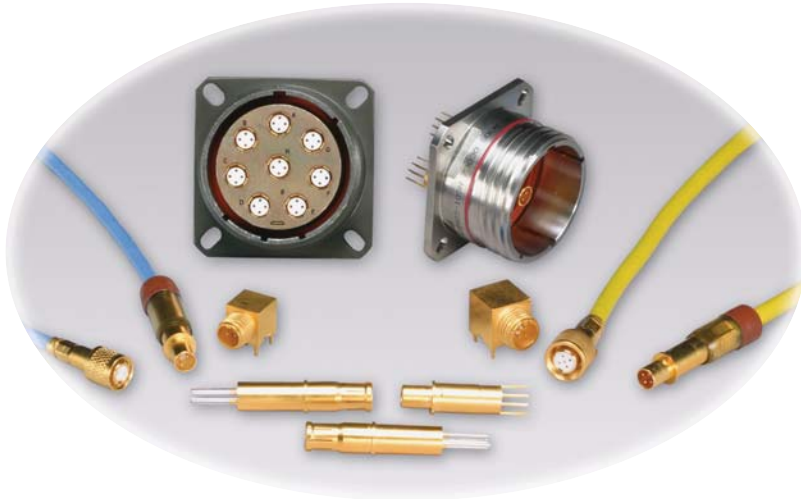


# Amphenol Aerospace

## Size 8 High Speed Quadrax and Differential Twinax Contacts For use in MIL-DTL-38999 Special\* Subminiature Cylindrical and ARINC 600 Rectangular Connectors



**Quadrax Contacts** consist of an outer contact with four strategically spaced inner contacts forming two 100 or 150 Ohm matched impedance differential pairs.

**Differential Twinax Contacts** consist of an outer contact with two inner contacts spaced to form one 100 or 150 Ohm matched impedance differential pair.

**Contacts can be used in connectors for applications:**

**Ethernet 100 Base-T-100 Ohm**

**Gigabit Ethernet 1000 Base-T-100 Ohm**

**Fibre-Channel-150 Ohm**

**IEEE 1394B FireWire-110 Ohm**

**Typical Electrical Performance:**

Bandwidth: Up to 3 Gigahertz

Data Rate: Exceeding 3 Gbits/sec

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



Eight Wire Gigabit Ethernet Assembly



D38999 Series III Groundplane Connector  
with Quadrax PCB Sockets



D38999 Series III with Quadrax and  
Power Contacts



Quadrax and Twinax Transition Plugs  
and Receptacle Adapters

\* Requires modified connector to accommodate keyed contacts.

L-1105-1 Printed 5/2008



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## Board Level Connectors with Compliant Quadrx Contacts

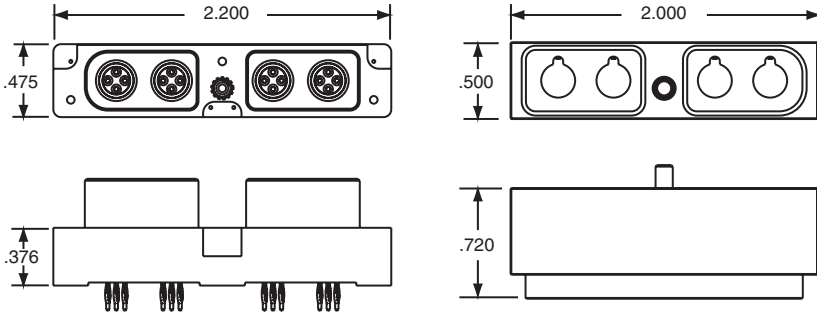
Compliant hole diameters:

.025 ±.002 PTH Quadrx contact

.040 ±.003 PTH Shell grounding

Accommodates backplane .125 inch minimum thickness

Consult Amphenol Aerospace for availability of additional connector configurations.



Compliant Quadrx Socket and PCB Tail Quadrx Pin



Board Level Quadrx Connector



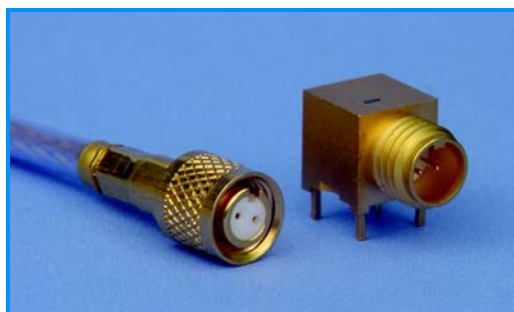
Quadrx Cable Assembly Attached to Board Level Compliant Quadrx Connector

## Board Level Transition Adapters

Also available are matched impedance Quadrx and Twinax Transition Adapters which provide a method of launching from the high speed connectors to the PCB boards. Non-threaded adapters for launching direct from the cable end to the board are also available. Part numbers vary depending on cable. Consult Amphenol for more information.



Straight Quadrx Receptacle Contact



90 Degree Twinax Receptacle Contact and Transition Plug



90 Degree Quadrx Receptacle Contact and Transition Plug



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The following pages provide a list of contact part numbers available, but not limited to the cables listed. All contacts are available kitted with or installed into ARINC 600 and specially modified MIL-DTL-38999 connectors\*.

### For D38999 Connectors

Description	Part Number	Cable Part Number	Impedance	Installation Instruction Sheet**
Quadrax Socket	21-33385-21	Draka Fileca F-4703-3, F4704-4, Filotex ET 2PC236, Filotex ET2PF870, PIC Wire E50424	100 Ohm	L-2119-A
	21-33385-31	Tensolite 26473/02006X-4(LD)/Gore RCN8328	150 Ohm	L-2119-B
	21-33385-51	Tensolite NF24Q100, NF24Q100-01, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD), Thermax 956-4TN, Tensolite 24450/0120X-4(LD), NF24-2Q100, 24443/03166X-4(LD), Thermax T956-4T200, Pic Wire E51424, Thermax MX100Q-24, NF24Q100-01-200C (Space), PIC E50424	100 Ohm	L-2119-D
	21-33385-61	Tensolite NF22Q100, NF22Q100-01, Thermax 956-5, Draka Fileca F-4704-5, GORE RCN 7688	100 Ohm	L-2119-H
	21-33385-61	Tensolite 24450/03089X-4(LD)	110 Ohm	L-2119-H
	21-33385-71	Tensolite NF26Q100, NF26Q100-01, NF26-2Q100, PIC E50426	100 Ohm	L-2119-AB
	21-33385-91	JSFY02-1	110 Ohm	L-2119-AD
	21-33385-111	Gore RCN8487, JSFY18	110 Ohm	L-2119-AK
	21-33385-151	Draka Fileca F-4704-6	100 Ohm	L-2119-AW
	21-33385-171	Gore RCN8513, JSF-118-3	100 Ohm	L-2119-BN
	21-33385-191	Tensolite NF24Q100, NF24Q100-01 for 2.5 Gbps applications	100 Ohm	L-2119-BS
PCB Socket	21-33397-21	PCB (1.035 Length)	100 Ohm	
	21-33397-31	PCB (.866 Length)	100 Ohm	
	21-33397-61	PCB (1.035 Length)	150 Ohm	
	21-33397-301	PCB (.836 Length)	100 Ohm	
Quadrax Pin	21-33384-21	Draka Fileca F-4703-3, F4704-4, Filotex ET 2PC236, PIC Wire E50424	100 Ohm	L-2119-A
	21-33384-31	Tensolite 26473/02006X-4(LD)/ Gore RCN8328	150 Ohm	L-2119-B
	21-33384-51	Tensolite NF24Q100, NF24Q100-01, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD), Thermax 956-4TN, Tensolite 24450/01201X-4(LD), NF24-2Q100, 24443/03166X-4(LD), Thermax T956-4T200, Pic Wire E51424, Thermax MX100Q-24, NF24Q100-01-200C (Space), PIC E50424	100 Ohm	L-2119-D
	21-33384-61	Tensolite NF22Q100, NFQ100-01, Thermax 956-5, Draka Fileca F-4704-5	100 Ohm	L-2119-H
	21-33384-61	Tensolite 24450/03089X-4(LD)	110 Ohm	L-2119-H
	21-33384-71	Tensolite NF26Q100, NF26Q100-01, NF26-2Q100, PIC E50426	100 Ohm	L-2119-AB
	21-33384-91	JSFY02-1	110 Ohm	L-2119-AD
	21-33384-111	Gore RCN8487, JSFY18	110 Ohm	L-2119-AK
	21-33384-171	Gore RCN8513, JSFY18-3	100 Ohm	L-2119-BN
	21-33384-151	Draka Fileca F-4704-6	100 Ohm	L-2119-AW
21-33384-191	Tensolite NF24Q100, NF24Q100-01 for 2.5 Gbps applications	100 Ohm	L-2119-BS	

\* Requires modified connector to accommodate keyed contacts.

\*\* Installation instructions are available on-line at [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp).



## For D38999 Connectors, cont.

Description	Part Number	Cable Part Number	Impedance	Installation Instruction Sheet**
PCB Pin	21-33398-21	PCB (1.035 Length)	100 Ohm	
	21-33398-31	PCB (.866 Length)	100 Ohm	
	21-33398-61	PCB (1.035 Length)	150 Ohm	
	21-33425-1	Right Angle Special PCB	100 Ohm	
	21-33398-71	PCB (.494 Length)	100 Ohm	
	21-33398-271	PCB Special (.430 Length)	100 Ohm	
	21-33398-101	PCB (1.194 Length)	100 Ohm	
	21-33398-121	PCB (.859 Length)	100 Ohm	
Transition Adapters	21-33836-21	Plug contact, Tensolite 26473/02006X-4(LD), Gore RCN8328	150 Ohm	L-2119-S
	21-33837-31	PCB Receptacle straight	150 Ohm	
	21-33837-21	PCB Receptacle 90 degree	150 Ohm	
	21-33836-31	Plug contact, Tensolite NF24Q100	100 Ohm	L-2119-U
	21-33836-41	Plug contact, Tensolite NF22Q100, NF22Q100-01, Thermax 956-5	100 Ohm	
	21-33836-51	Plug contact Draka Fileca F-4703-3, F-4704-4	100 Ohm	L-2119-Y
	21-33836-61	Plug contact, NF26Q100 cable	100 Ohm	
	21-33837-41	PCB receptacle 90 degree	100 Ohm	
	21-33837-51	PCB receptacle straight	100 Ohm	
	21-33837-61	PCB receptacle straight, special tail length (.200)	100 Ohm	
	21-33837-71	Cable to board 90 degree adapter	150 Ohm	
	21-33837-81	GSC-10-8273900 wired jam nut	100 Ohm	
	21-33837-91	Straight in-line receptacle (threaded) NF24Q100 cable	100 Ohm	L-2119-BL
	21-33837-101	Straight PCB cable to board adapter NF24Q100 cable	100 Ohm	L-2119-AN
	21-33837-111	Straight PCB cable to board adapter 26473/02006X-4 (LD) cable	150 Ohm	L-2119-AP
21-33837-141	Cable to board 90 degree adapter	100 Ohm		
21-33425-21	Pin terminator	100 Ohm		
Sealing Plugs	T3-4008-59P	Standard Plastic		
	T3-4008-59P1	Standard Plastic to be used with PCB tails (shorter tail length)		
	21-33899-8	Metal sealing plug (same as T3-4008-59P)		
	21-33899-8Q1	Metal sealing plug can be used when mating with contacts on mating half		
	21-33899-8Q2	Metal sealing plug used with PCB's and mating contact on mating half		
	21-33321-23	Metalized piggyback grommet		

\*\* Installation instructions are available on-line at [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp).



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### For D38999 Connectors, cont.

Description	Part Number	Cable Part Number	Impedance	Installation Instruction Sheet**
Differential Twinax Socket	21-33388-21	Tensolite 24463/05099X-8(LD), Thermax MX 100-24, Tensolite 24463/9P025X-2(LD), Thermax 12814, ST5M1284-003 (98 Ohm), 26463/70460X-2 (98 Ohm), PIC E10224, Fileca 2709-3, NF24T100-200C (Space)	100 Ohm	L-2119-E
	21-33388-31	Tensolite 26483/03071X-2(LD)	150 Ohm	L-2119-AC
	21-33388-41	Tensolite 26453/03184X-2(LD), Thermax 956-626Z, GORE GSC-05-827300-00, 26453/03184X-(2)LD	100 Ohm	L-2119-T
	21-33388-51	GORE GSC-05-827300-00 Vacuum Degassed	100 Ohm	L-2119-AY
	21-33388-61	23460/05114X-2(LD)	100 Ohm	L-2119-BH
	21-33388-71	Raychem 0026A0024	100 Ohm	
	21-33388-91	JSFY11-24, Tensolite 24463/03220T-2(LD), Thermax 956-1T200	100 Ohm	L-2119-BT
	21-33388-101	S280W502-6	100 Ohm	
Twinax Socket PCB	21-33835-1	PCB (1.035 Length)	100 Ohm	
	21-33835-21	PCB (1.035 Length)	150 Ohm	
Differential Twinax Pin	21-33387-21	Tensolite 24463/9P025X-2(LD), Thermax 12814, ST5M1284-003 (98 Ohm), 26463/70460X-2 (98 Ohm), 24463/05099X-8(LD), Thermax MX 100-24, PIC E 10224, Fileca 2709-3, NF24T100-200C (Space)	100 Ohm	L-2119-E
	21-33387-31	Tensolite 26483/03071X-2(LD)	150 Ohm	L-2119-AC
	21-33387-41	Tensolite 26453/03184X-2(LD), Thermax 956-626Z, GORE GSC-05-827300-00, 26453/03184X-(2)LD	100 Ohm	L-2119-T
	21-33387-51	GORE GSC-05-827300-00 Vacuum Degassed	100 Ohm	L-2119-AY
	21-33387-61	23460/05114X-2(LD)	100 Ohm	L-2119-BH
	21-33387-71	Raychem 0026A0024	100 Ohm	
	21-33387-91	JSFY11-24, Tensolite 24463/03220T-2(LD), Thermax 956-1T200	100 Ohm	L-2119-BT
Twinax Pin PCB	21-33834-1	PCB (1.035 Length)	100 Ohm	
	21-33834-21	PCB (1.035 Length)	150 Ohm	
Transition Adapters - Twinax	21-33833-31	Straight receptacle	100 Ohm	
	21-33833-21	90 degree receptacle	100 Ohm	
	21-33833-91	90 degree receptacle (smaller profile)	100 Ohm	
	21-33833-51	90 degree PCB cable to board, cable 224463/9P025X-2	100 Ohm	L-2119-V
	21-33833-161	90 degree PCB (.283 tail)	100 Ohm	
	21-33833-171	Straight PCB (.283 tail)	100 Ohm	
	21-33833-121	90 degree receptacle (small profile .310)	150 Ohm	
	21-33832-21	Plug for 24463/9P025X-2(LD)	100 Ohm	L-2119-P
	21-33832-81	Plug for M17/176-00002	78 Ohm	L-2119-AJ
	21-33833-101	90 degree PCB cable to board, cable 26483/03071X-2	150 Ohm	
	21-33832-91	Plug for 26483/03071X-2	150 Ohm	L-2119-BR
	21-33833-111	90 degree Receptacle	150 Ohm	
	21-33832-101	Plug for 26483/03071X-2 (mates to 21-33833-121)	150 Ohm	

\*\* Installation instructions are available on-line at [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp).



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## For ARINC 600 Connectors

Description	Part Number	Cable Part Number	Impedance	Installation Instruction Sheet**
Quadrax Socket	21-33383-21	Tensolite NF24Q100, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD)	100 Ohm	L-2119-AH
	21-33383-31	Draka Fileca F-4703-3	100 Ohm	L-2119-I
	21-33383-61	Tensolite 26473/02006X-4(LD), Gore RCN8328	150 Ohm	L-2119-L
	21-33383-71	JSFY02-1	110 Ohm	
	21-33383-101	Draka Fileca F-4704-5, NF22Q100	100 Ohm	L-2119-AS
Socket PCB	21-33397-1	PCB (1.037 Length)	100 Ohm	
Quadrax Pin	21-33382-21	Tensolite NF24Q100, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD)	100 Ohm	L-2119-AH
	21-33382-31	Draka Fileca F-4703-3	100 Ohm	L-2119-I
	21-33382-61	Tensolite 26473/02006X-4(LD), Gore RCN8328	150 Ohm	L-2119-L
	21-33382-71	JSFY02-1		
	21-33382-101	Draka Fileca F-4704-5, NF22Q100	100 Ohm	L-2119-AS
Pin PCB	21-33398-41	PCB (.283 Length)	100 Ohm	
	21-33398-1	PCB (1.037 Length)	100 Ohm	
	21-33398-51	PCB (.283 Length)	100 Ohm	
Differential Twinax Socket	21-33379-21	ABS0386WF24	100 Ohm	L-2119-G
	21-33379-31	ASNE0272TK22	100 Ohm	L-2119-G
	21-33379-41	ASNE0272TK24	100 Ohm	L-2119-G
	21-33379-51	Tensolite 24463/9P025X-2(LD)	100 Ohm	
Differential Twinax Pin	21-33378-21	ABS0386WF24	100 Ohm	L-2119-G
	21-33378-31	ASNE0272TK22	100 Ohm	L-2119-G
	21-33378-41	ASNE0272TK24	100 Ohm	L-2119-G
	21-33378-51	Tensolite 24463/9025X-2(LD)	100 Ohm	

\*\* Installation instructions are available on-line at [www.amphenol-aerospace.com/serviceinstructions.asp](http://www.amphenol-aerospace.com/serviceinstructions.asp).



Quadrax Contact for ARINC Connectors



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## HOW TO ORDER

Amphenol Quadrax Connectors can be ordered by coded part number. The below connectors are kitted with the 100 Ohm Quadrax 21-033385-051 Socket and 21-033384-051 Pin contacts only. For contacts other than the previous list, please consult Amphenol Aerospace for part numbers.

Example **TVP00RQW21-75P**

### Connector Type

TV designates Tri-Start Series Connector\*\*  
TVP designates back panel mounted receptacle

### Shell Style

00 designates wall mount receptacle  
02 designates box mount receptacle available only with the PCB tails and epoxy backfilled (non-removable)  
06 designates straight plug  
07 designates jam nut receptacle

### Service Class

RQF electroless nickel plated aluminum  
RGQF electroless nickel plated groundplane aluminum  
RQW olive drab cadmium plate  
RGQW olive drab cadmium plated groundplane aluminum  
RQB NiAlBronze  
RGQB NiAlBronze ground plane  
RQK corrosion resistance stainless steel  
RGQK stainless steel ground plane

### Shell Size / Insert arrangement available

MIL-DTL-38999, Sizes 9-25 (see insert arrangements available on next page)

### Contact Type

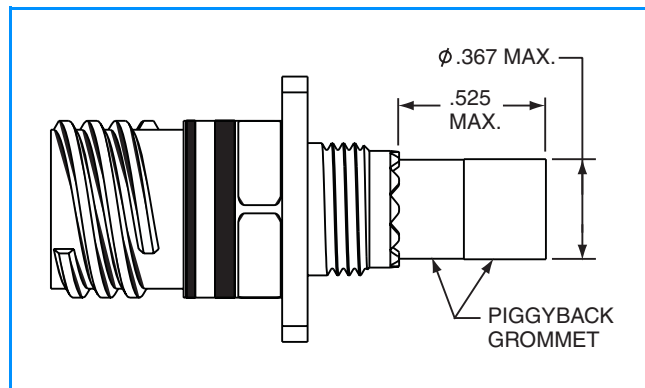
P designates pin contacts  
S designates socket contacts

\*\* Consult Amphenol Catalog 12-092 for more information on Tri-Start, MIL-DTL-38999 connectors. This catalog is online at [www.amphenol-aerospace.com](http://www.amphenol-aerospace.com)

### Suggested Strain Relief

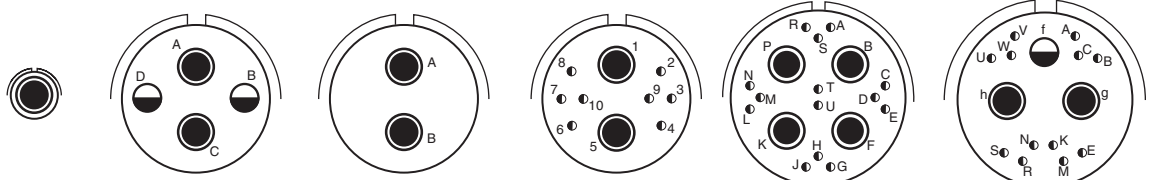
Due to the piggyback grommet interference with normal strain reliefs on the shell size 9 only, the recommended strain relief for the connector is: Amphenol part number TGW-R-5309-10 (OD Cad) or TGR-R-5309-10 (Electroless Nickel) - Size 9 only

For 19-18 insert pattern, recommended backshell - Glenair 367-221-NF. This is recommended due to the proximity of the Size 8 contacts in relation to the shell.

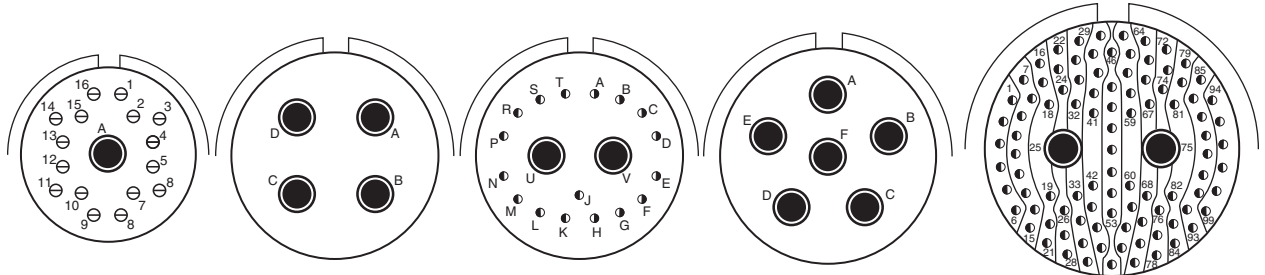


# Quadrax & Differential Twinax Contact insert arrangements for MIL-DTL-38999

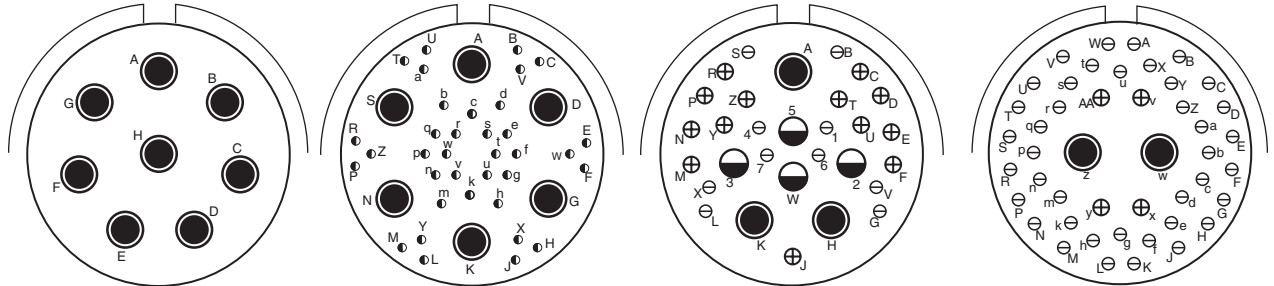
front face of pin inserts illustrated



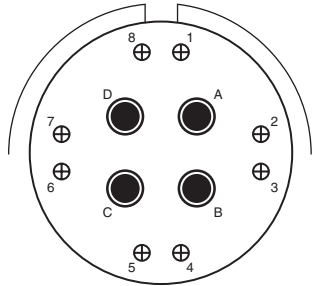
Insert Arrangement	9-5	17-22		17-52	17-60		19-18		19-31		
Number of Contacts	1	2	2	2	8	2	14	4	2	1	12
Contact Size	8	12	8	8	22D	8	22D	8	8	12	22D
	Grounded			Meets Boeing Specification							



Insert Arrangement	19-AD		21-75		21-79		23-6		25-7		
Number of Contacts	16	1	4		17	2	6		97	2	
Contact Size	20	8	8		22D	8	8		22D	8	



Insert Arrangement	25-8		25-17		25-20				25-46		
Number of Contacts	8		36	6	10	13	3	4	40	4	2
Contact Size	8		22D	8	20	16	8	12	20	16	8



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





## Suggested Numbering for Quadrax and Twinax Contacts

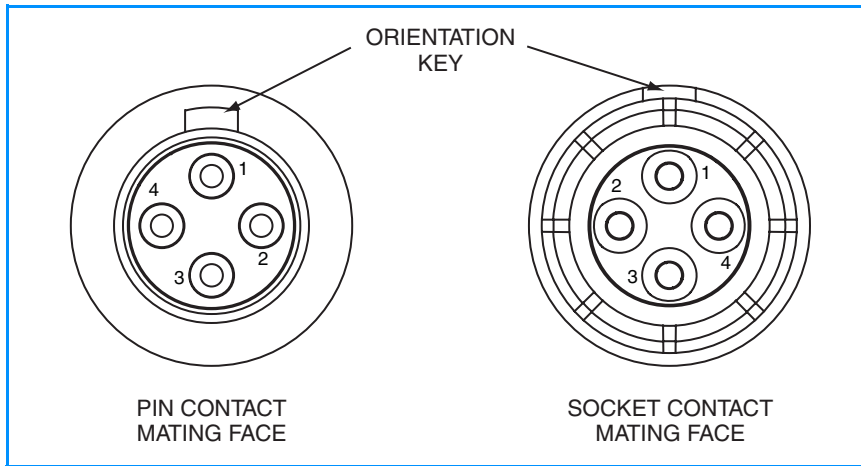


FIGURE 1 - INNER CONTACT NUMBERING, QUADRIX

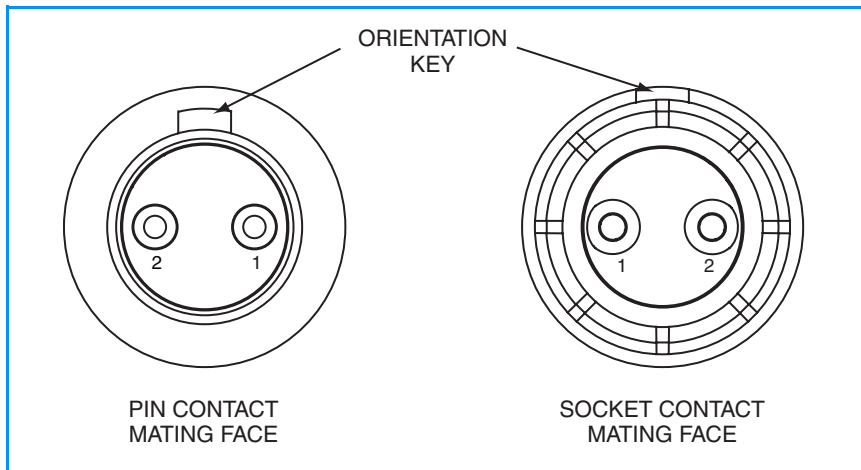
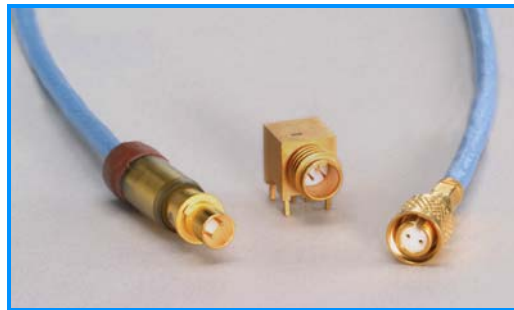


FIGURE 2 - INNER CONTACT NUMBERING, TWINAX



Differential Twinax Contact



Differential Twinax Contacts and Adapter

**Size 8 Quadrax Mated Pair  
Terminated to Tensolite Cable NF24Q100**

Differential Impedance	100 Ohm $\pm$ 10	Ethernet 100 Base-T Cable IEEE 1394 FireWire Cable
Attenuation on 22.5 ft.	100 MHz : 1.78 dB 400 MHz : 3.94 dB 1.0 GHz : 7.55 dB 2.5 GHz : 15.8 dB 3.0 GHz : 19.1 dB	
Far End Cross Talk (FEXT) <sup>2</sup>	> -30 dB up to 3.5 GHz	
Eye Pattern <sup>1</sup>	The minimum output eye opening with a 1-volt p-p input shall be 408 mV p-p measured at 50% of the period	

<sup>1</sup> Differential mode, 22.5 feet test length, 100 ps rise time (30%-80%), 1.65 Gb/sec.

<sup>2</sup> 22.5 feet test length, tested on HP8753ES Network Analyzer

**Size 8 Quadrax Mated Pair  
Terminated to Tensolite Cable 26473/02006X-4(LD)**

Differential Impedance	150 Ohm $\pm$ 30	Fibre Channel Cable
Attenuation on 22.5 ft.	512 MHz : 4.41 dB 1.06 MHz : 7.02 dB 1.65 GHz : 10.72 dB 2.00 GHz : 12.65 dB	
Far End Cross Talk (FEXT) <sup>2</sup>	> -30 dB up to 3.5 GHz	
Eye Pattern <sup>1</sup>	The minimum output eye opening with a 1-volt p-p input shall be 438 mV p-p measured at 50% of the period	

<sup>1</sup> Differential mode, 35 feet test length, 100 ps rise time (30%-80%), 1.65 Gb/sec.

<sup>2</sup> 35 feet test length, tested on HP8753ES Network Analyzer

**Size 8 Differential Twinax Mated Pair  
Terminated to Tensolite Cable 24463/9P025X-2(LD)**

Differential Impedance	100 Ohm $\pm$ 10	Ethernet 100 Base-T Cable IEEE 1394 FireWire Cable
Attenuation on 22.5 ft.	608 MHz : 32.22 dB 1.85 MHz : 23.98 dB 2.31 GHz : 23.30 dB 3.31 GHz : 23.90 dB	
Eye Pattern <sup>1</sup>	The minimum output eye opening with a 1-volt p-p input shall be 434 mV p-p measured at 50% of the period	

<sup>1</sup> Differential mode, 22.5 feet test length, 100 ps rise time (20%-80%), 1.65 Gb/sec.



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