

# New "Split-Pair" Quadrax Contacts & Cable Assemblies for MIL-DTL-38999, Series III Cylindricals

## 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
- 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
- Serial RapidIO (up to 3.125 Gbps)
- PCI-Express 2.0
- HDMI 1.3a
- SATA 2.0 (up to 3 GHz)

See page 7: Guide for Selecting High Frequency Contacts and Cables

**SPLIT-PAIR QUADRAX CONTACT\* PART NUMBERS:**

Crimp Style Part Number	Cable	AWG
<b>PIN 21-033470-001</b>	<b>Thermax 1536-224</b>	<b>24</b>
<b>SOCKET 21-033471-001</b>		
<b>PIN 21-033470-021</b>	<b>Thermax 1536-195</b>	<b>26</b>
<b>SOCKET 21-033471-021</b>		

**CRIMP TOOLS:**

Outer Contact	Inner Contact
<b>DANIELS M22520/5-01 with die set Y1999 or M22520/5-45</b>	<b>DANIELS M22520/2-01 with positioner K1777</b>

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

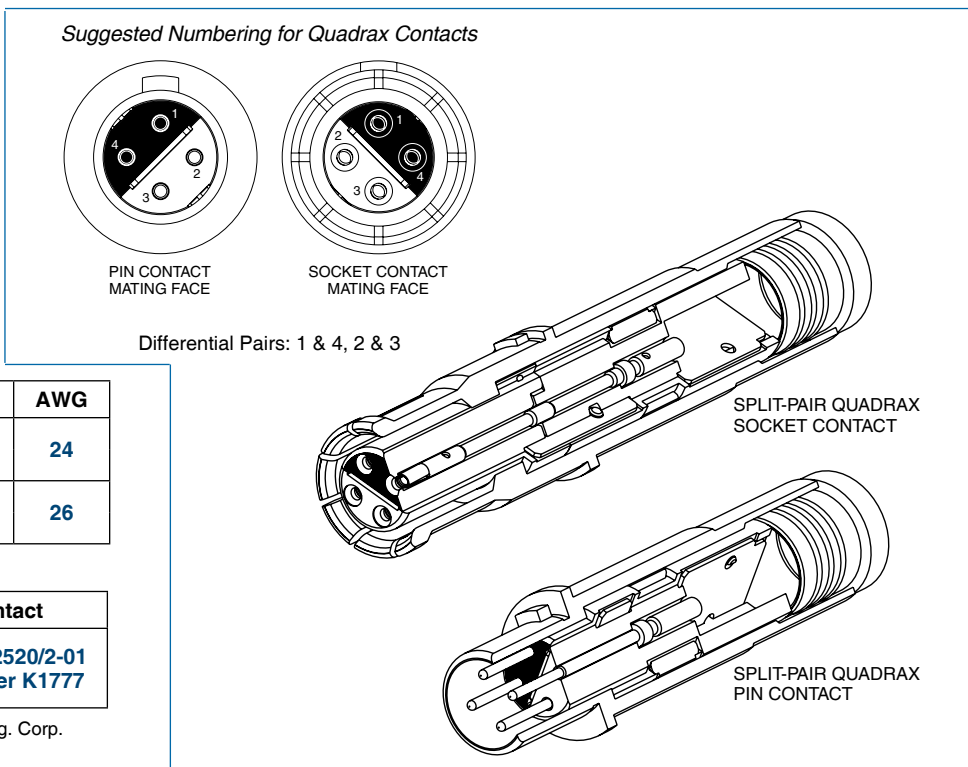
REMOVAL TOOL: **M81969/14-12**



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



\* Patent pending.

\*\* See Amphenol® Quadrax Contacts in the High Speed Section of the combined circular interconnect product catalog from Amphenol, 12-C3, online at [www.amphenol-aerospace.com](http://www.amphenol-aerospace.com).

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## PCB QUADRAX PIN

PCB Pin Part Numbers	Impedance	Length $\pm$ .015
21-033466-011	100 Ohm	1.035
21-033466-021		.815
21-033466-031*		.815
21-033466-041		.866
21-033466-051		.494
21-033466-061		.582

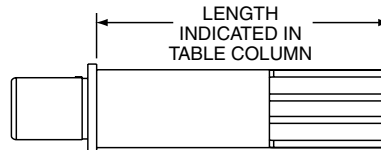
## PCB QUADRAX SOCKET

PCB Socket Part Numbers	Impedance	Length $\pm$ .015
21-033467-011	100 Ohm	1.035
21-033467-021		.815
21-033467-031*		.815
21-033467-041		.866
21-033467-051		.494
21-033467-061		.582

\*Pretinned

Indicated length given in charts above 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.

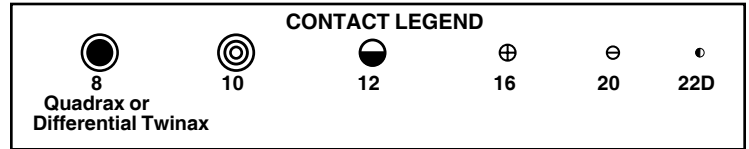


## TRANSITION ADAPTERS FOR LAUNCHING SIGNALS TO PC BOARDS

100 OHM QUADRAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS					
Quadrax Type Adapter/ Cable or PCB Tail Length	Illustration of Adapter	Part Number		Impedance (Ohms)	Mating Thread Size
		Plug	Receptacle		
Quadrax Plug Adapter/ Thermax 1536-224		21-033468-011		100	.375
PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .110			21-033469-001		
PCB Quadrax Receptacle Straight Adapter/ Tail Length .110			21-033469-011		
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		

# Insert Patterns - for MIL-DTL-38999, Series III Cylindricals

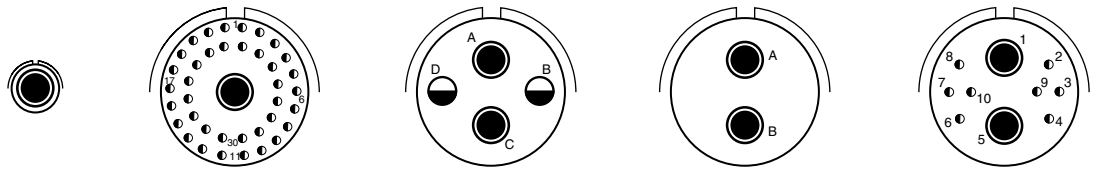
## Incorporating "Split-Pair" Quadrax Contacts



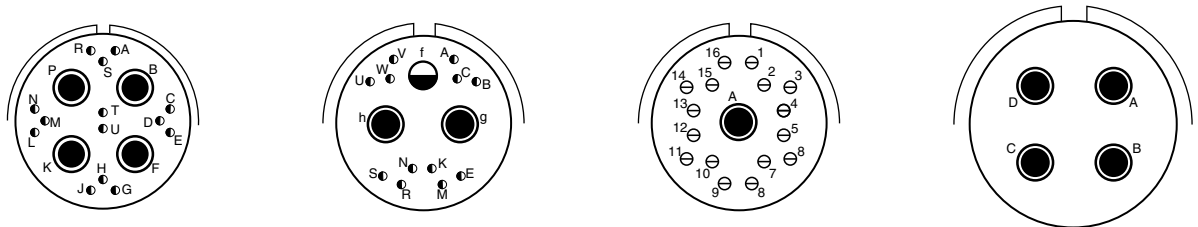
front face of pin inserts illustrated

This illustrated listing represents the most readily available patterns incorporating Amphenol's new split-pair quadrax contacts as well as standard quadrax and differential twinax contacts within D38999, Series III cylindrical connectors.\*

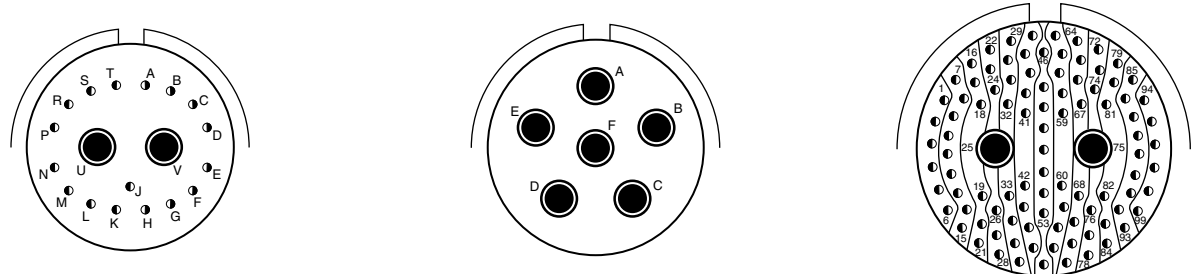
If you require other arrangements than what are shown here, consult Amphenol for further availability. In most cases, unless otherwise stated, size 8 cavities can be filled with quadrax or differential twinax contacts. Arrangements can be mixed with any size 8 coax, and/or concentric twinax or triax contacts.



Insert Arrangement	9-5	17-2	17-22	17-52	17-60
Number of Contacts	1	38 1	2 2	2	8 2
Contact Size	8	22D 8 Twinax	12 8	8	22D 8
	Grounded			Meets Boeing Specification	



Insert Arrangement	19-18	19-31	19-AD	21-75
Number of Contacts	14 4	12 1 2	16 1	4
Contact Size	22D 8	22D 12 8	20 8	8

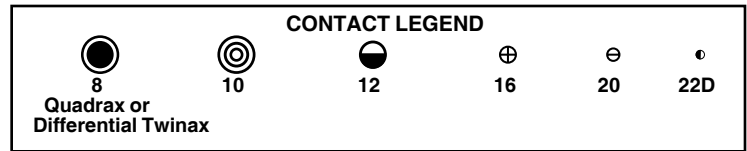


Insert Arrangement	21-79	23-6	25-7
Number of Contacts	17 2	6	97 2
Contact Size	22D 8	8	22D 8

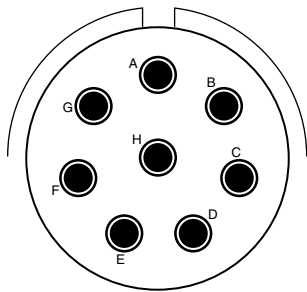
\* Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts.

# Insert Patterns - for MIL-DTL-38999, Series III Cylindricals

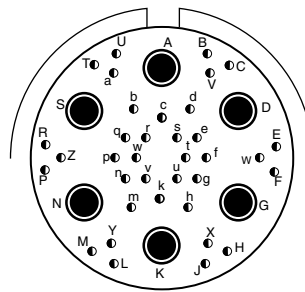
## Incorporating "Split-Pair" Quadrax Contacts



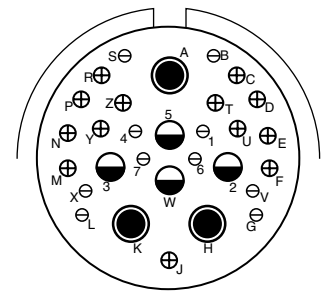
front face of pin inserts illustrated



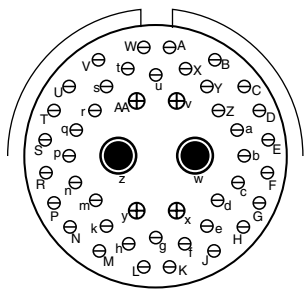
Insert Arrangement **25-8**  
Number of Contacts **8**  
Contact Size **8**



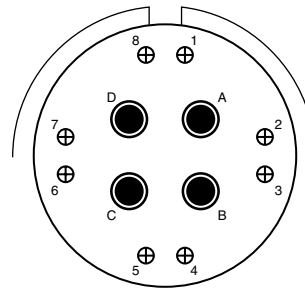
Insert Arrangement **25-17**  
Number of Contacts **36 6**  
Contact Size **22D 8**



Insert Arrangement **25-20**  
Number of Contacts **10 13 3 4**  
Contact Size **20 16 8 12**



Insert Arrangement **25-46**  
Number of Contacts **40 4 2**  
Contact Size **20 16 8**



Insert Arrangement **25-62**  
Number of Contacts **8 4**  
Contact Size **16 8**

# New "Split-Pair" Quadrax Contacts for MIL-DTL-38999, Series III Cylindricals

## Frequencies & Performance Data

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

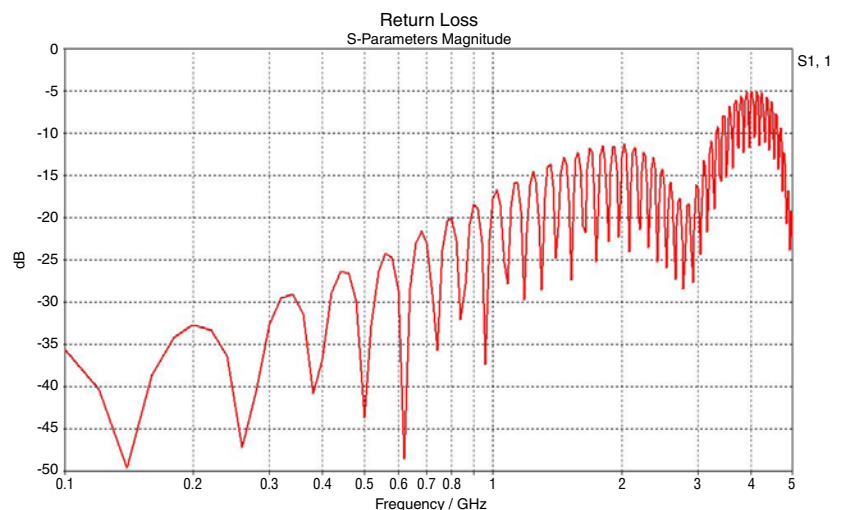
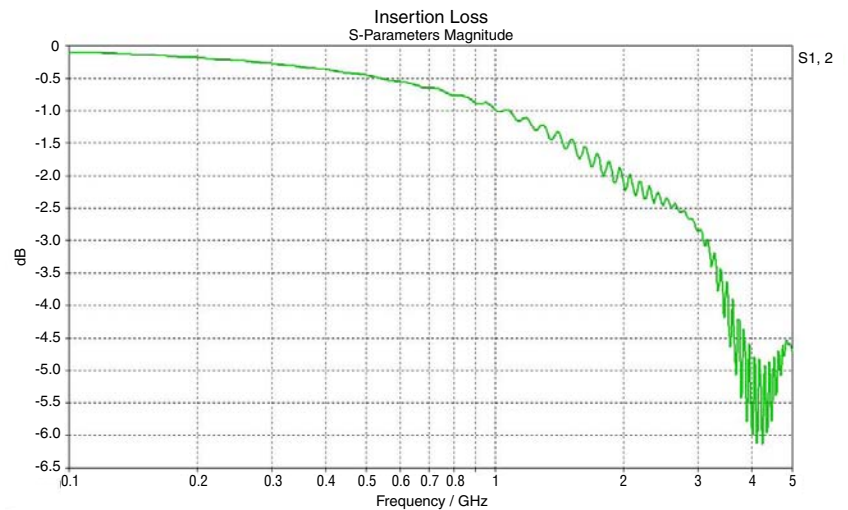
- 10/100/1000/10GBASE-T Ethernet
- DVI
- USB 2.0
- Serial RapidIO (up to 3.125 Gbps)
- PCI-Express 2.0
- HDMI 1.3a
- SATA 2.0 (up to 3 GHz)

### FREQUENCIES OF INTEREST

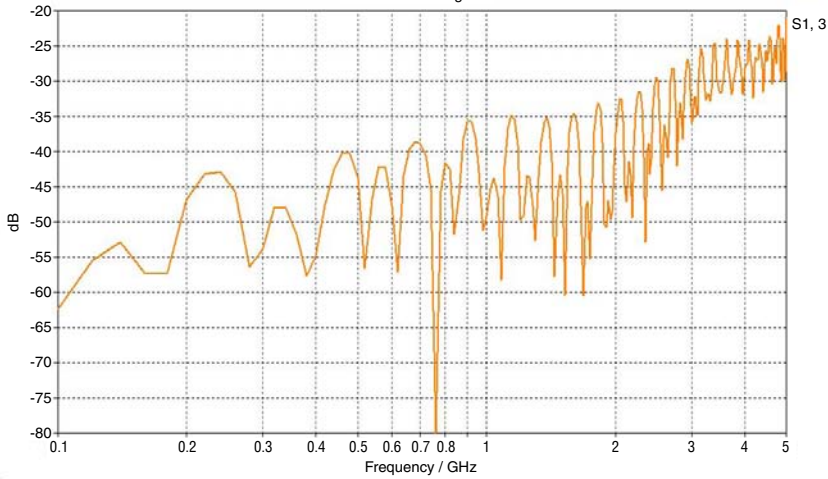
Frequency (GHz)	Insertion Loss (dB)	Return Loss (dB)	NEXT (dB)	FEXT (dB)
0.1	0.09	35.68	62.36	59.29
0.24	0.22	36.44	42.87	62.25
0.5	0.45	43.66	43.63	55.22
0.625	0.57	43.49	53.68	43.53
1	0.98	17.82	49.26	48.33
1.25	1.29	15.1	43.57	44.12
1.5	1.47	17.94	46.02	40.78
1.7	1.86	12.23	48.01	47.23
2	2.11	12.9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

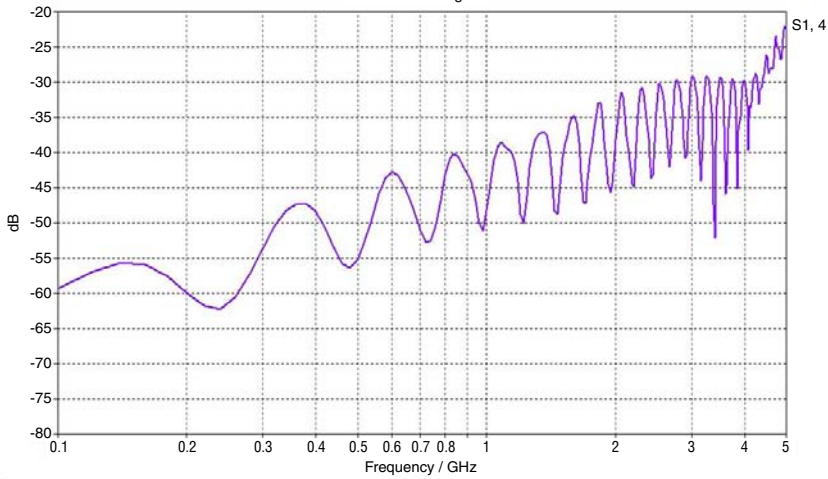
The following graphs on this page and the next page provide performance data on Amphenol® 10GBASE signal integrity (SI) quadrax contacts. Testing was done with 2 mated contacts terminated on both ends of 1 meter Thermax cable.



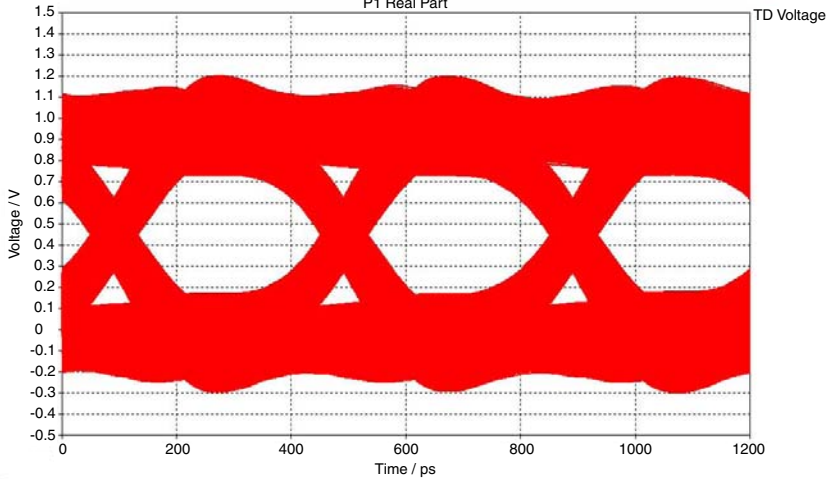
Near-end Crosstalk  
S-Parameters Magnitude



Far-end Crosstalk  
S-Parameters Magnitude



2.5 Gps Eye Pattern (PRBS n=15)  
P1 Real Part



Notice: Specifications are subject to change without notice. Contact your nearest Amphenol Corporation Sales Office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should assume that all safety measures are indicated or that other measures may not be required. Specifications are typical and may not apply to all connectors.

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## Guide for Selecting High Frequency Contacts 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 \_\_\_\_\_

\* 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 \_\_\_\_\_

### 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

50Ω  75Ω  100Ω  150Ω  Other \_\_\_\_\_

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