-063	Pin	Crimp	4	91-646132-064	Supplied Less Contacts
91-646132-064	Socket	Straight PCB Tails	4	91-646132-063	PCB Installed
91-646132-065	Pin	Crimp	2	91-646132-066, 91-646132-086	Supplied Less Contacts
91-646132-066	Socket	Straight PCB Tails	2	91-646132-065	PCB Installed
91-646132-070	Socket	Straight Compliant PCB	4	Various	PCB Installed
91-646132-086	Socket	Straight Compliant PCB	2	91-646132-065	PCB Installed
91-646132-091	Socket	Crimp	4	91-646132-048	Supplied Less Contacts
91-646132-098	Pin	Straight PCB Tails	8	91-646132-099	PCB Installed
91-646132-099	Socket	Crimp	8	91-646132-098	Supplied Less Contacts
91-646132-151X	Pin	PCB Right Angle	2	91-646132-117X	PCB Installed
91-646136-2XX	Pin	PCB Right Angle	1 thru 12	91-646137-1XX	Tabulated drawing, PCB installed
91-646137-1XX	Socket	Crimp	1 thru 12	91-646136-2XX	Supplied Less Contacts
91-646136-5XX	Pin	Straight PCB Tail	1 thru 12		1000 Base-T & 1.25Gbps

# Split-Pair Quadrax Contacts & Cables

Features & Benefits/ How to Order

## “SPLIT-PAIR” FOR USE WITH CAT6A TYPE CABLE

### AMPHENOL AEROSPACE OFFERS THE HIGH PERFORMANCE INTERCONNECT SOLUTION FOR CAT6A TYPE CABLE.

#### FEATURES & BENEFITS:

- Overall higher bandwidth than standard CAT5E quadrax - Supports up to 6.5 Gbps per pair
- Enhanced crosstalk performance (compared to standard quadrax) due to compatibility with shielded twisted pair of cables
- Can be used for a variety of high speed applications beyond current quadrax design
- Four strategically spaced inner contacts form two 100 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Available in size 8 crimp termination style
- Also available in size 8 PC tails
- Can be installed into existing quadrax contact connector cavities
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts

#### APPLICATIONS:

For use with, but not limited to, the following electrical protocols:

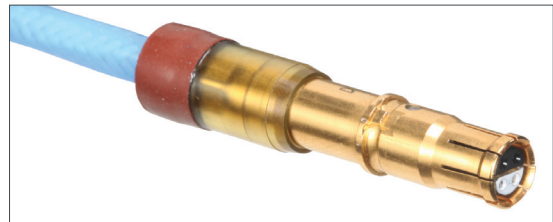
- 10/100/1000/10GBASE-T Ethernet
- DVI
- USB 2.0, 3.0
- Serial Rapid IO (up to 3.125 Gbps)
- PCI-Express 2.0
- HDMI 1.3a
- SATA 2.0 (up to 3 GHz)

Cable selection may limit data rate of above protocols

Split-Pair US Patent #8579647

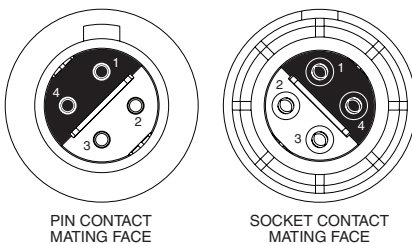


MIL-DTL-38999 Series III Connectors with “Split-Pair” Quadrax Contacts for use with CAT6A Type Cable

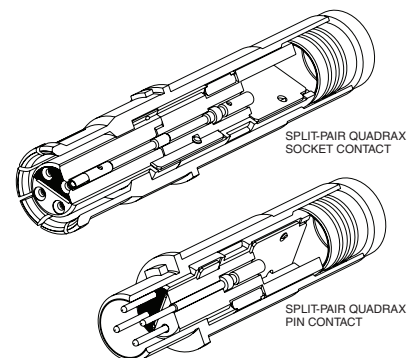


“Split-Pair” Quadrax Contacts for use with CAT6A Type Cable

#### SUGGESTED NUMBERING FOR QUADRAx CONTACTS



Differential Pairs: 1 & 4, 2 & 3



Patent approved

\*Note: Default in D38999 style connector is diamond inner contact layout. Box pattern is mainly used in rectangular connectors when mating to 90 degree PCB tails installed in rectangular connector configuration.

# Split-Pair Quadrax Contacts

## Contacts and Cables

QUADRAX Split Pair

Impedance (Ohm)	Inner Contact Layout*	Cable Part #	Notes	Part Number	
				Pin	Socket
100	Diamond	Thermax (24 AWG) - 1536-224		21-033470-001	21-033471-001
	Diamond	Thermax (26 AWG) - 1536-195		21-033470-021	21-033471-021
	Box	Thermax (24 AWG) - 1536-224		21-033470-031	21-033471-031
	Box	PIC...P/N TBD		21-033470-041	21-033471-041
	Box	Thermax (26 AWG) - 1536-195		21-033470-051	21-033471-051
	Diamond	Tensolite 24463/9P025X-2(LD)	**SPECIAL** Only uses one of the pairs, only supplied with 2 inners	21-033470-061	21-033471-061
	Diamond	Thermax (24 AWG) - 1536-224	Space Grade	21-033470-071	21-033471-071
	Box	Thermax (24 AWG) - 1536-224		21-033470-081	21-033471-081
	Diamond	Gore RCN9007-24 Gore RCN9062		21-033470-091	21-033471-091
	Diamond	Gore RCN9007-24 Gore RCN9062	Space Grade	21-033470-111	21-033471-111
	Box	Gore RCN9007-24 Gore RCN9062		21-033470-131	21-033471-131
	Box	Gore RCN9007-24 Gore RCN9062	Space Grade	21-033470-151	21-033471-151
	Diamond	Gore RCN9007-24 Gore RCN9062	Space Grade	21-033470-171	21-033471-171
	Box	Gore RCN9007-24 Gore RCN9062	Space Grade	21-033470-181	21-033471-181
	Diamond	Thermax (26 AWG) - 1536-195	Space Grade	21-033470-191	21-033471-191
	Box	Tempflex V5026, V5069 (28AWG twinax)	Space Grade	21-033470-201	21-033471-201
	Diamond	PIC E10424		21-033470-211	21-033471-211
	Diamond	Tensolite NF24P100		21-033470-221	21-033471-221
	Diamond	Tempflex VS026, V5069 (28 awg Twinax)	Space Grade	21-033470-241	21-033471-241
	Diamond	2X GSC-05-82559-00 2X DXN2602	Space Grade	21-033470-251	21-033471-251
	Diamond	GSC-05-83111-00		21-033470-261	21-033471-261
	Box	2X GSC-05-82559-00 2X DXN2602	Space Grade	21-033470-271	21-033471-271
	Box	1X GSC-05-82559-00 1X DXN2602	Space Grade (uses only one of the pairs only supply with two inners)	21-033470-281	21-033471-281
Box	GORE GSC-01-85249-24S		21-033470-291	21-033471-291	

# Split-Pair Quadrax Contacts

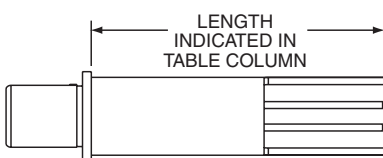
PCB Contacts

**Amphenol**  
MILITARY HIGH SPEED

QUADRAX Split Pair

Impedance (Ohm)	L Dim +/- .015	Inner contact layout	Notes	PCB Pin Part Numbers	PCB Socket Part Numbers
100	1.035	Diamond		21-033466-011	21-033467-011
	0.815	Diamond		21-033466-021	21-033467-021
	0.815	Diamond	Pretinned Tails	21-033466-031	21-033467-031
	0.866	Diamond		21-033466-041	21-033467-041
	0.494	Diamond		21-033466-051	21-033467-051
	0.582	Diamond		21-033466-061	21-033467-061
	0.815	Diamond		21-033466-071	21-033467-071
	0.84	Diamond		21-033466-081	21-033467-081
	0.847	Diamond		21-033466-091	21-033467-091
	1.208	Diamond		21-033466-101	21-033467-101
	0.88	Diamond		21-033466-111	21-033467-111
	0.45	Diamond		21-033466-121	21-033467-121
	0.77	Diamond		21-033466-131	21-033467-131
	0.741	Diamond		21-033466-141	21-033467-141
	0.973	Diamond		21-033466-151	21-033467-151
	0.741	Diamond		21-033466-161	21-033467-161
	0.495	Diamond		21-033466-181	21-033467-181
	0.621	Diamond		21-033466-191	21-033467-191
	0.495	Diamond	Space Grade	21-033466-201	21-033467-201
	0.45	Diamond	Space Grade	21-033466-211	21-033467-211
	0.847	Diamond	No outer tails	21-033466-221	21-033467-221
	0.815	Diamond	Space Grade	21-033466-231	21-033467-231
	0.815	Diamond	Space Grade/Pre tinned	21-033466-241	21-033467-241
	0.806	Diamond		21-033466-251	21-033467-251
	1.035	Diamond		21-033466-261	21-033467-261
	0.45	Diamond		21-033466-271	21-033467-271
	0.495	Diamond		21-033466-281	21-033467-281
	0.495	Box	Space Grade	21-033466-291	21-033467-291
0.495	Box		21-033466-301	21-033467-301	
1.035	Diamond		21-033466-321	21-033467-321	
0.866	Box		21-033466-331	21-033467-331	
0.866	Diamond		21-033466-341	21-033467-341	
0.898	Diamond		21-033466-351	21-033467-351	
90	0.261	Diamond	For USB3.0, contact has an integrated drive and equalize circuit internal to the contact.	21-033466-311	

Indicated length given in charts is the distance from the rear of the contact retention shoulder to the tip of the PCB tails.



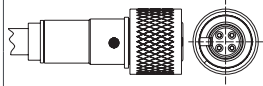
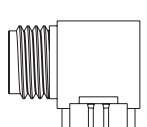
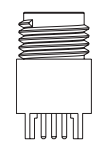
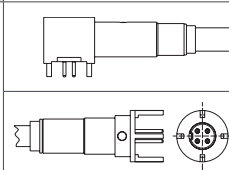
Note: it does not indicate stickout length when installed in D38999 connector.

# Split-Pair Quadrax Contacts

## Transition Adapter Contacts

\*Pretinned

### 100 OHM SPLIT PAIR QUADRAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS

Illustration of Adapter	Impedance (Ohms)	Quadrax Type Adapter/ Cable or PCB Tail Length	Notes	Part Number		
				Plug	Receptacle	
	100	Quadrax Plug Adapter/ Thermax 1536-224		21-033468-011		
		Thermax (24 AWG)-1536-224, DXN2602 (2)		21-033468-021		
		Thermax (26 AWG)-1536-195		21-033468-031		
		Gore RCN9062, RCN9007-24	With nut flats and lock wire holes	21-033468-041		
		Gore RCN9007-24	Space Grade with nut flats and lock wire holes	21-033468-061		
		Gore RCN9083-24	With nut flats and lock wire holes	21-033468-081		
		Thermax (26 AWG)-1536-195	Space Grade	21-033468-091		
			PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .110			21-033469-001
			PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .250, Standoff .250			21-033469-081
			PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .250	Space Grade		21-033469-171
PCB Quadrax Receptacle Straight Adapter/ Tail Length .110				21-033469-011		
PCB Quadrax Receptacle Straight Adapter/ Tail Length .160				21-033469-091		
PCB Quadrax Receptacle Straight Adapter/ Tail Length .165				21-033469-151		
PCB Quadrax Receptacle Straight Adapter/ Tail Length .195				21-033469-181		
	Quadrax Receptacle 90 degree Adapter with cable to board/ Thermax 1536-224			21-033469-021		
	Quadrax Receptacle Straight Adapter with cable to board/ .195 tail length Thermax 1536-224			21-033469-031		

QUADRAX Split Pair

Mating plugs and receptacles

Wired to board



# Split-Pair Quadrax Contacts

Frequencies & Performance Data

## FREQUENCIES OF INTEREST

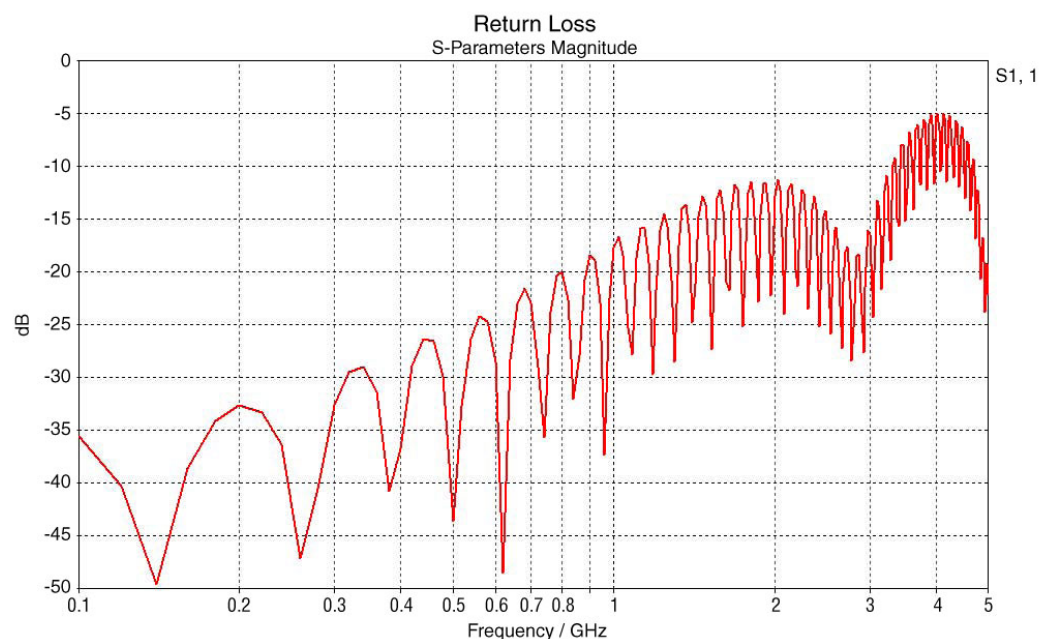
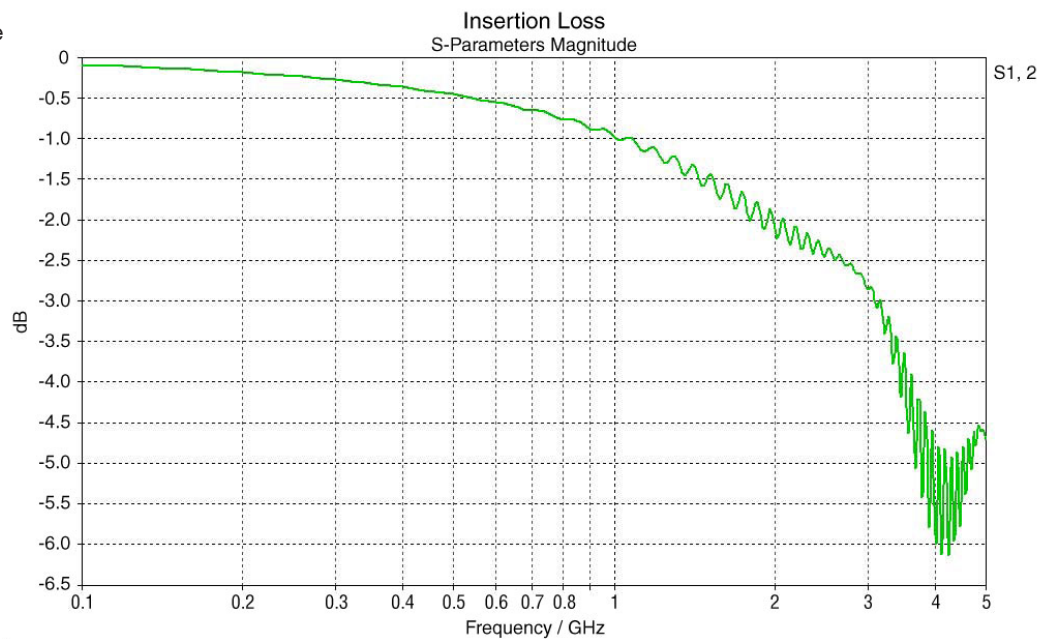
For use with the following, but not limited to, electrical protocols:

- 10/100/1000/10GBASE-T Ethernet
- DVI
- USB 2.0
- Serial Rapid IO (up to 3.125 Gbps)
- PCI-Express 2.0
- HDMI 1.3a
- SATA 2.0 (up to 3 GHz)

Frequency (GHz)	Insertion Loss (dB)	Return Loss (dB)	NEXT (dB)	FEXT (dB)
0.1	0.09	35.68	62.36	59.29
0.24	0.22	36.44	42.87	62.25
0.5	0.45	43.66	43.63	55.22
0.625	0.57	43.49	53.68	43.53
1	0.98	17.82	49.26	48.33
1.25	1.29	15.1	43.57	44.12
1.5	1.47	17.94	46.02	40.78
1.7	1.86	12.23	48.01	47.23
2	2.11	12.9	37.45	38.12
2.5	2.42	15.97	29.9	31.52
3	2.86	16.52	35.94	29.36

## PERFORMANCE DATA

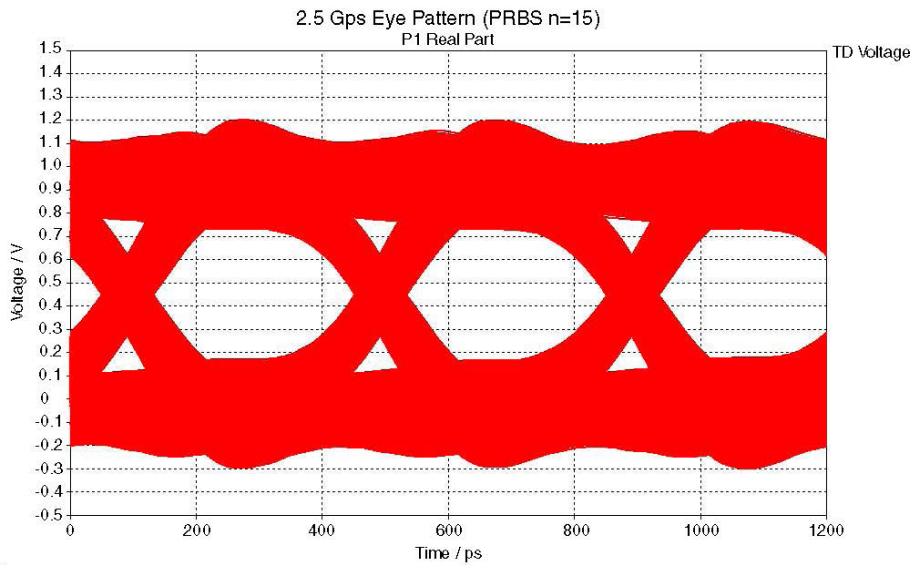
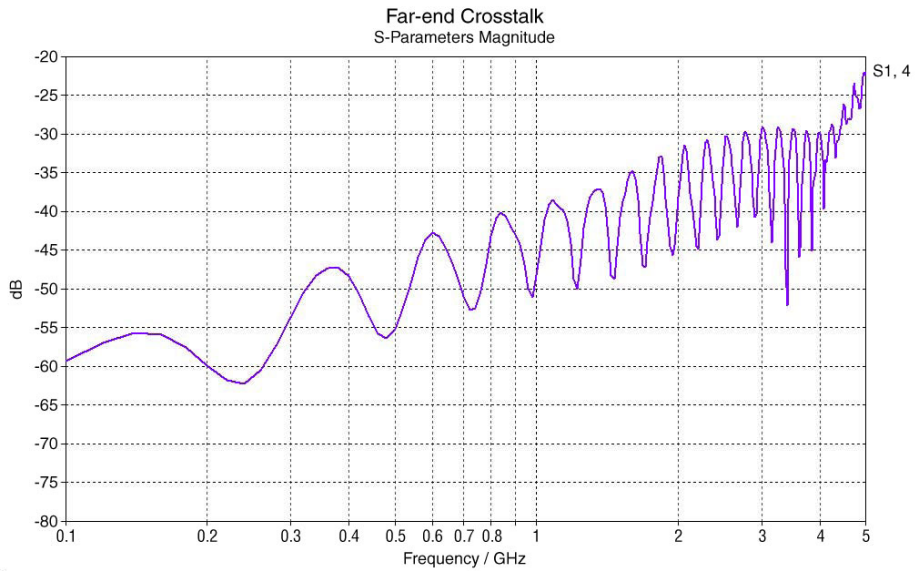
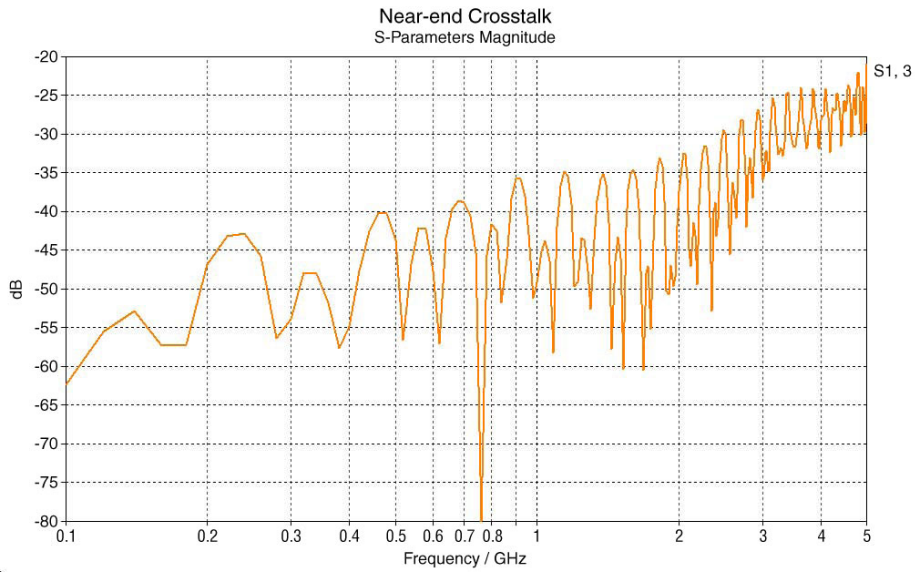
The following graphs on this page and the next page provide performance data on Amphenol 10GBASE signal integrity (SI) quadrax contacts. Testing was done with 2 mated contacts terminated on both ends of 1 meter Thermax cable.



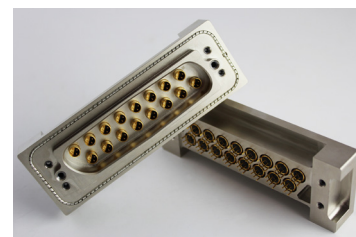
# Split-Pair Quadrax Contacts

Frequencies & Performance Data

QUADRIX Split Pair



# Rectangular D-Sub Type Connectors with Split Pair Quadrax Contacts



Inner Contact Layout:  
(Pin Mating Face)

Diamond

Box

Rotated Box

Connector Part Number	Contact	Type Contact	Number of Contacts	Mating connector part number (not limited to)	Comments	Backshell	PCB Inner Contact Layout	Type of Mating Innerface Inner Contact layout	Space Grade
91-646132-072	Pin	Straight PCB Tails	16	91-646132-073	PCB Contacts are installed		Diamond		X
91-646132-073	Socket	Crimp	16	91-646132-072	Crimp 21-033471-071 Supplied with connector or L suffix for less contacts	10-6462R8-002		Diamond	X
91-646132-078	Pin	Straight PCB Tails- C Stack, keyway offset 45 degrees	16	91-646132-079	PCB Contacts are installed keyway offset 45°		Rotated Box		
91-646132-079	Socket	Crimp	16	91-646132-078	21-033471-071 Supplied, keyway offset 45 degrees or L suffix for less contacts			Rotated Box	X
91-646132-080	Pin	PCB Right Angle	4	91-646132-081	PCB Contacts are installed		Box		X
91-646132-081X	Socket	Crimp	4	91-646132-080 91-646132-095X	21-033471-071 Supplied, keyway offset 45 degrees or L suffix for less contacts	10-646234-990X		Box	X
91-646132-089	Pin	PCB Right Angle	4	91-646132-090 91-646132-104 91-646132-115	PCB Contacts are installed		Box		X
91-646132-090	Socket	Crimp	4	91-646132-089	Supplied Less Contacts			Box	X
91-646132-092	Pin/Pin	Feed through	4	91-646132-090	Feed Through, Contacts installed			Box	X
91-646132-093X	Pin	PCB Straight	8	91-646132-094 91-646132-147X	2x4, PCB Installed		Diamond		X
91-646132-094X	Socket	Crimp	8	91-646132-093	2x4, Crimp Contacts Supplied 21-033471-071	10-646234-992X		Diamond	X
91-646132-095X	Pin	PCB Straight, keyway offset 45 degrees	4	91-646132-081	PCB Contacts are installed		Box		X
91-646132-096	Pin/Socket	Feed through	4	91-646132-089 & 91-646132-115	Feed Through, Contacts installed			Box	X
91-646132-098	Pin	PCB Straight	8	91-646132-099	2x4, PCB installed		Diamond		

Note: Offset keyway within a connector uses a diamond pattern quadrax when installed forms a box type.

X = Suffix letter is required. For example: S for Space Grade, T for Non Space Grade. Refer to individual drawings for specific suffix callouts.

# Rectangular D-Sub Type Connectors with Split Pair Quadrax Contacts



Inner Contact Layout:  
(Pin Mating Face)

Diamond

Box

Rotated Box

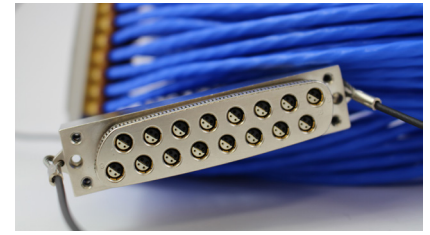


QUADRAX Split Pair

Connector Part Number	Contact	Type Contact	Number of Contacts	Mating connector part number (not limited to)	Comments	Backshell	PCB Inner Contact Layout	Type of Mating Innerface Inner Contact layout	Space Grade
91-646132-112	Socket	Crimp	8	91-646132-111 91-646132-093 91-646132-147X	Crimp 21-033471-071 Supplied with connector or L suffix for less contacts	Included		Diamond	X
91-646132-113	Pin	PCB Right Angle	4	91-646132-090 91-646132-104 91-646132-115	PCB Contacts are installed		Box		X
91-646132-114	Socket	Crimp	4	91-646132-089 91-646132-113	Crimp 21-033471-071 Supplied with connector or L suffix for less contacts	Included with Assembly		Box	X
91-646132-115	Socket	Crimp	4	91-646132-089	Supplied Less Contacts	10-646234-630S 10-646234-633X		Box/ Diamond (depends on mating conn.)	X
91-646132-116X	Pin	PCB Right Angle	2	91-646132-117X	PCB Contacts are installed		Box		X
91-646132-117X	Socket	Crimp	2	91-646132-116X	less contacts	10-646234-631X 10-646234-636X		Box/ Diamond (depends on mating conn.)	X
91-646132-118X	Pin/ Socket	Feed through	2	91-646132-116X 91-646132-117X	Contacts installed		Box		X
91-646132-119X	Pin	PCB Right Angle	4	91-646132-115	PCB Contacts are installed		Box		X
91-646132-120X	Pin	PCB Right Angle	2	91-646132-117X	PCB Contacts are installed		Box		X
91-646132-121	Socket	Crimp	2	91-646132-120	less contacts	10-646234-632X		Box	X
91-646132-122	Pin	Crimp	4	91-646132-115	less contacts			Box	X
91-646132-123	Socket	Crimp, keyway offset 45 degrees	4	91-646132-089	less contacts	10-646234-630X		Diamond	X
91-646132-124	Pin	Crimp	4	91-646132-115	Less contacts	10-646234-630X 10-646234-633X		Diamond	X
91-646132-125	Pin	Crimp	2	91-646132-117X	Less contacts	10-646234-631X		Diamond	X
91-646132-127	Pin/ Socket	Connector Saver	4	91-646132-113 Rec. 91-646132-089 Rec. 91-646132-114 Plug	Contacts installed			Diamond	X
91-646132-129	Pin/ Socket	Connector Saver	8	91-646132-111 Rec. 91-646132-093X Rec. 91-646132-112 Plug 91-646132-094X Plug	Contacts installed			Diamond	X
91-646132-132	Pin	PCB Straight	4	91-646132-115	PCB Contacts are installed		Diamond		X
91-646132-140X	Pin	PCB Straight	2	91-646132-117X	PCB Contacts are installed		Diamond		X

X = Suffix letter is required. For example: S for Space Grade, T for Non Space Grade. Refer to individual drawings for specific suffix callouts.

# Rectangular D-Sub Type Connectors with Split Pair Quadrax Contacts



Inner Contact Layout:  
(Pin Mating Face)

Diamond

Box

Rotated Box

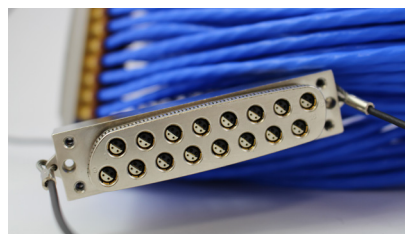
Connector Part Number	Contact	Type Contact	Number of Contacts	Mating connector part number (not limited to)	Comments	Backshell	PCB Inner Contact Layout	Type of Mating Innerface Inner Contact layout	Space Grade
91-646132-141X	Socket	Crimp keyway offset 45°	4	91-646132-110 91-646132-095X	Crimp 21-033471-071 Supplied with connector or L suffix for less contacts	10-646234-990		Box/ Diamond (depends on mating conn.)	X
91-646132-100	Pin	PCB Right Angle	4	91-646132-090	PCB Contacts are installed		Box		X
91-646132-104	Socket	Crimp	4	91-646132-089	Supplied Less Contacts			Box	X
91-646132-106	Socket	Crimp	16	91-646132-072	Crimp 21-033471-071 Supplied with connector or L suffix for less contacts	10-6462R8-002		Diamond	X
91-646132-109	Socket	Crimp	4	91-646132-080	Crimp 21-033471-071 Supplied connector or L suffix for less contacts			Diamond	X
91-646132-110	Pin	PCB Straight, keyway offset 45°	4	91-646132-109, 91-646132-081	PCB Contacts are installed		Box		X
91-646132-111	Pin	PCB Straight, keyway offset 45°	8	91-646132-111 91-646132-093	2 x 4 PCB Contacts are installed		Diamond		X
91-646132-131	Pin	PCB Straight, keyway offset 45°	16	91-646132-073	PCB Contacts are installed		Diamond		X
91-646132-142X	Socket	Crimp	8	91-646132-111 91-646132-093X	2 x 4 Crimp 21-033471-071 Supplied connector or L suffix for less contacts	10-646234-992		Box/ Diamond (depends on mating conn.)	X
91-646132-143X	Pin	PCB Straight	4	91-646132-115	PCB Contacts are installed		Box		X
91-646136-4XX	Pin	PCB Right Angle	1 thru 12	91-646137-1XX	Tabulated drawing, PCB installed		Box		
91-646137-1XX	Socket	Crimp	1 thru 12	91-646136-4XX	Tabulated drawing, Less contacts			Box	
91-646132-145	Pin/Pin	Feed through	4	91-646132-115 91-646132-132	Contacts installed		Diamond	Diamond	X
91-646132-146	Pin/ Socket	Feed through	4	91-646132-132 91-646132-115	Contacts installed		Diamond	Diamond	X

X = Suffix letter is required. For example: S for Space Grade, T for Non Space Grade. Refer to individual drawings for specific suffix callouts.

QUADRAx Split Pair



# Rectangular D-Sub Type Connectors with Split Pair Quadrax Contacts



Inner Contact Layout:  
(Pin Mating Face)



Diamond



Box



Rotated Box

QUADRAX Split Pair

Connector Part Number	Contact	Type Contact	Number of Contacts	Mating connector part number (not limited to)	Comments	Backshell	PCB Inner Contact Layout	Type of Mating Interface Inner Contact layout	Space Grade
91-646132-147X	Socket	Crimp	8	91-646132-111 91-646132-093 91-646132-147X	Supplied Less Contacts	10-6462R8-007X Sold Separately		Diamond	X
91-646132-148X	Pin	Crimp	8	91-646132-112 91-646132-094X 91-646132-147X	Supplied Less Contacts	10-6462R8-007X Sold Separately		Diamond	
91-646132-153X	Socket	Crimp	2	91-646132-116	Supplied Less Contacts	10-646234-631X		Box/ Diamond (depends on mating conn.)	X
91-646132-150X	Pin	PCB	4	91-646132-115	Contacts installed, Same as 91-646132-089 but includes a groove for a spiral shield (sold separately)		Box		X
91-646132-151X	Pin	PCB	2	91-646132-117X	Same as -089 No Spiral Shield		Box		X
91-646132-152X	Socket	Crimp	2	91-646132-116X	Same as 91-646132-117 except box pattern	10-646234-631X		Box	X
91-646132-153X	Socket	Crimp	2	91-646132-116X	Same as 91-646132-117 Except modified for Customer	10-646234-631X		Box	X
91-646132-154X	Pin/Pin	Feed through	4	91-646132-115 using 21-033471-151 contacts and others				Box	X
91-646132-155X	Pin	Crimp	4	91-646132-081 21-033471-109				Box/ Diamond	X
91-646132-156X	Pin	PCB Straight	8	91-646132-094 21-033471-147X	Same as 91-646132-093X except 100% IR/DWV Testing		Diamond		X

PROTECTION CAPS		
Part Number	Conn Pin	Description
FH-6460F0-225	91-646132-113 91-646132-089	Mating End Cap
FH-6460F0-223	91-646132-113 91-646132-089	PCB Tail Side
FH-6460F0-229	91-646132-093 91-646132-111	Mating End Cap
FH-6460F0-235	91-646132-093 91-646132-111	PCB Tail Side
FH-6460F0-321X	91-646132-151X	Mating End Cap

X = Suffix letter is required. For example: S for Space Grade, T for Non Space Grade. Refer to individual drawings for specific suffix callouts.



# Differential Twinax Contacts

## General Description

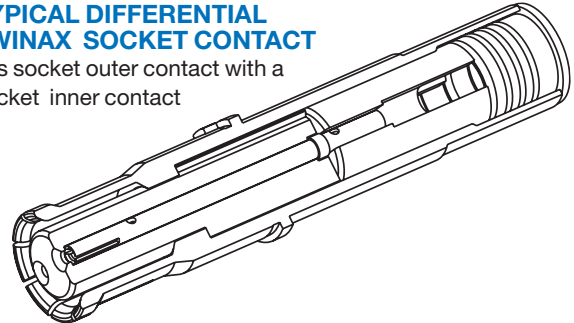
### AMPHENOL DIFFERENTIAL TWINAX CONTACTS

Offer several advantages for high data transfer rates, low power consumption and excellent EMI compatibility:

- Two strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Available in size 8 crimp termination style
- Also available in size 8 with PC tails
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts

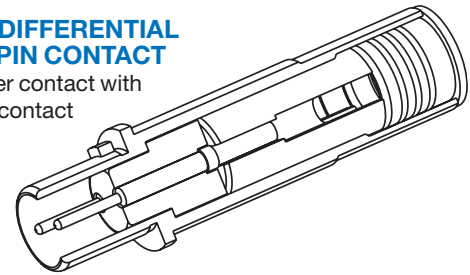
#### TYPICAL DIFFERENTIAL TWINAX SOCKET CONTACT

has socket outer contact with a socket inner contact

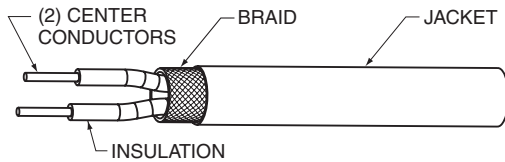


#### TYPICAL DIFFERENTIAL TWINAX PIN CONTACT

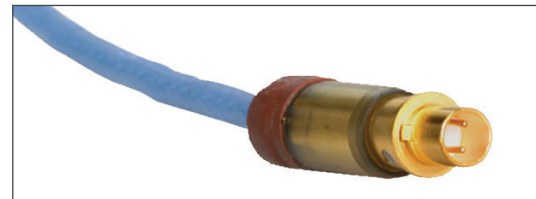
has pin outer contact with a pin inner contact



#### CABLE ILLUSTRATION DIFFERENTIAL TWINAX CONTACT



Differential Twinax Socket Contact



Differential Twinax Pin Contact

### DIFFERENTIAL TWINAX CONTACTS ARE GOLD PLATED, CRIMP TERMINATION

Finish of mating contact parts: supplied with 0.000050 min. gold over nickel on mating interface.

#### DIFFERENTIAL TWINAX SIZE 8 CONTACT PERFORMANCE:

**Bandwidth:** Up to 1.25 GHz

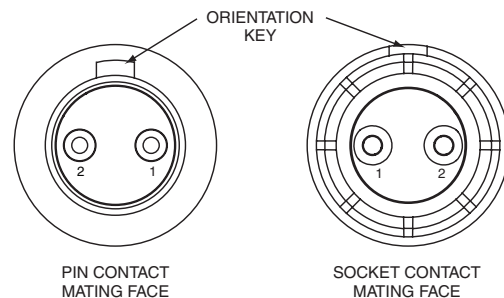
**Data Rate:** Exceeding 2.5 Gbps

**Voltage Rating:** 500 Vrms max. @ sea level

#### Dielectric Withstanding

- Voltage:**
- 1000 VAC rms between all inner contacts @ sea level
  - 500 VAC rms between inner and outer contacts @ sea level

#### SUGGESTED NUMBERING OF DIFFERENTIAL TWINAX CONTACTS



#### DIFFERENTIAL TWINAX CONTACT DATA

Contacts are inserted by hand. Refer to termination instructions listed. Contacts are removed with a removal tool. Recommended tool is MIL-I-81969/14-06, Daniels DRK-264-8. Refer to termination instructions listed. Finish of mating contact parts: Contact part numbers shown in the chart are supplied gold plated per ASTM B488 Type II, Code C, .000050 min. thick over nickel plate per AMS-QQ-N-290, Class 2, .000030/.000150 thick.

# Differential Twinax Contacts

MIL-DTL-38999, Series III\*, Contact Part Number Guide by Cable

DIFFERENTIAL TWINAX CONTACTS FOR USE IN TV-R CONNECTORS					
Impedance (Ohms)	Contact Size	Electrical Protocol††	Cable	Contact Part Number (Termination Instruction Sheet)**	
				Pin	Socket
100	8	Ethernet, USB	26463/70460X-2 (98 Ohm)	21-033387-021 (L-2119-E)	21-033388-021 (L-2119-E)
			Fileca 2709-3		
			GORE GSC-05-82559-00		
			Gore RCN9034		
			NF24T100-200C (Space)		
			PIC E10224		
			REV. B Raychem 0024A0024		
			S280W502-1		
			ST5M1284-003 (98 Ohm)		
			Tensolite 24463/05099X-8(LD)		
			Tensolite 24463/9P025X-2(LD)		
			Tensolite NF24T100		
			Thermax 12814		
			Thermax MX 100-24		
			BMS13-72T07C02G024		
			GigaFlight GF100-24TWIN-1		
			GORE GSC-05-827300-00	21-033387-051*** (L-2119-AY)	21-033388-051*** (L-2119-AY)
			Tensolite 26453/03184X-2(LD)		
			Thermax 956-626Z		
			ASNE08072003-09, -041	21-033387-041 (L-2119-T)	21-033388-041 (L-2119-T)
			Cheminax 7726SOLL 4		
			DXN 2310		
			GORE GSC-05-81973-00		
			GORE GSC-05-827300-00		
			Tensolite 26453/03184X-2(LD)		
			Thermax 956-626Z		
			23460/05114X-2(LD)	21-033387-061 (L-2119-BH)	21-033388-061 (L-2119-BH)
			PIC E10224		
			M17/176-00002 (77 Ohm)		
			Raychem 0026A0024	21-033387-071 (L-2119-BJ)	21-033388-071 (L-2119-BJ)
			CAN24TST120		
			JSFY11-24		
			Tensolite 24463/03220T-2(LD)	21-033387-091 (L-2119-BT)	21-033388-091 (L-2119-BT)
Thermax 956-1T200					
S280W502-6					
Tensolite 24463/9P026X-2(LD)	21-033387-101 (L-2119-AK)	21-033388-101 (L-2119-AK)			
AXON P509782					
CAN24TDT120 (120 Ohm)					
GC875ACH	21-033387-141	21-033388-141			
Tensolite 26453/03184X-2(LD)	21-033387-151	21-033388-151			
Gore DXN 2125, Gore GSC-05-84308-00, Gore DXN 2602	21-033387-161	21-033388-161			
963-102-30	21-033387-211	21-033388-211			
Gore GSC-03-83971-01	21-033387-221	21-033388-221			
Gore GSC-05-82561-00	21-033387-231	21-033388-231			
Raychem 0026A0024 (Space Grade)	21-033387-261	21-033388-261			
Tensolite 26483/03071X-2(LD)	21-033387-031 (L-2119-AC)	21-033388-031 (L-2119-AC)			
150	Fibre Channel, 1000 Base-CX Ethernet	Gore RCN 8328	21-033456-001 (L-2119-BX)†	21-033457-001 (L-2119-BX)†	

Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809  
 \* Requires modified connector to accommodate keyed contacts.  
 \*\*\* Indicated contact is vacuum degassed  
 †† Test reports available for indicated protocols. Consult Amphenol Aerospace.

\*\* Termination instructions are packaged with each contact and can be found on-line at: [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp)  
 † Consult Amphenol Aerospace for current release of this instruction sheet.

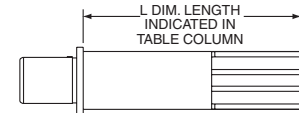
Stabilizer-To be used on all PCB Pins & Sockets. 21-033323-023

# Differential Twinax Contacts

MIL-DTL-38999, Series III\*, Contact Part Number Guide by Cable

PCB DIFFERENTIAL TWINAX CONTACTS FOR USE IN TV-R CONNECTORS				
Impedance (Ohms)	Contact Size	PCB Twinax Contacts Length	Contact Part Number	
			Pin	Socket
100	8	.494	21-033834-041	21-033835-041
		.530	21-033834-131	21-033835-131
		.780	21-033834-061	21-033835-061
		.788	21-033834-031	21-033835-031
		.806	21-033834-111	21-033835-111
		.819	21-033834-141	21-033835-141
		.843	21-033834-101	21-033835-101
		.871	21-033834-071	21-033835-071
		.908	21-033834-121	21-033835-121
		.937	21-033834-081	21-033835-081
		.939	21-033834-051	21-033835-051
		1.035	21-033834-001	21-033835-001
		1.035	21-033834-091	21-033835-091
		1.035	21-033834-021	21-033835-021
150		1.035 mates to 21-33456/57 series	21-033458-001	21-033459-001

Indicated length given in chart at left is the distance from the rear of the contact retention shoulder to the tip of the PCB tails.

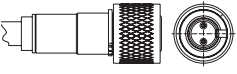
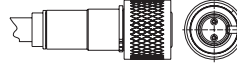
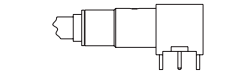


Note: It does not indicate stickout length when installed in D38999 connector.

Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

# Differential Twinax Transition Adapters

MIL-DTL-38999, Series III, Attachment to PC Boards Data

100 OHM DIFFERENTIAL TWINAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS						
Illustration of Adapter	Impedance (Ohms)	Differential Twinax Type Adapter/ Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**		
				Plug	Receptacle	
	77	M17/176-00002 (77 ohms)	.3125	21-033832-081 (L-2119-AJ)		
		24463/9P026X-2		21-033832-081 (L-2119-AJ)		
		Tensolite 24463/9P025X-2(LD) 10-646060		21-033832-021 (L-2119-P)		
		Tensolite 24463-9P025X-2(LD) hex nut w/ lockwire holes		21-033832-181		
		PCB Differential Twinax Receptacle 90 Degree Adapter/ Tail Length .110			21-033833-021	
		PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .110			21-033833-031	
	100	Tensolite CAN22TDT120 (120 Ohm)	.375	21-033832-111†		
		PCB Differential Twinax Receptacle 90 degree Adapter/Tail Length .283			21-033833-161†	
		PCB Differential Twinax Receptacle Straight Adapter/Tail Length .283			21-033833-171†	
		Differential Twinax Receptacle 90 degree Adapter (low profile) with cable to board/ Tensolite 24463/9P026X-2	N/A		21-033833-091 (L-2119-AF)	
		Differential Twinax Receptacle 90 degree Adapter with cable to board/ Tensolite 24463/9P025X-2			21-033833-051 (L-2119-V)	
		Differential Twinax Receptacle 90 degree Adapter with cable to board/Tensolite 24463/9P025X-2			21-033833-141 (L-2119-BU)	

† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

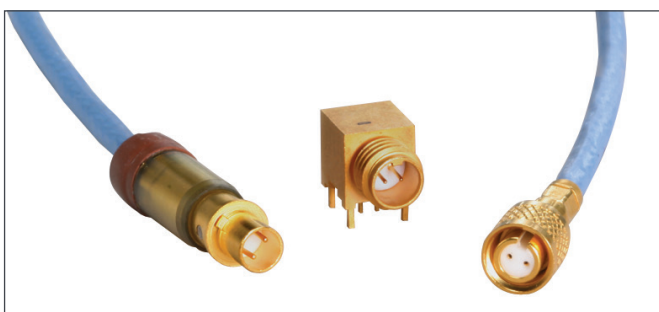
# Differential Twinax Transition Adapters

MIL-DTL-38999, Series III, Attachment to PC Boards Data

150 OHM DIFFERENTIAL TWINAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS						
	Illustration of Adapter	Impedance (Ohms)	Differential Twinax Type Adapter/Cable or PCB Tail Length	Mating Thread Size	Part Number (Termination Instruction Sheet)**	
					Plug	Receptacle
Mating plugs and receptacles		150	Differential Twinax Plug Adapter/ Tensolite 26483/03071X-2	.375	21-033832-091 (L-2119-BR)	
			Tensolite 26483/03071X-2		21-033832-271	
			PCB Differential Twinax Receptacle 90 Degree Adapter/ Tail Length .110			21-033833-111
			PCB Differential Twinax Receptacle, Space grade, 90 Degree Adapter/ Tail Length .110			21-033833-351
			PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .110			21-033833-181†
Wired to board		150	Differential Twinax Receptacle 90 degree Adapter with cable to board/ Tensolite 26483/03071X-2	N/A		21-033833-101 (L-2119-BM)†

† Consult Amphenol Aerospace for current release of this adapter and instruction sheet, if applicable.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/termination-instructions>



90° Differential Twinax Receptacle and Plug Transition Adapter

## TRANSITION ADAPTER DATA

Finish of mating contact parts: Contacts are supplied gold plated per ASTM B488 Type II, Code C, .000050 min. thick over nickel plate per AMS-QQ-N-290, Class 2, .000030/.000150 thick.

# Micro Differential Twinax Transition Adapters

Push-Pull Quick-Disconnect Interconnects

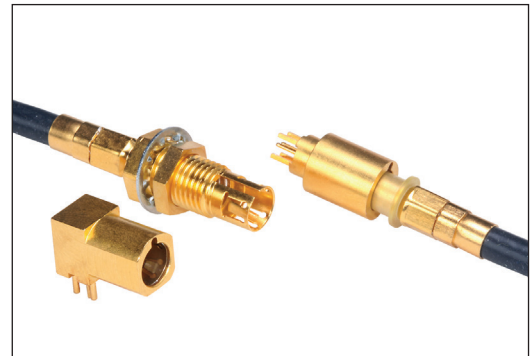
## MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTERS

Amphenol now offers differential twinax transition adapters in smaller sizes that provide matched impedance interconnection to PCB boards. Our unique push-pull quick disconnect adapter design offers:

- Advantages over traditional threaded type adapters
- Launching of controlled impedance (100 ohm) signals for high speed twinax contacts with push-pull quick disconnect coupling
- Rugged construction, 100+ mating cycles for reliable and secure data transmission
- Miniature size for tighter spacing on boards
- Intermountability with existing threaded solutions having the same PCB tail footprint

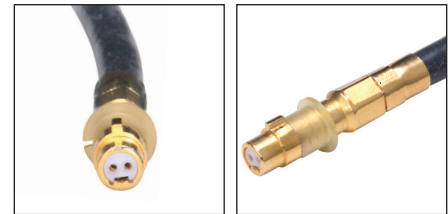
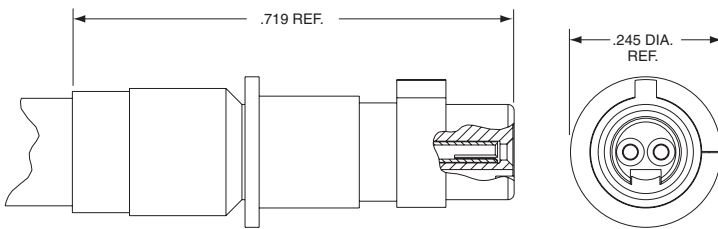
### STYLES INCLUDE:

- Plug - standard length and extended length options
- Straight PCB receptacle, 90° PCB receptacle
- Two jam nut receptacle styles - both with standard length and extended length options
- Bushing assembly 90° adapter (used with plug or jam nut receptacle)



Micro Differential Twinax Transition Adapters  
Shown right: Straight receptacle mated to plug  
Shown left: Jam nut and 90° receptacles

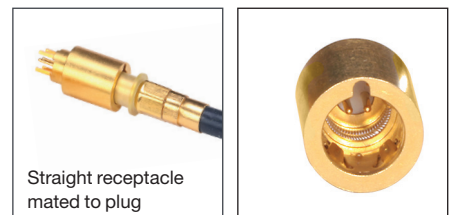
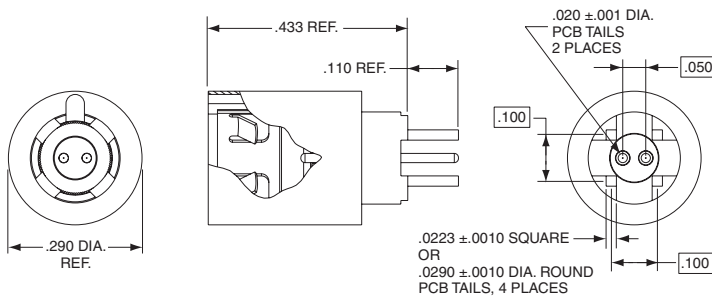
## MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTER PLUG



Impedance (Ohms)	Cable Type*	Part Number
100	Calmont 3007-1923-12-7	21-033832-151
	Calmont 3007-1923-12-7	21-033832-121**
	Tensolite 26453/03184X-2LD	
	Thermax 956-626Z	21-033832-161
	Thermax 956-626S	

\*\* Same as -151 with extended ferrule for added cable support

## MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTER STRAIGHT PCB RECEPTACLE



Straight receptacle mated to plug

Impedance (Ohms)	Part Number
100	21-033833-191

All dimensions for reference only.



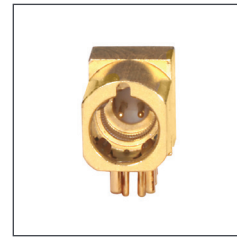
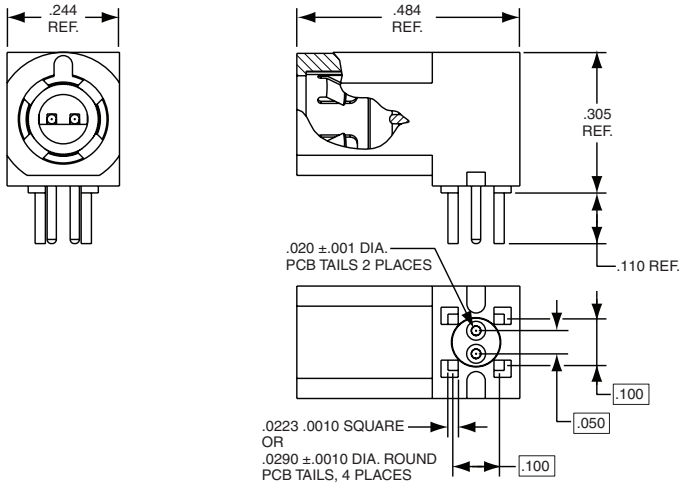
# Micro Differential Twinax Transition Adapters

Push-Pull Quick Disconnect Interconnects

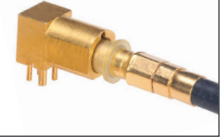
**Amphenol**  
MILITARY HIGH SPEED

DIFFERENTIAL TWINAX Adapters

## MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTER 90° PCB RECEPTACLE



90 Degree receptacle mated to plug

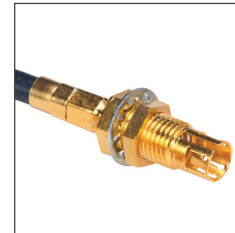
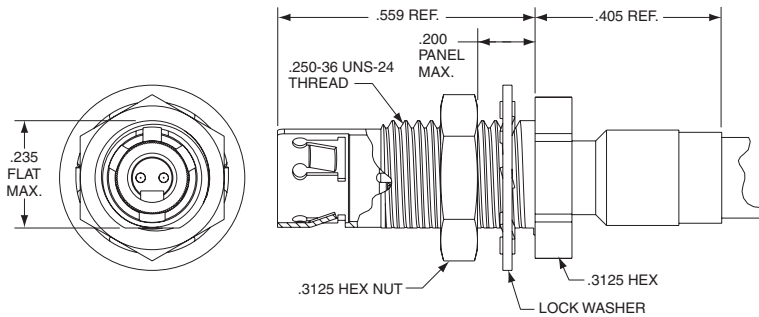


Impedance (Ohms)	Part Number
100	21-033833-201
	21-033833-281 .140 PCB tail length

## MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTER JAM NUT RECEPTACLES

### JAM NUT RECEPTACLE, STYLE 1

Smaller diameter front shell requires a smaller mounting D-hole dimension in panel.



Jam nut receptacle, Style 1, mated to plug

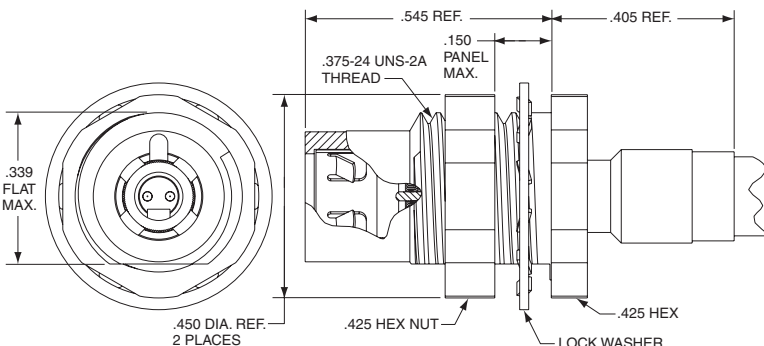


Impedance (Ohms)	Cable Type*	Part Number
100	Calmont 3007-1923-12-7	21-033833-211**
	Calmont 3007-1923-12-7	21-033833-241
	Tensolite 26453/03184X-2LD	21-033833-261
	Thermax 956-626Z	

\*\* Same as -241 with extended ferrule for added cable support

### JAM NUT RECEPTACLE, STYLE 2

Has a larger diameter front shell than Style 1. Requires a larger mounting D-hole in panel.



Jam nut receptacle, Style 2, mated to plug



Impedance (Ohms)	Cable Type*	Part Number
100	Calmont 3007-1923-12-7	21-033833-231**
	Calmont 3007-1923-12-7	21-033833-251
	Tensolite 26453/03184X-2LD	21-033833-271
	Thermax 956-626Z	

\*\* Same as -251 with extended ferrule for added cable support

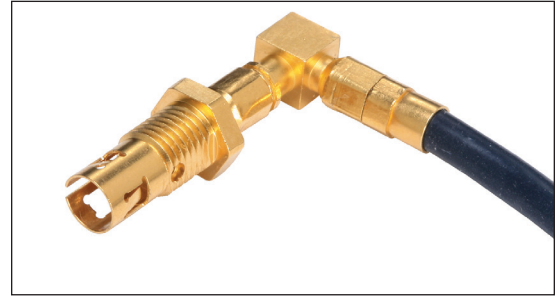
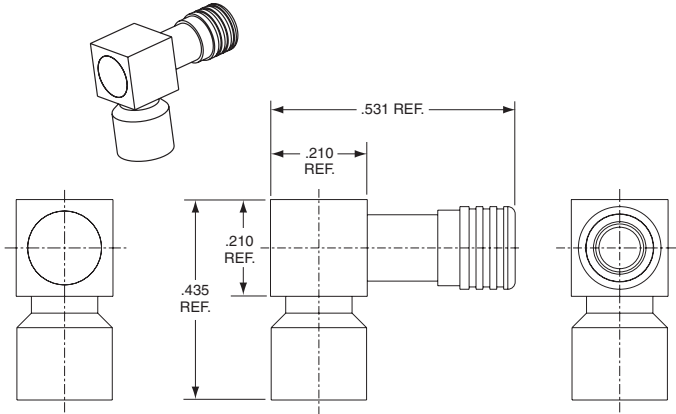
All dimensions for reference only.

# Micro Differential Twinax Transition Adapters

Push-Pull Quick Disconnect Interconnects

## 90° BUSHING ASSEMBLIES FOR USE WITH WIRED MICRO DIFFERENTIAL TWINAX TRANSITION ADAPTERS

Amphenol provides bushing assemblies which convert straight plug and receptacle wired adapters into 90° wired adapters. To facilitate tight cable bend requirements.



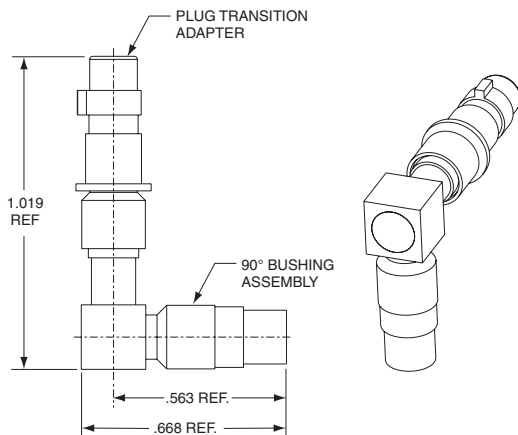
90° Bushing Assembly with Jam Nut Micro Differential Transition Adapter

90° Bushing Assembly  
Part Number

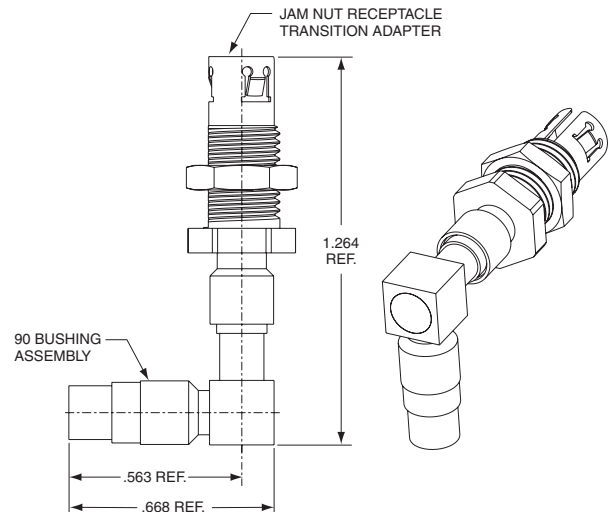
21-033425-201

90° bushing assembly is ordered separately. Adapters are not included with bushing assembly.

Illustrations below show how the 90° bushing assembly attaches to either a plug or a jam nut receptacle adapter.



90° BUSHING ASSEMBLY WITH WIRED MICRO DIFFERENTIAL PLUG TRANSITION ADAPTER



90° BUSHING ASSEMBLY WITH WIRED MICRO DIFFERENTIAL JAM NUT RECEPTACLE TRANSITION ADAPTER

Amphenol transition adapters are capable of terminating to additional 100 Ohm cables beyond what are listed in the charts on pages 56 and 57.

**Cables need to have the following dimensions:**

- .0210/.011 Dia. stranded center conductor (26/30 AWG)
- .045 Dia. max. inner wire insulation
- .115 Dia. max. outer braid (round type preferred)
- .150 Dia. max. jacket
- Consult Amphenol Aerospace for other cable termination possibilities.

All dimensions for reference only.

# High Speed Contacts for Rack & Panel

ARINC 600 & R27 Rack and Panel Connectors

QUADRAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS				
Impedance (Ohms)	Contact Size	Cable	Contact Part Number (Termination Instruction Sheet)**	
			Pin	Socket
100	8	24443/03130X-4(LD)	21-033382-021 (L-2119-AH)	21-033383-021 (L-2119-AH)
		24443/9P025X-4(LD)		
		PIC E51424		
		S280W502-4		
		Tensolite NF24Q100-01	21-033382-031 (L-2119-I)	21-033383-031 (L-2119-I)
		Draka Fileca F-4703-3		
		Draka Fileca F-4704-5		
110	8	NF22Q100	21-033382-101 (L-2119-AS)†	21-033383-101 (L-2119-AS)†
		JSFY02-1	21-033382-071†	21-033383-071†
150	8	Gore RCN8328	21-033382-061 (L-2119-L)	21-033383-061 (L-2119-L)
		Tensolite 26473/02006X-4(LD)		

DIFFERENTIAL TWINAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS				
Impedance (Ohms)	Contact Size	Cable	Contact Part Number (Termination Instruction Sheet)**	
			Pin	Socket
77		GC875TM24H	21-033378-061 (L-2119-AU)	21-033379-061 (L-2119-AU)
100	8	ABS0386WF24	21-033378-021 (L-2119-G)	21-033379-021 (L-2119-G)
		ASNE0272TK22	21-033378-031 (L-2119-G)	21-033379-031 (L-2119-G)
		ASNE0272TK24	21-033378-041 (L-2119-G)	21-033379-041 (L-2119-G)
		Tensolite 24463/9P025X-2(LD)	21-033378-051†	21-033379-051†
110			21-033378-071†	21-033379-071†

COAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS			
Contact Size	Cable	Contact Part Number (Termination Instruction Sheet)**	
		Pin	Socket
8	RG-179	21-033676-001 (L-2090-B)	21-033675-001 (L-2090-A)
	RG316		
	RG-179	21-033476-001	21-033475-001
	RG316		
	5M2869-001		

TWINAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS			
Contact Size	Cable	Contact Part Number (Termination Instruction Sheet)**	
		Pin	Socket
12	10612	21-033631-004† (L-2092-U)†	21-033632-003 (L-2092-J)
	EPD 32263		
	GSC-12-2548-00		

PCB QUADRAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS				
Impedance (Ohms)	Contact Size	PCB Quadrax Contacts	Contact Part Number	
			Pin	Socket
100	8	PCB (.346 Length)		21-033397-171
		PCB (.473 Length)	21-033398-261	

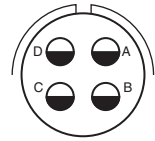
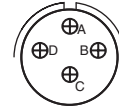
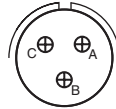
† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable. Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

\*\*Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

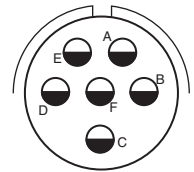
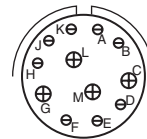
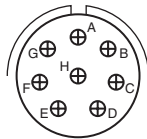
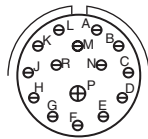
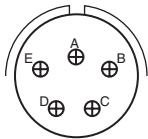
# Insert Arrangements-MIL-DTL-38999

Incorporating Coax, Twinax and Triax Contacts

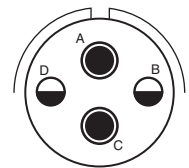
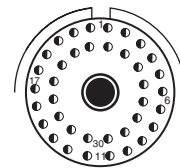
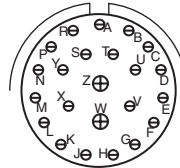
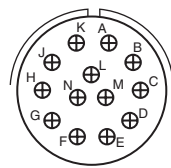
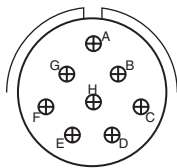
Front face of pin inserts illustrated



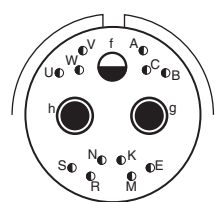
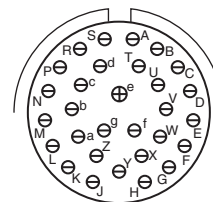
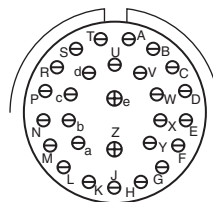
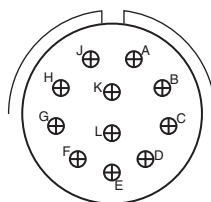
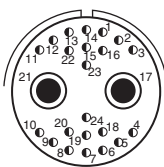
Insert Arrangement	9-5	10-2	11-2	12-3	13-3	12-4	13-4	14-4	15-4
Connector Series	TV	SJT	LJT, TV	JT	LJT	JT, SJT	LJT, TV	JT	LJT
Service Rating	Grounded	I		II		I		I	
Number of Contact	1	2		3		4		4	
Contact Size	8 Twinax	16		16		16		12	



Insert Arrangement	14-5	15-5	14-15	15-15	14-68	15-68	14-97	15-97	16-6	17-6
Connector Series	JT, SJT	LJT, TV	JT, SJT	LJT, TV	JT	LJT	JT, SJT	LJT, TV	JT, SJT	LJT, TV
Service Rating	II		I		I		I		I	
Number of Contact	5		14	1	8		8	4		6
Contact Size	16		20	16	16		20	16		12



Insert Arrangement	16-8	17-8	16-13	17-13	16-99	17-99	17-2	17-22
Connector Series	JT, SJT	LJT, TV	JT, SJT	LJT	JT, SJT	LJT, TV	LJT TV	LJT TV
Service Rating	II		I		I		M	Coax
Number of Contact	8		13		21	2	38 1	2 2
Contact Size	16		16		20 16		22D 8	12 8



Insert Arrangement	17-25	18-11	19-11	18-28	19-28	18-30	19-30	19-31
Connector Series	LJT	JT, SJT	LJT, TV	JT	LJT	JT	LJT	TV
Service Rating	M		II		I		I	M
Number of Contact	22	2	11	26	2	29	1	2 1 12
Contact Size	22D	8	16	20	16	20	16	8 12 22D

The insert arrangements shown on this page and the next page represent the most readily available patterns within the 38999 Circular Series. Contact Amphenol if you require other arrangements than what are shown here. Size 8 and size 12 cavities can be filled with either coax, twinax, triax or power contacts in most cases.

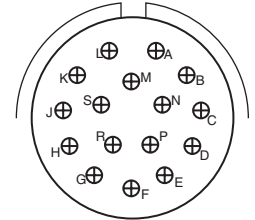
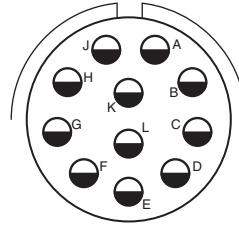
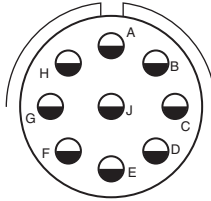
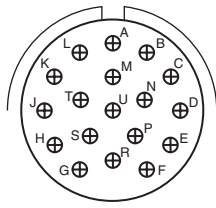
### CONTACT LEGEND

8	10	12	16	20	22D
Coax, Twinax Triax or Power	Twinax, Triax, or Power	Coax, Twinax, Triax or Power	Coax or Power	Power	Power

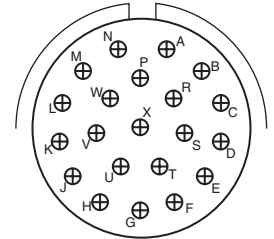
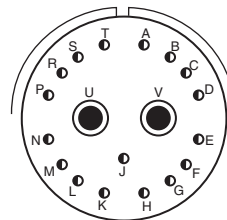
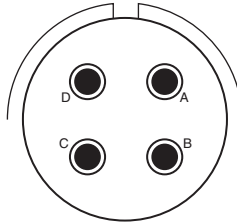
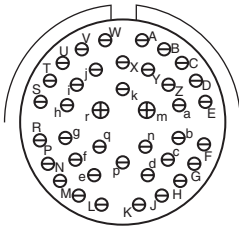
# Insert Patterns-MIL-DTL-38999

Incorporating Coax, Twinax and Triax Contacts

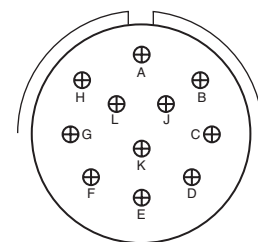
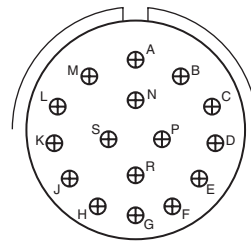
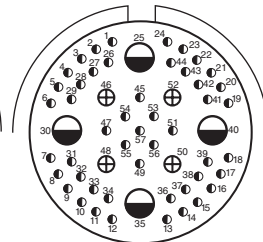
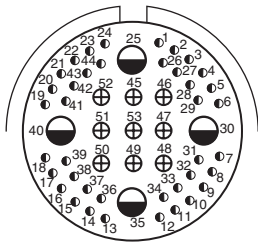
Front face of pin inserts illustrated



Insert Arrangement	18-68	19-68	18-96	20-11	21-11	20-16	21-16
Connector Series	JT	LJT	JT	JT, SJT	LJT, TV	JT, SJT	LJT, TV
Service Rating	I		I	I		II	
Number of Contact	18		9	11		16	
Contact Size	16		12	12		16	



Insert Arrangement	20-39	21-39	20-75	21-75	20-79	21-79	22-21	23-21
Connector Series	JT, SJT	LJT, TV	SJT	LJT, TV	SJT	LJT	JT, SJT	LJT, TV
Service Rating	I		M		II		II	
Number of Contact	37	2	4		17		21	
Contact Size	20	16	8		22D		16	



Insert Arrangement	23-54			23-63			23-97	23-99
Connector Series	TV			TV, LJT			LJT	LJT
Service Rating	M			M			II	II
Number of Contact	40	9	4	49	4	4	16	11
Contact Size	22D	16	12	22D	16	12	16	16

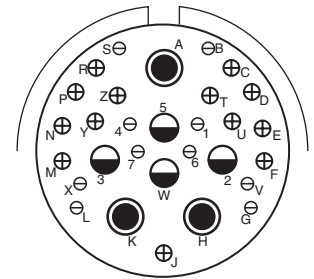
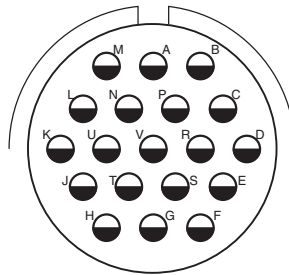
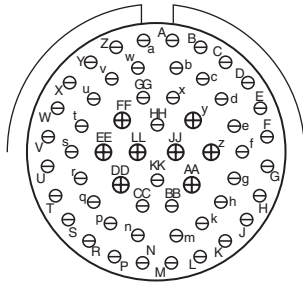
### CONTACT LEGEND



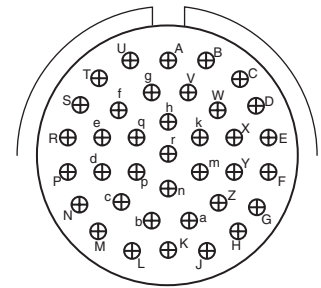
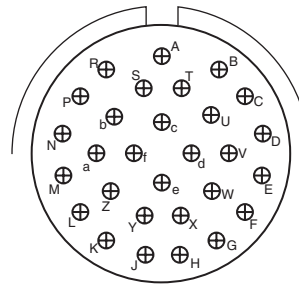
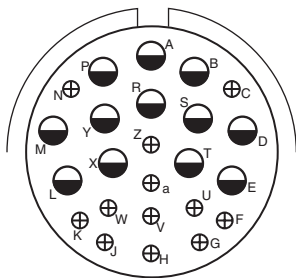
COAX, TWINAX, TRIAX Insert Arrangements

# Insert Patterns-MIL-DTL-38999

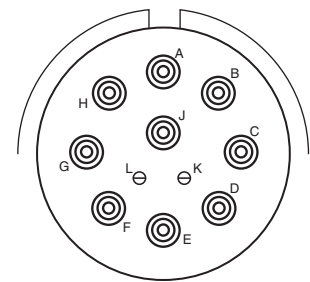
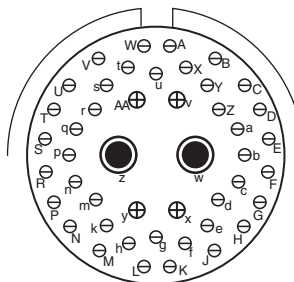
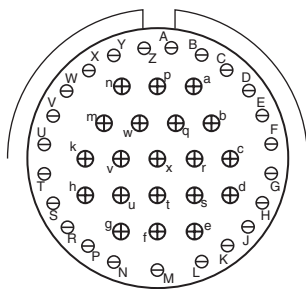
Incorporating Coax, Twinax and Triax Contacts



Insert Arrangement	24-4	25-4	24-19	25-19	24-20	25-20*
Connector Series	JT, SJT	LJT, TV	JT, SJT	LJT, TV	SJT	LJT, TV
Service Rating	I			I		
Number of Contact	48	8	19		10	13
Contact Size	20	16	12		20	16
					8	12
					(Locations U and Y - Dedicated to Fiber Optics)	



Insert Arrangement	24-24	25-24	24-29	25-29	24-37	25-37
Connector Series	JT, SJT	LJT, TV	JT, SJT	LJT, TV	JT, SJT	LJT, TV
Service Rating	I			I		
Number of Contact	12	12	29		37	
Contact Size	16	12	16		16	



Insert Arrangement	24-43	25-43	24-46	25-46	25-11*
Connector Series	JT, SJT	L JT, TV	SJT	LJT, TV	LJT, TV
Service Rating	I		I		N
Number of Contact	23	20	40	4	2
Contact Size	20	16	20	16	8
					2
					9
					10

\* For use in MIL-STD-1760 applications with MIL-DTL-38999 Series III.

### CONTACT LEGEND

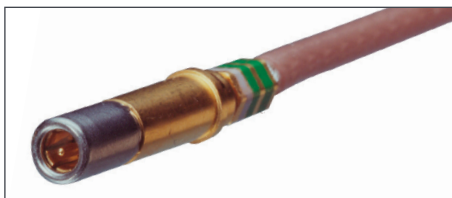




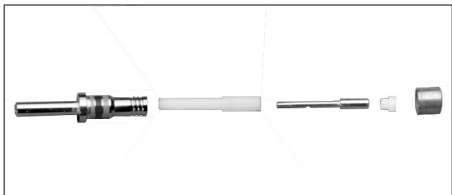
### AMPHENOL COAXIAL CONTACTS

Offer several advantages for reliable interconnection and continued performance:

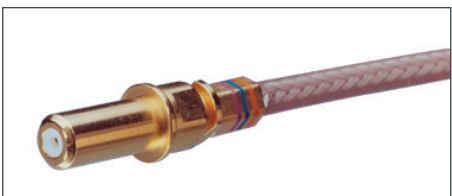
- Large crimping area assures low contact resistance and high tensile strength
- Back insulator positively captivates inner contact against axial loads
- Front insulator provides closed entry for socket inner contact
- Recessed inner contact is protected
- Outer contact has rugged wall section for durability



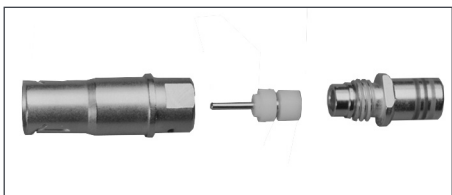
*MIL-DTL-38999 LJT-R, JT-R, TV-R,  
SJT-R MS Type, Coax Size 12 Socket  
Assembled Contact*



*MIL-DTL-38999 LJT-R, JT-R, TV-R,  
SJT-R MS Type, Coax Size 16 Pin  
Unassembled Contact*



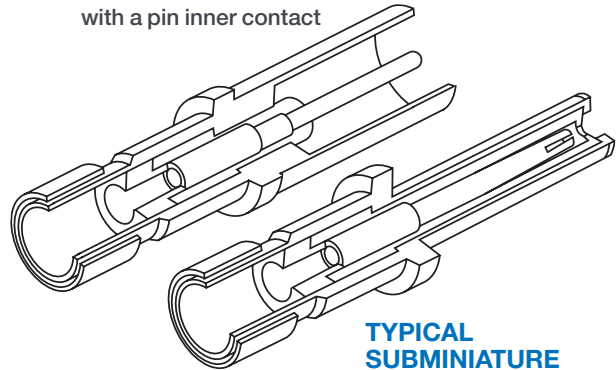
*MIL-DTL-38999 LJT-R, JT-R, TV-R,  
SJT-R MS Type, Coax Size 8 Pin  
Assembled Contact*



*MIL-DTL-38999 LJT-R, JT-R, TV-R,  
SJT-R MS Type, Coax Size 8 Socket  
Unassembled Contact*

#### TYPICAL SUBMINIATURE COAX SOCKET CONTACT

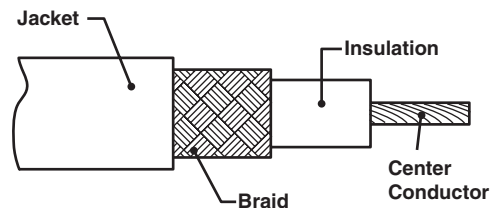
has socket outer contact with a pin inner contact



#### TYPICAL SUBMINIATURE COAX PIN CONTACT

has pin outer contact with a socket inner contact

#### CABLE ILLUSTRATION - COAX CONTACT



#### COAX CONTACTS ARE GOLD PLATED, CRIMP TERMINATION

Finish of mating contact parts: supplied with 0.000050 min. gold over nickel on mating parts. Other finishes are available; consult Amphenol for further information.

#### COAX SIZE 12 & 16 CONTACT PERFORMANCE:

##### Typical VSWR:

- 1.5:1 maximum up to 700 MHz and 500 MHz respectively, for properly cabled size 12 and 16 coaxial contacts in the M38999 Series I, II and III

##### Insulation Resistance:

- 5,000 megohms minimum @ 25°C

##### Dielectric Withstanding Voltage:

- Size 12: 1,000 VAC Rms @ sea level, 250 VAC Rms @ 50,000 ft.
- Size 16: 800 VAC Rms @ sea level, 250 VAC Rms @ 50,000 ft.

##### Contact Resistance:

- See MIL-C-39029/27, /28, /75, /76, /77, /78

#### COAX SIZE 8 CONTACT PERFORMANCE:

##### Typical VSWR when terminated to specified 50 ohm cable:

- 1.5:1 maximum up to 3 GHz (excluding 21-033101/2-27)
- Insulation Resistance: 5,000 megohms minimum @ 25°C

##### Dielectric Withstanding Voltage:

- 1,300 VAC Rms @ sea level, 250 VAC Rms @ 50,000 ft.

##### Contact Resistance:

- See MIL-C-39029/59, /60

# Coaxial Contacts

## Contact Part Number Guide by Cable

JT-R Series, MIL-DTL-38999 Series II, SAE AS39029 (27, 28, 76, 78)

### COAX CONTACTS FOR USE IN JT-R CONNECTORS

Contact Size	Cable	Installation Tools		Contact Part Number (Termination Instruction Sheet)**					
		Insertion	Removal	Pin	Socket				
16	RG-178B/U	M81969/8-07 or M81969/ 14-03 or Amphenol 11-8674-16 11-8794-16 or MS27495A16 or MS27534-16	M81969/8-08 or M81969/14-03 or Amphenol 11-8675-16 11-8795-16 or MS27495R16 or MS27534-16	21-033122-564 (M39029/76-425) (L-2035-AG)	21-033121-564 (M39029/78-433) (L-2035-AH)				
	RG-196A/U			21-033122-562† (L-2035-AN)	21-033121-562† (L-2035-AP)				
	26723/A955KK1								
	30-02024								
	30-02033								
	Haveg 30-00761								
	Tensolite 24713/A955KK1								
	Haveg 61-02051					21-033122-561† (L-2035-AK)	21-033121-561† (L-2035-AL)		
	AA3248					21-033122-563 (M39029/76-424) (L-2035-AD)	21-033121-563 (M39029/78-432) (L-2035-AE)		
	Haveg 8100207								
	Raychem 7528H1424								
	RG-161/U								
	RG-174A/U								
	RG-179B/U								
RG-187A/U									
RG-188A/U									
RG-316/U									
Teledyne 11299									
RG174LL									
12	Times (HS-179)	M81969/8-09 or M81969/ 14-04 or Amphenol 11-8674-12 11-8794-12 or MS27495A12 or MS27534-12	M81969/8-10 or M81969/14-04 or Amphenol 11-8675-12 11-8795-12 or MS27495R12 or MS27534-12	21-033122-546 (M39029/28-211) (L-2035-F)	21-033121-546 (M39029/27-210) (L-2035-G)				
	Haveg 8100207								
	Raychem 7528H1424								
	RG-161/U								
	RG-174A/U								
	RG-179B/U								
	RG-187A/U								
	RG-188A/U								
	RG-316/U								
	Teledyne 11299					21-033122-541 (M39029/28-409) (L-2035-C)	21-033121-541 (M39029/27-402) (L-2035-E)		
	Times (HS-179)								
	Raychem 9528A1318								
	RG-180B/U,								
	RG-195A/U								
	Raychem 5022E5111							21-033122-543† (L-2035-M)	21-033121-543† (L-2035-N)
	Times AA-9879								
	Raychem 9530A5314							21-033122-544 (L-2035-R)	21-033121-544 (L-2035-S)
	Raychem 9527A1318							21-033122-545 (L-2035-U)	21-033121-545 (L-2035-V)
Filotex 124962	21-033122-547† (L-2035-X)	21-033121-547† (L-2035-Y)							

#### MIL-DTL-38999 CONTACT DATA

All contacts mate with other contacts in this series which have the same inner and outer contact diameters.

Finish of mating contact parts: Contact part numbers shown in the chart above are supplied with 0.000050 min. gold (Knoop hardness 130-200) over nickel on mating parts. Other finishes are available; consult Amphenol.

\*\* Termination instructions are packaged with each contact and can be found on-line at: [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp)

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

Daniels crimping tools are available from:  
Daniels Mfg. Corp. 6103 Anno Ave., Orlando FL 32809

LJT-R, MIL-DTL-38999 Series I; TV-R, MIL-DTL-38999 Series III; Amphe-Lite and SJT-R Series, SAE AS39029 (28, 59, 60, 75, 76, 77)

COAX CONTACTS FOR USE IN LJTR, TVR, AMPHE-LITE AND SJTR CONNECTORS					
Contact Size	Cable	Installation Tools		Contact Part Number (Termination Instruction Sheet)**	
		Insertion	Removal	Pin	Socket
16	RG-178B/U, RG-196A/U			21-033122-564 (M39029/76-425) (L-2035-AG)	21-033123-564 (M39029/77-429) (L-2035-AJ)
	30-02033				
	30-02024				
	Haveg 30-00761			21-033122-562† (L-2035-AN)	21-033123-562† (L-2035-AR)†
	Tensolite 26723/A955KK1				
	Tensolite 24713/A955KK1	M81969/8-07 or	M81969/8-08 or		
	Haveg 61-02051	M81969/14-03 or	M81969/14-03 or	21-033122-561† (L-2035-AK)†	21-033123-561† (L-2035-AM)†
	Haveg 8100207	Amphenol	Amphenol		
	Raychem 7528H1424 AA3248	11-8674-16 11-8794-16	11-8675-16 11-8795-16		
	RG-161/U	or	or		
	RG-174A/U	MS27495A16	MS27495R16		
	RG-179B/U	or	or		
	RG-187A/U	MS27534-16	MS27534-16	21-033122-563 (M39029/76-424) (L-2035-AD)	21-033123-563 (M39029/77-428) (L-2035-AF)
	RG-188A/U				
	RG-316/U				
Teledyne 11299					
Times (HS-179)					
RG174LL					
12	Haveg 8100207				
	Raychem 7528H1424 AA3248				
	RG-161/U				
	RG-174A/U				
	RG-179B/U				
	RG-187A/U	M81969/8-09 or	M81969/8-10 or	21-033122-546 (M39029/28-211) (L-2035-F)	21-033123-546 (M39029/75-416) (L-2035-H)
	RG-188A/U	M81969/14-04 or	M81969/14-04 or		
	RG-316/U	Amphenol	Amphenol		
	Teledyne 11299	11-8674-12	11-8675-12		
	Times (HS-179)	11-8794-12	11-8795-12		
	Belden 1865A	or	or		
	Raychem 9528A1318	MS27495A12	MS27495R12	21-033122-541 (M39029/28-409) (L-2035-C)	21-033123-541 (M39029/75-417) (L-2035-D)
	RG-180B/U	or	or		
	RG-195A/U	MS27534-12	MS27534-12		
	Raychem 5022E5111			21-033122-543† (L-2035-M)†	21-033123-543† (L-2035-P)
Raychem 9530A5314			21-033122-544† (L-2035-R)	21-033123-544† (L-2035-T)†	

NOTE: SAE AS39029 supersedes MIL-C-39029

CRIMPING TOOLS: Italicized letters in parenthesis that follow positioner part numbers indicate applicable die closure. Commercial equivalents with the same die closure dimension may be used.

CHART CONTINUES ON NEXT PAGE

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

†† When inner contact is installed by crimping only. 11-10134 Expander Tool Kit must be used to assemble rear insulator over contact.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

# Coaxial Contacts

## Contact Part Number Guide by Cable

LJT-R, MIL-DTL-38999 Series I; TV-R, MIL-DTL-38999 Series III; Amphe-Lite and SJT-R Series, SAE AS39029 (28, 59, 60, 75, 76, 77)

### COAX CONTACTS FOR USE IN LJ-T-R, TV-R, AMPHE-LITE AND SJT-R CONNECTORS

Contact Size	Cable	Installation Tools		Contact Part Number (Termination Instruction Sheet)**	
		Insertion	Removal	Pin	Socket
12	Raychem 9527A1318	M81969/8-09 or M81969/14-04	M81969/8-10 or M81969/14-04	21-033122-545† (L-2035-U)†	21-033123-545† (L-2035-W)
	Raychem 9527A1314	or Amphenol 11-8674-12	or Amphenol 11-8675-12	21-033122-585 (L-2035-GG)	21-033123-585 (L-2035-GH)
	Gore GWN1159A	or 11-8794-12	or 11-8795-12	21-033122-547 (L-2035-X) †	21-033123-547 (L-2035-Z) †
	Nexans RG179-DT	or MS27495A12	or MS27495R12	21-033122-589 (L-2035-GR)	21-033123-589 (L-2035-GT)
	M/A-Com 5M2869-001	or MS27534-12	or MS27534-12		
8	Haveg 8100207	Hand inserted	11-9170 or MS	21-033102-023† (L-1107-C)	21-033101-023† (L-1107-G)
	Multi Flex 86				
	RG-161/U				
	RG-174A/U				
	RG-179B/U				
	RG-187A/U				
	RG-188A/U				
	RG-316/U				
	Teledyne 11299				
	T-Flex 405				
	Times (HS-179) AA3248				
	RG-142B/U			21-033102-024* (L-1107-D)	21-033101-024* (L-1107-H)
	RG-223/U				
	SF-142 (solder inner conductor)				
Emteq TFLX165-100					

NOTE: SAE AS39029 PE-P141 supersedes MIL-C-39029  
 NOTE: Contacts can be ordered by part numbers given in chart  
 CRIMPING TOOLS: Italicized letters in parenthesis that follow positioner part numbers indicate applicable die closure. Commercial equivalents with the same die closure dimension may be used.

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable

\* When inner contact is installed by crimping only. 11-10134 Expander Tool Kit must be used to assemble rear insulator over contact.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/termination-instructions>

LJT-R, MIL-DTL-38999 Series I; TV-R, MIL-DTL-38999 Series III; Amphe-Lite and SJT-R Series, SAE AS39029 (28, 59, 60, 75, 76, 77)

COAX CONTACTS FOR USE IN LJTR, TV-R, AMPHE-LITE AND SJT-R CONNECTORS, CONT.					
Contact Size	Cable	Installation Tools		Contact Part Number (Termination Instruction Sheet)**	
		Insertion	Removal	Pin	Socket
8	Haveg 51-03111	Hand inserted	11-9170 or MS	21-033102-022 (L-1107-B)	21-033101-022 (L-1107-F)
	Tensolite 28895/2X1				
	RG-180B/U				
	RG-195A/U				
	Raychem 9528A1318				
	RD-316 Double Shield (M17/152-00001)				
	Filotex 124962				
	Raychem 7524D5111-9 (triax cable - contact will terminate inner coax portion only), Draka HDPRO0.6/2.8 AF				
	ECS3C058A				
	ECS352001				
	ECS432101				
	RG-400				
	M17/028-RG-058				
	RG303				
	RG-58 (M17/155-00001)				
	Times LMR-195-UF, LMR-195				
	5021D1331-0				
	5M2869-001				
	BMS13-65-0F				
	ESC432101				
	5022A1311-0				
	FA-19X				
	HP-160				
	Multi Flex 141				
	Raychem 7524A1311				
	T Flex-402, RG402				
	Utiflex UFB142G				
	Antenna x ANT-20014				
Times AA-11209 (PT-180)					
EN4604-10					

NOTE: SAE AS39029 supersedes MIL-C-39029  
 NOTE: Contacts can be ordered by part numbers given in chart  
 CRIMPING TOOLS: Italicized letters in parenthesis that follow positioner part numbers indicate applicable die closure. Commercial equivalents with the same die closure dimension may be used.

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable

\* When inner contact is installed by crimping only. 11-10134 Expander Tool Kit must be used to assemble rear insulator over contact.

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/termination-instructions>

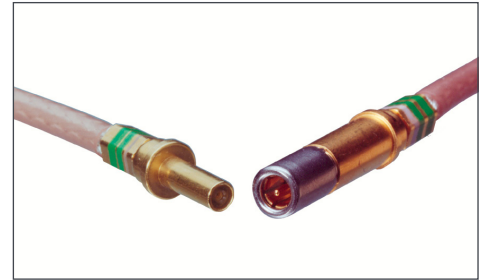
# Matched Impedance Coaxial Contacts for MIL-DTL-38999

## 12 COAXIAL CONTACTS FOR RF/MICROWAVE, HIGH FREQUENCY AND HIGH PERFORMANCE REQUIREMENTS

The matched impedance coax contact is available in size 12. It incorporates a captivated inner contact which “snaps into” the outer contact preventing displacement or pull-back of the inner contact in situations where the cable may be bent.

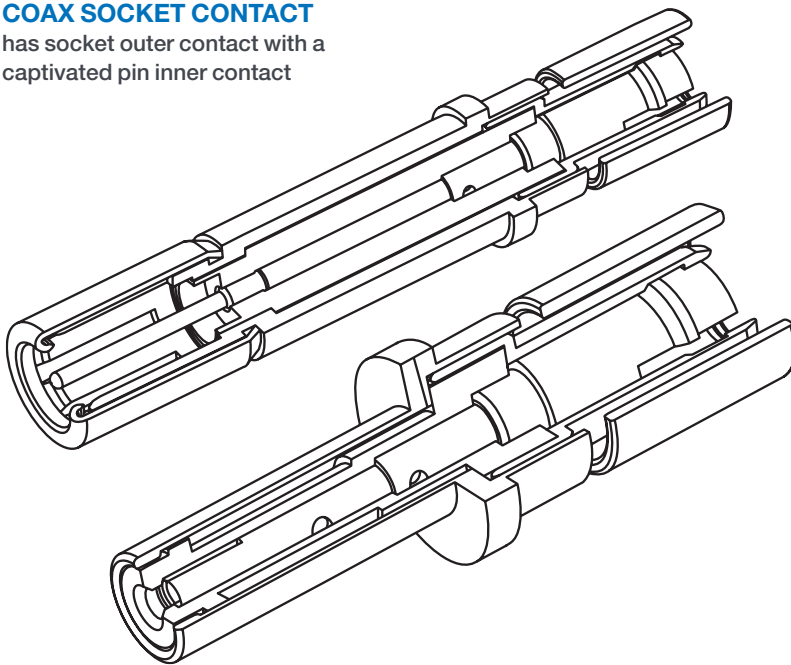
Design features and benefits of the Matched Impedance:

- For use in 90 degree angle or bent cable applications
- Provides 50 Ohm and 75 Ohm matched impedance resulting in low VSWR and low insertion loss
- Frequency range for a mated pair extends to 3 GHz and beyond, higher than other coaxial contacts previously offered
- Ideally suited for D38999 high performance and MIL-STD-1760 high band coaxial contact requirements



### TYPICAL MATCHED IMPEDANCE COAX SOCKET CONTACT

has socket outer contact with a captivated pin inner contact



### TYPICAL MATCHED IMPEDANCE COAX PIN CONTACT

has pin outer contact with a captivated socket inner contact

### MATCHED IMPEDANCE COAX CONTACT PERFORMANCE

#### Electrical Specifications

##### Contact

**Impedance:** 50 Ohms nominal

##### Frequency Range:

0–3 GHz Operable at higher frequencies depending on cable selection.

Consult Amphenol for details.

##### Dielectric withstanding Voltage (for a mated pair):

- At sea level = 1000 VRMS
- At 50,000 ft. = 250 VRMS

##### Insulation

**Resistance:** 5 gigaohms min. @ 25°C

**VSWR:** 1.20 + .04F (F in GHz) max. up to 3 GHz

##### Insertion Loss:

- .11√fGHz dB max.
- Size 12 75 Ohm cable to cable contacts limited to 2.1 GHz max
- Size 12 75 Ohm cable to PCB Pin limited to 3 GHz max
- Size 8 75 Ohm cable to cable contacts or cable to PCB limited to 3 GHz max

#### ENVIRONMENTAL SPECIFICATIONS:

##### Thermal

**limits:** –65°C to 175°C

#### MECHANICAL SPECIFICATIONS:

**Mating:** Slide-on

**Mounting:** Conforms to M39029/102 & /103 envelope dimensions (Size 12)



# Matched Impedance Coaxial Contacts for MIL-DTL-38999

HIGH PERFORMANCE SIZE 12 AND 8 COAX 50 OR 75 OHM MATCHED MIL-DTL-38999- LJT-R, SERIES I, JT-R, SERIES II, AND TV-R, SERIES III						
Impedance (Ohms)	Contact Size	Use with Cable	Comment	Pin (Termination Instruction Sheet)**	Socket (Termination Instruction Sheet)**	
50	12	RG316	M39029/102/103	21-033651-011 (L-2092-C)	21-033650-011 (L-2092-C)	
		Semflex SM405				
		T-Flex-405, L-COM CA-100				
		RG-316	JT-R, MIL-DTL-38999 Series II			21-033729-011 (L-2092-P)
		T-Flex-405				
		ET124962	M39029/102/103 Type	21-033651-017 (L-2092-F)	21-033650-017 (L-2092-F)	
		Filotex				
		M17/152-00001				
		RD316				
		JN1088WT	JN1104*50C	21-033213-042	21-033214-042 (L-2092-D)	
		JN1088WU	JN1104*50C	21-033213-043	21-033214-043	
		PAN6422XQ	PAN6841*50C	21-033651-012 (L-2092-E)	21-033650-012	
		Gore CXN 3403	M39029/102/103 Type	21-033651-018 (L-2092-K)	21-033650-018 (L-2092-K)	
		RG178				
		Gore CXN 3403	JT-R, MIL-DTL-38999 Series II		21-033729-018 (L-2092-K)	
		RG178				
		SFT-316-TR, 5024A1311-0	M39029/102/103 Type	21-033651-022 (L-2092-N)	21-033650-022 (L-2092-N)	
		Semflex SW060	M39029/102/103 Type	21-033651-025	21-033650-025	
		Semflex SW086 (solid inner conductor)	M39029/102/103 Type	21-033651-026	21-033650-026	
		ECS 432101	M39029/102/103 Type	21-033651-027	21-033650-027	
75		RT179, RG179		21-033651-030 (L-2092-AM)	21-033650-030 21-033729-030 (Series II)	
		PIC V73263		21-033651-031 (L-2092-AM)	21-033650-031 21-033729-031 (Series II)	
		Gore CXN3670				
		GigaFlight GF7-303D				
		7526M4422				
		S86208				
		VDM230		21-033651-041	21-033650-041 21-033729-041 (Series II)	
432101						
75	8	RG-179†		21-033592-001 (L-1107-AP)	21-033591-001 (L-1107-AP)	
		PIC V76261		21-033592-021 (L-1107-AL)	21-033591-021 (L-1107-AL)	
		PIC V73263				
		Whitmore/Wirenetics W-4200-1135				
		Gore CXN3670				
		Chemimax 7526M4422				
		179DT		21-033592-031 (L-1107-AR)	21-033591-031 (L-1107-AR)	
		Belden 1855A				
		VDM230				
		V78209		21-033592-041 (L-1107-AU)	21-033591-041 (L-1107-AU)	
		Beldon 1694F		21-033592-051	21-033591-051	
		Cheminax 7524A1811		21-033592-071	21-033591-071	
Gore CXN3671 (22 AWG)		21-033592-081	21-033591-081			

# Matched Impedance Coaxial Contacts for MIL-DTL-38999 PCB

PCB CONTACTS -75 OHMS MATCHED IMPEDANCE CONTACTS			
Contact Size	Length	Pin	
8	0.525	21-033599-001	
	0.833	21-033599-021	
	0.739	21-033599-031	
	0.849	21-033599-041	
	0.525	21-033599-051	
	1.035	21-033599-061	
	0.785	21-033599-071	
	0.810	21-033599-081	
	1.056	21-033599-091	
	Length	Socket	
	0.525	21-033590-001	
	0.860	21-033590-021	
	0.886	21-033590-031	
	0.810	21-033590-041	
0.952	21-033590-051		
0.810	21-033590-061		
1.134	21-033590-071		
12	Length	Pin	
	0.518	21-033686-023	
	0.847	21-033686-026	
	1.244	21-033686-027	
	0.561	21-033686-029	
	Length	Socket	
	0.850	21-033614-151	
	0.870	21-033614-221	
1.076	21-033614-241		

PCB CONTACTS -50 OHMS MATCHED IMPEDANCE CONTACTS			
Contact Size	Length	Pin	
12	0.669	21-033686-022	
	0.847	21-033686-030	
	Length	Socket	
	1.366	21-033614-231	
	0.870	21-033614-251	
	1.054	21-033614-261	
	0.976	21-033614-271 (Two outer tails)	

Size 12 75-Ohm crimp to crimp limited to 2.1 GHz

Size 12 75-Ohm to PCB tail limited to 5 Gbps (2.5 GHz)

\*\* Termination instructions are packaged with each contact and can be found on-line at:

<https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable

\* Add P or S for pin or socket

† 21-033591-XXX sockets will only mate with Amphenol 21-033592-XXX pins

# High Frequency Coax Contacts

## Series III Circular General Description

**Amphenol**  
MILITARY HIGH SPEED

### AMPHENOL HIGH FREQUENCY CONTACTS

Amphenol and SV Microwave (an Amphenol company) offer DC to 40 GHz high frequency size 8, 12 and 16 coaxial contacts for the D38999 Series III housing and standard inserts. These contacts allow any application to continue to use the D38999 connector and be able to expand the use to include the microwave transmission lines. Features include:

- Superior electrical performance and high frequency capability
- Blindmate advantage and maintenance of an accurate phase length when mated
- Can be terminated to a multiple of cable types depending on the application
- Uses standard interfaces based on MIL-STD-348, and can be installed in any MIL-DTL-38999 size 8, 12 or 16 insert
- Unique “Float Mount” technology allows for consistent microwave performance while maintaining tight mechanical tolerances



*Subminiature MIL-DTL-38999 Series III Connector with Size 8 High Frequency Contacts*

### SPECIFICATIONS HIGH FREQUENCY CONTACTS

#### Electrical (Mated pair size 8 - RG 405 Semi-Rigid Cable)

<b>Impedance:</b>	50 Ohm
<b>Frequency Range:</b>	DC - 40 GHz
<b>VSWR:</b>	1.05 +.01 (freq. GHz)
<b>Insertion Loss:</b>	0.03. $\sqrt{\text{freq. GHz}}$
<b>Insulation Resistance (Min.):</b>	10,000 m Ohm
<b>Contact Resistance (Max.)</b>	
• Center conductor:	6.0 m Ohm
• Outer conductor:	3.0 m Ohm
• Outer to cable:	0.5 m Ohm
<b>Dielectric Withstanding Voltage:</b>	1,000 VRMS
<b>Corona Extinction Voltage:</b>	250 VRMS
<b>RF High Potential Voltage:</b>	500 VRMS
<b>RF Leakage:</b>	-(80-freq. GHz)

### MATERIALS AND FINISH

<b>Body and Sleeve:</b>	Stainless steel per AMS-5640 Alloy UNS S30300 Type 1
<b>Ferrule:</b>	Brass per ASTM B16, Alloy UNS C36000
<b>Contact &amp; Lock Ring:</b>	Beryllium copper per ASTM B196 Alloy UNS C17300, Td04
<b>Insulator:</b>	PTFE per ASTM D1710, Type 1, Grade 1, Class B
<b>Spring:</b>	Stainless steel per ASTM A313 Type 631
<b>Rear Body &amp; Contacts:</b>	Gold per ASTM B488 Type II, Code C, Class 1.27; over Nickel per AMS-QQ-N-290 Class 1 (60 $\mu$ inches); over Copper per MIL-C-14550 (10 $\mu$ inches) Passivated per AMS-2700, Type 2

### ENVIRONMENTAL

<b>Temperature Range:</b>	-65°C to +125°C
<b>Corrosion (Salt Spray):</b>	MIL-STD-202, Method 101, Condition B
<b>Vibration:</b>	MIL-STD-202, Method 204, Condition D, 20 Gs
<b>Shock:</b>	MIL-STD-202, Method 213, Condition 1, 100 Gxs
<b>Thermal Shock:</b>	MIL-STD-202, Method 107, Condition B, -65°C to +125°C
<b>Moisture Resistance:</b>	MIL-STD-202, Method 106, Less step 7B
<b>Barometric Pressure (Altitude):</b>	MIL-STD-202, Method 105, Condition C, 70,000 ft.

# High Frequency Coax Contacts

HIGH FREQUENCY COAX CONTACTS FOR USE IN D38999, SERIES III CONNECTORS						
Cavity Size	Frequency	Interface	For use with Cable	*Piggyback Grommet	Type	Amphenol Part Number (Termination Instruction Sheet)**
8	2 GHZ	BMZ	RG-179	21-033321-007	Socket	21-033449-11HF
					Pin	21-033448-11HF
		BMZ-75 Ohm	LMR-240-75	21-033321-008	Socket	21-033449-08HF
					Pin	21-033448-08HF
	12 GHZ	BMZ	RG-400/RG-142	21-033321-009	Socket	21-033449-03HF
					Pin	21-033448-03HF
	18 GHZ	BMZ	FA19X	N/A	Socket	21-033449-17HF
					Pin	21-033448-17HF
		BMZ	TFLEX-405	21-033321-007	Socket	21-033449-02HF
					Pin	21-033448-02HF
		BMZ	TFLEX-402	21-033321-010	Socket	21-033449-04HF
					Pin	21-033448-04HF
	26.5 GHZ	BMA	TFLEX-405	21-033321-007	Socket	21-033449-06HF
					Pin	21-033448-06HF
BMA		TFLEX-402	21-033321-010	Socket	21-033449-07HF	
				Pin	21-033448-07HF	
40 GHZ	BMZ	TFLEX-405	21-033321-007	Socket	21-033449-01HF	
				Pin	21-033448-01HF	
12	34 GHZ	SERIES II	V76261	N/A	Socket	21-033449-16HF
					Pin	21-033448-16HF
	65 GHZ	SMPM	TFLEX-405	N/A	Socket	21-033449-09HF
					Pin	21-033448-09HF
16	3.0 GHZ	SERIES II	RG-179	N/A	Socket	21-033449-14HF
					Pin	21-033448-14HF
	65 GHZ	SMPS	0.047 Dia. Cable	N/A	Socket	21-033449-10HF
					Pin	21-033448-10HF
	3.0 GHZ	RG-179	N/A	Socket	21-033449-22HF	
				Pin	21-033448-22HF	

\* Piggyback grommet is not supplied with contacts and must be ordered separately

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

# Concentric Twinax Contacts

General Description, Application Data - Size 8

## SIZE 8 CONCENTRIC TWINAX CONTACTS

The size 8 concentric Twinax contact was developed for use in MIL-STD-1553 Airborne multiplex data bus applications which require high performance interconnect characteristics in multi-pin connectors. Ideal for this application need is the high performance Tri-Start connector with its fully scoop-proof feature of recessed pins. The concentric Twinax contact is crimp terminable to twisted shielded cable.

### FEATURES INCLUDE:

- Protection from magnetic and electrostatic interference including nuclear electromagnetic pulse
- Shield integrity through a multi-pin circular connector and does not require contact polarization within the insert
- 175°C rated and meets performance levels of MIL-DTL-38999 Series III connectors
- MIL-C-17/176-00002 cable termination
- Gold plated full crimp termination contacts qualified to M39029/90 & /91
- Integral part of the MIL-STD-1760 interconnection system
- Also available in modified, intermateable versions for termination to a host of cables (See chart on next page)

### TYPICAL ELECTRICAL PERFORMANCE

#### Size 8 Concentric Twinax Contacts

##### Voltage Rating:

- 500 Vrms max. @ sea level

##### Contact Resistance:

- Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Outer @ 12 Amps, 75 millivolts max. voltage drop @ 25°C
- Operating Frequency: 0–20 MHz

##### Dielectric Withstanding Voltage:

- Center to Intermediate: 1000 VAC Rms @ Sea Level
- Intermediate to Outer: 500 VAC Rms @ Sea Level

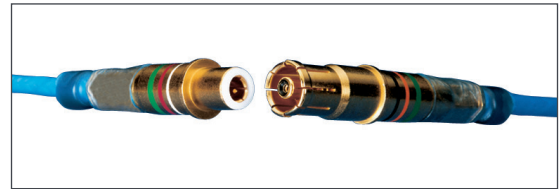
### SHORT PROFILE TWINAX CONTACT OPTION

A Short Profile size 8 Twinax is available that can be used with a low profile right angle backshell and can offer increased packaging efficiency. Consult Amphenol Aerospace for further information.

### TWINAX CABLE IN DATA BUS SYSTEMS

#### Benefits:

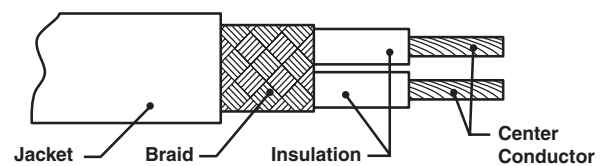
- Protection from magnetic interference
- Protection from electrostatic interference including nuclear electromagnetic pulse
- Meets parameters defined by MIL-STD-1553B
- Maintains shield integrity through a multi-pin circular connector and does not require contact polarization within the insert



Concentric Twinax Contacts Size 8



Short Profile Twinax vs  
Standard Length Twinax Contact



CABLE ILLUSTRATION - TWINAX CONTACT

# Concentric Twinax Contacts

## Contact Part Number Guide by Cable

### SIZE 8 CONCENTRIC TWINAX CONTACTS FOR USE IN D38999 CONNECTORS

Connector Series	For use with Cable	Comments	Size 8 Concentric Twinaxial Contact Part Number (Termination Instruction Sheet)**	
			Pin	Socket
	M17/176-00002	AS39029/113-625 & /114-628 (Amphenol) Supplied with heat shrink seal	21-033190-625 (L-1253-AG)	21-033191-628 (L-1253-AG)
D38999 Series I, III	5PTM1T04-2	AS39029/90/91 (Amphenol) Supplied with heat shrink seal	21-033190-529 (L-1253-A)	21-033191-530 (L-1253-B)
	M17/176-00002, PIC 6771553			
	M17/176-00002, PIC 6771553	M39029/90/91 (Pyle) Supplied with heat shrink seal	T3-46T08-LD (PN-430)	T3-47T08-LD (PN-430)
	M17/176-00002, PIC 6771553	Without seals	21-033190-000 (L-1253-A)	21-033191-000 (L-1253-B)
	M17/176-00002, PIC 6771553	Supplied with piggyback grommet seal	21-033190-001 (L-1253-A)	21-033191-001 (L-1253-B)
	5M2022-003	Without seals	21-033190-026 (L-1253-AA)	21-033191-026†
	Raychem 10612			
	05A0771	Without seals	21-033190-022 (L-1253-C)	21-033191-022 (L-1253-D)
	7724C8664			
	EPD22189B			
	GC875TM24H			
	Raychem 10614			
	T10971			
	23089/RC	Supplied with heat shrink seal	21-033190-027 (L-1253-K)	21-033191-027 (L-1253-L)
	PAN711-6421			
	Raychem 10613	Supplied with piggyback grommet seal	21-033190-029 (L-1253-K)	21-033191-029 (L-1253-L)
	23089/RC			
	PAN711-6421			
	Raychem 10613	Without seals	21-033190-030 (L-1253-K)	21-033191-030 (L-1253-L)
	23089/RC			
	PAN711-6421			
	Raychem 10613	Supplied with heat shrink sleeve	21-033190-040 (L-1253-S)	21-033191-040 (L-1253-T)
	7726D0664			
	ASNE 08072003-09			
	GSC-12-2548-00	Supplied with piggyback grommet seal	21-033190-081 (L-1253-W)†	21-033191-081 (L-1253-Y)†
	Axon P517417			
	5M2022-003			
	Raychem 10612	Supplied with heat shrink seal	21-033190-261 (L-1253-AA)	21-033191-261†
	5M2022-003			
	Raychem 10612	Without seals	T3-46TB08-LD (PN-494)	T3-47TB08-LD (PN-494)
7724C8664				
Raychem 10614				
7820D0111 (20 AWG)	Without seals	T3-467C08-LD (PN-537)	T3-477C08-LD (PN-537)	
Gore CXN2268	Short profile Supplied with heat shrink seal (.465)	T3-46TE08-LD (PN-1001)	T3-47TE08-LD (PN-1001)	
M17/176-00002, PIC 6771553	Short profile Supplied with heat shrink seal (.465)	T3-46TD08-LD (PN-1000)	T3-47TD08-LD (PN-1000)	
M17/176-00002, PIC 6771553	Short profile Without seals (.263)	21-033910-015† (PN-1005)	21-033922-015 (PN-1005)	
M17/176-00002, PIC 6771553	Short profile Supplied with piggyback grommet seal (.465)	21-033617-001 (REF PN-100)	21-033922-015 (PN-1005)	
Gore CNX2702	Short profile Supplied with heat shrink seal (.465)	T3-46TF08-LD (PN-1002)	T3-47TF08-LD (PN-1002)	
M17/176-00002, PIC 6771553	Short profile Without seals (.303)		P-209546-27†	

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.



# Concentric Twinax Contacts

Contact Part Number Guide by Cable

SIZE 8 CONCENTRIC TWINAX CONTACTS FOR USE IN D38999 CONNECTORS				
Connector Series	For use with Cable	Comments	Size 8 Concentric Twinaxial Contact Part Number (Termination Instruction Sheet)**	
			Pin	Socket
D38999 Series I, III	0024A0024	Without seals	21-033190-070 (L-1253-U)	21-033191-070 (L-1253-V)
	Fileca F2709-13-CA			
	HS5930			
	S280W502-1			
	Raychem 10602 0024G0024			
	0024A0024	Supplied with piggyback grommet seal	21-033190-071 (L-1253-U)	21-033191-071 (L-1253-V)
	Fileca F2709-13-CA			
	HS5930			
	Raychem 10602 0024G0024			
	S280W502-1			
	Tensolite 24463/9P025x-2(LD)	Supplied with heat shrink seal	21-033190-072 (L-1253-U)	21-033191-072 (L-1253-V)
	0024A0024			
	Fileca F2709-13-CA			
	HS5930			
	Raychem 10602 0024G0024			
	S280W502-1	Without seals	21-033190-090†	21-033191-090 (L-1253-AD)
	PIC E10244			
	0024A0311	Supplied with piggyback grommet seal	21-033190-091†	21-033191-091 (L-1253-AD)
	PIC E10224			
	0024A0311	Supplied with heat shrink seal	21-033190-092†	21-033191-092 (L-1253-AD)
PIC E10224				
M17/176-00002	M39029/113-625 & /114-628 Supplied with heat shrink seal	21-033190-625 (L-1253-AG)	21-033191-628 (L-1253-AG)	

\*\* Termination instructions are packaged with each contact and can be found on-line at:  
<https://www.amphenol-aerospace.com/resources/terminationinstructions>

† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

# Concentric Twinax Contacts

General Description, Contact Part Number Guide by Cable

## AMPHENOL TWINAX CONTACTS

### SIZE 10 & 12 CONCENTRIC TWINAX CONTACTS

The size 12 concentric twinax contact interface was developed for JN1104 EuroFighter contacts, and can be used in any size 12 cavity M38999 I, II or III or SJT connector.

#### FEATURES:

- Operating temperature -65°C to 175°C
- Pins are scoop-proof
- Meets performance levels of M38999 connector
- 4 components, gold plated crimp termination
- For use with a variety of cables (See chart below)

#### TYPICAL ELECTRICAL PERFORMANCE

##### Size 10 & 12 Concentric Twinax Contacts

##### Voltage Rating:

- 500 Vrms max. @ sea level

##### Contact Resistance:

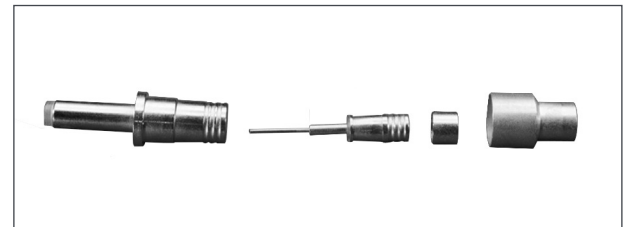
- Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Outer @ 12 Amps, 85 millivolts max. voltage drop @ 25°C
- Operating Frequency: 0-30 MHz

##### Dielectric Withstanding Voltage:

- Center to Intermediate 800 VAC Rms @ Sea Level
- Intermediate to Outer 500 VAC Rms @ Sea Level



Concentric Twinax Contacts Size 12



Unassembled Components of Size 12 Concentric Twinax Contact

### SIZE 10 & 12 CONCENTRIC TWINAX CONTACTS FOR USE IN D38999 CONNECTORS

Connector Series	Contact Size	For use with Cable	Comments	Concentric Twinaxial Contact Part Number (Termination Instruction Sheet)**	
				Pin	Socket
D38999 Series I, III	10	5M2022-003	Supplied with Thermal fit sleeve	21-033844-001 (L-1255-A)	21-033843-001 (L-1255-B)
D38999 Series I, III	12	M17/176-00002	JN1104 Interface	21-033909-025 (L-2092-G)	21-033908-025 (L-2092-G)
		ST5M1212-002			
		TWC-78-1			
		G771553		21-033909-028 (L-2092-G)	21-033908-028 (L-2092-G)
		0024A0024, 0024F4424			
		5M 2022-003			
		Fileca F2709-13-CA		21-033909-029 (L-2092-H)	21-033908-029 (L-2092-H)
		10612			
		EPD32263A			
		GSC-12-2548-00		21-033909-081 (L-2092-AB)	21-033908-081 (L-2092-AB)
		5PTM1T04-1			
		ASNE0849			
		WW26 EN 3375-007		21-033909-091 (L-2092-AC)	21-033908-091 (L-2092-AC)
		ECS 0700			
		VG95218T023D002			
55PC1221-24	Same as -91 except new ferrule with wire support	21-033909-101 (L-2092-AC)	21-033908-101 (L-2092-AC)		
VG95218T023D002					
M27500A22SD2T23					
D38999 Series II		GSC-12-2549-00	JN1104 Interface		21-033640-025 (L-2092-W)
		M17/176-00002			21-033640-028 (L-2092-V)
		0024A0024			21-033640-151
		WW26 EN3375-007			

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/termination-instructions>

### AMPHENOL TRIAX CONTACTS

Provide additional shielding when terminated to triax cable having solid or stranded center conductors. Amphenol supplies triax contacts in sizes 8, 10 and 12 and they are ideally suited for use in D38999 Series I, II and III circular connectors.

#### FEATURES AND BENEFITS:

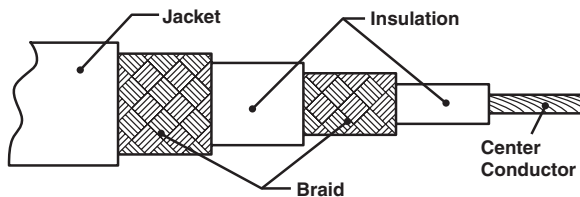
- Incorporates three conductors, designed for use with triax cable
- Each of the three conductors are separated by dielectric insulation to isolate ground planes
- Shielding effectiveness is improved with two isolated shields
- May be specified for direct connection to printed circuit boards
- May be mixed with coax, twinax and power contacts in a single connector



*Triax Size 8 Pin Contact*



*Triax Size 12 Socket Contact*



**Cable Illustration - Triax Contact**

#### TYPICAL ELECTRICAL PERFORMANCE

##### Size 8, 10 and 12 Triax Contacts

##### Contact Resistance:

- Center @ 1 Amp, 120 millivolts max. voltage drop @ 25°C
- Intermediate @ 1 Amp, 60 millivolts max. voltage drop @ 25°C
- Outer @ 12 Amps, 90 millivolts max. voltage drop @ 25°C

##### Operating Frequency:

- Size 12: 0-30 MHz
- Size 10: 0-300 MHz
- Size 8: 0-500 MHz

##### Dielectric Withstanding Voltage:

- Center to Intermediate 800 VAC Rms @ Sea Level
- Intermediate to Outer 500 VAC Rms @ Sea Level

##### Insulation Resistance:

- 1000 megohms minimum @ 25°C

# Triax Contacts

## Contact Part Number Guide by Cable

### SIZE 8, 10 & 12 TRIAX CONTACTS FOR USE IN D38999 SERIES I & III CONNECTORS

Size	For use with Cable	Comments	Size 8, 10, 12 Triax Contact Part Number (Termination Instruction Sheet)**	
			Pin	Socket
8	28883/02060X-1		21-033198-003 (L-1254-F)	21-033197-003 (L-1254-E)
	5M2397-002			
	7528A5314			
	81264-02			
	Champlain 81-00321A			
	RGX-179			
	RT-179			
	RTG 179			
	Tensolite 28883/02060X-1(LD)			
	Thermatics 12447			
	Times RT316 (AA-6861)			
	PAN6595XM			
	752866314			
	7528G6314			
	5M2559-001		21-033198-004 (L-1254-D)	21-033197-004 (L-1254-C)
	81264-01			
	Cheminax 9530F5214			
	Teledyne 13809			
	Tensolite 28598/9J063T-1			
	ST5M1323-001			
	Champlain 81-00700			
	Teledyne 11914/1			
	Tensolite 26895/90334X-1			
	Times AA6603			
	Tyco 7530A5314		21-033198-010 (L-1254-S)	21-033197-010 (L-1254-S)
	10602 (Twinax)			
RT316				
Pic L7626TX (75 Ohm)				
GigaFlight GF7-TX303D				
Gore GSC-03-81497-00, TMSAA11908				
ST5M1322-001 (AA2317)				
Tyco Raychem 5026S 5614				
RG-403				
PIC L8620TX				
10	5M2397-002		21-033800-001 (L-1256-A)	21-033801-001 (L-1256-B)
12	JN1088WT (50 Ohm)	JN1104 Interface	21-033909-012 (L-1256-J)	21-033908-012 (L-1256-J)
	JN1088WU (75 Ohm)			
	GSC-03-81497-00 (75 Ohm)	Replaced by -33 with improved rear insulator	21-033909-023 (L-1256-M)	21-033908-023 (L-1256-M)
	GSC-03-81497-00 (75 Ohm)	JN1104 Interface	21-033909-033 (L-1256-P)	21-033908-033 (L-1256-P)
	540-1050-000 (75 Ohm)			
	Axon RGX-179			
	Harbour TRX179			
	Times Microwave AA-6151 (RT-179)			

\*\* Termination instructions are packaged with each contact and can be found on-line at: <https://www.amphenol-aerospace.com/resources/termination-instructions>

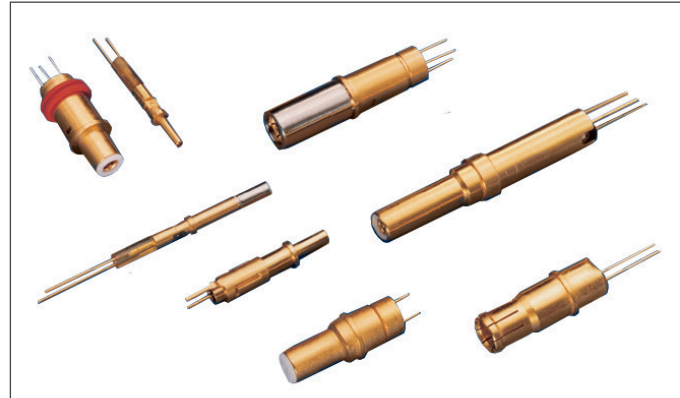
### AMPHENOL PRINTED CIRCUIT TAIL CONTACTS

Contacts are currently supplied as follows:

- 8, 12 and 16 Coax
- 8, 10 and 12 Twinax
- 8 Triax (socket only)

PC Tail shielded contacts provide a cost effective packaging solution for limited space applications where connectors are attached to printed circuit boards. High reliability is assured with factory pre-assembled contacts and standardization termination to the board.

PC Tail contacts are available for MIL-DTL-38999 Series I and III circular connectors and also for ARINC 404, ARINC 600 and R27 rectangular connectors. The following pages show the available PC Tail contact part numbers for 38999 Circular connectors. See page 59 for information on twinax contacts for ARINC Rectangular connectors along with compatible cable terminations. Consult Amphenol Aerospace for further information on the applicable tooling for these contacts.



PC Tail Coax and Twinax Contacts for Attachment to Printed Circuit Boards

### TYPICAL ELECTRICAL PERFORMANCE

#### Size 8, 12 & 16 PC Tail Coax Contacts

##### Contact Resistance:

- Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Outer @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Operating Frequency: 0–500 MHz

##### Dielectric Withstanding Voltage:

- Center to Outer 500 VAC Rms @ Sea Level

##### Insulation Resistance:

- 1,000 megohms minimum @ 25°C

### TYPICAL ELECTRICAL PERFORMANCE

#### Size 8, 10 & 12 PC Tail Twinax Contacts

##### Contact Resistance:

- Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Outer @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Operating Frequency: 0–20 MHz

##### Dielectric Withstanding Voltage:

- Center to Intermediate 500 VAC Rms @ Sea Level
- Intermediate to Outer 500 VAC Rms @ Sea Level

##### Insulation Resistance:

- 1,000 megohms minimum @ 25°C

### TYPICAL ELECTRICAL PERFORMANCE

#### Size 8 PC Tail Triax Contacts

##### Contact Resistance:

- Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Outer @ 1 Amp, 55 millivolts max. voltage drop @ 25°C
- Operating Frequency: 0–500 MHz

##### Dielectric Withstanding Voltage:

- Center to Intermediate 500 VAC Rms @ Sea Level
- Intermediate to Outer 500 VAC Rms @ Sea Level

##### Insulation Resistance:

- 1,000 megohms minimum @ 25°C



Size 8, PC Tail Twinax Socket Contact for use in D38999 Connectors



D38999 Connector with PC Tail Coax Contacts, Sealing Plugs in unused contact cavities and PC Tail Alignment Disc

# Coax, Twinax & Triax PC Tail Contacts

## Contact Part Number Guide

PC TAIL COAX, TWINAX, AND TRIAX CONTACTS FOR USE IN D38999 SERIES I & III CONNECTORS						
Size	Tails*	Comments	PC Tail Coax Contact Part Number	PC Tail Twinax Contact Part Number	PC Tail Triax Contact Part Number	
8 Pin	PCB 2 tails		21-033733-007			
		For epoxy filled connector	21-033733-002			
		For epoxy filled connector	21-033733-004			
			21-033733-009			
			21-033733-008			
	PCB 4 outer tails, 1 inner		21-033733-005			
	PCB 3 tails	M39029/90/91 Interface			21-033967-115	
					21-033967-125	
					21-033967-015	
					21-033967-045	
					21-033967-055	
					21-033967-065	
					21-033967-085	
					21-033967-095	
	PCB 9 tails				P-209550†	
				P-209532-1		
				P-209532-2		
PCB 3 tails					21-033828-001	
					21-033828-021	
					21-033828-041	
8 Socket	PCB 2 tails		21-033426-001			
		M39029/91 Interface Outer body grounded to shell			DB-109002	
					21-033919-015	
					21-033919-025	
	PCB 3 tails			21-033426-021	21-033921-015	
				21-033426-041	21-033921-025	
					21-033921-045	
					21-033921-035	
					21-033921-065	
					21-033921-075	
					21-033921-115†	
			AS39029/114 Type (with hood)		21-033479-001	
		AS39029/114 Type (with hood)		21-033479-021		
		M39029/90/91 Interface .040 dia. tails		21-033921-105†		
	PCB 2 tails	Outer body grounded to shell				21-033840-021
Outer body grounded to shell					21-033841-001	
PCB 3 tails					21-033840-001	
10 Pin	PCB 2 tails	Outer body grounded to shell		21-033844-002†		

\* Consult Amphenol Aerospace for tail configurations and tail diameters.

† Consult Amphenol Aerospace for current release of this contact.



# Coax, Twinax & Triax PC Tail Contacts

## Contact Part Number Guide

### PC TAIL COAX, TWINAX, AND TRIAX CONTACTS FOR USE IN D38999 SERIES I & III CONNECTORS

Size	Tails*	Comments	PC Tail Coax Contact Part Number	PC Tail Twinax Contact Part Number	
12 Pin	PCB 2 tails		21-033686-008		
		Outer tail clip type	21-033686-009		
			21-033686-005		
			21-033686-010		
		Outer tail clip type	21-033686-013		
		For epoxy filled connector	21-033687-006		
			21-033687-007		
			21-033686-016†		
12 Socket	PCB 2 tails		21-033614-001		
			21-033614-021		
			21-033614-041		
		Outer tail clip type	21-033611-003		
		Outer tail clip type, M38999 Series II	21-033430-001		
	M38999 Series II	21-033430-021			
	PCB 3 tails		21-033440-001		
		M38999 Series II	21-033430-041		
16 Pin	PCB 1 tail	Outer body grounded to shell	21-033634-015		
		Outer body grounded to shell	21-033634-035		
			21-033634-045		
	PCB 2 tails		21-033856-015		
			21-033856-065		
			21-033386-001		
		PCB 90 degree, 2 tails		21-033856-025	
16 Socket	PCB 2 tails		21-033857-001		
			21-033857-008		
			21-033857-007		
			21-033610-001		
			21-033610-002		
			21-033441-001		
			M38999 Series II	21-033606-001	
				21-033606-021†	
				21-033606-031†	
				21-033610-003	
		21-033857-003			
12 Pin	PCB 4 tails	JN1104 Interface		21-033633-001†**	
			21-033633-002**		
			21-033633-006**		
			21-033633-007**		
			21-033393-006**		
12 Socket	PCB 4 tails	M38999 Series II, JN1104 Interface		21-033393-005**	
			21-033433-001**		

\* Consult Amphenol Aerospace for tail configurations and tail diameters.

\*\* Size 12 twinax and triax contacts are intermateable.

† Consult Amphenol Aerospace for current release of this contact.

# MRC Connectors

High Speed Micro-Miniature Series



## OVERVIEW

Amphenol Aerospace now offers a connector series that can be used for all of your multi-media needs. This series is capable of running Gigabit Ethernet, USB 2.0/USB 3.0, HDMI and 10 Gigabit Ethernet when specified and designated to a specific configuration. MRC is a micro-miniature connector ideal for Commercial, Industrial and Military Communication Systems.

The MRC flange mounting plugs are supplied with rigid contacts that are flat to the front surface of the connector. This feature allows it to be used in applications such as ruggedized displays, radios, and routers that have potential to come in contact with dirt and sand during use. The MRC can be easily cleaned by simply wiping off debris whereas standard pin and socket style connectors tend to be more difficult to remove debris once it has been compacted in the contacts.

The MRC cable assemblies feature connectors with spring loaded contacts and two coupling styles (Push/Pull and Push w/ ¼ turn lock). Both of these coupling styles mate with the standard flange mounting plug. Cable assemblies are available in various lengths and can either be supplied as double ended with MRC connectors on both ends or with standard COTS RJ45, USB, HDMI connections on one end. Additional cable materials and connector configuration are available; please consult our product team with your requirements.

## MRC SERIES SPECIFICATIONS

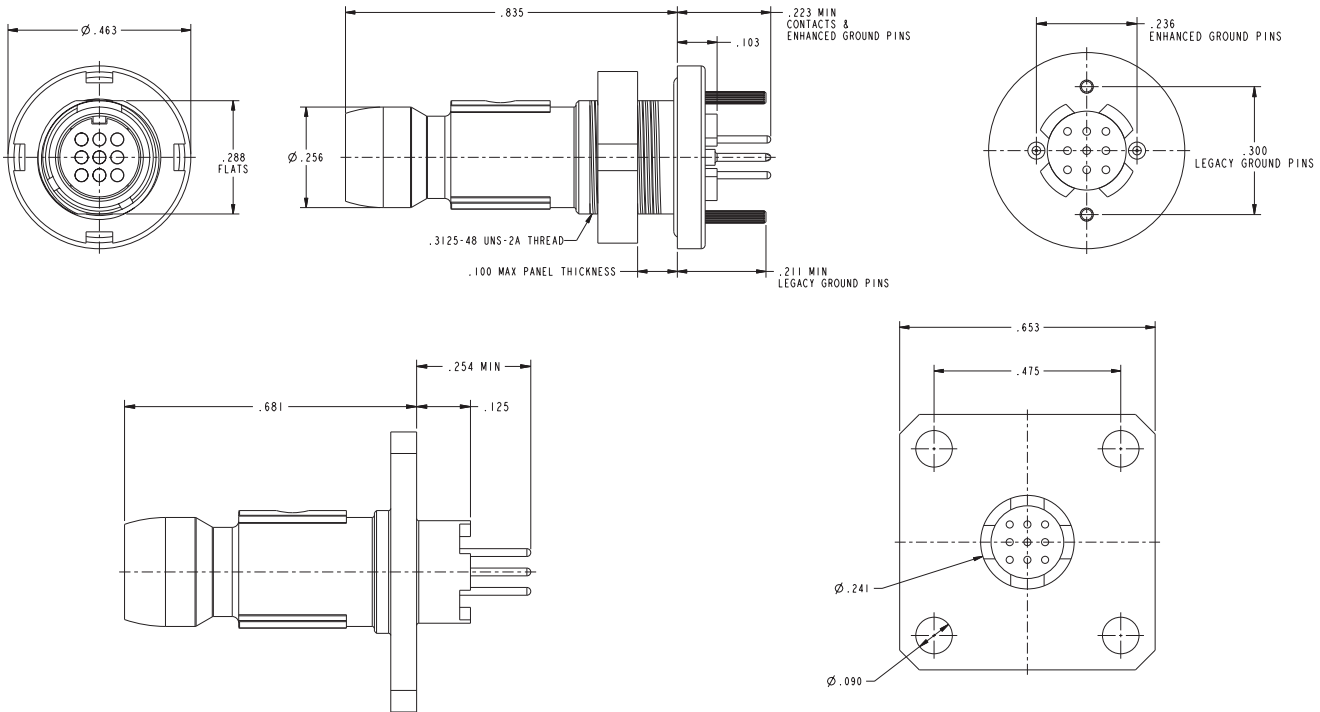
CURRENT RATING	2.5 AMPS Max Per Contact
PROTOCOLS SUPPORTED	Gigabit Ethernet, USB 2.0/3.0, 10 Gigabit Ethernet, & HDMI
DURABILITY	2000 Mating Cycles
UNMATING FORCE	4 lb. Min
TEMPERATURE RANGE	See Individual Connector Pages
INSULATION RESISTANCE	500 Megohms min. @ 100 VDC-PCB Receptacle 10 Megohms min. @ 50 VDC-Plug USB, HDMI
Wire Sizes	28-24 AWG Max outer jacket diameter .500 inch

## MATERIALS & FINISHES

SHELLS	Aluminum Alloy
CONTACTS	Copper Alloy, Gold Plated
INSULATORS	Polyphenylene Sulfide (PPS), Teflon
CANTED COIL SPRING	Stainless Steel, Gold Plated

# MRC - 9 Pin Mount Plug

How to Order



1. Series	2. Shell Style	3. Service Class	4. Alternate Keying Positions	5. Grounding Pins
<b>MRC9</b>	<b>7</b>	<b>C</b>	<b>N</b>	<b>G</b>

\*Omit grounding pins for square flange.

## 1. SERIES

**MRC9** 9 Pin MRC Connector

## 2. SHELL STYLE

**7** PC Jam Nut Panel Mount Plug  
**2** PC Square Flange\*

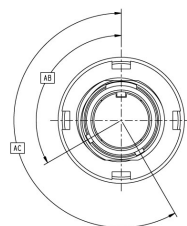
\*Only mates with a Push-Pull style Receptacle

## 3. SERVICE CLASS

Finish
<b>C</b> OD Cadmium
<b>E</b> Electroless Nickel
<b>D</b> Durmalon
<b>Z</b> Black Zinc Nickel
<b>G</b> Green Zinc Nickel
<b>B</b> Black Electroless Nickel

## 4. ALTERNATE KEYING POSITION

Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275



## 5. GROUNDING PINS

<b>Omit</b>	Legacy Ground Pins - inactive for new design
<b>G</b>	Enhanced Ground Pin
<b>N</b>	Non-grounded

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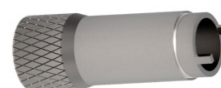
## TEMPERATURE

-55° C to 175° C

## SPANNER NUT TOOL

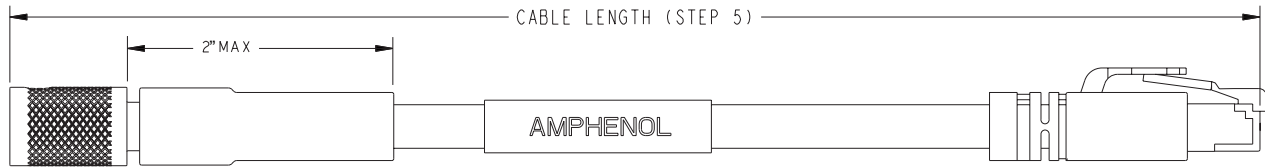
11-013020-005

RECOMMENDED TORQUE 20-25 INCH POUNDS



# Ethernet Cable Assemblies

## How to Order



1.	2.	3.	4.	5.	6.	TEMPERATURE
Series	Cable End A	Service Class	Alternate Keying Position (Side A)	Cable Length in Inches	Cable End B	
<b>MRC9</b>	<b>1</b>	<b>C</b>	<b>N</b>	<b>24</b>	<b>EM</b>	-20° C to 75° C

### 1. SERIES

<b>MRC9</b>	9 Pin MRC Connector
-------------	---------------------

### 5. CABLE LENGTH

Determine the overall length of your cable from end to end in inches. For Ex. 24 = 24 Inches.  
Note: 12 inch Minimum

### 2. SHELL STYLE

	Cable End A
<b>1</b>	Push-pull Receptacle (Spring Contacts)
<b>3</b>	Twist-lock Receptacle (Spring Contacts)

### 6. SHELL STYLE

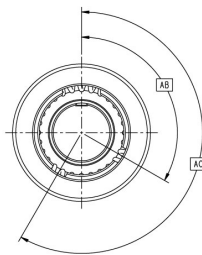
	Cable End B
<b>EM</b>	Ethernet RJ45 Male Cat 6
<b>E1</b>	Push-pull Receptacle (Spring Contacts)
<b>E3</b>	Twist-lock Receptacle (Spring Contacts)
<b>EMZ</b>	Ethernet RJ45 Male Cat 6, LSZH
<b>EIZ</b>	Push-pull Receptacle (Spring Contacts), LSZH
<b>E3Z</b>	Twist-lock Receptacle (Spring Contacts), LSZH

### 3. SERVICE CLASS

	Finish
<b>C</b>	OD Cadmium
<b>E</b>	Electroless Nickel
<b>D</b>	Durmalon
<b>Z</b>	Black Zinc Nickel
<b>G</b>	Green Zinc Nickel
<b>B</b>	Black Electroless Nickel

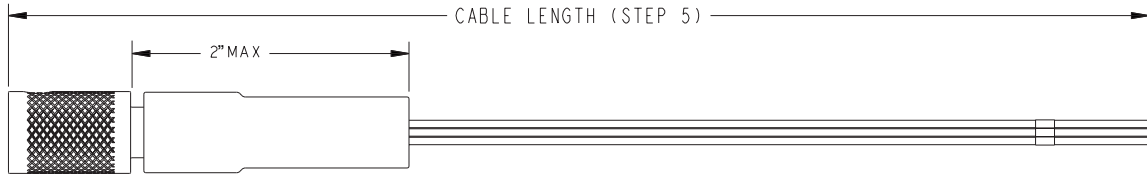
### 4. ALTERNATE KEYING POSITION

Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275



# 9 Pin Pig Tail Cable Assemblies

How to Order



1.	2.	3.	4.	5.	6.
Series	Cable End A	Service Class	Alternate Keying Position (Side A)	Cable Length in Inches	Cable End B
<b>MRC9</b>	<b>1</b>	<b>C</b>	<b>N</b>	<b>24</b>	<b>P</b>

TEMPERATURE
-55° C to 105° C

## 1. SERIES

**MRC9** 9 Pin MRC Connector

## 5. CABLE LENGTH

Determine the overall length of your cable from end to end in inches. For Ex. 24 = 24 Inches.  
Note: 12 inch Minimum

## 2. SHELL STYLE

Connector Designator	Cable End A
<b>1</b>	Push-pull Receptacle (Spring Contacts)
<b>3</b>	Twist-lock Receptacle (Spring Contacts)

## 6. SHELL STYLE

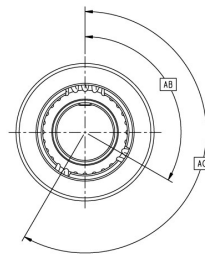
Connector Designator	Cable End B
<b>P</b>	Pig Tail Wire
<b>P1</b>	Push-Pull Receptacle
<b>P3</b>	Twist-Lock Receptacle

## 3. SERVICE CLASS

	Finish
<b>C</b>	OD Cadmium
<b>E</b>	Electroless Nickel
<b>D</b>	Durmalon
<b>Z</b>	Black Zinc Nickel
<b>G</b>	Green Zinc Nickel
<b>B</b>	Black Electroless Nickel

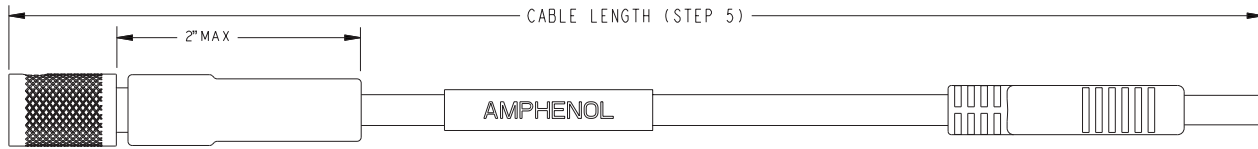
## 4. ALTERNATE KEYING POSITION

Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275



# USB 2.0 / 3.0 Cable Assemblies

## How to Order



1.	2.	3.	4.	5.	6.
Series	Cable End A	Service Class	Alternate Keying Position (Side A)	Cable Length in Inches	Cable End B
<b>MRC9</b>	<b>1</b>	<b>C</b>	<b>N</b>	<b>24</b>	<b>U1</b>

### 1. SERIES

<b>MRC9</b>	9 Pin MRC Connector
-------------	---------------------

### 5. CABLE LENGTH

Determine the overall length of your cable from end to end in inches. For Ex. 24 = 24 Inches.  
Note: 12 inch Minimum, 180 inch Maximum

### 2. SHELL STYLE

	Cable End A
<b>1</b>	Push-pull Receptacle (Spring Contacts)
<b>3</b>	Twist-lock Receptacle (Spring Contacts)

### 6. SHELL STYLE

	Cable End B	
<b>U1</b>	USB 2.0 Type A Male	
<b>U2</b>	USB 2.0 Type A Micro B Male	
<b>U3</b>	USB 3.0 Type A Male	
	U4 Superseded by U4A or U4B	
<b>U4A*</b>	USB 3.0 Type A Female	
<b>U4B*</b>	USB 3.0 Type A Female	
<b>U5</b>	USB 3.0 Type A Micro B Male	
<b>U6A</b>	Push-pull Receptacle	USB 2.0 Cable
<b>U6B</b>		USB 3.0 Cable
<b>U7A</b>	Twist-lock Receptacle	USB 2.0 Cable
<b>U7B</b>		USB 3.0 Cable

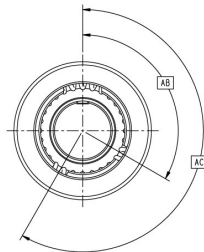
\*See parent level drawing for wiring configuration  
Use Z to designate low smoke zero Halogen call out on any above. Example MRC91ZN60U3Z

### 3. SERVICE CLASS

	Finish
<b>C</b>	OD Cadmium
<b>E</b>	Electroless Nickel
<b>D</b>	Durmalon
<b>Z</b>	Black Zinc Nickel
<b>G</b>	Green Zinc Nickel
<b>B</b>	Black Electroless Nickel

### 4. ALTERNATE KEYING POSITION (SIDE A)

Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275

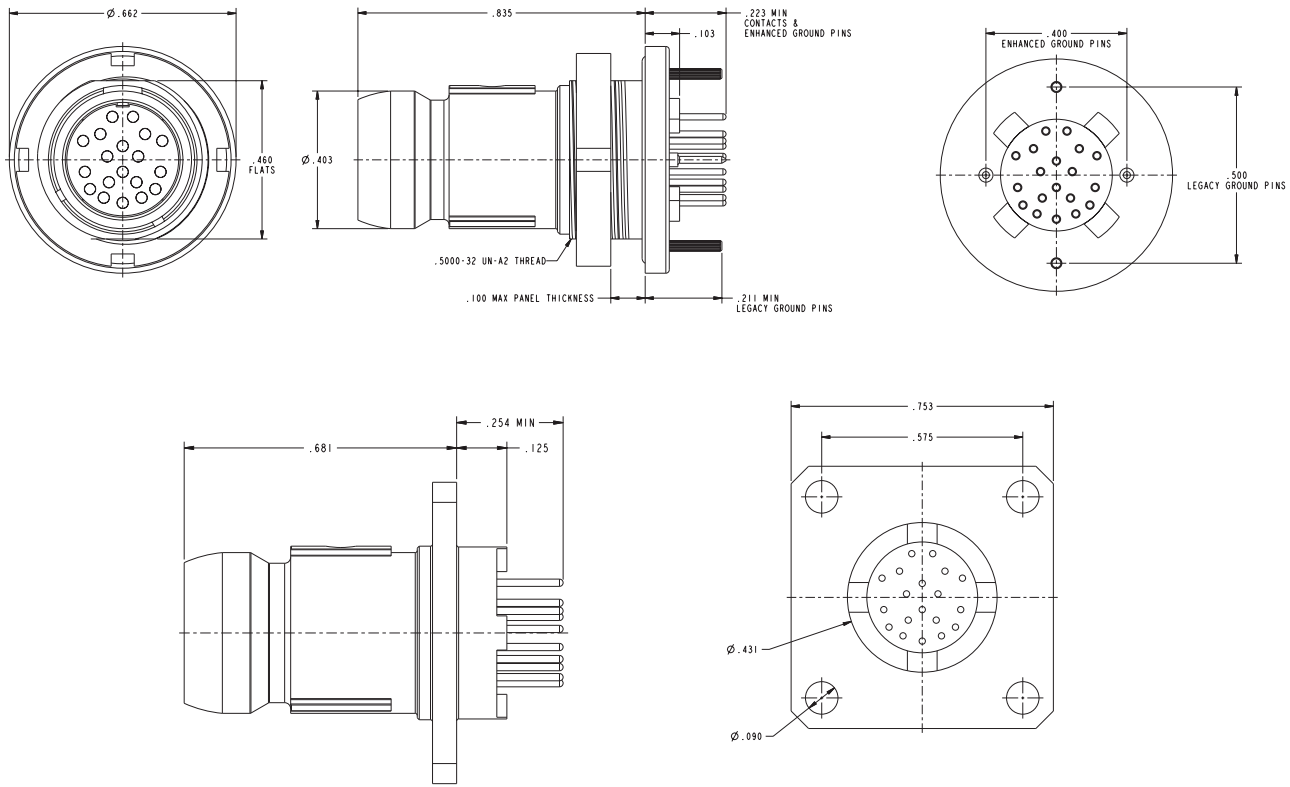




# 19 Pin HDMI Chassis Mount Plug

How to Order

**Amphenol**  
MILITARY HIGH SPEED



1.	2.	3.	4.	5.
Series	Shell Style	Service Class	Alternate Keying Position	Grounding Pins
<b>MRC19</b>	<b>7</b>	<b>C</b>	<b>N</b>	<b>G</b>

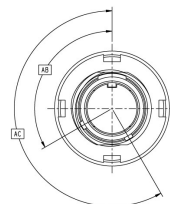
\*Omit grounding pins for square flange.

1. SERIES	
<b>MRC19</b>	19 Pin MRC Connector

2. SHELL STYLE	
<b>7</b>	PC Jam Nut Panel Mount Plug

3. SERVICE CLASS	
	Finish
<b>C</b>	OD Cadmium
<b>E</b>	Electroless Nickel
<b>D</b>	Durmalon
<b>Z</b>	Black Zinc Nickel
<b>G</b>	Green Zinc Nickel
<b>B</b>	Black Electroless Nickel

4. ALTERNATE KEYING POSITION		
Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275



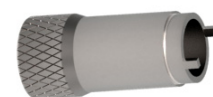
5. GROUNDING PINS	
<b>Omit</b>	Legacy Ground Pins - inactive for new design
<b>G</b>	Enhanced Ground Pins
<b>N</b>	Non-grounded

FOR JAMNUT ONLY

TEMPERATURE
-55° C to 175° C

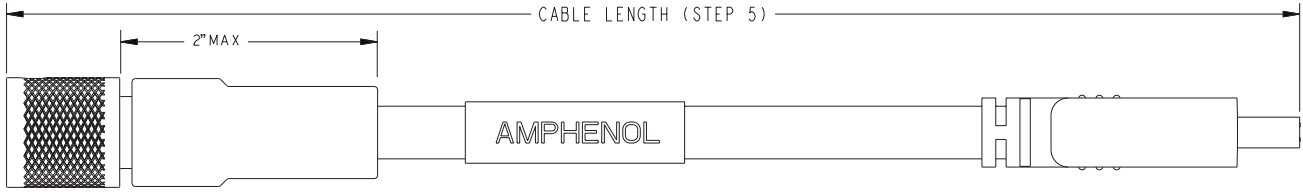
SPANNER NUT TOOL
11-013020-007

30-40 inch lb. recommended torque



# HDMI Cable Assemblies

## How to Order



1.	2.	3.	4.	5.	6.
Series	Cable End A	Service Class	Alternate Keying Position (End A)	Cable Length in Inches	Cable End B
MRC19	1	C	N	24	H1

TEMPERATURE
-20° C to 80° C

### 1. SERIES

MRC19	19 Pin MRC Connector
-------	----------------------

### 2. SHELL STYLE

	Cable End A
1	Push-pull Receptacle (Spring Contacts)
3	Twist-lock Receptacle (Spring Contacts)

### 3. SERVICE CLASS

	Finish
C	OD Cadmium
E	Electroless Nickel
D	Durmalon
Z	Black Zinc Nickel
G	Green Zinc Nickel
B	Black Electroless Nickel

### 4. ALTERNATE KEYING POSITION (END A)

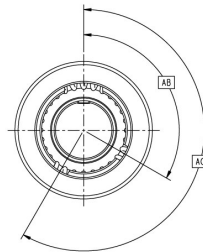
Key Position	AB°	AC°
N	120	210
A	150	210
B	95	210
C	120	275
D	150	275

### 5. CABLE LENGTH

Determine the overall length of your cable from end to end in inches. For Ex. 24 = 24 Inches.  
 Note: 12 inch Minimum,  
 180 inch Maximum.

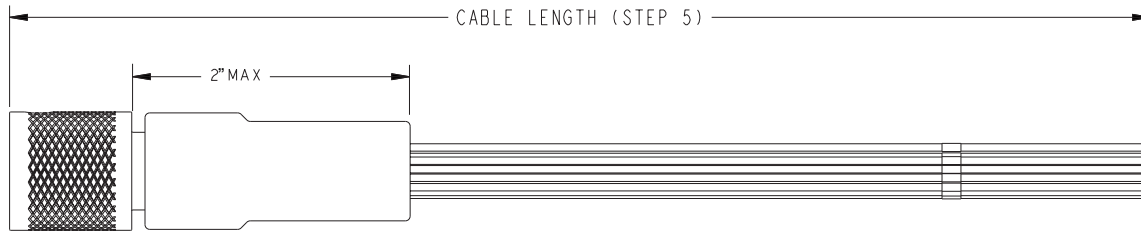
### 6. SHELL STYLE

	Cable End B
H1	HDMI Male
H2	HDMI Male Mini
H3	Push-pull Receptacle (Spring Contacts)
H4	Twist-lock Receptacle (Spring Contacts)



# 19 Pin Pig Tail Cable Assemblies

How to Order



1.	2.	3.	4.	5.	6.	TEMPERATURE
Series	Cable End A	Service Class	Alternate Keying Position (End A)	Cable Length in Inches	Cable End B	
<b>MRC19</b>	<b>1</b>	<b>C</b>	<b>N</b>	<b>24</b>	<b>P</b>	-55° C to 105° C

1. SERIES	
<b>MRC19</b>	19 Pin MRC Connector

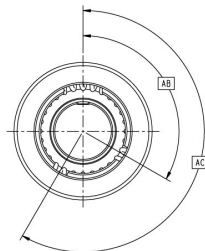
**5. CABLE LENGTH**  
Determine the overall length of your cable from end to end in inches. For Ex. 24 = 24 Inches.  
Note: 12 inch Minimum

2. SHELL STYLE	
	Cable End A
<b>1</b>	Push-pull Receptacle (Spring Contacts)
<b>3</b>	Twist-lock Receptacle (Spring Contacts)

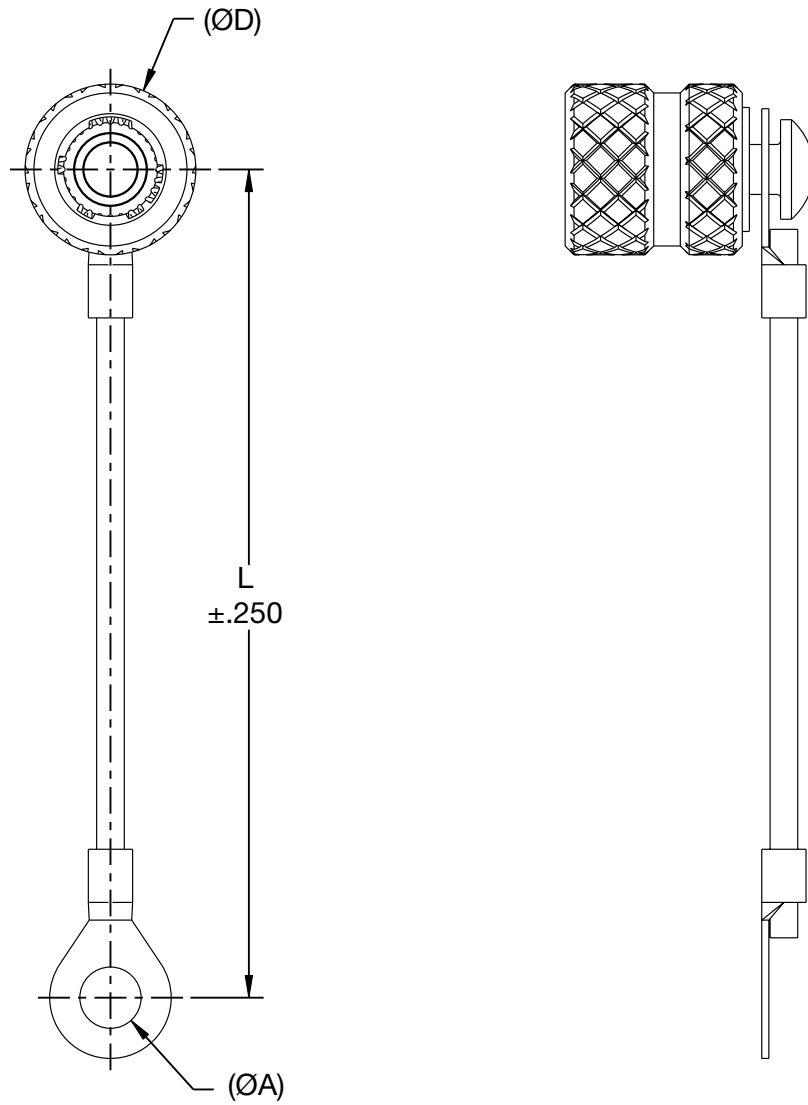
6. SHELL STYLE	
Connector Designator	Cable End B
<b>P</b>	Pig Tail Wire
<b>P1</b>	Push-Pull Receptacle
<b>P3</b>	Twist-Lock Receptacle

3. SERVICE CLASS	
	Finish
<b>C</b>	OD Cadmium
<b>E</b>	Electroless Nickel
<b>D</b>	Durmalon
<b>Z</b>	Black Zinc Nickel
<b>G</b>	Green Zinc Nickel
<b>B</b>	Black Electroless Nickel

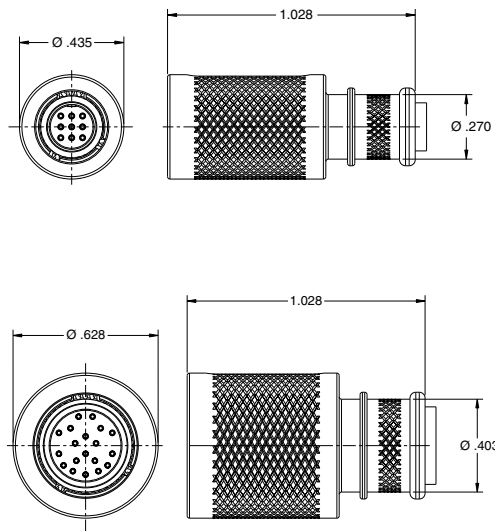
4. ALTERNATE KEYING POSITION (END A)		
Key Position	AB°	AC°
<b>N</b>	120	210
<b>A</b>	150	210
<b>B</b>	95	210
<b>C</b>	120	275
<b>D</b>	150	275



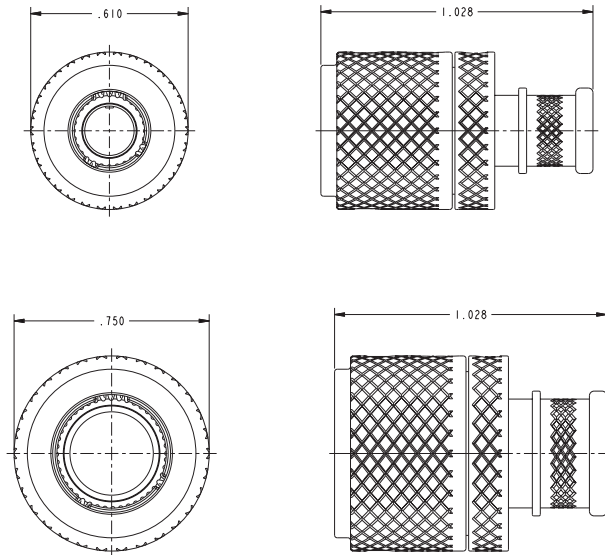
# MRC - Protection Cap for Plug



## 1 - PUSH-PULL RECEPTACLE (SPRING LOADED CONTACTS)



## 3 - TWIST-LOCK RECEPTACLE (SPRING LOADED CONTACTS)



# MRC SOLUTIONS

The MRC panel mount connectors are also available with COTS connector assemblies. These assemblies allow the user to connect commercial cables inside their box or on the backside of a bulkhead. This type of assembly allows the user to ruggedize specific areas of the application while others can remain commercial. Please contact Amphenol with your requirements.



# High-Speed/High Frequency Contact Design Form

## For Connectors and Cables

The following check list is provided to help you specify a high frequency contact and cable system, and it will help our design team to meet your requirements. You may copy this page and fax it to Amphenol Aerospace 607-563-5157, attention Contact Design. Or call 607-563-5011 or 800-678-0141 for assistance.

Date \_\_\_\_\_

Amphenol \_\_\_\_\_

Salesperson \_\_\_\_\_

### CUSTOMER INFORMATION

Customer Company Name \_\_\_\_\_

Engineer Name \_\_\_\_\_

Program \_\_\_\_\_

Forecast \_\_\_\_\_

### CABLE INFORMATION

Cable Part Number\* \_\_\_\_\_

Cable Manufacturer \_\_\_\_\_

Cable Type: Coaxial  Twinax  Triax  Quadrax

Cable Impedance \_\_\_\_\_

### CONNECTOR INFORMATION

Connector Family: TV-R  LJT-R  JT-R

Other \_\_\_\_\_

Insert Arrangement Desired \_\_\_\_\_

Shell Style \_\_\_\_\_

Shell Plating \_\_\_\_\_

### CONTACT INFORMATION

Type: Coaxial  Concentric Twinax  Triax

Differential Twinax\*  Quadrax\*

Size\*: 8  12  16

Contact Impedance Matched? Yes  No

50 Ohm  75 Ohm  100 Ohm  150 Ohm

Other \_\_\_\_\_

\* Quadrax and Differential Twinax currently available in size 8 only.

\* if not an RG-Number complete below information:

O.D. of Inner Wire \_\_\_\_\_ AWG of Inner Wires \_\_\_\_\_

No. of Inner Wire Strands \_\_\_\_\_ Material of Inner Wires \_\_\_\_\_

O.D. of Inner Insulation \_\_\_\_\_ Material of Inner Insulation \_\_\_\_\_

O.D. of First Braid \_\_\_\_\_ Braid Type \_\_\_\_\_ Braid AWG \_\_\_\_\_  
(flat, round, wrap)

O.D. of First Jacket \_\_\_\_\_ Jacket Material \_\_\_\_\_

O.D. of Second Braid \_\_\_\_\_ Braid Type \_\_\_\_\_ Braid AWG \_\_\_\_\_  
(flat, round, wrap)

O.D. of Second Jacket \_\_\_\_\_ Jacket Material \_\_\_\_\_

It is essential that a 3 foot sample of the cable be supplied for performance and crimp tool development.

### PERFORMANCE INFORMATION

Electrical Protocol \_\_\_\_\_

VSWR Requirement 1. to 1. \_\_\_\_\_ Cross Talk \_\_\_\_\_ db

Operating Frequency \_\_\_\_\_ Attenuation \_\_\_\_\_ Insertion Loss \_\_\_\_\_

Operating Voltage \_\_\_\_\_ VAC (RMS) \_\_\_\_\_ DC

Current Outer Contact \_\_\_\_\_ Amp Current Inner Contacts \_\_\_\_\_ Amp

Application Temperature \_\_\_\_\_ Environmental Requirement \_\_\_\_\_





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