Amphenol® Connectors are ideally suited for the incorporation of shielded contacts for high performance interconnection applications. The circular family is built around MIL-DTL-38999 specifications, with Mil-approved and commercial styles offered. Normal operating voltage for circulars with power contacts only is up to 900 VAC (RMS) at sea level.

The MIL-DTL-38999 family offer these features for contact termination flexibility:

- Widest selection of insert arrangements that can incorporate:
  - Size 8 high speed Quadrax and Differential Twinax contacts for MIL-DTL-38999 Series III (specially modified to accommodate keyed contacts)
  - Transition adapters for use in attaching D38999 Series III connectors with high speed quadrax or differential contacts to PCB boards
  - Size 8, 12 and 16 Coax contacts
  - Size 8 and 12 Twinax contacts
  - Size 8, 10 & 12 Triax contacts
- Wide selection of connector shell styles and sizes
- Scoop-Proof recessed design in LJT-R, TV-R and SJT-R connectors provide protection for contacts
- Standard power contacts are crimp rear release, qualified to SAE AS39029
- Coax, Twinax, and Triax contacts employ the same retention system as power contacts, simplifying user substitution

TV-R, Tri-Start, D38999 Series III

- *High performance capability series for both general duty and severe environment applications*
- *Offers the widest range of Subminiature Family Mil-Spec qualified options in contact and connector styles*
- *Threaded coupling; completely mates in one turn; crimp termination*
- *Superior EMI/EMP shielding effectiveness*
- *Scoop-proof design (recessed pins)*
- *Available in aluminum, stainless steel and firewall, or lightweight composite styles*

See 38999 section Series III for complete information on this section.

GENERAL ORDERING INFORMATION

Amphenol MIL-DTL-38999, which feature rear removable contacts, are normally supplied with a full complement of power contacts, separately packaged. Coax, twinax and triax contacts are ordered by part number as referenced in the part number charts on the following pages of this catalog, and are substituted for the power contacts at the time of the cable or equipment assembly. If the application is for coax, twinax or triax contacts only, the connector may be ordered *less contacts* and no power contacts will be supplied.

JT-R, D38999 Series II

See 38999 section Series II, JT for complete information on this series.

- *Shorter profile connector series for applications requiring maximum space savings*
- *Bayonet coupling, crimp termination*
- *Also available in solder termination types under MIL-DTL-27599 Series II*

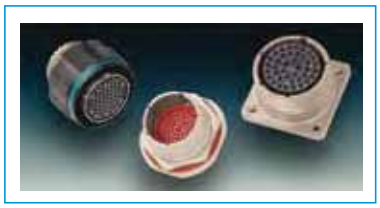
LJT-R, D38999 Series I

See 38999 section Series I, LJT for complete information on this series.

- *Scoop-proof (recessed pins)*
- *Bayonet coupling, crimp termination*
- *Also available in solder termination types under MIL-DTL-27599 Series II*

HOW TO ORDER CONNECTORS AND HIGH FREQUENCY CONTACTS

- Select the Circular Series desired.
  (See features of each series given briefly on this page and in-depth in the other sections of this catalog, which are on-line at www.amphenol-aerospace.com).
  Series I - LJT-R Connectors
  Series II - JT-R Connectors
  Series III - TV-R Connectors
  SJT* - SJT-R Connectors
  See Amphe-Lite (Industrial 38999 type) Catalog 12-094
- Select the quadrax, differential twinax, coax, twinax and/or triax contacts or the transition adapters that are needed from the tables on the following pages that correspond to the cable being used.
- Select the insert arrangement to accommodate required number of contacts. Insert patterns for quadrax and differential twinax contacts are on pages 387,388. Insert patterns for coax, twinax and triax contacts are on pages 404-406.
- Complete the connector part number from the connector series catalog, incorporating the chosen insert pattern number. See detailed how to order page 389 for ordering 38999, Series III with quadrax and differential twinax contacts. Consult Amphenol for assistance in ordering 38999 circulars with coax, twinax and triax contacts.
- Consult Amphenol Aerospace for ordering information for connectors with PC tail contacts, and for transition adapters.
- If connector is ordered less contacts, power contacts and/or sealing plugs may be ordered separately to fill out the insert arrangement.



Amphe-Lite, 38999 Type

See Catalog 12-094 for complete information on this series.

- *Commercial/Industrial 38999 Series III type*
- *Cost effective high performance connector for severe environments or general duty industrial applications*
- *Consult Amphenol Industrial Operations for further information 12-094 catalog is on-line at www.amphenol-industrial.com.*

SJT-R, 38999 Type

See the SJT section of this catalog.

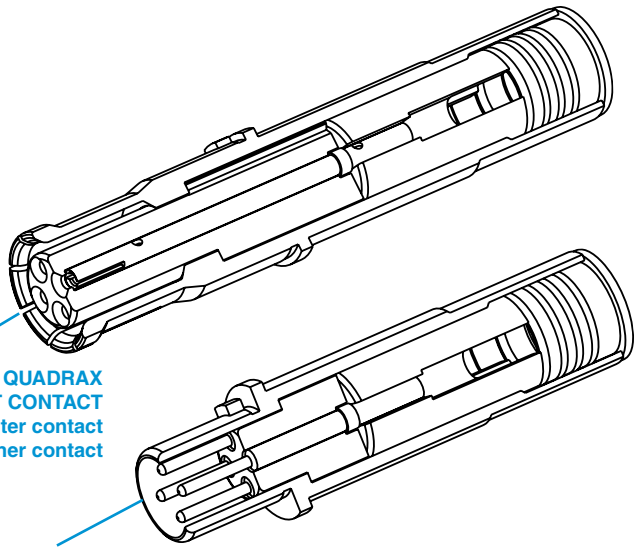
- *Amphenol proprietary series (non-MS) which is a further expansion of the basic JT family, but incorporates the LJT scoop-proof design*
- *Compliant with several European specifications*

NOTE: SAE AS39029 supersedes MIL-C-39029.
NOTE: MIL-DTL-38999 supersedes MIL-C-38999.
MIL-DTL-27599 supersedes MIL-C-27599

Amphenol Aerospace

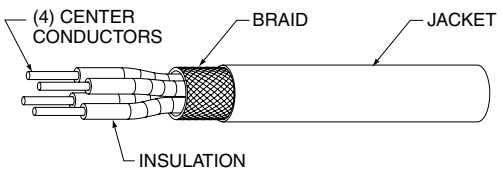
Amphenol® Quadrax Contacts -offer several advantages for high data transfer rates, low power consumption and excellent EMI compatibility:

- Four strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Available in size 8 crimp termination style
- Also available in size 8 with PC tails (see page 379)
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts



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



Cable Illustration - Quadrax Contact

Quadrax Pin with 8P8C "RJ45" Jack

Quadrax Pin Size 8 and MIL-DTL-38999 Series III Connector

Quadrax in an Eight Wire Gigabit Ethernet Assembly

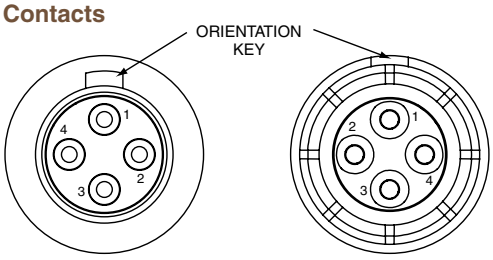
Quadrax Contacts are gold plated, crimp termination

Finish of mating contacts parts: supplied with 0.000050 min. gold over nickel on mating parts. Consult Amphenol for availability of other finishes.

Quadrax Size 8 Contact 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

Suggested Numbering for Quadrax Contacts



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

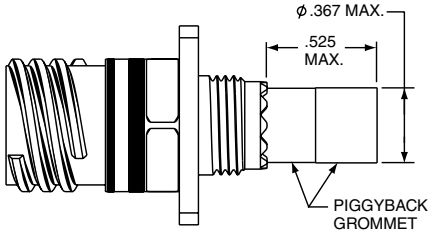
See page 389 for part number ordering of popularly used 38999 Series III connectors with 100 ohm quadrax contacts.

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

Suggested Strain Relief - Insert Arrangements 9-5 or 19-18 with Quadrax Contacts

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 TGF-R-5309-10 (Electroless nickel)

- shell 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.



Also see Quadrax contacts for ARINC 600 and R27 Rack and Panel Connectors on page 411 and 412.

TV-R Series, MIL-DTL-38999 Series III* Connectors

QUADRAX CONTACTS FOR USE IN TV-R CONNECTORS								
Cable	Contact Part Number (Termination Instruction Sheet)**		Impedance (Ohms)	Inner Conductor (AWG)	Contact Size	Electrical Protocol††	Crimping Tools	
	Pin	Socket					Inner Contact	Outer Contact
Draka Fileca F-4703-3, F4704-4, Filotex ET 2PC236, Filotex ET2PF870, PIC Wire E50424 ABS0972, Tensolite 23450/04090X-4(LD)	21-33384-21 (L-2119-A)	21-33385-21 (L-2119-A)	100	24	8	Ethernet, 1000 Base-T Gigabit Ethernet	M22520/2-01 with Positioner M22520/2-37 or with Daniels Positioner K709	M22520/5-01 with Die Set M22520/5-45 (Location A)
Tensolite NF24Q100, NF24Q100-01, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD), 24443/C20714X-4(LD), 24450/0120X-4(LD), NF24-2Q100, TYCO CEC-RWC-18664, GORE GSC-01-81869-01, 24443/03166X-4(LD), Thermax T956-4T200, Pic Wire E51424, Thermax MX100Q-24, NF24Q100-01-200C (Space)	21-33384-51 (L-2119-D)	21-33385-51 (L-2119-D)		24		Ethernet, 1000 Base-T Gigabit Ethernet		
Tensolite NF22Q100, NF22Q100-01, Thermax 956-5, GORE RCN 7688 Draka Fileca F-4704-5, ABS1503 KD 24	21-33384-61 (L-2119-H)	21-33385-61 (L-2119-H)		22		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Tensolite NF26Q100, NF26Q100-01, NF26-2Q100, PIC E51426	21-33384-71 (L-2119-AB)	21-33385-71 (L-2119-AB)		26		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Draka Fileca F-4704-6, Gore RCN 8672	21-33384-151 (L-2119-AW)	21-33385-151 (L-2119-AW)		26		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Tensolite NF24Q100-01 (same as 21-3338( ) -51, uses EMI Piggyback)	21-33384-161 (L-2119-BE)	21-33385-161 (L-2119-BE)		24		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Gore RCN8513, JSFY18-3	21-33384-171 (L-2119-BN)	21-33385-171 (L-2119-BN)		22		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Tensolite NF22Q100 Special Box pattern, only mates with 21-333 ( )-181	21-33384-181 (L-2119-BP)	21-33384-181 (L-2119-BP)		22		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Tensolite NF24Q100, NF24Q100-01 for 2.5 Gbps applications	21-33384-191 (L-2119-BS)	21-33385-191 (L-2119-BS)		24		Serial FPDP Applications (2.5 Gbps)		
USB2 (28433/02171LX-4)	21-33384-101†	21-33385-101†	90			USB2.0 (480 Mbps)		
Tensolite 24450/03089X-4(LD)	21-33384-211	21-33385-211	110	24		IEEE 1394B Firewire		
JSFY02-1, JSFY18	21-33384-221	21-33385-221		24		IEEE 1394B Firewire		
Gore RCN8487, JSFY18	21-33384-231	21-33385-231		24		IEEE 1394B Firewire		
Tensolite 24450/03089X-4(LD) Same as 21-3338( )-211 but Box pattern, mates with 21-3338( )-241 only	21-33384-241†	21-33385-241†		24		IEEE 1394B Firewire		
Tensolite 26473/02006X-4(LD)/Gore RCN8328 (not for new designs, use 21-33450/1 series)	21-33384-31 (L-2119-B)	21-33385-31 (L-2119-B)	150	26				

CHART CONTINUES ON NEXT PAGE

QUADRAX 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 above 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.

CONTACT ORDERING: Example number given in chart 21-33384-21 should be ordered as 21-033384-021; example number 21-33384-151 should be ordered as 21-033384-151. Adding Zeros is necessary for Amphenol ordering process on all contact numbers
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: www.amphenol-aerospace.com/serviceinstructions.asp
† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.
†† Test reports available for indicated protocols. Consult Amphenol Aerospace.

TV-R Series, MIL-DTL-38999 Series III* Connectors

QUADRAX CONTACTS FOR USE IN TV-R CONNECTORS								
Cable	Contact Part Number (Termination Instruction Sheet)**		Impedance (Ohms)	Inner Conductor (AWG)	Contact Size	Electrical Protocol††	Crimping Tools	
	Pin	Socket					Inner Contact	Outer Contact
Tensolite 26473/02006X-4(LD) Same as 21-33384/5-31 but box pattern (not for new designs, use 21-33450/1 series)	21-33384-201†	21-33385-201†	150	26	8		M22520/2-01 with Positioner M22520/2-37 or with Daniels Positioner K709	M22520/5-01 with Die Set M22520/5-45 (Location A)
Tensolite 26473/02006X-4(LD), Gore RCN8328	21-33450-001 (L-2119-BW)	21-33451-001 (L-2119-BW)		26		Fibre-Channel (1 GBPS, 2 GBPS, 1G/2G), 1000 Base-CX (1.25 GBPS), SCSI-2 (3.2 GBPS)		
Tensolite 26473/02006X-4(LD), Gore RCN8328 (same as 21-33450/1-1 except box pattern. Mates with 21-33450/1-11 only.	21-33450-011†	21-33451-011†		26		Fibre-Channel (1 GBPS, 2 GBPS, 1G/2G), 1000 Base-CX (1.25 GBPS), SCSI-2 (3.2 GBPS)		

PCB QUADRAX CONTACTS FOR USE IN TV-R CONNECTORS				
PCB Quadrax Contacts	Contact Part Number		Impedance (Ohms)	Contact Size
	Pin	Socket		
PCB (1.035 Length) Pre-tinned tails	21-33398-21	21-33397-21	100	8
PCB (.866 Length)	21-33398-31	21-33397-31	100	
PCB Right Angle, inner contacts box pattern	21-33425-1		100	
PCB (.494 Length) Pre-tinned tails	21-33398-71		150	
PCB (1.194 Length) Pre-tinned tails	21-33398-101		100	
PCB (.859 Length)	21-33398-121		100	
PCB (.741 Length)	21-33398-271†		100	
PCB (1.035 Length)	21-33398-291	21-33397-291	100	
PCB (.836 Length)		21-33397-301	150	
PCB (1.035 Length) Pre-tinned tails	21-33398-61	21-33397-61	150	
PCB (1.035 Length) mates to 21-33451 series	21-33452-11†		150	
PCB (1.035 Length) mates to 21-33450 series		21-33453-11†	150	
PCB (.815 Length) mates to 21-33451 series	21-33452-21†		150	
PCB (.815 Length) mates to 21-33450 series		21-33453-21†	150	
PCB (.815 Length) Pre-tinned tails, mates to 21-33451 series	21-33452-31†		150	
PCB (.815 Length) Pre-tinned tails, mates to 21-33450 series		21-33453-31†	150	
PCB .866 Length) mates to 21-33451 series	21-33452-41†		150	
PCB (.866 Length) mates to 21-33450 series		21-33453-41†	150	
PCB (.494 Length) mates to 21-33451 series	21-33452-51†		150	
PCB (.494 Length) mates to 21-33450 series		21-33453-51†	150	
PCB (.840 Length) Pre-tinned tails	21-33398-81		150	
PCB (.780 Length) Pre-tinned tails	21-33398-131		150	
PCB (.840 Length) Pre-tinned tails	21-33398-91		100	
PCB (.708 Length)	21-33398-111		100	
PCB (.605 Length)	21-33398-191		100	
PCB (.494 Length)	21-33398-231		100	
PCB (.741 Length)	21-33398-241	21-33397-241	100	
PCB (.806 Length)	21-33398-281		100	
PCB (.940 Length)	21-33398-311		100	
PCB (.939 Length)	21-33398-361		100	
PCB (.672 Length)	21-33398-371		100	
PCB (.914 Length)	21-33398-381		100	
PCB (.866 Length)	21-33398-411		100	
PCB (.901 Length)		21-33397-341	100	
PCB (.871 Length)		21-33397-351	100	
PCB (1.169 Length)		21-33397-421	100	

CONTACT ORDERING: Example number given in chart above 21-33384-201 should be ordered as 21-033384-201; example number given in chart at left 21-33398-21 should be ordered as 21-033398-021. Adding Zeros is necessary for Amphenol ordering process on all contact numbers

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: www.amphenol-aerospace.com/serviceinstructions.asp

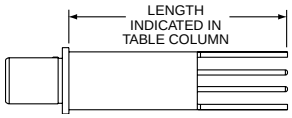
† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

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

SEALING PLUGS	
Sealing Plugs for use with D38999 Connectors using Quadrax Contacts - Size 8 Cavities	Part Number
Standard Plastic	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	21-33899-8Q1
Metal sealing plug used with PCB's and mating contact on mating half	21-33899-8Q2

PIGGYBACK GROMMET	
Grommet for use with D38999 Connectors using Quadrax Contacts	Part Number
Metallized piggyback grommet	21-33321-23

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.

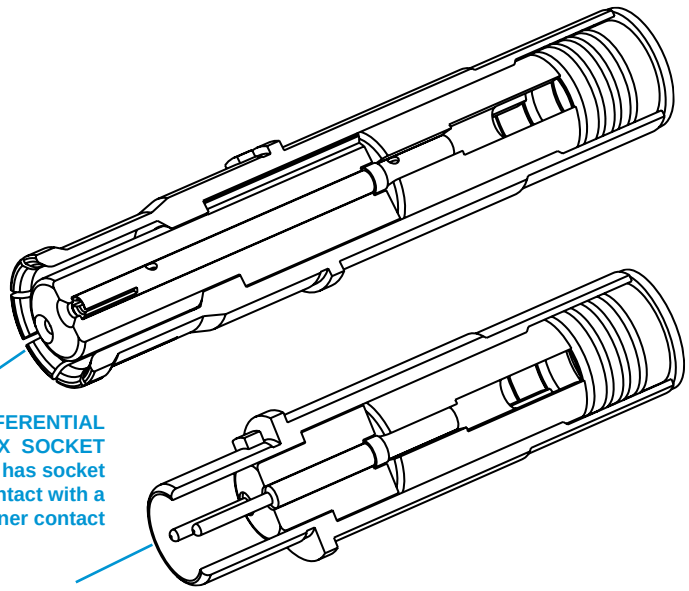


Note: it does not indicate stickout length when installed in D38999 connector.

Amphenol® Differential Twinax Contacts -

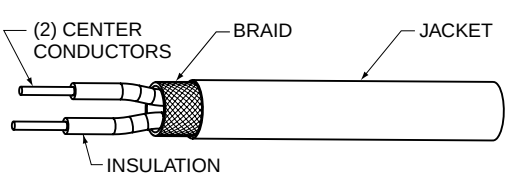
Offer several advantages for high data transfer rates, low power consumption and excellent EMI compatibility:

- 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 (see page 381)
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts



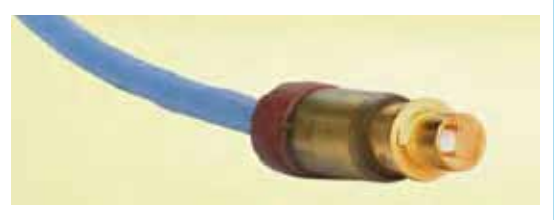
TYPICAL DIFFERENTIAL TWINAX SOCKET CONTACT has socket outer contact with a socket inner contact

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

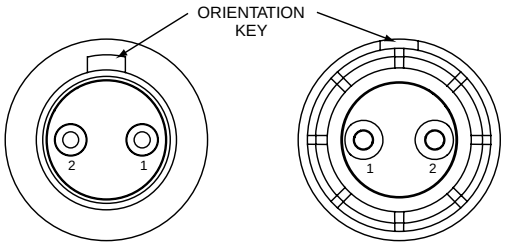
Differential Twinax Contacts are Gold plated, Crimp Termination

Finish of mating contacts parts: supplied with 0.000050 min. gold over nickel on mating parts. Consult Amphenol for availability of other finishes.

Differential Twinax Size 8 Contact 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

Suggested Numbering for Differential Twinax Contacts



TV-R Series, MIL-DTL-38999 Series III* Connectors

DIFFERENTIAL TWINAX CONTACTS FOR USE IN TV-R CONNECTORS							
Cable	Contact Part Number (Termination Instruction Sheet)**		Impedance (Ohms)	Contact Size	Electrical Protocol††	Crimping Tools	
	Pin	Socket				Inner Contact	Outer Contact
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), S280W502-1	21-33387-21 (L-2119-E)	21-33388-21 (L-2119-E)	100	8	Ethernet, USB	M22520/2-01 with Positioner M22520/2-37 or with Daniels Positioner K709	M22520/5-01 with Die Set M22520/5-45 (Location A)
GORE GSC-05-827300-00	21-33387-51*** (L-2119-AY)	21-33388-51*** (L-2119-AY)					
Tensolite 26453/03184X-2(LD), Thermax 956-626Z, GORE GSC-05-827300-00	21-33387-41 (L-2119-T)	21-33388-41 (L-2119-T)					
23460/05114X-2(LD), PIC E1024	21-33387-61 (L-2119-BH)	21-33388-61 (L-2119-BH)					
Raychem 0026A0024, M17/176-00002 (77 Ohm)	21-33387-71 (L-2119-BJ)	21-33388-71 (L-2119-BJ)					
JSFY11-24, Tensolite 24463/03220T-2(LD), Thermax 956-1T200	21-33387-91 (L-2119-BT)	21-33388-91 (L-2119-BT)					
S280W502-6, Tensolite 24463/9P026X-2(LD)	21-33387-101 (L-2119-AK)	21-33388-101 (L-2119-AK)					
Tensolite 26483/03071X-2(LD)	21-33387-31 (L-2119-AC)	21-33388-31 (L-2119-AC)	150				
Tensolite 26483/03071X-2(LD)	21-33456-1 (L-2119-BX)†	21-33457-1 (L-2119-BX)†			Fibre Channel, 1000 Base-CX Ethernet		

PCB DIFFERENTIAL TWINAX CONTACTS FOR USE IN TV-R CONNECTORS				
PCB Quadrax Contacts	Contact Part Number		Impedance (Ohms)	Contact Size
	Pin	Socket		
PCB (1.035 Length)	21-33834-1	21-33835-1	100	8
PCB (.788 Length)	21-33834-31	21-33835-31		
PCB (.494 Length)	21-33834-41	21-33835-41		
PCB (.939 Length)	21-33834-51	21-33835-51		
PCB (.780 Length)	21-33834-61	21-33835-61		
PCB (.871 Length)	21-33834-71	21-33835-71		
PCB (.937 Length)	21-33834-81	21-33835-81		
PCB (1.035 Length)	21-33834-91	21-33835-91		
PCB (.843 Length)	21-33834-101	21-33835-101		
PCB (.806 Length)	21-33834-111	21-33835-111		
PCB (.908 Length)	21-33834-121	21-33835-121		
PCB (.530 Length)	21-33834-131	21-33835-131		
PCB (.819 Length)	21-33834-141	21-33835-141		
PCB (1.035 Length)	21-33834-21	21-33835-21	150	
PCB (1.035 Length) mates to 21-33456/57 series	21-33458-001	21-33457-001		

CONTACT ORDERING: Example number given in chart above 21-33387-21 should be ordered as 21-033387-021; example number given in chart left 21-33834-1 should be ordered as 21-033834-001. Adding Zeros is necessary for Amphenol ordering process on all contact numbers 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

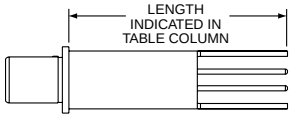
† Consult Amphenol Aerospace for current release of this instruction sheet.

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 above 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.

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.

General Description

Amphenol® Quadrax Contacts for Printed Circuit Board Attachment

- Available for MIL-DTL-38999 Series III Circular connectors with straight PC tail termination and with compliant pin termination. These provide the ideal solution for bringing high speed data transmission to the board.

Compliant Pin Quadrax and PC Tail Quadrax Contacts

MIL-DTL-38999, SERIES III CONNECTOR WITH PC TAIL CONTACTS. This arrangement has 33 size 22D and 2 Quadrax PC tail contacts.

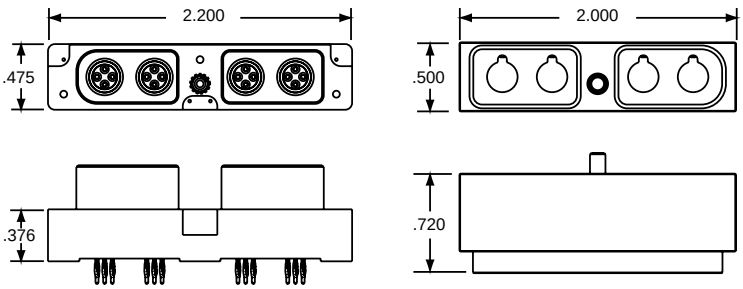
MIL-DTL-38999, SERIES III CONNECTOR WITH PC TAIL CONTACTS. This arrangement has 8 Quadrax PC tail contacts.

Amphenol® Quadrax Contacts for Rectangular Board Level Connectors

- Incorporate the same size 8 Quadrax PCB contacts as used in circular 38999 connectors.

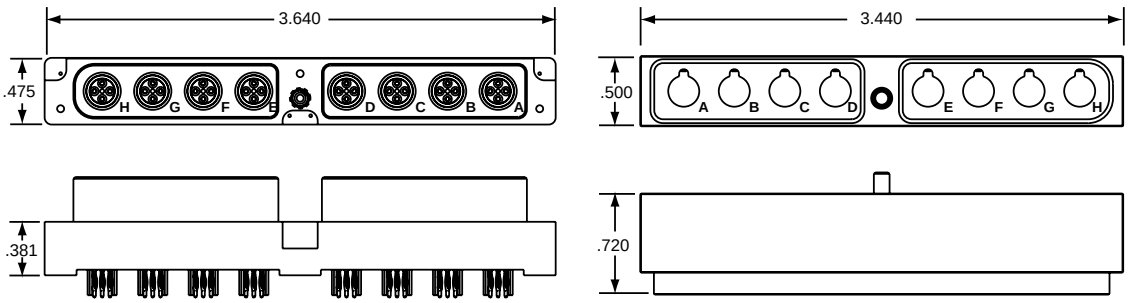
- Size 8 Quadrax Compliant contacts with hole diameters:
  .025 ±.002 PTH Quadrax contact
  .040 ±.003 PTH shell grounding
  Accommodates backplane .125 inch min. thickness
- Consult Amphenol Aerospace for availability of additional connector configurations

4 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX



Compliant Pin Quadrax Board Level Connector

8 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX



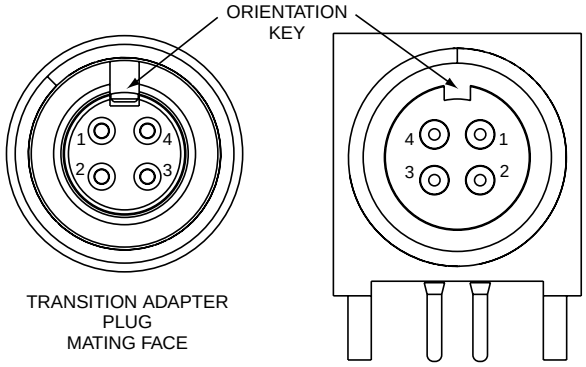
General Description

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

90° Quadrax Receptacle and Plug Transition Adapter

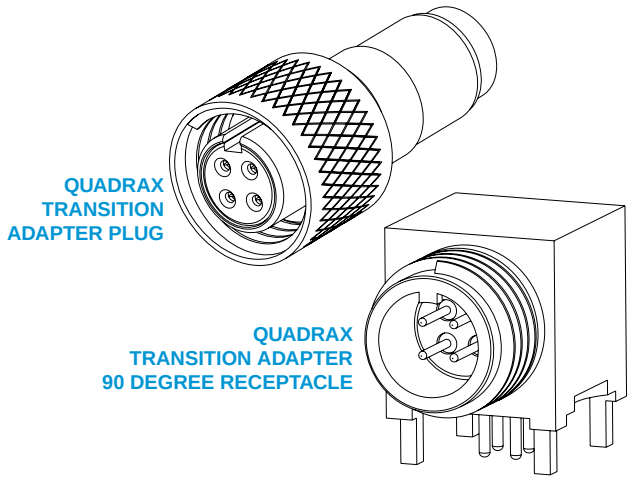
Suggested Numbering for Transition Adapters with Quadrax Contacts



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.



ELECTRICAL PROTOCOLS FOR QUADRAX TRANSITION ADAPTERS

Part Number		Impedance (Ohms)	Electrical Protocol††
Plug	Receptacle		
21-33836-31		100	Ethernet, gigabit Ether
21-33836-41			Ethernet, gigabit Ether
21-33836-51			Ethernet, gigabit Ether
21-33836-61			Ethernet, gigabit Ether
	21-33837-81 (90 degree)		
	21-33837-91 (90 degree)		
	21-33837-41 (90 degree)		
	21-33837-51 (straight)		Ethernet, gigabit Ether
	21-33837-61 (90 degree)		
	21-33837-141 (90 degree)		
21-33837-101			
21-33836-21		150	1000 Base CX, Fibre channel
	21-33837-21 (90 degree)		1000 Base CX, Fibre channel
	21-33837-211 (jam nut)		
	21-33837-31 (straight)		
	21-33837-71 (90 degree)		
21-33837-111			

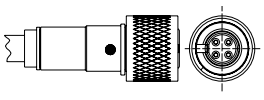
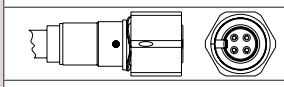
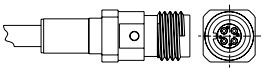
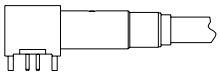
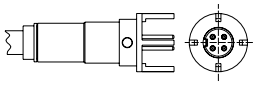
ELECTRICAL PROTOCOLS FOR DIFFERENTIAL TWINAX TRANSITION ADAPTERS

Part Number		Impedance (Ohms)	Electrical Protocol††
Plug	Receptacle		
21-33832-81		100	
21-33832-21			Ethernet
	21-33833-21 (90 degree)		
	21-33833-31 (90 degree)		Ethernet
	21-33833-151 (90 degree)		
21-33832-111†			
	21-33833-161† (90 degree)		
	21-33833-171† (90 degree)		
	21-33833-91 (90 degree)		
	21-33833-51 (90 degree)		
	21-33833-141 (90 degree)		
21-33832-91		150	
	21-33833-111 (90 degree)		
	21-33833-181† (90 degree)		
	21-33833-101 (90 degree)		

† Consult Amphenol Aerospace for current release of this adapter.
††Test reports available for indicated protocols; consult Amphenol Aerospace.

Application Data

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

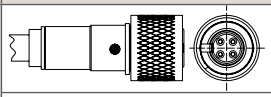
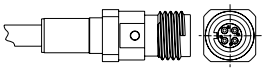
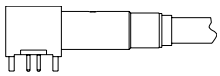
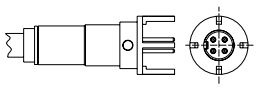
Quadrax Type Adapter/ Cable or PCB Tail Length		Illustration of Adapter	Part Number (Termination Instruction Sheet)** Plug	Part Number (Termination Instruction Sheet)** Receptacle	Impedance (Ohms)	Mating Thread Size	Crimping Tools Inner Contact	Crimping Tools Outer Contact
Quadrax Plug Adapter/ Tensolite NF24Q100	Mating plugs and receptacles		21-33836-31 (L-2119-U)		100	.375	M22520/2-01 with Positioner M22520/2-37 or with Daniels Positioner K709	M22520/5-01 with Die Set M22520/5-45 (Location A)
Quadrax Plug Adapter/ Tensolite NF22Q100, NF22Q100-01, Thermax 956-5			21-33836-41 (L-2119-W)†					
Quadrax Plug Adapter/ Draka Fileca F-4703-3, F-4704-4			21-33836-51 (L-2119-Y)					
Quadrax Plug Adapter/ NF26Q100			21-33836-61 (L-2119-AM)†					
Quadrax Plug Adapter/ Hexnut with Lock Wire Holes Tensolite NF24Q100			21-33836-81					
Quadrax Receptacle Straight Adapter in-line jam nut (threaded)/ GSC-10-8273900				21-33837-81 (L-2119-AR)†				
Quadrax Receptacle Straight Adapter in-line (threaded)/ NF24Q100				21-33837-91 (L-2119-BL)				
PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .110				21-33837-41			NA	NA
PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .200				21-33837-201				
PCB Quadrax Receptacle Straight Adapter/ Tail Length .110				21-33837-51				
PCB Quadrax Receptacle Straight Adapter/ Special Tail Length (.200)				21-33837-61				
Quadrax Receptacle 90 degree Adapter with cable to board/ NF24Q100	Wired to board			21-33837-141 (L-2119-BB)†	100		M22520/2-01 with Positioner M22520/2-37 or with Daniels Positioner K709	M22520/5-01 with Die Set M22520/5-45 (Location A)
Quadrax Receptacle 90 degree Adapter with cable to board/ ABS1503KD24				21-33837-231				
Quadrax Receptacle Straight Adapter with cable to board/ NF24Q100				21-33837-101 (L-2119-AN)				

CONTACT ORDERING: Example number given in chart 21-33837-81 should be ordered as 21-033837-081; example number 21-33837-101 should be ordered as 21-033837-101. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.
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: www.amphenol-aerospace.com/serviceinstructions.asp
† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable.
See electrical protocols for transition adapters on page 383.

Amphenol Aerospace

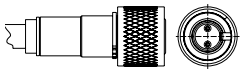
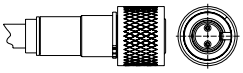
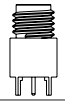
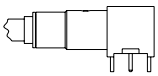
Application Data

150 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 (Termination Instruction Sheet)**		Impedance (Ohms)	Mating Thread Size	Crimping Tools	
			Plug	Receptacle			Inner Contact	Outer Contact
Quadrax Plug Adapter/ Tensolite 26473/02006X-4(LD), Gore RCN8328	Mating plugs and receptacles		21-33836-21 (L-2119-S)		150	.375	M22520/2-01 with Positioner M22520/2-34	NA
PCB Quadrax Receptacle 90 Degree Adapter/ Tail Length .110				21-33837-21			NA	
PCB Quadrax Receptacle Straight Adapter/ Tail Length .110				21-33837-31				
Quadrax Receptacle Straight Adapter in-line Jam Nut (threaded) Tensolite 26473/02006X-4 (LD), Gore RCN8328	Wired to board			21-33837-211 (L-2119-BY)	150			
Quadrax Receptacle 90 degree Adapter with cable to board/ Tensolite 26473/02006X-4				21-33837-71 (L-2119-AI)†			M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)
Quadrax Receptacle Straight Adapter with cable to board/ Tensolite 26473/02006X-4 (LD)				21-33837-111 (L-2119-AP)				

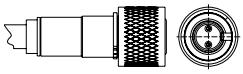
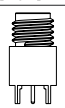
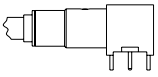
CONTACT ORDERING: Example number given in chart 21-33837-81 should be ordered as 21-033837-081; example number 21-33837-101 should be ordered as 21-033837-101. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.
Daniels crimping tools are available from Daniels Mfg. Corp. 6103 Anno Ave., Orlando, FL 32809

**Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/serviceinstructions.asp
† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable.
See electrical protocols for transition adapters on page 383.

100 OHM DIFFERENTIAL TWINAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS

Differential Twinax Type Adapter/ Cable or PCB Tail Length		Illustration of Adapter	Part Number (Termination Instruction Sheet)** Plug	Part Number (Termination Instruction Sheet)** Receptacle	Impedance (Ohms)	Mating Thread Size	Crimping Tools Inner Contact	Crimping Tools Outer Contact
Differential Twinax Plug Adapter/ M17/176-00002 (77 ohms)	Mating plugs and receptacles		21-33832-81 (L-2119-AJ)		100	.3125	M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-05 (Location B)
Differential Twinax Plug Adapter/ Tensolite 24463/9P025X-2(LD) 10-646060			21-33832-21 (L-2119-P)					
PCB Differential Twinax Receptacle 90 Degree Adapter/ Tail Length .110				21-33833-21			N/A	N/A
PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .110				21-33833-31				
PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .165				21-33833-151				
Differential Twinax Plug Adapter/Tensolite CAN22TDT120 (120 Ohm)	Mating plugs and receptacles		21-33832-111†		100	.375	M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)
PCB Differential Twinax Receptacle 90 degree Adapter/ Tail Length .283				21-33833-161†			N/A	N/A
PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .283				21-33833-171†				
Differential Twinax Receptacle 90 degree Adapter (low profile) with cable to board/ Tensolite 24463/9P026X-2	Wired to board			21-33833-91 (L-2119-AF)	100	N/A	M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)
Differential Twinax Receptacle 90 degree Adapter with cable to board/ Tensolite 24463/9P025X-2				21-33833-51 (L-2119-V)				
Differential Twinax Receptacle 90 degree Adapter with cable to board/Tensolite 24463/9P025X-2				21-33833-141 (L-2119-BU)				

150 OHM DIFFERENTIAL TWINAX TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS

Differential Twinax Type Adapter/ Cable or PCB Tail Length		Illustration of Adapter	Part Number (Termination Instruction Sheet)** Plug	Part Number (Termination Instruction Sheet)** Receptacle	Impedance (Ohms)	Mating Thread Size	Crimping Tools Inner Contact	Crimping Tools Outer Contact
Differential Twinax Plug Adapter/ Tensolite 26483/03071X-2	Mating plugs and receptacles		21-33832-91 (L-2119-BR)		150	.375	M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)
PCB Differential Twinax Receptacle 90 Degree Adapter/ Tail Length .110				21-33833-111			N/A	N/A
PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .110				21-33833-181†			N/A	N/A
Differential Twinax Receptacle 90 degree Adapter with cable to board/ Tensolite 26483/03071X-2	Wired to board			21-33833-101 (L-2119-BM)†	150	N/A	M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)

CONTACT ORDERING: Example number given in chart 21-33832-21 should be ordered as 21-033832-021; example number 21-338373-141 should be ordered as 21-033833-141. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

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

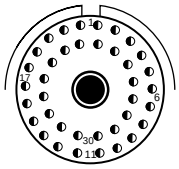
† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable. See electrical protocols for transition adapters on page 383.

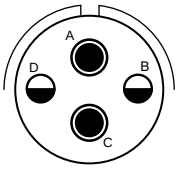
Insert Arrangements - MIL-DTL-38999, Series III
Incorporating Quadrax & Differential Twinax Contacts

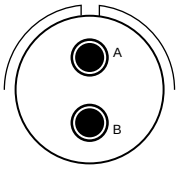
Amphenol Aerospace

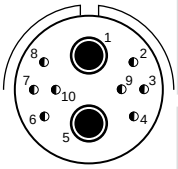
This illustrated listing represents the most readily available patterns incorporating quadrax and differential twinax contacts within D38999, Series III connectors. If you require other arrangements than what are shown here, consult Amphenol for further availability. In most cases, unless otherwise stated, 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

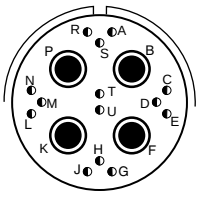


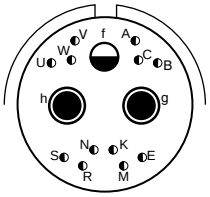


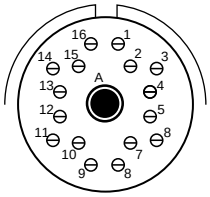


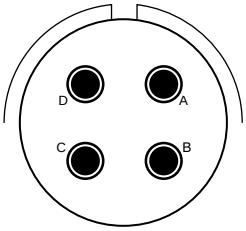


Insert Arrangement	9-5	17-2		17-22		17-52	17-60	
Number of Contacts	1	38	1	2	2	2	8	2
Contact Size	8	22D	8 Twinax	12	8	8	22D	8
	Grounded					Meets Boeing Specification		

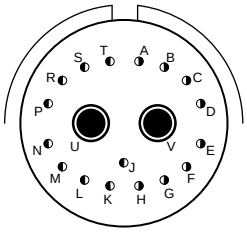


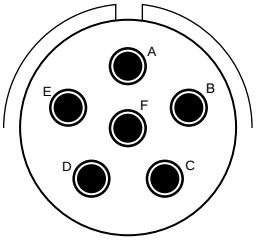


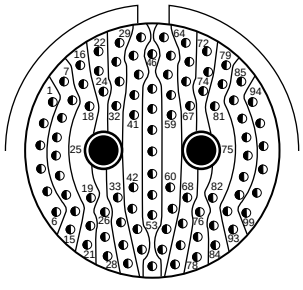




Insert Arrangement	19-18		19-31			19-AD		21-75
Number of Contacts	14	4	12	1	2	16	1	4
Contact Size	22D	8	22D	12	8	20	8	8





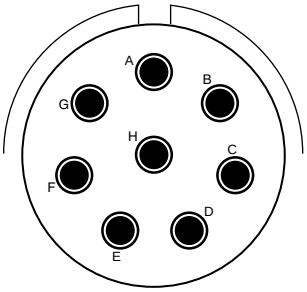


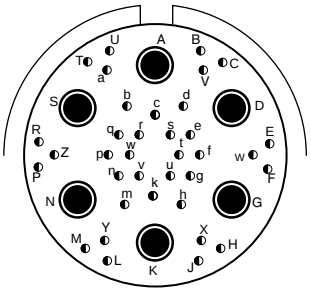
Insert Arrangement	21-79		23-6	25-7	
Number of Contacts	17	2	6	97	2
Contact Size	22D	8	8	22D	8

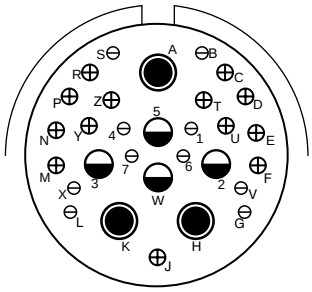
CONTACT LEGEND

8	10	12	16	20	22D
Quadrax or Differential Twinax					

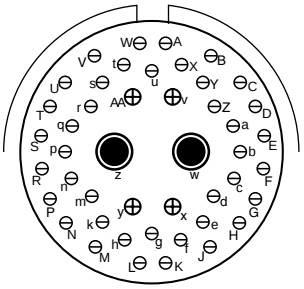
Front face of pin inserts illustrated

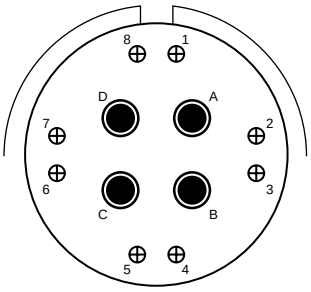






Insert Arrangement	25-8	25-17		25-20			
Number of Contacts	8	36	6	10	13	3	4
Contact Size	8	22D	8	20	16	8	12





Insert Arrangement	25-46			25-62	
Number of Contacts	40	4	2	8	4
Contact Size	20	16	8	16	8
				Ground plane only	

CONTACT LEGEND

8	10	12	16	20	22D
Quadrax or Differential Twinax					

How to Order 38999, Series III Circular
With Quadrax 100 Ohm Contacts

Amphenol Aerospace

Amphenol Tri-Start, 38999 Series III* Connectors can be ordered with the following popularly used Quadrax contacts:
100 ohm quadrax 21-033385-051 socket contacts
100 ohm quadrax 21-033384-051 pin contacts
Use the following coded number ordering procedure :

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

For ordering of connectors with any other quadrax contacts or differential twinax contacts, please consult Amphenol Aerospace for part numbers.

Step 1. Select a Connector Type

TV	Tri-Start Series Connector with metal shells
TVP	Back panel mounted receptacle with metal shells
CTV	Tri-Start Series Connector with composite shells
CTVP	Back panel mounted receptacle with composite shells

Step 2. Select a Shell Style

00	Wall mount receptacle
02	Box mount receptacle available only with the PCB tails and epoxy backfilled (non-removable)
06	Straight plug
07	Jam nut receptacle

Step 3. Select a Service Class with Quadrax

RQF	Electroless nickel plated aluminum
RGQF	Electroless nickel plated ground plane aluminum
RQW	Olive drab cadmium plate
RGQW	Olive drab cadmium plated ground plane aluminum
RQB	NiAlBronze
RGQB	NiAlBronze ground plane
RQK	Corrosion resistance stainless steel
RGQK	Stainless steel ground plane
QDT	Durmalon plated, Nickel-PTFE alternative to cadmium
GQDT	Groundplane Durmalon

Step 4. Select a Shell Size and Insert Arrangement

See insert arrangements available with quadrax contacts on preceding pages. Shell Size and Insert Arrangements are together in one chart. First number represents Shell Size, second number is the Insert Arrangement

Step 5. Select Contact Type

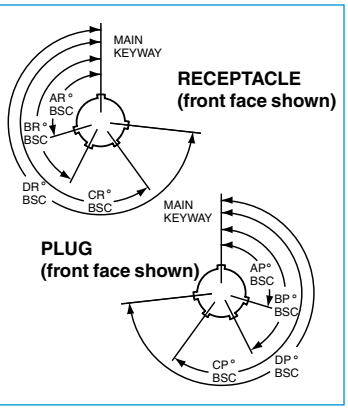
P	Pin contacts
S	Socket contacts

Step 6. Select an 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.



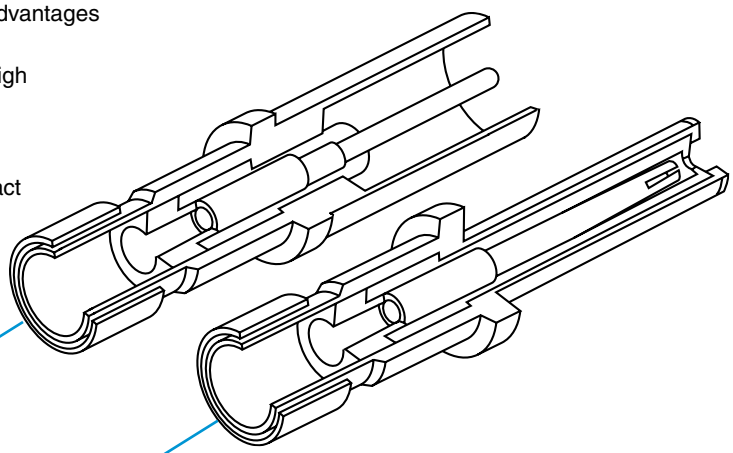
Shell Size	Key & Keyway Arrangement Identification Letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	N	105	140	215	265
	A	102	132	248	320
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
	E	91	131	197	240
11, 13, and 15	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C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

* The incorporation of quadrax or differential twinax contacts requires a modified connector to accommodate keyed contacts.

For more information on Tri-Start, MIL-DTL-38999 Series III connectors see the section in this catalog.

Amphenol® Coaxial Contacts -Offer several advantages for reliable interconnection and continued performance:

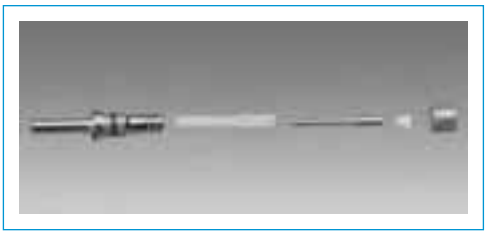
- Large crimping area assures low contact resistance and high tensile strength
- Back insulator positively captivates inner contact against axial loads
- Front insulator provides closed entry for socket inner contact
- Recessed inner contact is protected
- Outer contact has rugged wall section for durability



TYPICAL SUBMINIATURE COAX SOCKET CONTACT has socket outer contact with a pin inner contact

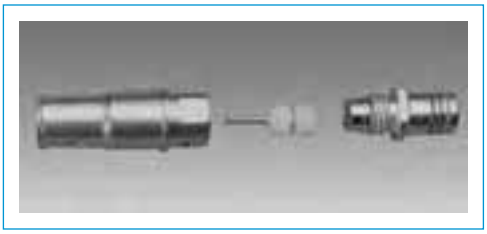
TYPICAL SUBMINIATURE COAX PIN CONTACT has pin outer contact with a socket inner contact

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

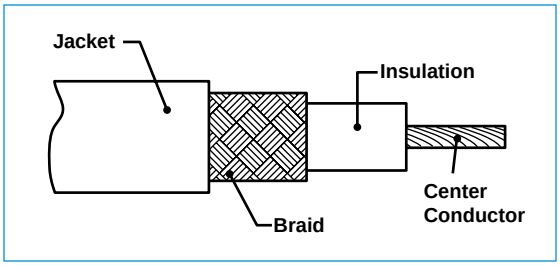


MIL-DTL-38999 LJT-R, JT-R, TV-R, SJT-R MS Type, Coax Size 16 Pin Unassembled Contact

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



Cable Illustration - Coax Contact

Coax Contacts are gold plated, crimp termination

Finish of mating contacts 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 21-33101/2-27)
- 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

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

COAX CONTACTS FOR USE IN JT-R CONNECTORS							
Cable	Contact Part Number (Termination Instruction Sheet)**		Contact Size	Crimping Tools		Installation Tools	
	Pin	Socket		Inner Contact	Crimp Ferrule	Insertion	Removal
RG-178B/U, RG-196A/U	21-33122-564 (M39029/76-425) (L-2035-AG)	21-33121-564 (M39029/78-433) (L-2035-AH)	16	M22520/2-01 with Positioner M22520/2-35 or with Daniels Positioner K532	M22520/4-01 with Positioner M22520/4-02	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
Haveg 30-00761, 30-02024, 30-02033 Tensolite 24713/A955KK1, 26723/ A955KK1	21-33122-562† (L-2035-AN)	21-33121-562† (L-2035-AP)					
Haveg 61-02051	21-33122-561† (L-2035-AK)	21-33121-561† (L-2035-AL)					
RG-174A/U, RG-188A/U, RG-161/U, RG-187A/U, RG-316/U, RG-179B/U, Haveg 8100207, Times (HS-179) AA3248, Teledyne 11299	21-33122-563 (M39029/76-424) (L-2035-AD)	21-33121-563 (M39029/78-432) (L-2035-AE)					
	21-33122-546 (M39029/28-211) (L-2035-F)	21-33121-546 (M39029/27-210) (L-2035-G)	12	M22520/2-01 with Positioner M22520/2-34 or with Daniels Positioner K323	M22520/31-01 with Positioner M22520/31-02 or Daniels GS-200 Tool with Positioner G2P330	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
RG-180B/U, RG-195A/U, Raychem 9528A1318	21-33122-541 (M39029/28-409) (L-2035-C)	21-33121-541 (M39029/27-402) (L-2035-E)					
Raychem 5022E5111	21-33122-543† (L-2035-M)	21-33121-543† (L-2035-N)					
Raychem 9530A5314	21-33122-544 (L-2035-R)	21-33121-544 (L-2035-S)					
Raychem 9527A1318	21-33122-545 (L-2035-U)	21-33121-545 (L-2035-V)					
Gore GWN1159A	21-33122-547† (L-2035-X)	21-33121-547† (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.

CONTACT ORDERING: Example number given in chart 21-33122-564 should be ordered as 21-033122-564.
Adding Zeros is necessary for Amphenol ordering process on all contact numbers
† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

NOTE: SAE AS39029 supersedes MIL-C-39029
**Termination instructions are packaged with each contact and can be found on-line at:
www.amphenol-aerospace.com/serviceinstructions.asp

JT Example:	Socket 21-33121-564 on RG-196A/U cable will mate with pin 21-33122-563 on RG-188A/U cable which is used in both this and the LJT-R series.
LJT, TV, SJT, Amphe-Lite Example:	Socket 21-33123-564 on RG-196A/U cable will mate with pin 21-33122-563 on RG-188A/Ucable which is used in both this and the JT-R series.

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.

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 LJT-R, TV-R, AMPHE-LITE AND SJT-R CONNECTORS

Cable	Contact Part Number		Contact Size	Crimping Tools		Installation Tools	
	Pin	Socket		Inner Contact	Crimp Ferrule	Insertion	Removal
RG-178B/U, RG-196A/U	21-33122-564 (M39029/76-425) (L-2035-AG)	21-33123-564 (M39029/77-429) (L-2035-AJ	16	M22520/2-01 with Positioner M22520/2-35 or with Daniels Positioner K532	M22520/4-01 with Positioner M22520/4-02	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
Haveg 30-00761, 30-02024, 30-02033 Tensolite 24713/A955KK1, 26723/A955KK1	21-33122-562† (L-2035-AN)	21-33123-562† (L-2035-AR)†					
Haveg 61-02051	21-33122-561† (L-2035-AK) †	21-33123-561† (L-2035-AM) †					
RG-174A/U, RG-188A/U, RG-316/U, RG-161/U RG-187A/U, RG-179B/U, Haveg 8100207, Times (HS-179) AA3248, Teledyne 11299	21-33122-563 (M39029/76-424) (L-2035-AD)	21-33123-563 (M39029/77-428) (L-2035-AF)					
	21-33122-546 (M39029/28-211) (L-2035-F)	21-33123-546 (M39029/75-416) (L-2035-H)	12	M22520/2-01 with Positioner M22520/2-34 or with Daniels Positioner K323	M22520/31-01 with Positioner M22520/31-02 or Daniels GS-200 Tool with Positioner G2P330	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
RG-180B/U, RG-195A/U, Raychem 9528A1318	21-33122-541 (M39029/28-409) (L-2035-C)	21-33123-541 (M39029/75-417) (L-2035-D)					
Raychem 5022E5111	21-33122-543† (L-2035-M) †	21-33123-543† (L-2035-P)					
Raychem 9530A5314	21-33122-544† (L-2035R)	21-33123-544† (L-2035-T) †					
Raychem 9527A1318	21-33122-545† (L-2035-U) †	21-33123-545† (L-2035-W)					
Raychem 9527A1314	21-33122-585 (L-2035-GG)	21-33123-585 (L-2035-GH)					
Gore GWN1159A, Nexans RG179-DT	21-33122-547 (L-2035-X) †	21-33123-547 (L-2035-Z) †					
M/A-Com 5M2869-001	21-33122-589 (L-2035-GR)	21-33123-589 (L-2035-GT)					
RG-187A/U, RG-179B/U, RG-174A/U, RG-188A/U, RG-316/U, RG-161/U Haveg 8100207, Times (HS-179)AA3248, Teledyne 11299	21-33102-23† (L-1107-C)	21-33101-23† (L-1107-G)	8	M22520/2-01 with Positioner M22520/2-31†† or solder	M22520/5-01 with die set M22520/5-03 (A) or M22520/5-08 (A) M22520/5-35 (B) or M22520/10-01 with Die Set M22520/10-05 (A)	Hand inserted	11-9170 or MS
RG-142B/U, RG-223/U	21-33102-24* (L-1107-D)	21-33101-24* (L-1107-H)			M22520/5-01 with die set M22520/5-05 (A) or M22520/5-19 (B) or M22520/10-01 with Die Set M22520/10-07 (A)		

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

CONTACT ORDERING: Example number given in chart 21-33122-564 should be ordered as 21-033122-564; example number 21-33102-23 should be ordered as 21-033102-023. Adding Zeros is necessary for Amphenol ordering process on all contact numbers
† 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: www.amphenol-aerospace.com/serviceinstructions.asp

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), cont.

COAX CONTACTS FOR USE IN LJT-R, TV-R, AMPHE-LITE AND SJT-R CONNECTORS, CONT.

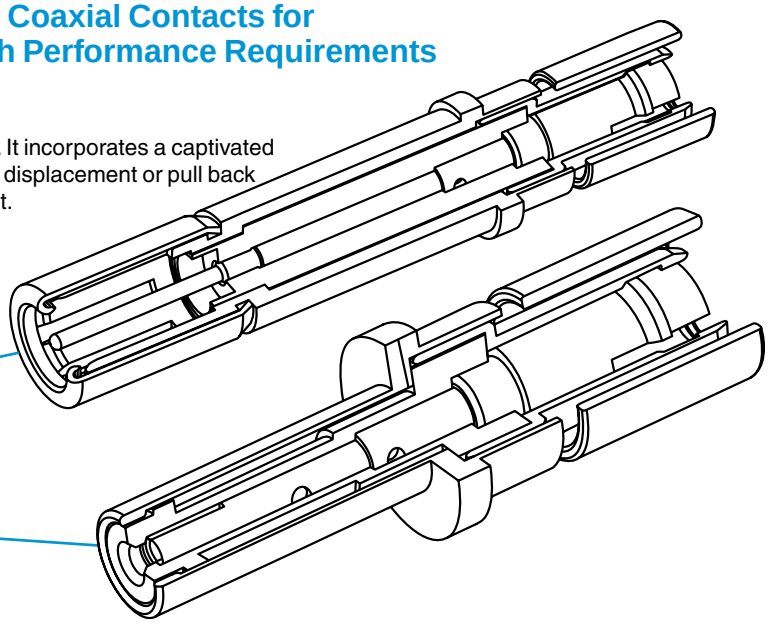
Cable	Contact Part Number (Termination Instruction Sheet)***		Contact Size	Crimping Tools		Installation Tools	
	Pin	Socket		Inner Contact	Crimp Ferrule	Insertion	Removal
Haveg 51-03111, Tensolite 28895/2X1	21-33102-22 (L-1107-B)	21-33101-22 (L-1107-F)	8	M22520/2-01 with Positioner M22520/2-31** or solder	M22520/5-01 with die set M22520/5-05 (B) or M22520/5-41 (B) or M22520/10-01 with Die Set M22520/10-07 (B)	Hand inserted	11-9170 or MS
RG-180B/U, RG-195A/U, Raychem 9528A1318	21-33102-21 (M39029/60-367 Supersedes MS27536) (L-1107-A)	21-33101-21 (M39029/59-366 Supersedes MS27535) (L-1107-E)					
RD-316 Double Shield (M17/152-00001)	21-33102-25 (L-1107-J)	21-33101-25 (L-1107-N)		M22520/2-01 with Positioner M22520/2-31	M22520/5-01 with Die Set M22520/5-37 (B) or M22520/10-01 with Die Set M22520/10-15 (A)		
Raychem 7524D5111-9 (triax cable - contact will terminate inner coax portion only)	21-33102-26 (L-1107-M)	21-33101-26 (L-1107-M)					
RG-400, ECS3C058A ECS352001	21-33102-27 (L-1286-B)	21-33101-27 (L-1293-B)		M22520/2-01 with Positioner M22520/2-10	M22520/5-01 with Die Set M22520/5-45 (A)		
RG-58 (M17/155-00001), M17/028-RG-058	21-33102-29 (L-1107-AA)	21-33101-29 (L-1107-Y)†		Solder	M22520/5-01 with Die Set M22520/5-05 (B)		
5021D1331-0	21-33102-36 (L-1107-P)	21-33101-36† (L-1107-Q)		M22520/2-01 with Positioner M22520/2-31	M22520/5-01 with Die Set M22520/5-05 (B) or M22520/10-01 with Die Set M22520/10-07 (B)		
5M2869-001 ESC432101	21-33102-37 (L-1107-V)	21-33101-37 (L-1107-W)					
5022A1311-0	21-33102-39 (L-1107-AC)	21-33101-36† (L-1107-AB)					
FA-19X	21-33652-1 (L-2091-A)	21-033653-1 (L-2091-B)		M22520/2-01 with Positioner K1106	M22520/5-01 with Die Set Y25 (B)		
T Flex-402	21-33102-41 (L-1107-AG)	21-33101-41 (L-1107-AF)		Solder	M22520/5-01 with Die Set M22520/5-05 (B)		

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.

CONTACT ORDERING: Example number given in chart 21-33102-22 should be ordered as 21-033102-022; example number 21-33652-1 should be ordered as 21-033652-001. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.
† 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: www.amphenol-aerospace.com/serviceinstructions.asp

Amphenol® Matched Impedance Size 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.



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

Design features and benefits of the Matched Impedance:

- For use in 90 degree angle or bent cable applications
- Provides 50 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

High Performance Size 12 Coax 50 Ohm matched

LJT-R, MIL-DTL-38999 Series I, JT-R, MIL-DTL-38999 Series II, and TV-R, MIL-DTL-38999 Series III

Use with Cable	Comment	Pin (Termination Instruction Sheet)***	Socket (Termination Instruction Sheet)***
RG316, T-Flex-405	M39029/102/103	21-33651-11 (L-2092-C)	21-33650-11 (L-2092-C)
RG-316, T-Flex-405	JT-R, MIL-DTL-38999 Series II		21-33729-11 (L-2092-P)
RD316, Filotex, ET124962, M17/152-00001	M39029/102/103 Type	21-33651-17 (L-2092-F)	21-33650-17 (L-2092-F)
JN1088WT	JN1104*50C	21-33213-42	21-33214-42 (L-2092-D)
PAN6422XQ	PAN6841*50C	21-33651-12 (L-2092-E)	21-33650-12
RG178, Gore CXN 3403	M39029/102/103 Type	21-33651-18 (L-2092-K)	21-33650-18 (L-2092-K)
RG178, Gore CXN 3403	JT-R, MIL-DTL-38999 Series II		21-33729-18 (L-2092-K)
SFT-316-TR	M39029/102/103 Type	21-33651-22 (L-2092-N)	21-33650-22 (L-2092-N)
Semflex SW060	M39029/102/103 Type	21-33651-25	21-33650-25
Semflex SW086 (solid inner conductor)	M39029/102/103 Type	21-33651-26	21-33650-26

* Add P or S for pin or socket
CONTACT ORDERING: Example number given in chart 21-33651-11 should be ordered as 21-033651-011. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.
***Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/serviceinstructions.asp

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: $.11\sqrt{fGHz\ dB\ max.}$

Environmental Specifications:

- Thermal limits: –55 ° to 200°C

Mechanical Specifications:

- Mating: slide-on
- Mounting: conforms to M39029/102 & /103 envelope dimensions

Typical Contact Installation Instructions
for Coax Contacts

The following is an example of a contact instruction sheet that would be shipped within the package of contacts for a Crimp, Size 12 Coax Contact for use in Subminiature, D38999 connectors. The sheet provides detailed instructions for assembling the component parts and for crimping the contact to coaxial cable, along with the recommended cable and tooling to be used. Installation instructions are included within all contacts for D38999 connectors. For installation instructions for other connector series, there are separate documents (not included in packaging of parts) as follows: L- 633 for Miniature solder types, L-613 for Miniature SE types, L-660 for Miniature CE types, and L-650 for MS/Standard and Heavy Duty types. For any other instructions needed, consult Amphenol. Most installation instructions can be found on-line at www.amphenol-aerospace.com (from home page, go to Service Instructions and enter contact part number or instruction sheet number).

21-33651-11 (PIN)
21-33650-11 (SOCKET)

Contact, Pin and Socket, Coaxial,
Type LJT-R & TV-R, (MIL-DTL-38999 Series I & III) Crimp, Size 12
Installation Instructions

See table on reverse side for coaxial cable recommended and crimp tool information.

A. 1. Slide outer crimp ferrule over cable outer jacket as shown.
2. Strip cable outer braid as illustrated. Ends must be cut cleanly and at right angles to the axial plane of the cable. The cable must not be deformed while making cuts.
3. Flare outer braid, then strip cable dielectric as shown.

B. 1. Assemble inner contact assembly over cable center conductor and cable dielectric until inside bore of bushing butts against cable dielectric.
2. Cable center conductor must be visible through the inspection hole in the inner contact wire well.
3. Crimp inner contact wire well using crimp tool listed in table.

C. 1. Carefully slide outer contact assembly over inner contact assembly and under cable outer braid until inner contact butts against insulator shoulder as illustrated. (Inner contact assembly will snap into the locked position when fully assembled inside the outer contact assembly.)
2. Bring outer crimp ferrule forward over cable outer braid as illustrated. (Continue to push the inner contact assembly fully forward while bringing the outer crimp ferrule into position.)
3. Crimp outer crimp ferrule using crimp tool listed in table (.156 Max. over ferrule after crimping). Trim excess braid ahead of crimp ferrule, if necessary.

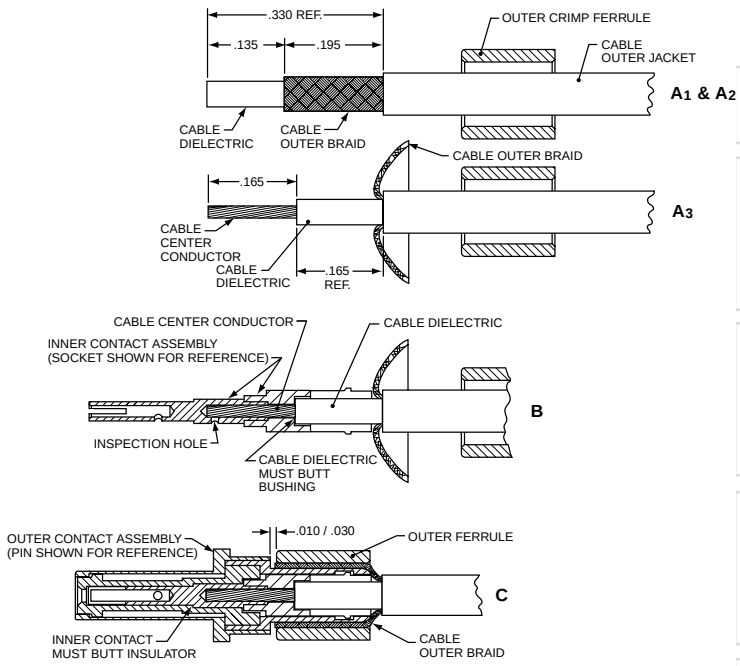
CONTACT INSERTION INTO CONNECTOR

Using insertion tool (part number M81969/8-09 or M81969/14-04), insert contact assembly into rear connector grommet hole. Contact must be aligned with hole and not inserted at an angle. Push forward until contact is felt to snap into position within insert. Remove tool.

CONTACT REMOVAL FROM CONNECTOR

Position removal tool (part number M81969/8-10 or M81969/14-04) around cable and slide tool down wire until tool tips enter rear grommet and come to a positive stop. Hold tool tip firmly against positive stop on contact, grip wire and simultaneously remove tool, contact and cable.

21-33651-11 (PIN)
21-33650-11 (SOCKET)



L-2092-C
October 2001

FSCM77820

Amphenol ® Part Number	Description	Coaxial Cable Accommodated	Tools				
			Inner Contact			Outer Contact	
			Crimp Tool	Setting	Positioner (Daniels)	Tool	Positioner
21-33651-11	Matched Impedance* Size 12 Coax Pin	RG316 (M17/113-RG316)	MH992 (Daniels)	5	K1360	M22520/5-01	M22520/5-03 (A) or M22520/5-35 (B)
		RG179 (M17/094-RG179)	MH992 (Daniels)	4	K1360		
21-33650-11	Matched Impedance* Size 12 Coax Socket	RG316 (M17/113-RG316)	MH992 (Daniels)	5	K1360		
		RG179 (M17/094-RG179)	MH992 (Daniels)	4	K1360		

* Matched Impedance applies when contacts are terminated to RG316 cable only.

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 maintance 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

HIGH FREQUENCY CONTACTS

SPECIFICATIONS

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

Impedance	50 Ω
Frequency Range	DC - 40 GHz
VSWR	1.05 +.01 (freq. GHz)
Insertion Loss	0.03.√(freq. GHz)
Insulation Resistance (Min.)	10,000 M Ω
Contact Resistance (Max.)	
Center conductor:	6.0 mΩ
outer conductor:	3.0 mΩ
outer to cable:	0.5 mΩ
Dielectric Withstanding Voltage	1,000 VRMS
Corona Extinction Voltage	250 VRMS
RF High Potential Voltage	500 VRMS
RF Leakage	- (80-freq. GHz)

Materials and Finish

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

Environmental

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

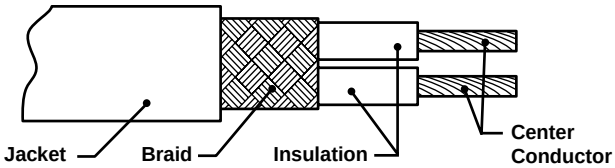
HIGH FREQUENCY COAX CONTACTS FOR USE IN D38999, SERIES III CONNECTORS

High Frequency Amphenol Part Number (Termination Instruction Sheet)	Inter-face	Frequency	For use with Cable	Type	Cavity Size	Piggyback Grommet
21-033449-01HF (300-17-008)	BMZ	40 GHZ	TFLEX-405	Socket	8	21-033321-007
21-033448-01HF (300-17-008)				Pin		
21-033449-02HF (300-89-009)	BMZ	18 GHZ	TFLEX-405	Socket	8	21-033321-007
21-033448-02HF (300-89-009)				Pin		
21-033449-03HF (300-89-008)	BMZ	12 GHZ	RG-400/ RG-142	Socket	8	21-033321-009
21-033448-03HF (300-89-008)				Pin		
21-033449-04HF (300-89-002)	BMZ	18 GHZ	TFLEX-402	Socket	8	21-033321-010
21-033448-04HF (300-89-002)				Pin		
21-033449-06HF	BMA	26.5 GHZ	TFLEX-405	Socket	8	21-033321-007
21-033448-06HF				Pin		
21-033449-07HF	BMA	26.5 GHZ	TFLEX-402	Socket	8	21-033321-010
21-033448-07HF				Pin		
21-033449-08HF	BMZ-75 Ohm	2 GHZ	LMR-240-75	Socket	8	21-033321-008
21-033448-08HF				Pin		
21-033449-09HF	SMPM	65 GHZ	TFLEX-405	Socket	12	N/A
21-033448-09HF				Pin		
21-033449-10HF	SMPS	65 GHZ	0.047 Dia. Cable	Socket	16	N/A
21-033448-10HF				Pin		

Amphenol Aerospace

Amphenol® Twinax Contacts -Were designed for use with twinax cable in Data Bus systems. Twinax contacts provide the following 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



Cable Illustration - Twinax Contact

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:

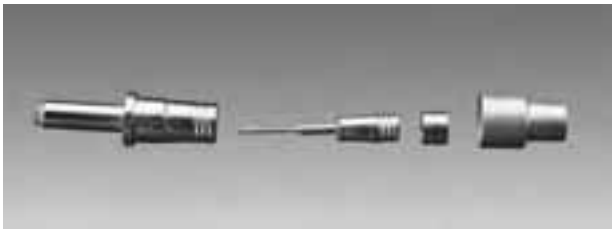
- Operating temperature –55°C to 175°C
- Pins are scoop-proof
- Meets performance levels of M38999 connector
- 4 components, gold plated crimp termination
- For use with a variety of cables (See chart below)

Concentric Twinax Contacts Size 12

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



Unassembled Components of Size 12 Concentric Twinax Contact

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

For use with Cable	Concentric Twinaxial Contact Part Number (Termination Instruction Sheet)**		Contact Size	Comments	Connector Series
	Pin	Socket			
M17/176-00002, ST5M1212-002	21-33909-25 (L-2092-G)	21-33908-25 (L-2092-G)	12	JN1104 Interface	D38999 Series I, III
0024A0024, Fileca F2709-13-CA	21-33909-28 (L-2092-G)	21-33908-28 (L-2092-G)			
EPD32263A,10612, GSC-12-2548-00	21-33909-29 (L-2092-H)	21-33908-29 (L-2092-H)			
ASNE0849, 5PTM1T04-1	21-33909-81 (L-2092-AB)	21-33908-81 (L-2092-AB)			
VG95218T023D002	21-33909-91 (L-2092-AC)	21-33908-91 (L-2092-AC)			
VG95218T023D002	21-33909-101 (L-2092-AC)	21-33908-101 (L-2092-AC)		Same as -91 except new ferrule with wire support	
M17/176-00002, GSC-12-2549-00		21-33640-25 (L-2092-W)	12	JN1104 Interface	D38999 Series II
0024A0024		21-33640-28 (L-2092-V)			
5M2022-003	21-33844-1 (L-1255-A)	21-33843-1 (L-1255-B)	10	Supplied with Thermal fit sleeve	D38999 Series I, III

CONTACT ORDERING: Example number given in chart above 21-33909-25 should be ordered as 21-033909-025; example number 21-33843-1 should be ordered as 21-033843-001. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

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

High performance connectors within the D38999 families are the most commonly used connectors for incorporation of Twinax contacts. These connectors offer wide versatility in insert arrangements for not only concentric Twinax contacts, but also coax, triax, PCB, wire wrap, thermocouples and EMI filter contacts.
Other connectors available with concentric Twinax contacts:

- Wire Integrated Connectors (WICS) for Data Bus Systems. Consult Amphenol Aerospace, Sidney, NY.
- ARINC 404, ARINC 600 and R27 Series rectangular connectors. Supplied by Amphenol Canada.

MIL-DTL-38999 Series III Connector with Twinax Contacts and Standard Contacts

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:

- Provides protection from magnetic and electrostatic interference including nuclear electromagnetic pulse
- Maintains 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 but intermateable versions for termination to a host of cables (See chart on next page)

Concentric Twinax Contacts Size 8

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 vs Standard Length Twinax Contact

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.

SIZE 8 CONCENTRIC TWINAX CONTACTS FOR USE IN D38999 CONNECTORS				
For use with Cable	Size 8 Concentric Twinaxial Contact Part Number (Termination Instruction Sheet)**		Comments	Connector Series
	Pin	Socket		
M17/176-00002, 5PTM1T04-2	21-33190-529 (L-1253-A)	21-33191-530 (L-1253-B)	M39029/90/91 (Amphenol) Supplied with heat shrink seal	D38999 Series I, III
M17/176-00002	T3-46T08-LD (PN-430)	T3-47T08-LD (PN-430)	M39029/90/91 (Pyle) Supplied with heat shrink seal	
M17/176-00002	21-33190 (L-1253-A)	21-33191 (L-1253-B)	Without seals	
M17/176-00002	21-33190-1 (L-1253-A)	21-33191-1 (L-1253-B)	Supplied with piggyback grommet seal	
Raychem 10612, 5M2022-003	21-33190-26 (L-1253-AA)	21-33191-26†	Without seals	
Raychem 10614, EPD22189B, 7724C8664, 05A0771, GC875TM24H, T10971	21-33190-22 (L-1253-C)	21-33191-22 (L-1253-D)	Without seals	
Raychem 10613, PAN711-6421, 23089/RC	21-33190-27 (L-1253-K)	21-33191-27 (L-1253-L)	Supplied with heat shrink seal	
Raychem 10613, PAN711-6421, 23089/RC	21-33190-29 (L-1253-K)	21-33191-29 (L-1253-L)	Supplied with piggyback grommet seal	
Raychem 10613, PAN711-6421, 23089/RC	21-33190-30 (L-1253-K)	21-33191-30 (L-1253-L)	Without seals	
GSC-12-2548-00, 7726D0664	21-33190-40 (L-1253-S)	21-33191-40 (L-1253-T)	Supplied with heat shrink sleeve	
Axon P517417	21-33190-81 (L-1253-W)†	21-33191-81 (L-1253-Y)†	Supplied with piggyback grommet seal	
Raychem 10612, 5M2022-003	21-33190-261 (L-1253-AA)	21-33191-261†	Supplied with piggyback grommet seal	
Raychem 10612, 5M2022-003	21-33190-262 (L-1253-AA)	21-33190-262†	Supplied with heat shrink seal	
Raychem 10614, 7724C8664	T3-46TB08-LD (PN-494)	T3-47TB08-LD (PN-494)	Without seals	
7820D0111 (20 AWG)	T3-467C08-LD (PN-537)	T3-47TC08-LD (PN-537)	Without seals	
Gore CXN2268	T3-46TE08-LD (PN-1001)	T3-47TE08-LD (PN-1001)	Short profile Supplied with heat shrink seal (.450)	
M17/176-00002	T3-46TD08-LD (PN-1000)	T3-47TD08-LD (PN-1000)	Short profile Supplied with heat shrink seal (.450)	
M17/176-00002	21-33910-15† (PN-1005)	21-33922-15 (PN-1005)	Short profile Without seals (.263)	
M17/176-00002	21-33617-1 (REF PN-100)		Short profile Supplied with piggyback grommet seal (.450)	
Gore CNX2702	T3-46TF08-LD (PN-1002)	T3-47TF08-LD (PN-1002)	Short profile Supplied with heat shrink seal (.450)	
M17/176-00002		P-209546-27†	Short profile Without seals (.303)	
S280W502-1, Fileca F2709-13-CA, HS5930, Raychem 10602 0024G0024, 0024A0024	21-33190-70 (L-1253-U)	21-33191-70 (L-1253-V)	Without seals	
S280W502-1, Fileca F2709-13-CA, HS5930, Raychem 10602 0024G0024, 0024A0024	21-33190-71 (L-1253-U)	21-33191-71 (L-1253-V)	Supplied with piggyback grommet seal	
S280W502-1, Fileca F2709-13-CA, HS5930, Raychem 10602 0024G0024, 0024A0024	21-33190-72 (L-1253-U)	21-33191-72 (L-1253-V)	Supplied with heat shrink seal	
0024A0311, PIC E10244	21-33190-90†	21-33191-90 (L-1253-AD)	Without seals	
0024A0311, PIC E1024	21-33190-91†	21-33191-91 (L-1253-AD)	Supplied with piggyback grommet seal	
0024A0311, PIC E1024	21-33190-92†	21-33191-92 (L-1253-AD)	Supplied with heat shrink seal	
M17/176-00002	21-33190-625 (L-1253-AG)	21-33191-628 (L-1253-AG)	M39029/113-625 & /114-628 Supplied with heat shrink seal	

CONTACT ORDERING: Example number given in chart above 21-33190-529 should be ordered as 21-033190-529; example number 21-33190-1 should be ordered as 21-033190-001. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

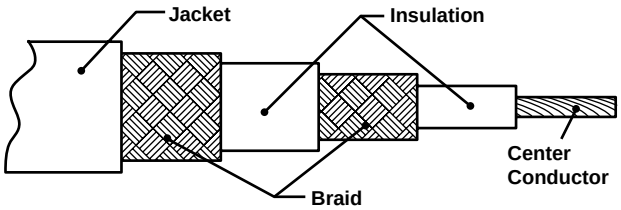
**Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/serviceinstructions.asp

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

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 of Amphenol triax contacts include:

- 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



Cable Illustration - Triax Contact

Triax Size 8 Pin Contact

Triax Size 12 Socket Contact

TYPICAL ELECTRICAL PERFORMANCE

Size 8, 10 and 12 Triax Contacts

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

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

For use with Cable	Size	Size 8, 10, 12 Triax Contact Part Number (Termination Instruction Sheet)**		Comments
		Pin	Socket	
5M2397-002, 81264-02, RGX-179, RT-179, Champlain 81-00321A, Tensolite 28883/02060X-1(LD), 7528A5314, Thermatics 12447, 28883/02060X-1	8	21-33198-3 (L-1254-F)	21-33197-3 (L-1254-E)	
752866314, 7528G6314	8	21-33198-11 (L-1254-V)	21-33197-11 (L-1254-T)	
5M2559-001, 81264-01, Tensolite 28598/9J063T-1, Teledyne 13809, Cheminax 9530F5214	8	21-33198-4 (L-1254-D)	21-33197-4 (L-1254-C)	
ST5M1323-001, Champlain 81-00700, Teledyne 11914/1, Times AA6603, Tensolite 26895/90334X-1	8	21-33198-10 (L-1254-S)	21-33197-10 (L-1254-S)	
5M2397-002	10	21-33800-1 (L-1256-A)	21-33801-1 (L-1256-B)	
JN1088WU (75Ω), JN1088WT (50Ω)	12	21-33909-12 (L-1256-J)	21-33908-12 (L-1256-J)	JN1104 Interface
GSC-03-81497-00 (75Ω)	12	21-33909-23 (L-1256-M)	21-33908-23 (L-1256-M)	Replaced by -33 with improved rear insulator
GSC-03-81497-00 (75Ω)	12	21-33909-33 (L-1256-P)	21-33908-33 (L-1256-P)	JN1104 Interface
Harbour TRX179, Times Microwave AA-6151 (RT-179), Axon RGX-179, 540-1050-000 (75Ω)	12	21-33909-71 (L-1256-AA)	21-33908-71 (L-1256-AA)	
10602 (Twinax)	8	21-33724-15 (L-1255-C)	(Consult with Amphenol for availability)	Special design with triax mating end and twinax cable termination

CONTACT ORDERING: Example number given in chart 21-33198-3 should be ordered as 21-033198-003; example number given in chart 21-33198-10 should be ordered as 21-033198-010. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

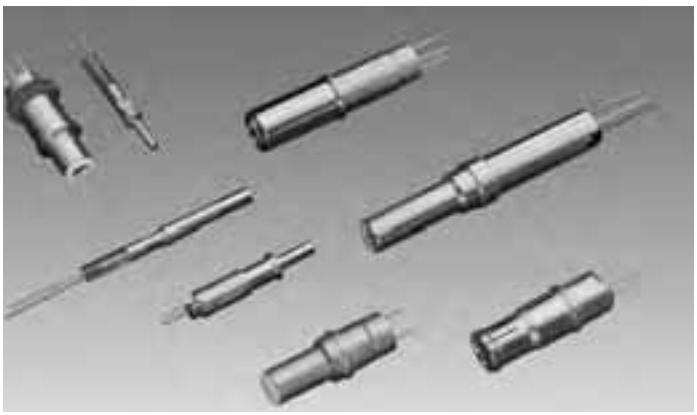
**Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/serviceinstructions.asp

Amphenol® Printed Circuit Tail 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 (402 & 403) show the available PC Tail contact part numbers for 38999 Circular connectors. See page 412 Rectangular Section of this catalog 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

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

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

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

PC TAIL COAX, TWINAX, AND TRIAX CONTACTS FOR USE IN D38999 SERIES I & III CONNECTORS					
Size	**PC Tail Coax Contact Part Number**	**PC Tail Twinax Contact Part Number**	**PC Tail Triax Contact Part Number**	**Tails***	**Comments**
8 Pin	21-33733-7			PCB 2 tails	
8 Pin	21-33733-2			PCB 2 tails	For epoxy filled connector
8 Pin	21-33733-4			PCB 2 tails	For epoxy filled connector
8 Pin	21-33733-5			PCB 4 outer tails, 1 inner	
8 Pin	21-33733-9			PCB 2 tails	
8 Pin	21-33733-8			PCB 2 tails	
8 Socket	21-33426-1			PCB 2 tails	
8 Pin		21-33967-115		PCB 3 tails	M39029/90/91 Interface
8 Pin		21-33967-125		PCB 3 tails	
8 Pin		21-33967-15		PCB 3 tails	
8 Pin		21-33967-45		PCB 3 tails	
8 Pin		21-33967-55		PCB 3 tails	
8 Pin		21-33967-65		PCB 3 tails	
8 Pin		21-33967-85		PCB 3 tails	
8 Pin		21-33967-95		PCB 3 tails	
8 Pin		P-209550†		PCB 3 tails	
8 Pin		P-209532-1		PCB 9 tails	
8 Pin		P-209532-2		PCB 9 tails	
8 Socket		21-33921-15		PCB 3 tails	
8 Socket		21-33921-45		PCB 3 tails	
8 Socket		21-33921-35		PCB 3 tails	
8 Socket		21-33921-65		PCB 3 tails	
8 Socket		21-33921-75		PCB 3 tails	
8 Socket		21-33921-115†		PCB 3 tails	
8 Socket		21-33921-105†		PCB 3 tails	M39029/90/91 Interface .040 dia. tails
8 Socket		DB-109002		PCB 2 tails	M39029/91 Interface Outer body grounded to shell
8 Socket		21-33919-15		PCB 2 tails	
8 Socket		21-33919-25		PCB 2 tails	
8 Pin			21-33828-1	PCB 3 tails	
8 Pin			21-33828-21	PCB 3 tails	
8 Pin			21-33828-41	PCB 3 tails	
8 Socket			21-33840-1	PCB 3 tails	
8 Socket			21-33840-21	PCB 2 tails	Outer body grounded to shell
8 Socket			21-33841-1	PCB 2 tails	Outer body grounded to shell
10 Pin		21-33844-2†		PCB 2 tails	Outer body grounded to shell
12 Socket					

* Consult Amphenol Aerospace for tail configurations and tail diameters.
† Consult Amphenol Aerospace for current release of this contact.

CONTACT ORDERING: Example number given in chart 21-33733-7 should be ordered as 21-033733-007; example number given in chart 21-33967-115 should be ordered as 21-033967-115; example number given in chart 21-33840-21 should be ordered as 21-033840-021. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

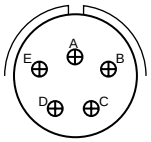
PC TAIL COAX, TWINAX, AND TRIAX CONTACTS FOR USE IN D38999 SERIES I & III CONNECTORS					
Size	PC Tail Coax Contact Part Number	PC Tail Twinax Contact Part Number	PC Tail Triax Contact Part Number	Tails*	Comments
12 Pin	21-33686-8			PCB 2 tails	
12 Pin	21-33686-9			PCB 2 tails	Outer tail clip type
12 Pin	21-33686-5			PCB 2 tails	
12 Pin	21-33686-10			PCB 2 tails	
12 Pin	21-33686-13			PCB 2 tails	Outer tail clip type
12 Pin	21-33687-6			PCB 2 tails	For epoxy filled connector
12 Pin	21-33687-7			PCB 2 tails	
12 Pin	21-33686-16†			PCB 2 tails	
12 Socket	21-33614-1			PCB 2 tails	
12 Socket	21-33614-21			PCB 2 tails	
12 Socket	21-33614-41			PCB 2 tails	
12 Socket	21-33611-3			PCB 2 tails	Outer tail clip type
12 Socket	21-33440-1			PCB 3 tails	
12 Socket	21-33430-1			PCB 2 tails	Outer tail clip type, M38999 Series II
12 Socket	21-33430-21			PCB 2 tails	M38999 Series II
12 Socket	21-33430-41				M38999 Series II
12 Pin		21-33633-1†**		PCB 4 tails	JN1104 Interface
12 Pin		21-33633-2**		PCB 4 tails	
12 Pin		21-33633-6**		PCB 4 tails	
12 Pin		21-33633-7**		PCB 4 tails	
12 Socket		21-33393-6**		PCB 4 tails	
12 Socket		21-33393-5**		PCB 4 tails	
12 Socket		21-33433-1**		PCB 4 tails	M38999 Series II, JN1104 Interface
16 Pin	21-33856-15			PCB 2 tails	
16 Pin	21-33856-25			PCB 90 degree, 2 tails	
16 Pin	21-33856-65			PCB 2 tails	
16 Pin	21-33634-15			PCB 1 tail	Outer body grounded to shell
16 Pin	21-33634-35			PCB 1 tail	Outer body grounded to shell
16 Pin	21-33634-45			PCB 1 tail	
16 Pin	21-33386-1			PCB 2 tails	
16 Socket	21-33857-1			PCB 2 tails	
16 Socket	21-33857-8			PCB 2 tails	
16 Socket	21-33857-7			PCB 2 tails	
16 Socket	21-33610-1			PCB 2 tails	
16 Socket	21-33610-2			PCB 2 tails	
16 Socket	21-33441-1			PCB 2 tails	
16 Socket	21-33606-1			PCB 2 tails	M38999 Series II
16 Socket	21-33606-21†			PCB 2 tails	
16 Socket	21-33606-31†			PCB 2 tails	
16 Socket	21-33610-3			PCB 2 tails	
16 Socket	21-33857-3			PCB 2 tails	

* Consult Amphenol Aerospace for tail configurations and tail diameters.
** Size 12 twinax and triax contacts are intermatable.
† Consult Amphenol Aerospace for current release of this contact.

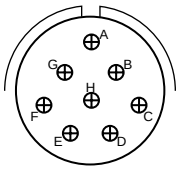
CONTACT ORDERING: Example number given in chart 21-33633-7 should be ordered as 21-033633-007; example number given in chart 21-33686-10 should be ordered as 21-033686-010. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

Front face of pin inserts illustrated

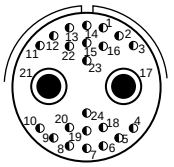
Insert Arrangement	9-5	10-2	11-2	12-3	13-3	12-4	13-4	14-4	15-4
Connector Series	TV	SJT	LJT, TV	JT	LJT	JT, SJT	LJT, TV	JT	LJT
Service Rating	Grounded	I		II		I		I	
Number of Contact	1	2		3		4		4	
Contact Size	8 Twinax	16		16		16		12	



Insert Arrangement	14-5	15-5	14-15	15-15	14-68	15-68	14-97	15-97	16-6	17-6
Available in 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	16-6	17-6
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

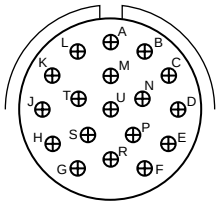


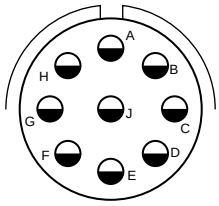
Insert Arrangement	17-25		18-11	19-11	18-28	19-28	18-30	19-30	19-31		
Connector Series	LJT		JT, SJT	LJT, TV	JT	LJT	JT	LJT	TV		
Service Rating	M		II		I		I		M		
Number of Contact	22	2	11		26	2	29	1	2	1	12
Contact Size	22D	8	16		20	16	20	16	8	12	22D

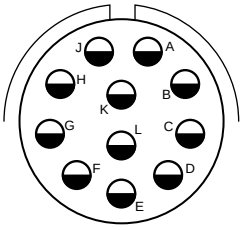
The insert arrangements shown on this page and the next page represent the most readily available patterns within the 38999 Circular Series. If you require other arrangements than what are shown here, consult Amphenol for further availability. In most cases, unless otherwise stated, size 8 and size 12 cavities can be filled with either coax, twinax, triax or power contacts.

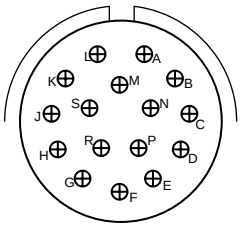
CONTACT LEGEND

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

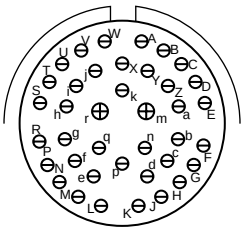


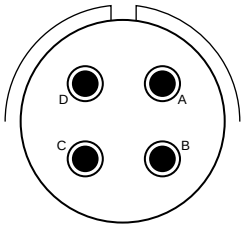


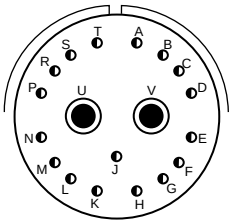


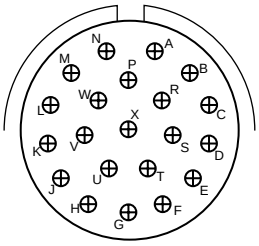


Insert Arrangement	18-68	19-68	18-96	20-11	21-11	20-16	21-16
Connector Series	JT	LJT	JT	JT, SJT	LJT,TV	JT, SJT	LJT,TV
Service Rating	I		I	I		II	
Number of Contact	18		9	11		16	
Contact Size	16		12	12		16	

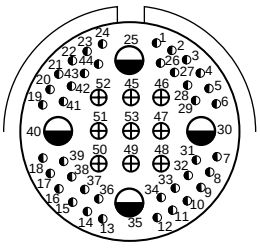


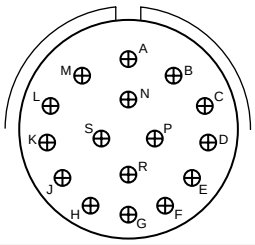


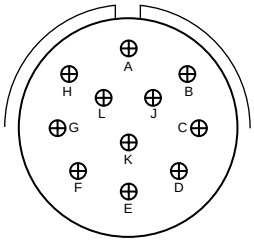


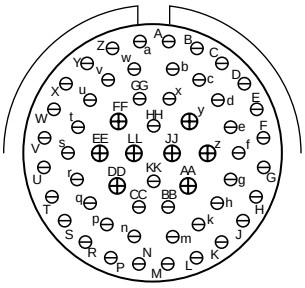


Insert Arrangement	20-39	21-39	20-75	21-75	20-79	21-79	22-21	23-21
Connector Series	JT, SJT	LJT,TV	SJT	LJT,TV	SJT	LJT	JT, SJT	LJT,TV
Service Rating	I		M		II		II	
Number of Contact	37	2	4		17		21	
Contact Size	20	16	8		22D		16	





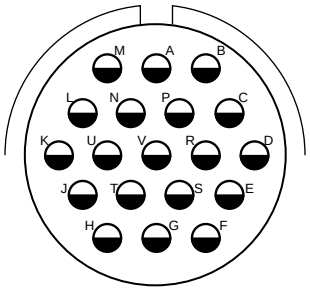


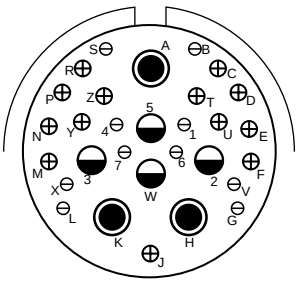


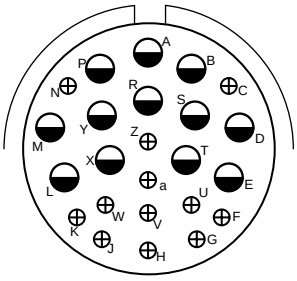
Insert Arrangement	23-54			23-97	23-99	24-4	25-4
Connector Series	TV			LJT	LJT	JT, SJT	LJT,TV
Service Rating	M			II	II	I	
Number of Contact	40	9	4	16	11	48	8
Contact Size	22D	16	12	16	16	20	16

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

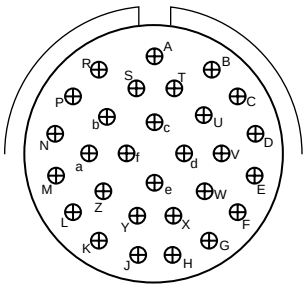


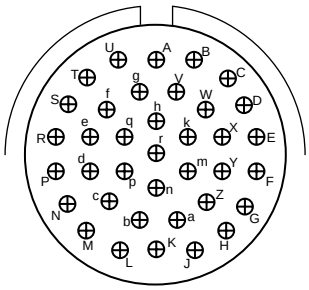


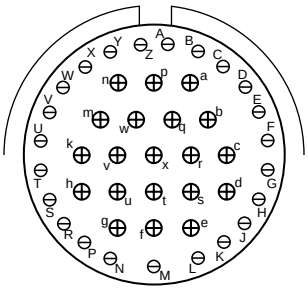


Insert Arrangement	24-19	25-19	24-20		25-20*		24-24	25-24
Connector Series	JT, SJT	LJT, TV	SJT		LJT, TV		JT, SJT	LJT, TV
Service Rating	I		N				I	
Number of Contact	19		10	13	3	4	12	12
Contact Size	12		20	16	8	12	16	12

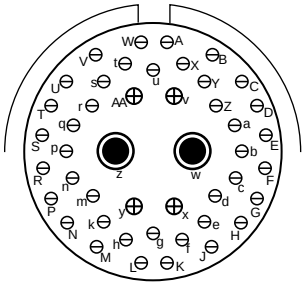
(Locations U and Y - Dedicated to Fiber Optics)

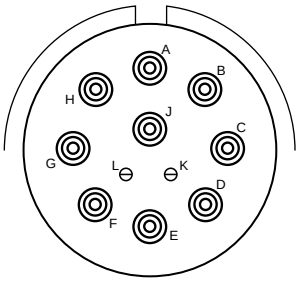






Insert Arrangement	24-29	25-29	24-37	25-37	24-43	25-43
Connector Series	JT, SJT	LJT, TV	JT, SJT	LJT, TV	JT, SJT	LJT, TV
Service Rating	I		I		I	
Number of Contact	29		37		23	20
Contact Size	16		16		20	16





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

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

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