

Amphenol® High Frequency Contacts for Multi-pin Connectors

12-130-4

HIGH PERFORMANCE CONNECTORS AND CONTACTS PROVIDE SECURE, RELIABLE DATA TRANSMISSION

CONCENTRIC TWINAX



COAXIAL



TRIAx



TWINAX PC TAIL



DIFFERENTIAL TWINAX



QUADRAX CONTACTS . DIFFERENTIAL TWINAX CONTACTS . TRANSITION ADAPTERS



Amphenol
Aerospace

**AMPHENOL'S WIDE RANGE OF CONTACTS
MEET THE DEMANDS OF MILITARY AND
AEROSPACE APPLICATIONS.**

Leading in the electrical connection arena, Amphenol products are used on major programs of military and commercial aircraft, military ground vehicles, space applications, missiles/ordnance, and C4ISR equipment.



Amphenol contacts are designed and qualified to a number of military specifications and standards. Always striving to meet or exceed customer needs, Amphenol is a leader in contact manufacturing.

For over 50 years, Amphenol Aerospace has been in the forefront of interconnect design and manufacturing for aerospace and harsh environment applications.



Engineers work with customers to define the proper circuitry for a connector usage - shielding protection, high frequency protection, combinations of contact types in one shell - the optimum design for your application.

Amphenol's high technology computer driven centers for connector and contact production result in quality production and cost reductions with shorter lead and delivery times.



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If more information on Amphenol Aerospace capabilities in contacts and interconnect products, or to speak with an applications engineer about a particular project using high frequency contacts, please consult us at:

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Fax: 607-563-5157

www.amphenol-aerospace.com

Amphenol Aerospace operates a Quality System that is third-party certified to ISO-9001:2000 and AS9100.

*The Amphenol Corporation
is known as the System
Designer's Choice for
electrical and optical con-
nections when performance,
quality and high reliability
are paramount*



*Breakaway Failsafe D38999
Connector with coax and
power contacts*



*38999 Connector
with Quadrax Contacts*



*New High Frequency 38999
Connector with special size 8
coax contacts that provide
DC to 40 GHz microwave
performance*

Amphenol® High Frequency Contacts provide high speed transmission and operate in high frequency conditions

When you need superior electrical performance plus shielding to eliminate interference from outside electrical sources in a connector, Amphenol has the most reliable contact solutions.

Amphenol offers a very wide range of contacts that provide high speed transmission and operate in high frequency conditions. You can be assured of interconnection compatibility when you come to Amphenol for your contact needs as well as your connector needs. Amphenol's expertise in interconnection solutions assures that your contacts will mate properly and will perform to the application specifications of your particular requirements.

MIL-DTL-38999 CONNECTORS - The high performance series most ideal for integrating high speed and high frequency contacts. MIL-DTL-38999, Series I, II and III are by far the choice of connector for today's avionics needs - these subminiature family connectors are ideally suited for the incorporation of shielded contacts.

This catalog is primarily devoted to the high speed and high frequency contact options for use in MIL-DTL-38999 Connectors, which include:

Coaxial	Concentric Twinax	Triax	Quadrax	Differential Twinax	High Frequency	Transition Adapters
Pin and socket contacts designed for RF/microwave and shielded wire applications. Sizes 4, 8, 12 & 16	Pin and socket contacts designed for protection from magnetic and electrostatic interference including nuclear electromagnetic pulse. Sizes 8 & 12	Pin and socket contacts designed for shielded wire applications with 3 conductors. Sizes 8, 10 & 12	Size 8 pin and socket contacts. An outer contact with 4 strategically spaced inner contacts forming two 100 or 150 Ohm matched impedance differential pairs.	Size 8 pin and socket contacts. An outer contact with 2 inner contacts spaced to form one 100 or 150 Ohm matched impedance differential pair.	Size 8 Coaxial contacts that provide high frequencies (DC to 40 GHz). Unique "Float Mount" technology maintains tight mechanical tolerances.	Matched impedance quadrax and twinax transition adapters provide a method of launching from the high speed connectors to PCB boards.

Other series of connectors from Amphenol Aerospace, in addition to 38999 connectors, can incorporate shielded contacts. These include the following (and are also covered in this catalog):

- Amphenol® Heavy Duty Cylindrical Connectors, MIL-DTL-22992 - with coax contacts.
- Amphenol® Printed Circuit Board Connectors - Rectangular connectors with standard low mating force brush contacts can have hybrid arrangements with coax contacts.
- LRM Interconnects - Rectangular module and backplane connectors with standard low mating force brush contacts can have hybrid arrangements with coax contacts.
- Amphenol® ARINC 600 and R27 Rack & Panel Connectors are available with quadrax, coax, twinax and differential twinax contacts.

The Cable Usage Guide is a key reference to help guide you in selecting the contacts best suited to your needs. Since most shielded wire applications start with a fixed requirement for cable types, the guide refers you to the Amphenol connector family utilizing contacts which are compatible with the cable characteristics.

For more information on other Amphenol connectors with shielded contacts:

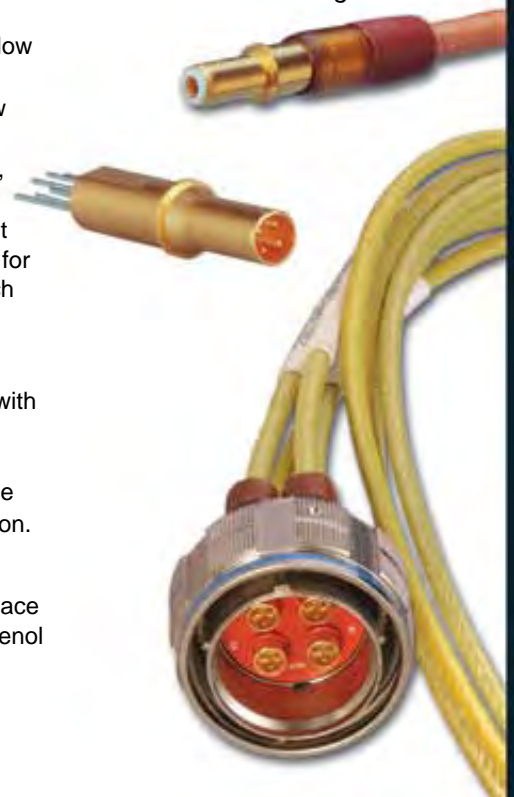
- Amphenol® Miniature Cylindrical Connectors, MIL-DTL-26482, Series 1 are available with coaxial contacts, size 8 and 12 for crimp and solder type. See catalog 12-070 on-line at www.amphenol-industrial.com, or consult Amphenol Industrial Operations.
- Amphenol® MS/Standard, MIL-DTL-5015 Cylindrical Connectors are available with size 4, 8 and 12 coax contacts. Consult Amphenol Industrial Operations for more information.

For more information on connectors with fiber optics:

- See catalog 12-352, Amphenol® Fiber Optic Interconnect Products for Military, Aerospace and Harsh Environments, on-line at www.amphenol-aerospace.com, or consult Amphenol Aerospace.



See High Frequency Contact Designer's Guide at end of this catalog.



High Speed Quadrax and Differential Twinax Contacts



Amphenol provides the latest technology in high speed contacts - differential twinax and quadrax contacts, size 8, for use in MIL-DTL-38999 Special* Subminiature Cylindrical Connectors.

DIFFERENTIAL TWINAX CONTACTS

High speed Differential Twinax contacts consist of an outer contact with two inner contacts spaced to form one 100 or 150 Ohm controlled impedance differential pair. See pages 15 and 16 for performance data and ordering of Differential Twinax contacts, and consult Amphenol Aerospace for more information.



Differential Twinax Contact

QUADRAX CONTACTS

High speed Quadrax contacts consist of an outer contact with four inner contacts spaced to form two 100 or 150 Ohm controlled impedance differential pair.

Both contacts, when used in Amphenol MIL-DTL-38999 Series III and ARINC type connectors, provide an excellent alternative for harsh environment applications such as:

- Ethernet 100 Base-T-100 Ohm
- Gigabit Ethernet 1000 Base-T-100 Ohm
- Fibre Channel-150 Ohm
- IEEE1394B FireWire-110 Ohm

Differential Twinax and Quadrax contact options include:

- Crimp or printed circuit board termination
- Established designs to accommodate a variety of cable types and gages
- Ground plane connectors can incorporate quadrax contacts. These connections have conductive inserts that ground the outer conductor of the contact body to the shell of the connector. They accommodate size 8 and 12 shielded contacts of which the size 8 can be quadrax type.

See pages 12-14 for performance data of Quadrax contacts. Consult Amphenol Aerospace for further information needed.

* Requires modified connector to accommodate keyed contacts.

Differential Twinax and Quadrax contacts provide high data transfer rates, low power consumption, and excellent EMI capability. They offer controlled impedance of 100 or 150 Ohm and are ideal for use in harsh environments.



D38999 Series III Ground Plane Connectors with Quadrax PCB Socket contacts



D38999 Series III with Quadrax and Power Contacts



D38999 Series III Connectors (standoff shell at right and standard shell below) with Quadrax PC Tail Contacts



Quadrax Contacts, Quadrax Terminators, Transition Adapters

QUADRAX CONTACTS FOR ARINC CONNECTORS

Amphenol ARINC 600 Rack and Panel connectors can incorporate high speed quadrax contacts as well as coax, twinax and differential twinax contacts. R27 Rack and Panel connectors use the same contacts as ARINC 600 connectors. See Cable Usage Guide and see pages 47 and 48 for more information on these rack and panel connectors.



Quadrax Contact for ARINC Connectors

BOARD LEVEL CONNECTORS WITH COMPLIANT QUADRAX CONTACTS

Amphenol also provides compliant quadrax socket contacts and Quadrax pin contacts with PC tails for attaching to printed circuit boards. See page 17 for more information.



Compliant Quadrax Socket and PCB Tail Quadrax Pin

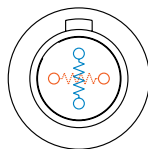
FEED-THROUGH CONNECTOR WITH QUADRAX CONTACTS

Amphenol's feed-through connector is double-ended for through bulkhead applications. Consult Amphenol for more information.



Quadrax Terminators

Amphenol offers a terminator assembly which is a low reactance, resistive impedance match to the characteristic impedance of a transmission line. It is used to terminate the far ends of a transmission line or an open tap so that the energy from signals traveling down the transmission line is absorbed within the resistor and not reflected back down the transmission line causing signal interference (noise). Consult Amphenol for more information.



Quadrax Terminator

Transition Adapters

In conjunction with its Differential Twinax and Quadrax contacts, Amphenol has developed a full line of Transition Adapters in order to facilitate launching of controlled impedance signals to printed circuit boards. These use differential twinax or quadrax 90° or straight receptacles and they can be either threaded or cable to board direct. The threaded transition adapters provide an ideal method of disconnecting the differential twinax or quadrax connector from the board. See pages 18-20 for further description, performance data and ordering of transition adapters.

Board Level Connector with Compliant Quadrax Contacts



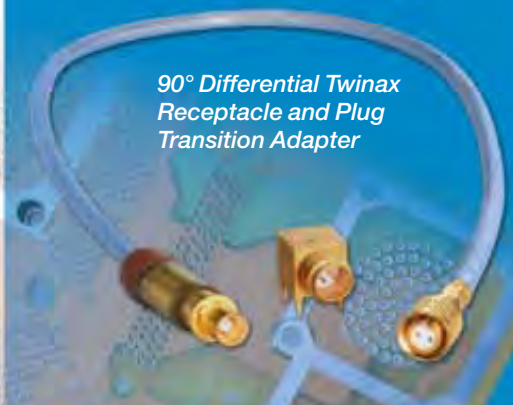
Straight Quadrax Receptacle Contact



90° Quadrax Receptacle and Plug Transition Adapter



90° Differential Twinax Receptacle and Plug Transition Adapter



High Speed Coax and Twinax Contacts

Optional choices, other than standard crimp or solder 500 cycle and 1500 cycle contacts, are often required for high frequency interconnections. Amphenol offers shielded contacts for RF applications as well as balanced high sensitivity circuits.

SHIELDED COAXIAL CONTACTS

High speed Coax contacts within a connector provide the shielding protection, and many cases the RF/microwave performance, needed in the circuitry of many applications.



Shielded Coax Contacts

All popular series of Amphenol cylindrical connectors and many rectangular connectors are available with coax contacts. Diameters are standardized in sizes 4, 8, 12 and 16 so that coaxial contacts may be interchanged with power contacts in connector arrangements which include those sizes. Popular RG cable types and a variety of other commercial coaxial cables can be accommodated. See page 24 for coax contact performance data. Matched impedance size 12 coax contacts are also available (see page 28). The use of coax contacts within a connector, compared to the use of individual coaxial/shielded connectors, offers advantages of savings in space and weight and no cross-mating difficulties. Coax and standard contacts may be mixed within the connector to meet special signal needs. The connector itself offers further protection and environmental integrity through the grommets and seals used, and coaxial junction is protected by the connector outer shell.

CONCENTRIC TWINAX SHIELDED CONTACTS

High performance shielding capabilities are available with Concentric Twinax contacts. These are designed for protection from magnetic and electrostatic interference including nuclear electro-magnetic pulse. The contact is crimp terminable to twisted shielded cable and is fully scoop-proof (recessed pins) in MIL-DTL-38999 connectors. The concentric twinax contact is engineered to maintain shield integrity through a multi-pin cylindrical connector and does not require contact polarization within the insert. Size 8 concentric twinax contacts were developed for use in MIL-STD-1553B Airborne multiplex data bus applications. Ideal for this application need is the high performance Tri-Start connector with its fully scoop-proof feature of recessed pins.



Concentric Twinax Contacts Size 8



MIL-DTL-38999 Lanyard "Breakaway" Connector with Concentric Twinax Contacts, Qualified for MIL-STD-1760

The concentric twinax contact is crimp terminable to twisted shielded cable. Size 12 concentric twinax contacts were developed for SAAB. They can be used in any size 12 cavity of D38999 I, II or III or SJT connector. Size 8 & 12 coax, triax or twinax contacts or size 16 coax contacts are available in Ground Plane Connectors (See photo preceding page). These are MIL-DTL-38999 Series III connectors for data bus, LAN and coax/triax/twinax transmission lines with conductive inserts that ground the outer contact conductor to the shell. They are sold "less contacts"

Amphenol® Shielded Contacts provide design versatility for electrical circuitry. Shielded contacts are used to eliminate interference from outside electrical sources, when standard crimp or solder contacts are not enough.



MIL-DTL-38999 Connector with High Speed Coax Contacts

Size 8 Coax Pin Contact



Concentric Twinax Size 12 Contacts



MIL-DTL-38999 Connector with Concentric Twinax Contacts



Coax Contacts with Frequency Range of DC to 40 GHz

HIGH FREQUENCY COAX CONTACTS WITH "FLOAT MOUNT" TECHNOLOGY

Amphenol Aerospace now offers DC to 40 GHz size 8 coaxial contacts for the D38999 housing and standard inserts. These contacts can be terminated to a multiple of cable types depending on the application.



High Frequency Size 8 Coax Contacts with "Float Mount Technology"

By using standard interfaces that are based on MIL-STD-348 and can be installed in any D38999 size 8 insert, Amphenol has transformed the circular connector industry. This technology expands the use of D38999 connectors to include the microwave transmission lines within the multi-port configuration without change to a custom connector.

The high frequencies are maintained by Amphenol's unique "Float Mount" technology. This technology allows for consistent microwave performance while maintaining tight mechanical tolerances. This consistency provides superior electrical performance and, unlike other blindmate connectors, will maintain an accurate phase length when mated. See page 30 for specifications, performances and ordering of this contact.

Twinax Contacts for Printed Circuit Board Applications

PC TAIL TWINAX CONTACTS

Amphenol provides Printed Circuit Tail Twinax contacts for MIL-DTL-38999 Series I and III cylindrical connectors and also for ARINC 404 and ARINC 600 rectangular connectors. High reliability is assured with factory pre-assembled contacts and standardized termination to the board.



Variety of PC Tail Twinax Contacts

See pages 35-37 for performance data and ordering of PC tail twinax contacts, and consult Amphenol Aerospace for further information needed. Also see Amphenol catalog 12-170, Cylindrical Connectors for Printed Circuit Boards, or Catalog 12-C1, Amphenol's new combined 38999 catalog.

Shielded Triax Contacts

TRIAx CONTACTS WITH THREE CONDUCTORS FOR USE WITH TRIAX CABLE

Amphenol supplies sizes 8, 10 and 12 triax contacts for use in MIL-DTL-38999 Series I, II and III connectors. Triax contacts provide additional shielding when terminated to triax cable having solid or stranded center conductors. See cable compatibility in the Cable Usage Guide and performance data and ordering of triax contacts on pages 34-37. Each of the three conductors of the triax contact is separated by dielectric insulation to isolate ground planes and to improve shielding effectiveness. All conductors are crimp terminated for high reliability and ease of assembly. Triax contacts may be specified for direct connection to printed circuit boards. For maximum system flexibility, triax contacts may be mixed with coax, twinax and power contacts in a single connector.



Triax Contacts

HF38999 - D38999 Connectors with High Frequency Coax Contacts



D38999 Connectors with PC Tail Twinax Contacts



Printed Circuit Twinax Contacts provide a cost effective packaging solution for limited space applications where connectors are attached to printed circuit boards.

Rail Launch MIL-STD-1760 Connector with Triax Contacts



Cable Systems with High Frequency Contacts

CABLE ASSEMBLY CAPABILITIES

Amphenol provides a large array of cable assemblies with high speed quadrax and differential twinax contacts, as well as coax and concentric twinax contacts. This page shows a few examples. The Cable Usage Guide pages that follow list the design possibilities for these high speed contacts.

Amphenol strives to offer customers the widest range of cable assemblies, keeping abreast of the latest cable types in the marketplace. Please consult with the contact product managers at Amphenol Aerospace for assistance in designing the cable assembly that suits your particular needs. From a simple one-cable interconnection, to a multiple cable system, Amphenol can design and supply your cable needs for high frequency contacts and connectors. See the High Frequency Contact Designer's Guide at the end of this catalog



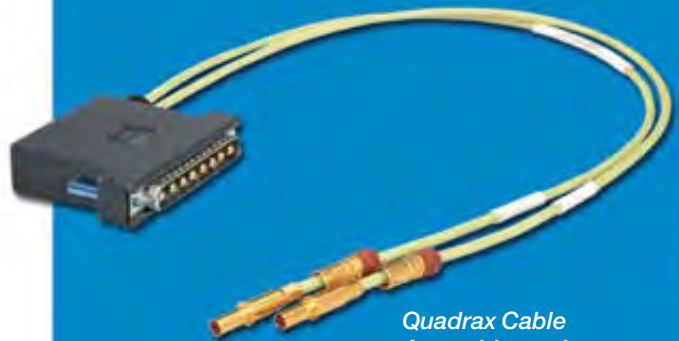
Eight Wire Gigabit Ethernet Assembly



Variety of Quadrax Cable Assemblies



Quadrax Contact with 8P8C "RJ45" Jack Ethernet Assembly



Quadrax Cable Assembly can be attached to any connector application

TESTING OF CABLES

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



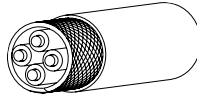
Quadrax Cable Assembly attached to Board Level Compliant Quadrax Connector

Cable Usage Guide

Use the Cable Usage Guide on pages 7-9 as follows:

1. Locate the cable you are using in Cable Type column. For cables not listed consult Amphenol Aerospace.
2. Refer to the Amphenol Connector section which features contacts/adapters for this cable. Connector size, performance features and insert pattern availability may influence your choice.
3. Order your connector and contacts or transition adapters by following the procedure given in the section for the connector series selected. These instructions are supplemented by the Amphenol Catalog Section covering the basic connector.

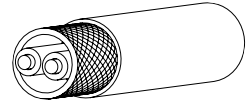
Quadrax Contacts CABLE USAGE GUIDE D38999 Series III* Connectors



Cable Type	Nominal Impedance (ohms)
Draka Fileca F-4703-3	100
F-4703-4	
F-4704-5	
F-47-4-6	
Filotex ET2PC236	
ET2PF870	
PIC Wire E50424	
E50426	
E51424	
Tensolite NF22Q100	
NF24Q100	
NF24Q100-1	
NF24Q100-01-200C	
NF26Q100	
NF26Q100-1	
NF26-2Q100	
24443/03130X-4(LD)	
24443/03166X-4(LD)	
24443/9P025X-4(LD)	
23450/04090X-4 (LD)	
24443/C20714X-4(LD)	
Gore RCN7688	110
RCN8513	
S280W502-4	
JSF-18-3	
Themax 956-4TN	
956-5	
T956-4T200	
MX100Q-24	
Tensolite 24450/03089X-4(LD)	
Gore RCN8487	
JSFY02-1	150
JSF18	
Tensolite 26473/02006X-4(LD)	
Gore RCN8328	

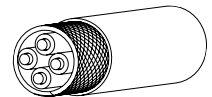
* Requires modified connector to accommodate keyed contacts.

Differential Twinax Contacts CABLE USAGE GUIDE D38999 Series III* Connectors



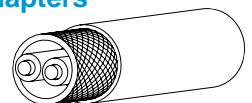
Cable Type	Nominal Impedance (ohms)
Tensolite 26463/70460X-2	98
ST5M1284-003	
Draka Fileca 2709-3	100
PIC Wire E10224	
Tensolite NF24T100-200C Space	
23460/05114X-2(LD)	
24463/03220T-2(LD)	
24463/05099X-8(LD)	
26453/03184X-2(LD)	
24463/9P025X-2(LD)	
Raychem 0026A0024, 0024G0024	
S280W502-6	
JSFY11-24	150
Gore GSC-05-827300-00	
Thermax 956-6262, 956-1T200	
12814	
MX 100-24	
Tensolite 26483/03071X-2(LD)	

Quadrax Transition Adapters CABLE USAGE GUIDE D38999 Series III* Connectors or ARINC 600 Connectors



Cable Type	Nominal Impedance (ohms)
Draka Fileca F-4703-3	100
F-4704-4	
Tensolite NF22Q100	
NF22Q100-01	
NF24Q100	
NF26Q100	
Themax 956-5	
Gore GSC-10-8273900	
Tensolite 26473/02006X-4(LD)	
	150

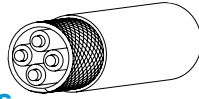
Differential Twinax Transition Adapters CABLE USAGE GUIDE D38999 Series III* Connectors or ARINC 600 Connectors



Cable Type	Nominal Impedance (ohms)
M17/176-00002	78
Tensolite 224463/9P025X-2	100
24463/9P025X-2(LD)	
Tensolite 26483/03071X-2	150

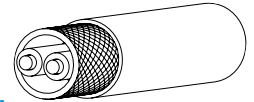
Cable Usage Guide, cont.

Quadrax Contacts CABLE USAGE GUIDE ARINC 600 Rack & Panel Connectors



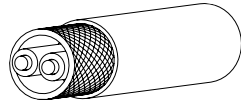
Cable Type	Nominal Impedance (ohms)
Draka Fileca F-4703-3	100
F-4704-5, F4704-4	
Tensolite NF22Q100	
NF24Q100	
24443/03130X-4(LD)	
24443/9P025X-4(LD)	110
S280W502-4	
JSFY02-1	150
Gore RCN8328	
Tensolite 26473/02006X-4(LD)	

Differential Twinax Contacts CABLE USAGE GUIDE ARINC 600 Rack & Panel Connectors



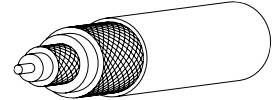
Cable Type	Nominal Impedance (ohms)
ABS0386WF24	100
ASNE0272TK22	100
ASNE0272TK24	100
Tensolite 24463/9P025X-2(LD)	100

Concentric Twinax Contacts CABLE USAGE GUIDE D38999 Series I, II, III & SJT Connectors



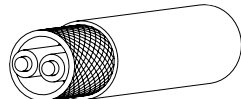
Cable Type	Nominal Impedance (ohms)
EPD32263A	77
EPD22189B	77
M17/176-00002	77
GSC-12-2548-00	77
GC875TM24H	77
GSC-12-81095-00	77
Raychem 10602	77
10606	77
10612	77
10613	77
10614	77
23089/RC	77
05A0771	77
T10971	77
7724C8664	77
7726D0664	77
782OD0111 (20 AWG)	78
0024G0024	100
5M2022-003	100
HS5930	100
S280W502-1	100
CXN2268	100

Triax Contacts CABLE USAGE GUIDE D38999 Series I, II, III & SJT Connectors



Cable Type	Nominal Impedance (ohms)
JN1088WT	50
5M2397-002	75
81264-02	75
JN1088WU	75
Gore GSC-03-81497-00	75
RG179 (Coax Cable)	75
Tensolite 28988/50823LXX-1	75
Tensolite 28988/50823LXX-1	75
Thermatics 12447	75
10602 (Twinax Cable)	77
5M2559-001	95
81264-01	95
ST5M1323-001	95
Champlain 81-00700	95
Tensolite 28598/9C026LT-1	95
26895/90334X-1	95
Teledyne 13809	95
11914/1	95
Times AA6603	95

Concentric Twinax Contacts CABLE USAGE GUIDE ARINC 600 Rack & Panel Connectors



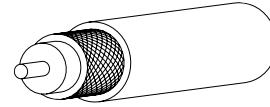
Cable Type	Nominal Impedance (ohms)
S280W502-1	100

Cable Usage Guide, cont.

Use the Cable Usage Guides on this page for Coax Contacts as follows:

1. Locate the cable you are using in Cable Type column. For cables not listed consult Amphenol Aerospace.
2. Refer to the Amphenol connector section which features contacts for this cable, as indicated by a • in the appropriate column. If more than one connector series utilizes contacts designed for your cable, investigate each of them. Connector size, performance features and insert pattern availability may influence your choice.
3. Order your connector and coax contact by following the procedure given in the section for the connector series selected. These instructions are supplemented by the Amphenol Catalog Section covering the basic connector.
4. The Additional Contacts column of this guide is used to indicate an additional availability of contact designs for older cable types or capability. Consult Amphenol Aerospace for further information.

Coax Contacts CABLE USAGE GUIDE



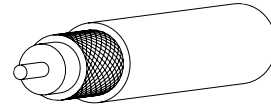
Cable Type	Nominal Impedance (ohms)	For Subminiature Cylindricals (MIL-DTL-38999 type)	For Standard & Heavy Duty Cylindricals (MIL-DTL-5015 type) (MIL-DTL-22992 type)	For Rectangular Connectors	Additional Contacts (Consult Amphenol)
RG-5B/U (M17/073-RG212)	50				•
RG-6A/U (M17/2-RG6)	75				•
RG-7/U	97				•
RG-9B/U (M17/075-RG214)	50				•
RG-11A/U (M17/6-RG11)	75				•
RG-12A/U (M17/6-RG12)	75				•
RG-13A/U	74				•
RG-21A/U	53				•
RG-55B/U (M17/084-RG223)	53		•	•	
RG-58C/U (M17/028-RG058)	50		•	•	
RG-58 (M17/155-00001)	50	•			
RG-59B/U (M17/29-RG59)	75		•		
RG-62A/U (M17/030-RG062)	93		•		
RG-62B/U	93		•		
RG-63B/U (M17/31-RG63)	125				•
RG-71B/U (M17/90-RG71)	93				•
RG-87A/U	50				•
RG-115/U	50				•
RG-115A/U	50				•
RG-116/U	50				•
RG-122/U (M17/054-RG122)	50			•	•
RG-133A/U (M17/100-RG133)	95				•
RG-140/U (M17/110-RG302)	75		•		
RG-141A/U	50		•	•	
RG-142A/U	50		•	•	•
RG-142B/U (M17/060-RG142)	50	•	•	•	•
RG-143A/U	50				•
RG-161/U	70	•	•		
RG-174A/U (M17/119-RG174)	50	•	•		
RG-178B/U (M17/093-RG178)	50	•	•		
RG-179B/U (M17/094-RG179)	75	•	•		
RG-180B/U (M17/095-RG180)	95	•	•	•	
RG-187A/U (M17/094-RG179)	75	•	•		
RG-188A/U (M17/113-RG316)	50	•	•		
RG-188 Double Braid	50				
RG-195A/U (M17/095-RG180)	95	•	•	•	
RG-195 Double Braid	95				
RG-196A/U (M17/169-00001)	50	•	•		
RG-210/U	93		•		
RG-212/U (M17/073-RG212)	50		•		•
RG-214/U (M17/075-RG214)	50				•
RG-216/U (M17/77-RG216)	75				•
RG-222/U	50				•
RG-223/U (M17/084-RG223)	50	•	•	•	
RG-225/U (M17/86-RG225)	50				•
RG-227/U	50				•
RG-302/U (M17/110-RG302)	75		•		

CHART CONTINUES ON NEXT PAGE

NOTE: For information on coax contacts for Miniature cylindrical connectors, MIL-DTL-26482 Series 1, see catalog 12-070 and consult Amphenol Industrial Operations.

NOTE: MIL-DTL-38999 supersedes MIL-C-38999.
MIL-DTL-5015 supersedes MIL-C-38999.
MIL-DTL-22992 supersedes MIL-C-22992

Cable Usage Guide, cont.



Coax Contacts CABLE USAGE GUIDE, cont.

Cable Type	Nominal Impedance (ohms)	For Subminiature Cylindricals (MIL-DTL-38999 type)	For Standard & Heavy Duty Cylindricals (MIL-DTL-5015 type) (MIL-DTL-22992 type)	For Rectangular Connectors	Additional Contacts (Consult Amphenol)
RG-303/U (M17/111-RG303)	50		•	•	
RG-304/U (M17/112-RG304)	50				•
RG-316/U (M17/113-RG316)	50	•	•		
RD-316 Double Braid (M17/152-00001)	50	•			
RG-400 (M17/128-RG400)	50	•			
M/A-COM 5M2869-001	50	•		•	
5022A1311-D	50	•			
Beldon 9307	50	•			
FA-19X	50	•			
T-Flex-402	50	•			
T-Flex-405	50	•			
Filotex ET124962	50	•			
JN1088WT (Triax)	50	•			
JN1088WU (Triax)	75	•			
PAN6422XQ	50	•			
PAN6422XY	75	•			
PAN6595XM (Triax)	75	•			
Haveg 51-04486		•			
81-00207		•			
Gore GWN1159A		•			
CXN3403		•			
Times AA3248		•			
Teledyne 11299		•			
Raychem 5021D1331-0	50	•			
5021D1331-9	50	•			
5022D1312-9	50	•			
7527A1318	75	•			
9527A1314	95	•			
9528A1318	95	•			
9530A5314	95	•			
9530D5314	95	•			
Thermatics 2929-29		•			
Tensolite 30850/87T-1		•			
Thermax 50C-25A-DS-1		•			

For Cable not found in the Coax Contact Cable Usage Guide, refer to these general dimensional ranges:
(In general, for D38999 Connectors, the size 8, 12 and 16 Coax Contacts will terminate cable in the following ranges)

SIZE 16

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

SIZE 12

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

SIZE 8

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

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

Subminiature Cylindrical Connector Overview

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

Subminiature Cylindricals 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

GENERAL ORDERING INFORMATION

Amphenol Subminiature Cylindricals, 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.

HOW TO ORDER CONNECTORS AND HIGH FREQUENCY CONTACTS

- Select the Subminiature Series desired.

(See features of each series given briefly on this page and in-depth in series catalogs, which are on-line at www.amphenol-aerospace.com.)

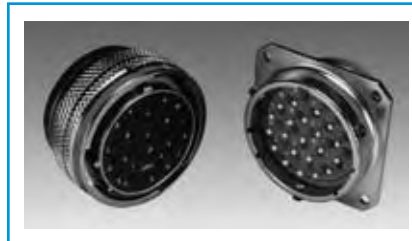
Catalog 12-090* - JT-R, LJT-R Connectors
 Catalog 12-092* - TV-R Connectors
 Catalog 12-091* - SJT-R Connectors
 Catalog 12-C1* - Combined 38999 Cylindrical Connectors
 Catalog 12-094 - Amphe-Lite (Industrial 38999 type)
- Select the quadrax, differential twinax, coax, twinax and/or triax contacts or the transition adapters that are needed from the tables on the following Subminiature Cylindrical 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 21, 22. Insert patterns for coax, twinax and triax contacts are on pages 38-40.
- Complete the connector part number from the connector series catalog, incorporating the chosen insert pattern number. See detailed how to order page 23 for ordering 38999, Series III with quadrax and differential twinax contacts. Consult Amphenol for assistance in ordering 38999 cylindricals 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.



TV-R, Tri-Start, D38999 Series III

See Catalog 12-092 or Catalog 12-C1* for complete information on this series.

- 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



JT-R, D38999 Series II

See Catalog 12-090 or Catalog 12-C1* 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 Catalog 12-090 or Catalog 12-C1* 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



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



SJT-R, 38999 Type

See Catalog 12-091 or Catalog 12-C1* for complete information on this series.

- 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.

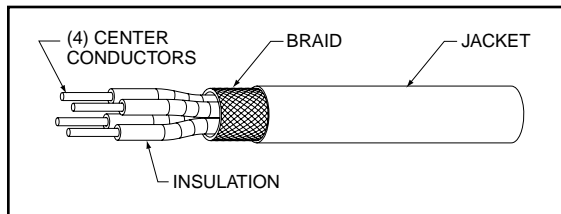
NOTE: MIL-DTL-38999 supersedes MIL-C-38999.
 MIL-DTL-27599 supersedes MIL-C-27599

* New Amphenol Catalog 12-C1 will combine 38999 Series I, II and III and SJT Series in one catalog. It will also include 38999 with Filter/Transient Protection and with PC Tails.

Quadrax Contacts for MIL-DTL-38999, Series III Cylindricals general description

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

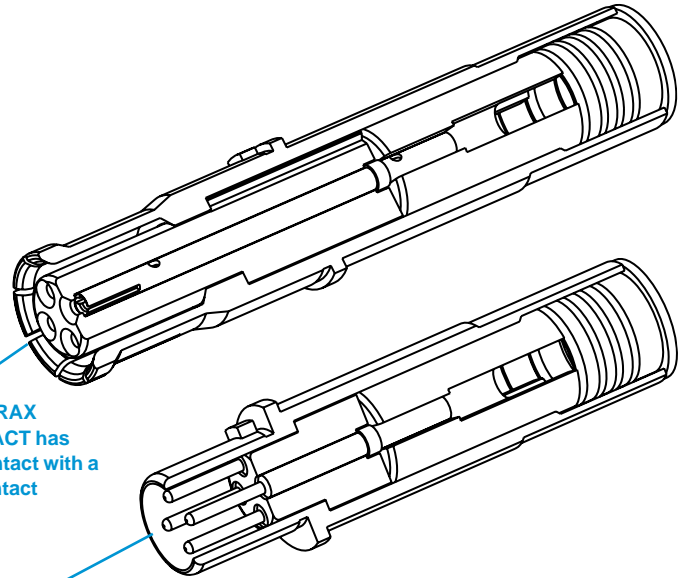
- Four strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Available in size 8 crimp termination style
- Also available in size 8 with PC tails (see page 14)
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts



Cable Illustration - Quadrax Contact

TYPICAL QUADRAX SOCKET CONTACT has socket outer contact with a socket inner contact

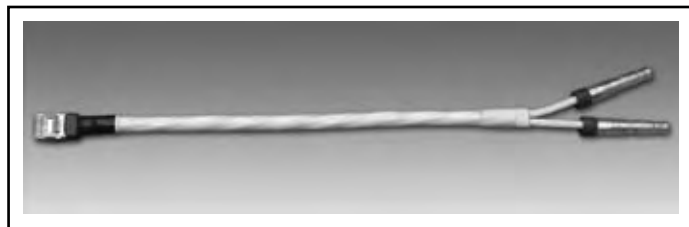
TYPICAL QUADRAX PIN CONTACT has pin outer contact with a pin inner contact



Quadrax Pin with 8P8C "RJ45" Jack



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

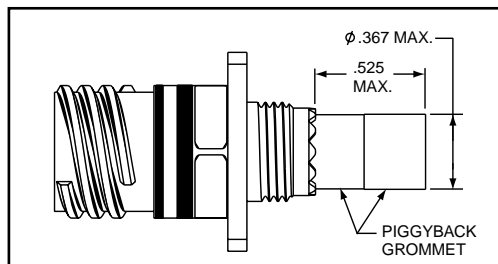


Quadrax in an Eight Wire Gigabit Ethernet Assembly

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.



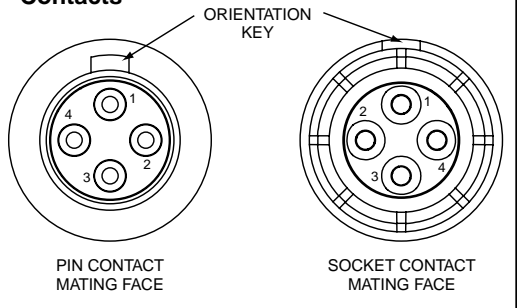
Quadrax Contacts are gold plated, crimp termination

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



See page 23 for part number ordering of popularly used 38999 Series III connectors with 100 ohm quadrax contacts.

Also see Quadrax contacts for ARINC 600 and R27 Rack and Panel Connectors on page 47 and 48.

Quadrap Contacts for MIL-DTL-38999, Series III Cylindrical application data

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

QUADRAP 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), PIC E50424	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, Draka Fileca F-4704-5, GORE RCN 7688, 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 E50426	21-33384-71 (L-2119-AB)	21-33385-71 (L-2119-AB)		26		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
NEXANS ET 132552, Tensolite 24443/03130X-4LD92607 altered key (inner contacts box pattern, mates with 21-3338()-81 only)	21-33384-81 (L-2119-R)	21-33385-81 (L-2119-R)		24		Ethernet (100 Mbps), 1000 Base-T Gigabit Ethernet (1 Gbps)		
Draka Fileca F-4704-6	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

QUADRAP 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/service_instructions.asp

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

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

Quadrax Contacts for MIL-DTL-38999, Series III Cylindricals, cont. application data

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	Fibre-Channel (1 GBPS, 2 GBPS, 1G/2G), 1000 Base-CX (1.25 GBPS), SCSI-2 (3.2 GBPS)	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				
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				

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/service-instructions.asp

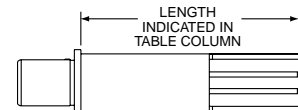
† Consult Amphenol Aerospace for current release of this contact or instruction sheet if applicable.

†† 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
Metalized 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.

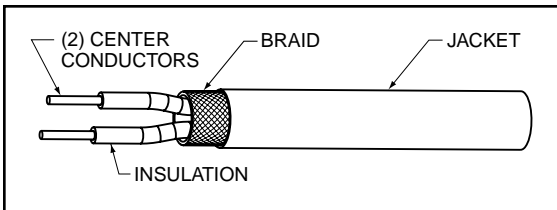


Note: it does not indicate stickout length when installed in D38999 connector.

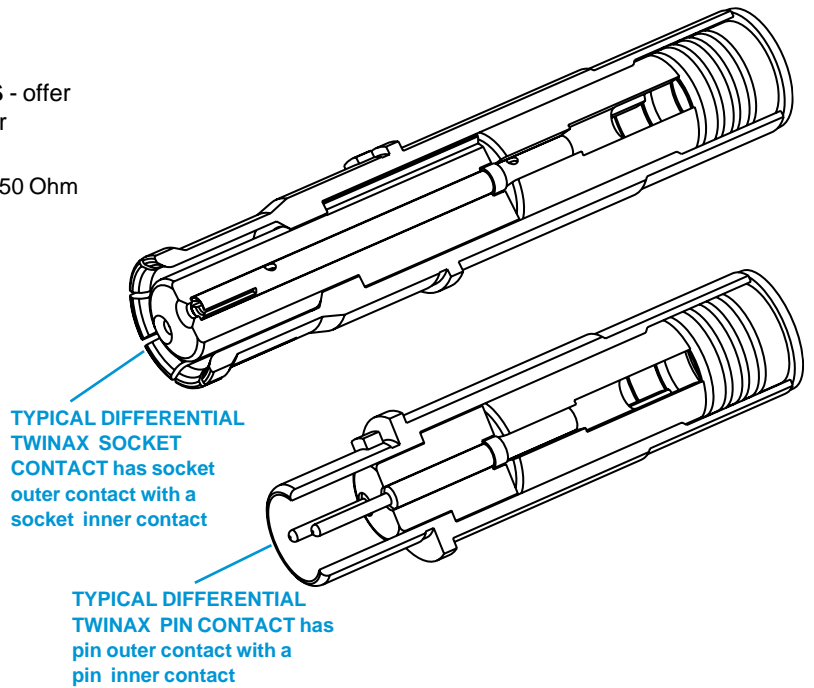
Differential Twinax Contacts for MIL-DTL-38999, Series III Cylindricals general description

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

- Two strategically spaced inner contacts form two 100 or 150 Ohm matched impedance differential pairs
- Outer contact has rugged wall section for durability
- Available in size 8 crimp termination style
- Also available in size 8 with PC tails (see page 16)
- Requires modification of MIL-DTL-38999 connector to accommodate keyed contacts



Cable Illustration - Differential Twinax Contact



Differential Twinax Socket Contact



Differential Twinax Pin Contact

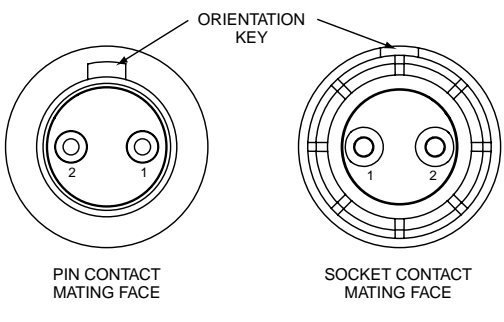
Differential Twinax Contacts are gold plated, crimp termination

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



Differential Twinax Contacts for MIL-DTL-38999, Series III Cylindricals application data

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-AV)	21-33388-51*** (L-2119-AV)					
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	21-33388-71					
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)	150		Fibre Channel, 1000 Base-CX Ethernet		
Tensolite 26483/03071X-2(LD)	21-33387-31 (L-2119-AC)	21-33388-31 (L-2119-AC)					
Tensolite 26483/03071X-2(LD)	21-33456-1 (L-2119-BX)†	21-33457-1 (L-2119-BX)†					

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		

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.

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.

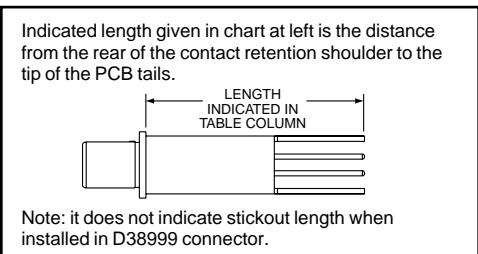
*** Indicated contact is vacuum degassed

†† 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/service_instructions.asp

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



Compliant Quadrax Contacts and PC Tail Quadrax Contacts for Attachment to PC Boards

general description

Amphenol® Quadrax Contacts for Printed Circuit Board Attachment - available for MIL-DTL-38999 Series III Cylindrical 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.

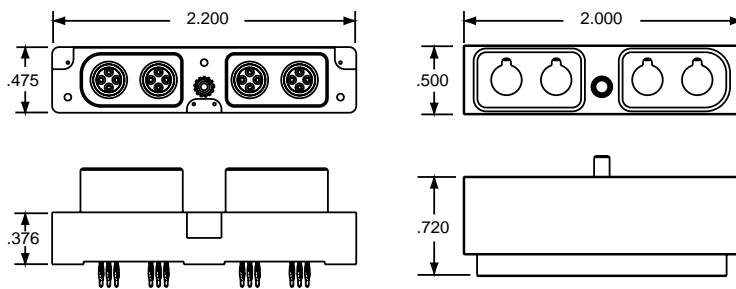
MIL-DTL-38999, SERIES III CONNECTOR WITH PC TAIL CONTACTS. This arrangement has 8 Quadrax PC tail contacts.



Amphenol® Quadrax Contacts for Rectangular Board Level Connectors - incorporate the same size 8 Quadrax PCB contacts as used in cylindrical 38999 connectors.

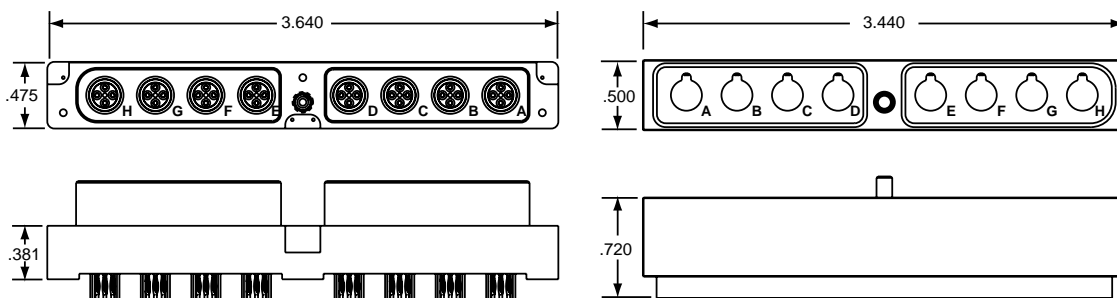
- Size 8 Quadrax Compliant contacts with hole diameters:
 - .025 ± .002 PTH Quadrax contact
 - .040 ± .003 PTH shell grounding
 - Accommodates backplane .125 inch min. thickness
- Consult Amphenol Aerospace for availability of additional connector configurations

4 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX



Compliant Pin Quadrax Board Level Connector

8 POSITION BOARD LEVEL CONNECTOR WITH QUADRAX

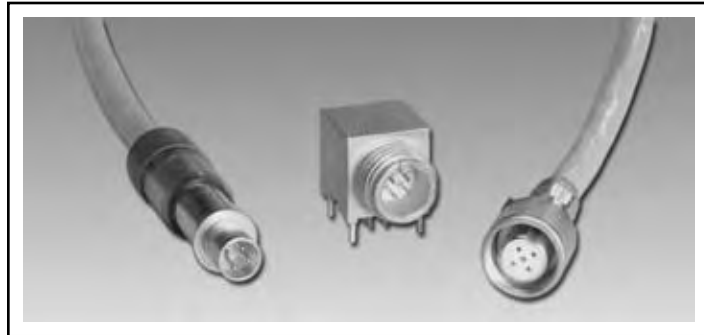


Quadrax Transition Adapters and Differential Twinax Transition Adapters

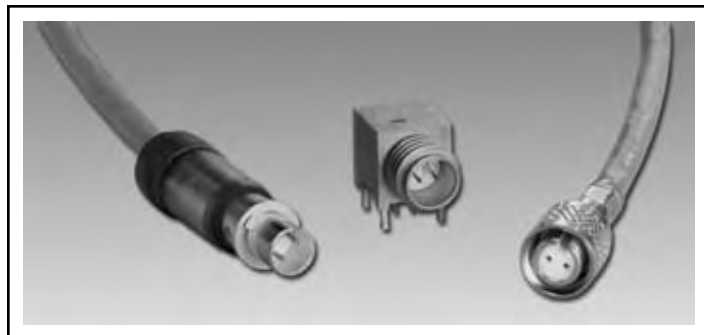
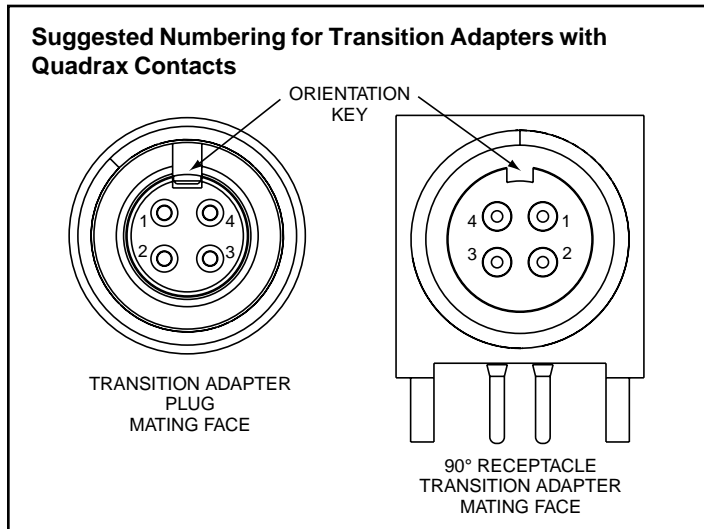
general description

Amphenol® Transition Adapters - are used to facilitate launching of controlled impedance signals to printed circuit boards. Amphenol provides transition adapters in both contact types:

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



90° Quadrax Receptacle and Plug Transition Adapter

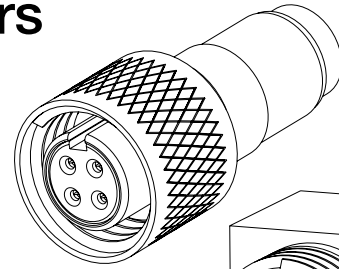


90° Differential Twinax Receptacle and Plug Transition Adapter

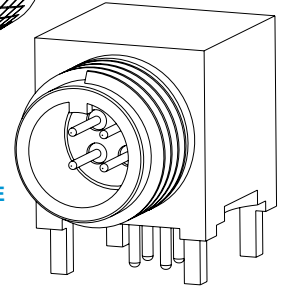
TRANSITION ADAPTER DATA

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.

QUADRAX
TRANSITION
ADAPTER PLUG



QUADRAX
TRANSITION ADAPTER
90 DEGREE RECEPTACLE



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		150	
21-33836-21			1000 Base CX, Fibre channel
	21-33837-21 (90 degree)		1000 Base CX, Fibre channel
	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.

Quadrap Transition Adapters for Attachment to PC Boards

application data

100 OHM QUADRAP TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS							
Quadrap 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
Quadrap Plug Adapter/ Tensolite NF24Q100		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)
Quadrap Plug Adapter/ Tensolite NF22Q100, NF22Q100-01, Thermax 956-5		21-33836-41 (L-2119-W)†					
Quadrap Plug Adapter/ Draka Fileca F-4703-3, F-4704-4		21-33836-51 (L-2119-Y)					
Quadrap Plug Adapter/ NF26Q100		21-33836-61 (L-2119-AM)†					
Quadrap Receptacle Straight Adapter in-line jam nut (threaded)/ GSC-10-8273900			21-33837-81 (L-2119-AR)†				
Quadrap Receptacle Straight Adapter in-line (threaded)/ NF24Q100			21-33837-91 (L-2119-BL)				
PCB Quadrap Receptacle 90 Degree Adapter/ Tail Length .110			21-33837-41			NA	NA
PCB Quadrap Receptacle Straight Adapter/ Tail Length .110			21-33837-51				
PCB Quadrap Receptacle Straight Adapter/ Special Tail Length (.200)			21-33837-61				
Quadrap Receptacle 90 degree Adapter with cable to board/ NF24Q100			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)
Quadrap Receptacle Straight Adapter with cable to board/ NF24Q100							

150 OHM QUADRAP TRANSITION ADAPTERS FOR LAUNCHING CONTROLLED IMPEDANCE SIGNALS TO PC BOARDS							
Quadrap 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
Quadrap Plug Adapter/ Tensolite 26473/02006X-4(LD), Gore RCN8328		21-33836-21 (L-2119-S)		150	.375	M22520/2-01 with Positioner M22520/2-34	NA
PCB Quadrap Receptacle 90 Degree Adapter/ Tail Length .110			21-33837-21				
PCB Quadrap Receptacle Straight Adapter/ Tail Length .110						21-33837-31	
Quadrap Receptacle 90 degree Adapter with cable to board/ Tensolite 26473/02006X-4			21-33837-71 (L-2119-A)†	150		M22520/2-01 with Positioner M22520/2-34	M22520/5-01 with Die Set M22520/5-45 (Location A)
Quadrap Receptacle Straight Adapter with cable to board/ Tensolite 26473/02006X-4 (LD)							

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

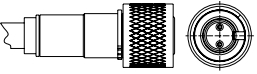






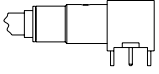
**Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/service_instructions.asp

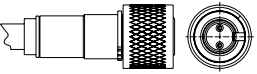


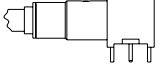
† Consult Amphenol Aerospace for current release of this adapter and instruction sheet if applicable.

See electrical protocols for transition adapters on page 18.

Differential Twinax Transition Adapters for Attachment to PC Boards

application data

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)**		Impedance (Ohms)	Mating Thread Size	Crimping Tools	
		Plug	Receptacle			Inner Contact	Outer Contact
Differential Twinax Plug Adapter/ M17/176-00002 (77 ohms)		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)		21-33832-21 (L-2119-P)					
PCB Differential Twinax Receptacle 90 Degree Adapter/ Tail Length .110			21-33833-21				
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)		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							
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			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)**		Impedance (Ohms)	Mating Thread Size	Crimping Tools	
		Plug	Receptacle			Inner Contact	Outer Contact
Differential Twinax Plug Adapter/ Tensolite 26483/03071X-2		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							
PCB Differential Twinax Receptacle Straight Adapter/ Tail Length .110			21-33833-181†				
Differential Twinax Receptacle 90 degree Adapter with cable to board/ Tensolite 26483/03071X-2			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.

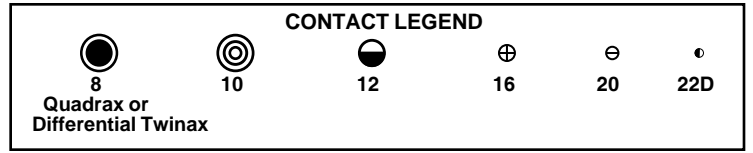
**Termination instructions are packaged with each contact and can be found on-line at: www.amphenol-aerospace.com/service_instructions.asp

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

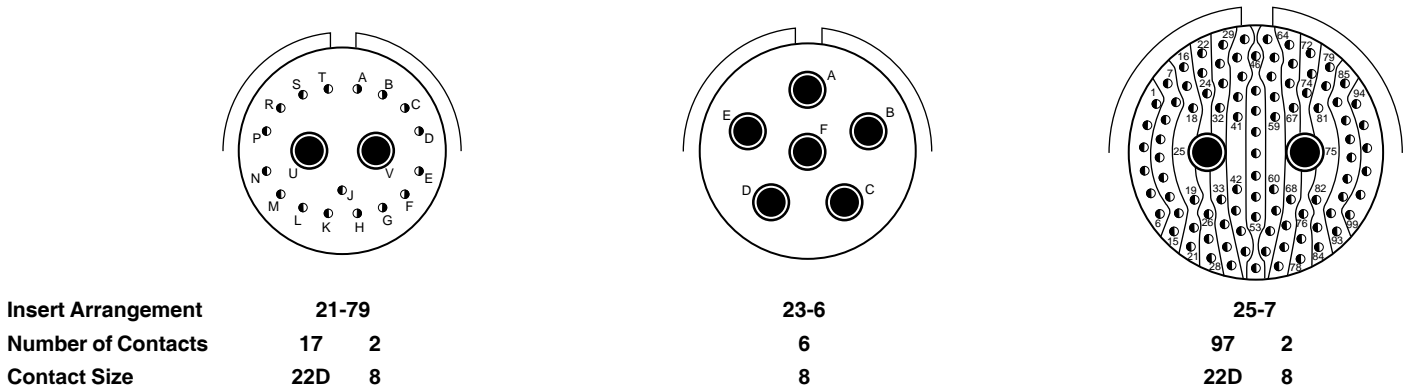
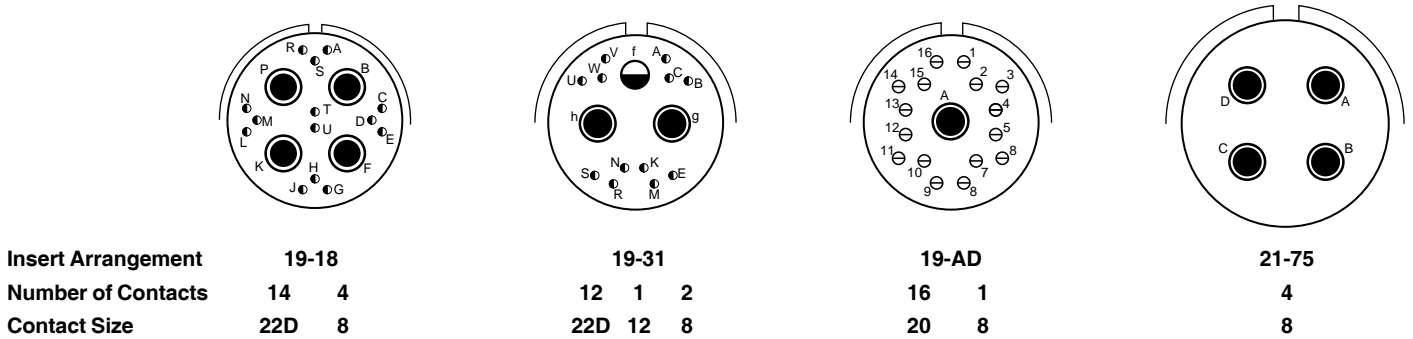
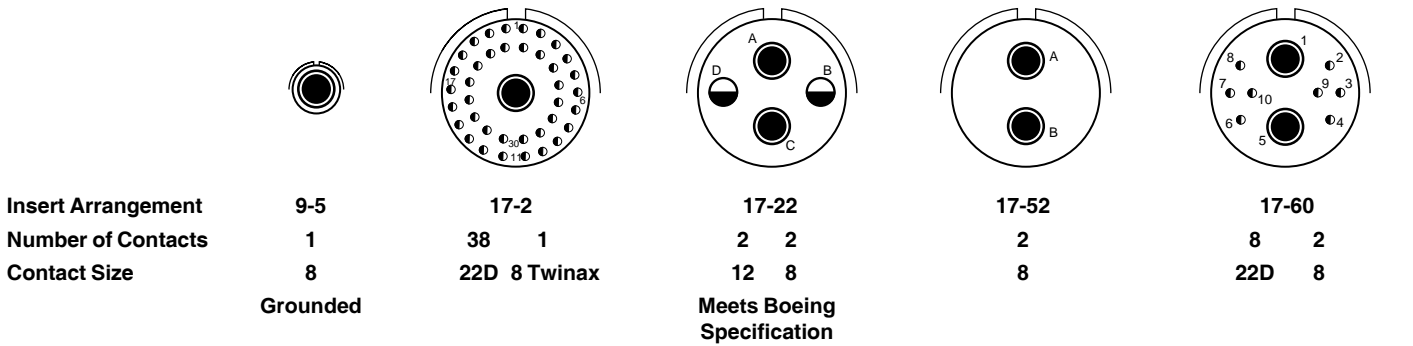
Insert Patterns - for MIL-DTL-38999, Series III Cylindricals

Incorporating quadrax and differential twinax contacts

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

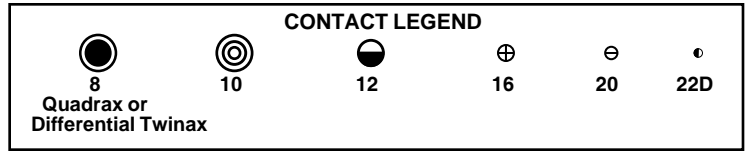


front face of pin inserts illustrated

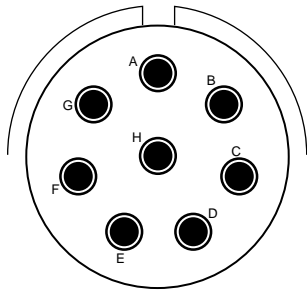


Insert Patterns - for MIL-DTL-38999, Series III Cylindricals

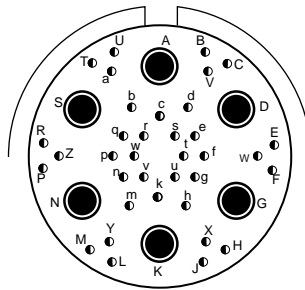
Incorporating quadrax and differential twinax contacts



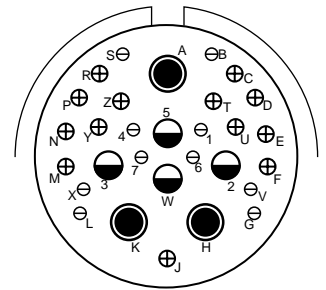
front face of pin inserts illustrated



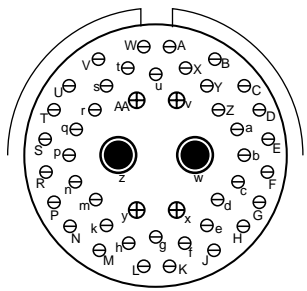
Insert Arrangement **25-8**
Number of Contacts **8**
Contact Size **8**



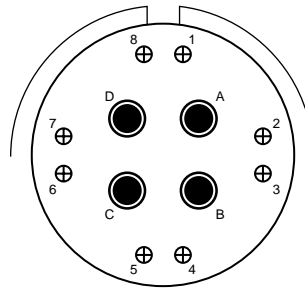
25-17
36 6
22D 8



25-20
10 13 3 4
20 16 8 12



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

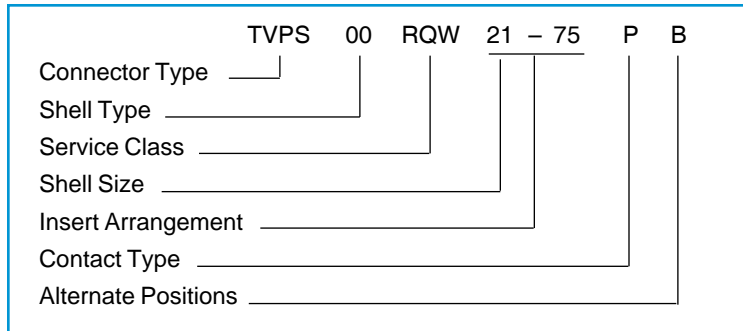


25-62
8 4
16 8

How to Order 38999, Series III Cylindricals With quadrax 100 ohm contacts

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 :

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



Connector Type

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

Shell Style

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

Service Classes 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
- DN Durmalon plated, Nickel-PTFE alternative to cadmium

Shell Size / Insert Arrangement

See insert arrangements available with quadrax contacts on preceding pages 21 and 22.

Contact Type

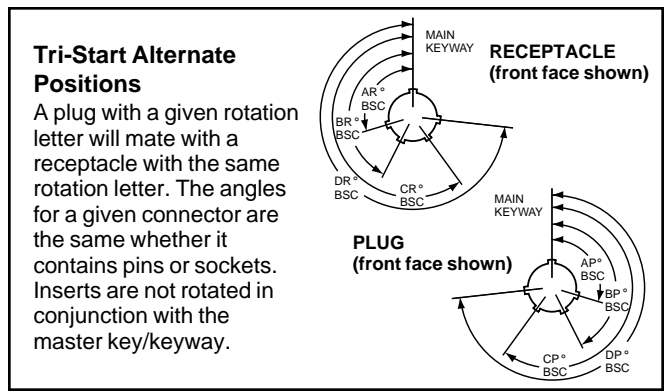
- P designates pin contacts
- S designates socket contacts

Alternate Positions

Locksmith keying - rotation of minor keys. See Tri-Start Alternate Positions at right. "N" not required for normal position

* 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 catalog 12-092 or catalog 12-C1. New Amphenol Catalog 12-C1 will combine 38999 Series I, II and III and SJT Series in one catalog. It will also include 38999 with Filter/Transient Protection and with PC Tails



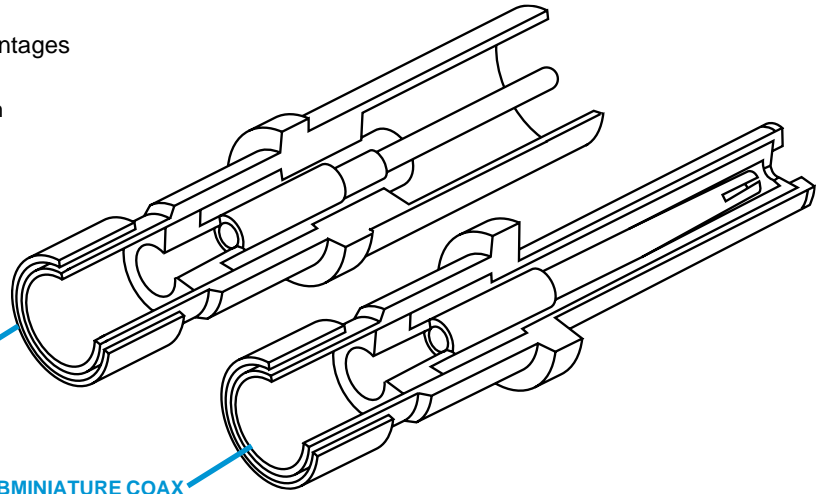
Shell Size	Key & Keyway Arrangement Identification Letter	AR° or AP° BSC	BR° or BP° BSC	CR° or CP° BSC	DR° or DP° BSC
9	N	105	140	215	265
	A	102	132	248	312
	B	80	118	230	312
	C	35	140	205	275
	D	64	155	234	304
11, 13, and 15	E	91	131	197	240
	N	95	141	208	236
	A	113	156	182	292
	B	90	145	195	252
	C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

Coaxial Contacts for Subminiature Cylindricals

general description

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

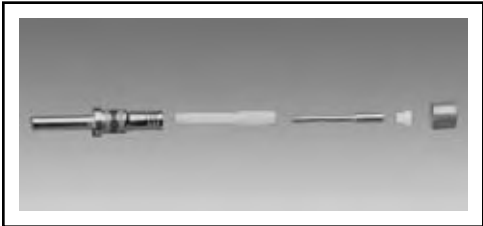


TYPICAL SUBMINIATURE COAX SOCKET CONTACT has socket outer contact with a pin inner contact

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



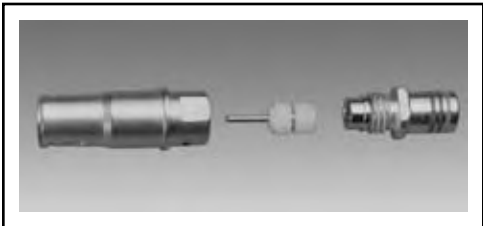
LJT-R, JT-R, TV-R, SJT-R MS Type, Coax Size 12 Socket Assembled Contact



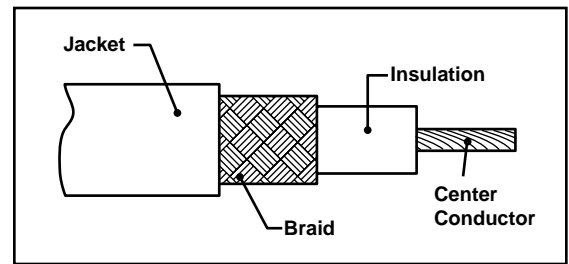
LJT-R, JT-R, TV-R, SJT-R MS Type, Coax Size 16 Pin Unassembled Contact



LJT-R, JT-R, TV-R, SJT-R MS Type, Coax Size 8 Pin Assembled Contact



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

Coaxial Contacts for Subminiature Cylindricals

application data

**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)					
RG-180B/U, RG-195A/U, Raychem 9528A1318	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)					

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/service_instructions.asp

SUBMINIATURE CONTACT DATA

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

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 LJ-T-R series.

LJT, TV, SJT,
Ampe-Lite

Example: Socket 21-33123-564 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 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

Coaxial Contacts for Subminiature Cylindricals

application data, cont.

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

COAX CONTACTS FOR USE IN LJTR, TV-R, AMPHE-LITE AND SJTR 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)	21-33123-564 (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	M81969/8-08 or M81969/14-03			
Haveg 30-00761, 30-02024, 30-02033 Tensolite 24713/A955KK1, 26723/ A955KK1	21-33122-562† (L-2035-AN)	21-33123-562† (L-2035-AR)†				or Amphenol 11-8674-16	or Amphenol 11-8675-16			
Haveg 61-02051	21-33122-561† (L-2035-AK)†	21-33123-561† (L-2035-AM)†				or MS27495A16	or MS27495R16			
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)				or MS27534-16	or MS27534-16			
RG-180B/U, RG-195A/U, Raychem 9528A1318	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	M81969/8-10 or M81969/14-04			
Raychem 5022E5111	21-33122-543† (L-2035-M)†	21-33123-543† (L-2035-P)				or Amphenol 11-8674-12	or Amphenol 11-8675-12			
Raychem 9530A5314	21-33122-544† (L-2035-R)	21-33123-544† (L-2035-T)†				or MS27495A12	or MS27495R12			
Raychem 9527A1318	21-33122-545† (L-2035-U)†	21-33123-545† (L-2035-W)				or MS27534-12	or MS27534-12			
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)								

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/service_instructions.asp

Coaxial Contacts for Subminiature Cylindricals

application data, cont.

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 LJTR, 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)		
RG-400, ECS3C058A	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	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)		M22520/2-01 with Positioner K1106	M22520/5-01 with Die Set Y25 (B)		
FA-19X	21-33652-1 (L-2091-A)	21-033653-1 (L-2091-B)		Solder	M22520/5-01 with Die Set M22520/5-05 (B)		
T Flex-402	21-33102-41 (L-1107-AG)	21-33101-41 (L-1107-AF)					

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/service_instructions.asp

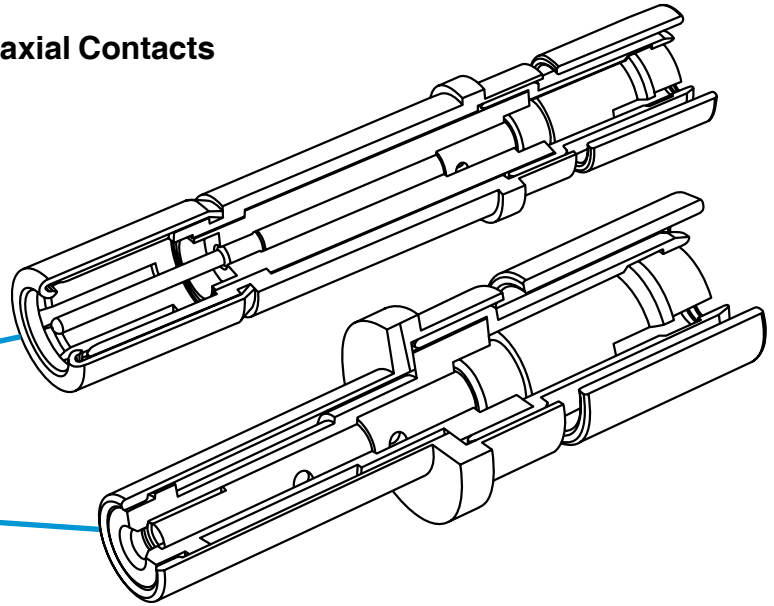
Matched Impedance Coaxial Contacts for Subminiature Cylindricals

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)

* 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/service_instructions.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{f} GHz 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.

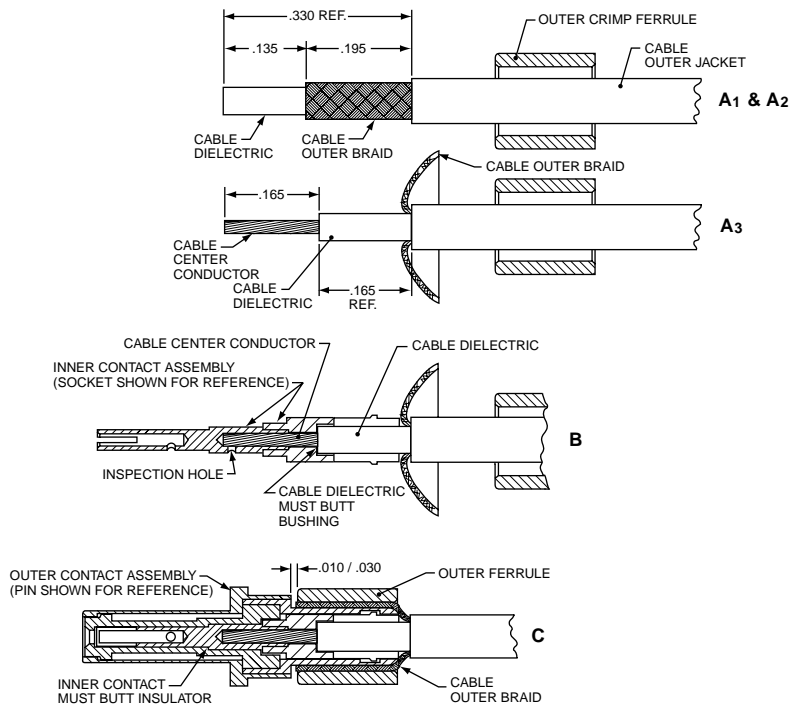
CONTACT REMOVAL FROM CONNECTOR

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.

L-2092-C
 October 2001

FSCM77820

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



Amphenol Aerospace

AMPHENOL CORPORATION
 Amphenol Aerospace
 40-60 Delaware Avenue
 Sidney, New York 13838-1395
www.amphenol-aerospace.com

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.

High Frequency Contacts for MIL-DTL-38999, Series III Cylindricals

general description

Amphenol® High Frequency Contacts

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

- Superior electrical performance and high frequency capability
- Blindmate advantage and maintenance of an accurate phase length when mated
- Can be terminated to a multiple of cable types depending on the application
- Uses standard interfaces based on MIL-STD-348, and can be installed in any D38999 size 8 insert
- Unique “Float Mount” technology allows for consistent microwave performance while maintaining tight mechanical tolerances

Most readily available D38999 insert arrangements for high frequency contacts are the same as arrangements for quad coax and differential twinax contacts shown on pages 21 and 22. Consult Amphenol for further availability of arrangements. Size 8 cavities can be filled with these high frequency contacts.



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

SIZE 8 HIGH FREQUENCY CONTACTS

SPECIFICATIONS

Electrical (Mated pair - 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 Exinction 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 and 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 and 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.

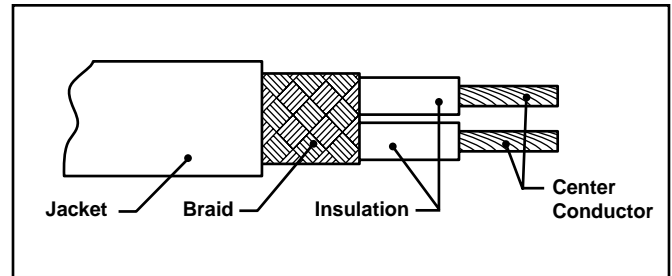
SIZE 8 HIGH FREQUENCY COAX CONTACTS FOR USE IN D38999, SERIES III CONNECTORS		
For use with Cable	Size 8 High Frequency Amphenol Part Number (Termination Instruction Sheet)**	Piggyback Grommet
TFLEX-405	21-033448-01HF (300-17-008)	21-033321-007
TFLEX-405	21-033449-01HF (300-17-008)	21-033321-007
TFLEX-405	21-033448-02HF (300-89-009)	21-033321-007
TFLEX-405	21-033449-02HF (300-89-009)	21-033321-007
RG-142	21-033448-03HF (300-89-008)	21-033321-009
RG-142	21-033449-03HF (300-89-008)	21-033321-009
RG-402	21-033448-04HF (300-89-002)	21-033321-010
Special coax 0.151 inch dia. cable	21-033449-04HF (300-89-002)	21-033321-010
	21-033448-05HF	21-033321-010
	21-033449-05HF	21-033321-010

Twinax Contacts for Subminiature Cylindricals

general description, application data - size 10 & 12

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 cylindrical 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

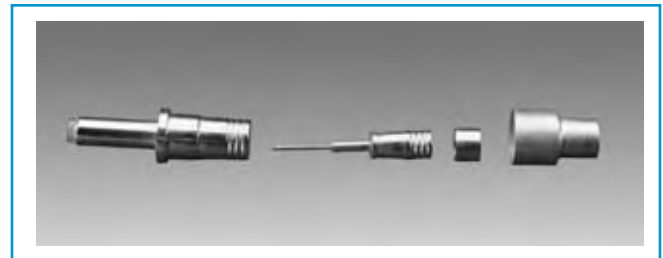
Outer @ 12 Amps, 85 millivolts max. voltage drop @ 25°C

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)			
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/service_instructions.asp

Twinax Contacts for Subminiature Cylindricals

general description, application data - size 8

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.

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 cylindrical 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)

TYPICAL ELECTRICAL PERFORMANCE

Size 8 Concentric Twinax Contacts

Voltage Rating: 500 Vrms max. @ sea level

Contact Resistance:

Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Outer @ 12 Amps, 75 millivolts max. voltage drop @ 25°C

Operating Frequency: 0–20 MHz

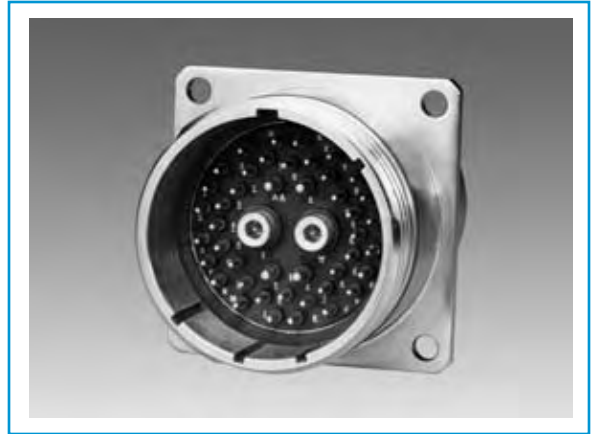
Dielectric Withstanding Voltage:

Center to Intermediate: 1000 VAC Rms @ Sea Level

Intermediate to Outer: 500 VAC Rms @ Sea Level

SHORT PROFILE TWINAX CONTACT OPTION

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



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



Concentric Twinax Contacts Size 8



Short Profile Twinax vs Standard Length Twinax Contact

Twinax Contacts for Subminiature Cylindricals

general description, application data - size 8, cont.

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)	21-33191-262†	Supplied with heat shrink seal	
Raychem 10614, 7724C8664	T3-46TB08-LD (PN-494)	T3-47TB08-LD (PN-494)	Without seals	
7820D0111 (20 AWG)	T3-46TC08-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, 0024G0024, Raychem 10602, Raychem 0024G0024	21-33190-70 (L-1253-U)	21-33191-70 (L-1253-V)	Without seals	
S280W502-1, Fileca F2709-13-CA, HS5930, 0024G0024, Raychem 10602	21-33190-71 (L-1253-U)	21-33191-71 (L-1253-V)	Supplied with piggyback grommet seal	
S280W502-1, Fileca F2709-13-CA, HS5930, 0024G0024, Raychem 10602	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/service_instructions.asp

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

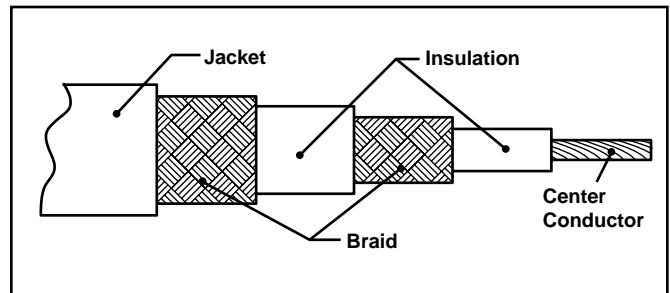
Triax Contacts for Subminiature Cylindricals

general description, application data

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 cylindrical 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

Contact Resistance:

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

Operating Frequency:

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

Dielectric Withstanding Voltage:

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

Insulation Resistance:

1000 megohms minimum @ 25°C

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 28988/50823LXX-1, 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 28598/9C026LT-1, Teledyne 13809	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, JN1088WT	12	21-33909-12 (L-1256-J)	21-33908-12 (L-1256-J)	JN1104 Interface
GSC-03-81497-00	12	21-33909-23 (L-1256-M)	21-33908-23 (L-1256-M)	
GSC-03-81497-00	12	21-33909-33 (L-1256-P)	21-33908-33 (L-1256-P)	
Harbour TRX179, Times Microwave AA-6151 (RT-179), Axon RGX-179, 540-1050-000	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/service_instructions.asp

Coax, Twinax & Triax PC Tail Contacts for Subminiature Cylindricals

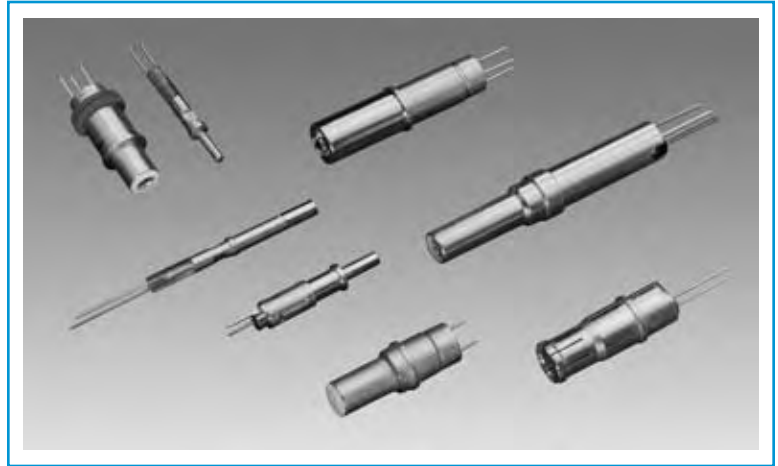
general description, application data

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 cylindrical connectors and also for ARINC 404, ARINC 600 and R27 rectangular connectors. The following pages (36 & 37) show the available PC Tail contact part numbers for Subminiature Cylindricals. See the 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

TYPICAL ELECTRICAL PERFORMANCE

Size 8, 10 & 12 PC Tail Twinax Contacts

Contact Resistance:

Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Outer @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Operating Frequency: 0–20 MHz

Dielectric Withstanding Voltage:

Center to Intermediate 500 VAC Rms @ Sea Level

Intermediate to Outer 500 VAC Rms @ Sea Level

Insulation Resistance

1,000 megohms minimum @ 25°C

TYPICAL ELECTRICAL PERFORMANCE

Size 8 PC Tail Triax Contacts

Contact Resistance:

Center @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Intermediate @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Outer @ 1 Amp, 55 millivolts max. voltage drop @ 25°C

Operating Frequency: 0–500 MHz

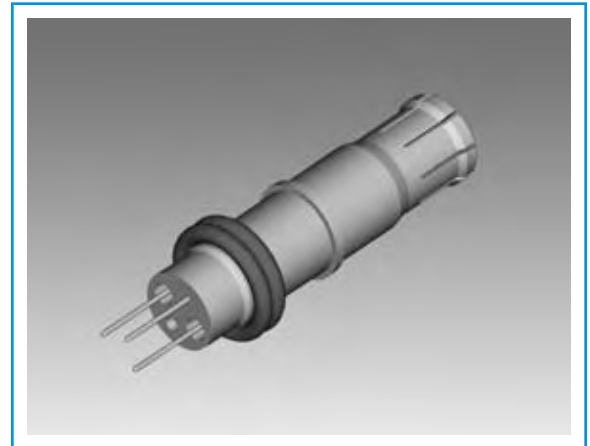
Dielectric Withstanding Voltage:

Center to Intermediate 500 VAC Rms @ Sea Level

Intermediate to Outer 500 VAC Rms @ Sea Level

Insulation Resistance

1,000 megohms minimum @ 25°C



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



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

Coax, Twinax & Triax PC Tail Contacts for Subminiature Cylindricals application data, cont.

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		21-33921-75		PCB 3 tails		
8 Socket		21-33921-35		PCB 3 tails		
8 Socket		21-33921-65		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	

* 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.

Coax, Twinax & Triax PC Tail Contacts for Subminiature Cylindricals application data, cont.

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 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	
16 Socket	21-33606-21†			PCB 2 tails	M38999 Series II
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.

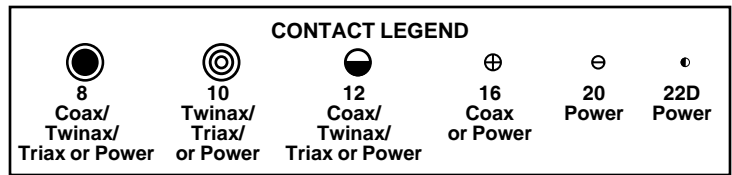
† Consult Amphenol Aerospace for current release of this contact.

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.

Insert Patterns - Subminiature Cylindricals

Incorporating coax, twinax and triax contacts

The following pages show the most popular insert arrangements within the Subminiature Cylindrical Connector Family. See page 11 for Subminiature Connector descriptions and for reference to detailed connector catalogs. This illustrated listing represents the most readily available patterns within the Subminiature 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.



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	
Available in 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		
Available in 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		
Available in 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

Insert Patterns - Subminiature Cylindrical

Incorporating coax, twinax and triax contacts

CONTACT LEGEND					
8 Coax/ Twinax/ Triax or Power	10 Twinax/ Triax/ or Power	12 Coax/ Twinax/ Triax or Power	16 Coax or Power	20 Power	22D Power

front face of pin inserts illustrated

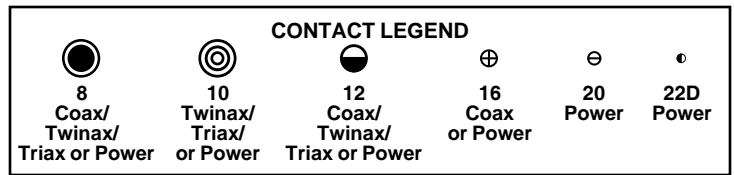
Insert Arrangement	18-68	19-68	18-96	20-11	21-11	20-16	21-16
Available in Connector Series	JT	LJT	JT	JT, SJT	LJT, TV	JT, SJT	LJT, TV
Service Rating	I	I	I	I	I	II	II
Number of Contact	18	16	9	11	12	16	16
Contact Size	16	16	12	12	12	16	16

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

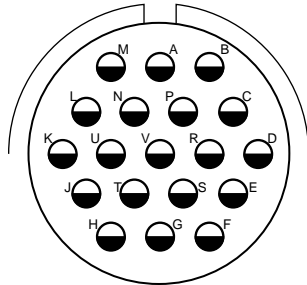
Insert Arrangement	23-54	23-97	23-99	24-4	25-4
Available in Connector Series	TV	LJT	LJT	JT, SJT	LJT, TV
Service Rating	M	II	II	I	I
Number of Contact	40	9	4	16	16
Contact Size	22D	16	12	16	16

Insert Patterns - Subminiature Cylindricals

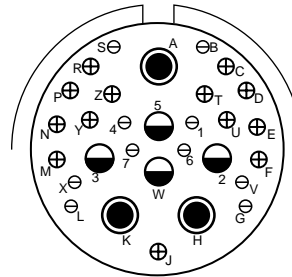
Incorporating coax, twinax and triax contacts



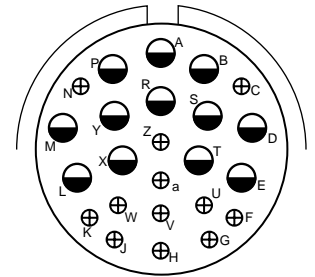
front face of pin inserts illustrated



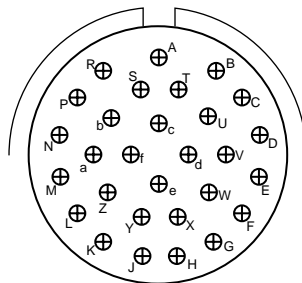
Insert Arrangement	24-19	25-19
Available in Connector Series	JT, SJT	LJT, TV
Service Rating	I	
Number of Contact	19	
Contact Size	12	



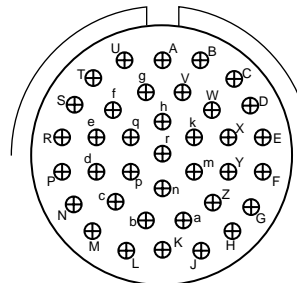
Insert Arrangement	24-20	25-20*
Available in Connector Series	SJT	LJT, TV
Service Rating	N	
Number of Contact	10 13	3 4
Contact Size	20 16	8 12
(Locations U and Y - Dedicated to Fiber Optics)		



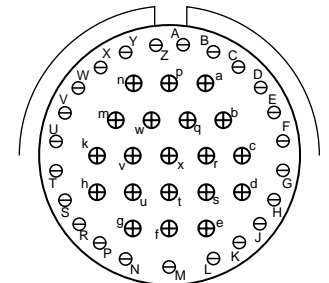
Insert Arrangement	24-24	25-24
Available in Connector Series	JT, SJT	LJT, TV
Service Rating	I	
Number of Contact	12	12
Contact Size	16	12



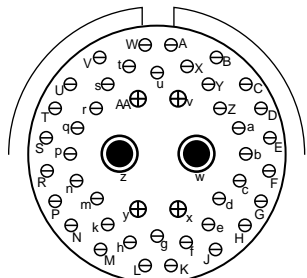
Insert Arrangement	24-29	25-29
Available in Connector Series	JT, SJT	LJT, TV
Service Rating	I	
Number of Contact	29	16
Contact Size	16	



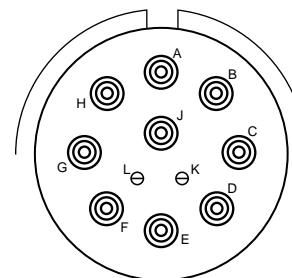
Insert Arrangement	24-37	25-37
Available in Connector Series	JT, SJT	LJT, TV
Service Rating	I	
Number of Contact	37	16
Contact Size	16	



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



Insert Arrangement	24-46	25-46
Available in Connector Series	SJT	LJT, TV
Service Rating	I	
Number of Contact	40	4 2
Contact Size	20 16	8



Insert Arrangement	25-11*
Available in Connector Series	LJT, TV
Service Rating	N
Number of Contact	2 9
Contact Size	20 10

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

Standard MIL-DTL-5015, Heavy Duty MIL-DTL-22992 Cylindrical Connectors Overview

Amphenol's medium to heavy weight cylindricals include the MS/Standard MIL-DTL-5015 series and the heaviest weight, largest size cylindrical is the Heavy Duty MIL-DTL-22992 series. These time-tested cylindricals have been used for several years. They are dependable general duty and environmentally resistant connectors for military and industrial applications.

Shielded coax contacts, although more popularly used in 38999 types and 26482 types, can be incorporated into some arrangements of the 5015 and 22992 type cylindricals. Shielded coaxial contacts within these series are considered MS modifications to the MIL-spec connector and the coax contacts are pre-installed in the connector. Normal operating voltage with power contacts only is up to 3000 VAC (RMS) at sea level for MIL-DTL-5015 cylindricals. The Heavy Duty types are designed for high current capacity and have current ratings (with power contacts only) of up to 200 amps.

Standard and Heavy Duty Cylindricals offer these features for contact termination flexibility:

- Insert arrangements that can incorporate:
 - Size 4, 8 & 12 Crimp Coax contacts, pre-installed in the connector
- Wide selection of connector shell styles and sizes
- Standard power contact options within the various connector styles include: solder type, crimp front release, crimp rear release
- Coax contacts are designed to the same high performance standards as power contacts. Coax and power contacts may be intermixed with no degradation of connector reliability.

Amphenol® MS/Standard Cylindrical MIL-DTL-5015* Type Connector Family:

See Catalog 12-020 for complete information on these styles.

MS-A, MS-C, MS-E, MS-F, MS-R

- Produced in strict accordance with MIL-DTL-5015
- Threaded coupling, solder or crimp rear insertion contacts (coax available in crimp type only)
- Class A, Solid Shell - intended for general connector usage
- Class C, Pressurized - for use on pressurized bulkheads or pressure barriers
- Class E/F, Environmental Resisting - ideally suited for installation where condensation, vibration and rapid changes in pressure or temperature are considerations
- Class R, Lightweight Environmental Resisting - shorter in length and lighter in weight than Class E

GENERAL ORDERING INFORMATION

Amphenol MS/Standard MIL-DTL-5015 type and Heavy Duty MIL-DTL-22992 type cylindricals are normally supplied with a full complement of power contacts, separately packaged. Coax 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. Coax contacts are pre-installed in these series. Installation instructions for the coax contacts for these series are provided in Amphenol document L-650.

HOW TO ORDER:

1. Select the coax contacts designed for the cable being used from the chart on page 43 of this catalog. Select a connector insert from those shown on page 44 which will accommodate the quantity and size of coaxial contacts needed plus any power contacts required.
2. Determine the MS/Standard or Heavy Duty Series style desired. (See features of each series referenced above). The catalog referenced for each series will guide you in determining shell style, finish, service class and insert rotation required for your application. Catalog 12-020 - MS/Standard MIL-DTL-5015 Type Connectors (catalog is on-line at www.amphenol-aerospace.com) Catalog 12-052 - MIL-DTL-22992 QWLD Connectors (catalog is on-line at www.amphenol-aerospace.com) Catalog 12-053 - QWL Connectors (catalog is currently not on-line; consult Amphenol Aerospace for hardcopy)
3. Consult Amphenol, Sidney, NY with the pertinent cable, contact, insert arrangement and connector style choices for complete connector part number.

* Amphenol also offers the following other MIL-DTL-5015 Cylindrical Connectors which are threaded coupling (consult Amphenol Industrial for availability of shielded contacts in any of these series):

- Amphenol®/Matrix® MIL-DTL-5015 with crimp rear releasable and rear insertable contacts. (Ask for Catalog 12-026)
- Amphenol® MIL-DTL-5015 Modifications (Ask for Industrial Catalog 12-021)
- Amphenol® GT Series with reverse bayonet coupling (Ask for Catalog 12-024)
- Amphenol® AC Threaded and AC-B Bayonet Series (Ask for Industrial Catalog 12-025)



MS/Standard MIL-DTL-5015 Type Connectors



Heavy Duty QWLD,
MIL-DTL-22992 Connectors

Amphenol® Heavy Duty Cylindrical MIL-DTL-22992 Connector Family:

QWLD

- Designed for most power and control circuits
 - Military MIL-DTL-22992 qualified versions and proprietary equivalents
- See Catalog 12-052 for complete information on these styles.

QWL

- A more compact heavy duty design for industrial power and control applications

See Catalog 12-053 for complete information on these styles.

NOTE:

MIL-DTL-5015 supersedes MIL-C-5015
MIL-DTL-22992 supersedes MIL-C-22992

Coaxial Contacts for Standard MIL-DTL-5015, Heavy Duty MIL-DTL-22992 Cylindricals

general description

Amphenol® Coaxial Contacts can be incorporated into MS/Standard MIL-DTL-5015 Type Cylindrical Connectors and Heavy Duty MIL-DTL-22992 Connectors. They offer the same durability advantages and design benefits for reliable interconnection as the Amphenol coax contacts used in high performance D38999 connectors. A variety of military and commercial shielded cables are accommodated within these cylindrical series.

Other features of the coax contacts available for MS/Standard and Heavy Duty cylindricals include:

- Several insert arrangements that can incorporate:
 - Size 4, 8 and 12 coax contacts
- Advanced shielding wire technology in a rugged military connector
- Single connector with multiple coaxial connection eliminates cross-mating
- Positive contact captivation - especially important in these series with its much higher coupling/uncoupling force
- Older shielded cable type availability



Coax Contact, Pin
for use in MS/Standard MIL-DTL-5015 and Heavy Duty MIL-DTL-22992 Connectors



Coax Contact, Socket
for use in MS/Standard MIL-DTL-5015 and Heavy Duty MIL-DTL-22992 Connectors

TYPICAL ELECTRICAL PERFORMANCE

Size 4, 8 & 12 Contacts

Contact Resistance:

Center @ 1 Amp, 170 millivolts max. voltage drop @ 25°C

Outer @ 12 Amps, 150 millivolts max. voltage drop @ 25°C

Dielectric Withstanding Voltage:

Size 4 & 8: 1,300 VAC Rms @ sea level

Size 12: 1,000 VAC Rms @ sea level

Size 4, 8 & 12: 250 VAC Rms @ 50,000 ft.

Insulation Resistance

5,000 megohms minimum @ 25°C

All contacts in these series are non-impedance matched contacts.

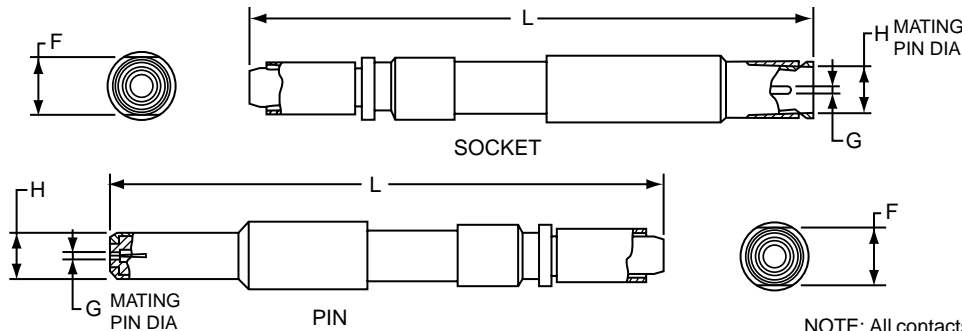
Part numbers 21-33063-XX() and 21-33064-XX() are moisture seal design (internal O-ring).

CONTACT FINISHES:

Suffix Finish

1	0.00020 min. silver over copper flash
2	0.00005 min. gold (Knoop hardness 130-200) over silver
3	0.00010 min. gold (Knoop hardness 130-200) over silver
4	0.00010 min. gold (Knoop hardness 130-200) over copper
5	0.00005 min. gold (Knoop hardness 130-200) over nickel
E	0.00005 min. gold (Knoop hardness 90 max.) over copper
F	0.00005 min. gold (Knoop hardness 130-200) over copper
H	0.00010 min. gold (Knoop hardness 130-200) over copper

Coaxial Contacts for Standard MIL-DTL-5015, Heavy Duty MIL-DTL-22992 Cylindricals application data



NOTE: All contacts of the same size and the same inner and outer contact diameters (G & H) will mate with each other.

COAX CONTACTS													
For use in MS/Standard MIL-DTL-5015 Type and Heavy Duty MIL-DTL-22992 Type Connectors													
Cable	Contact Part Number (See L-650 Termination Instruction Sheet for all contacts listed below)**		Contact Size	Finish on Mating Parts (See Pg. 42)	Dimensional Data (See Drawings above)					Crimp Ferrule Tools			Retainer Nut Wrench
	Pin	Socket			G Dia.	H Dia. ± 0.001	F Across Flats ± 0.004	L Length Ref.		MIL-T-22910/7-1 Tool Use with Die Part Number	MIL-T-22520/5-01 Tool Use with Die Part Number	MIL-T-229520/10-01 Tool Use with Die Part Number	
RG-58C/U, RG-141A/U, RG-303/U	21-33014-1	21-33013-1	8	5	0.0355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-15 (B)	M22520/5-05 (B) M22520/5-41 (B)	M22520/10-07 (B)	11-8676-2
	21-33034-2	21-33033-2	8	1									
	21-33048-2	21-33047-2	8	††									
	21-33016-5	21-33015-5	8	3									
	21-33130-2()	21-33129-2()	8	***									
RG-59B/U, RG-62A/U, RG-62B/U, RG-210/U	21-33014-5	21-33013-5	8	5	0.0355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-18 (B)	M22520/5-45 (B)		11-8676-3
	21-33016-2	21-33015-2	8	3									
	21-33034-5	21-33033-5†	8	1									
	21-33130-5()	21-33129-5()	8	***									
	21-33064-21()	21-33063-21()	8	***									
	21-33060-10()	21-33059-10()	4	***	0.0400 ± 0.0010	0.344	0.375	1.669	1.605				11-8676-4
RG-161/U, RG-174A/U, RG-179B/U, RG-187A/U, RG-188A/U, RG-316/U	21-33014-3	21-33013-3	8	5	0.0355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-12 (B)	M22520/5-03 (A) M22520/5-08 (A) M22520/5-35 (B)	M22520/10-05 (A)	11-8676-2
	21-33016-1	21-33015-1	8	3									
	21-33034-3	21-33033-3	8	1									
	21-33130-3()†	21-33129-3()†	8	***									
	21-33064-20()†	21-33063-20()†	8	***									
	21-33014-21	21-33013-21	12	5	0.0200 ± 0.0005	0.128	0.172	1.481	1.511	M22910/7-11 (B)	M22520/5-03 (B) M22520/5-33 (B)	M22520/10-05 (B)	11-8676-1
21-33034-1	21-33033-1	12	1										
21-33048-1	21-33047-1	12	***										
21-33130-1()†	21-33129-1()†	12	***										
RG-178B/U, RG-196A/U	21-33014-22†	21-33013-22†	12	5	0.0200 ± 0.0005	0.128	0.172	1.481	1.511	M22910/7-11 (B)	M22520/5-03 (B) M22520/5-33 (B)	M22520/10-05 (B)	11-8676-1
RG-180B/U, RG-195A/U	21-33014-6	21-33013-6	8	5	0.355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-15 (B)	M22520/5-05 (B) M22520/5-41 (B)	M22520/10-07 (B)	11-8676-2
	21-33034-6†	21-33033-6†	8	1									
	21-33048-3	21-33047-3	8	***									
	21-33130-6()†	21-33129-6()	8	***									
RG-212/U	21-33060-11()	21-33059-11()	4	***	0.0625 ± 0.0010	0.344	0.375	1.669	1.605	M22910/7-14 (A)	M22520/5-39 (A)		11-8676-4
RG-140/U, RG-302/U	21-33014-8	21-33013-8	8	5	0.0355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-17 (B)	M22520/5-05 (A) M22520/5-19 (B)	M22520/10-07 (A)	11-8676-2
	21-33034-8	21-33033-8	8	1									
	21-33130-8()†	21-33129-8()†	8	***									
RG-55B/U, RG-142A/U, RG-142B/U, RG-223/U	21-33014-4	21-33013-4	8	5	0.0355 ± 0.0010	0.218	0.280	1.481	1.511	M22910/7-17 (B)	M22520/5-05 (A) M22520/5-19 (B)	M22520/10-07 (A)	11-8676-2
	21-33034-4	21-33033-4	8	1									
	21-33130-4()	21-33129-4()	8	***									
	21-33060-12()	21-33059-12()	4	***									

CONTACT ORDERING: Example number given in chart 21-33014-1 should be ordered as 21-033014-001; example number 21-33014-21 should be ordered as 21-033014-021. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

*** See finish options for MS/Standard and Heavy Duty contacts listed on page 42. Replace the parenthesis of the contact part number with the finish suffix number. However, you should consult Amphenol Aerospace regarding the availability of all finish choices for each part number.

† Consult Amphenol Aerospace for current availability of this contact.

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.

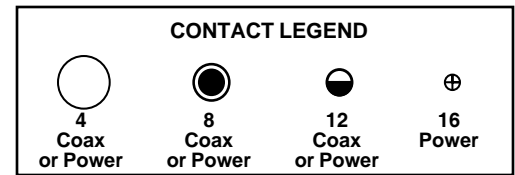
†† 21-33047-X and 21-33048-X are supplied with E (soft gold) finish on mating socket parts, and F (hard gold) finish on mating pin parts.

**Termination instruction sheet L-650 can be found on-line at: www.amphenol-aerospace.com/service_instructions.asp

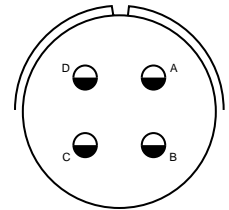
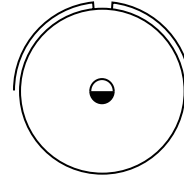
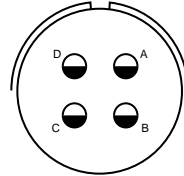
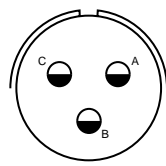
Insert Patterns - Standard MIL-DTL-5015, Heavy Duty MIL-DTL-22992 Cylindricals

Incorporating coax contacts

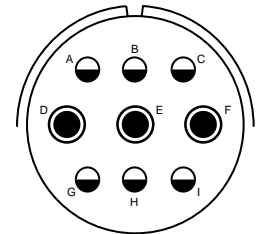
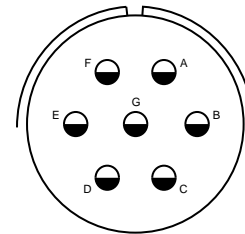
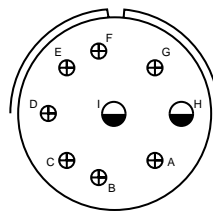
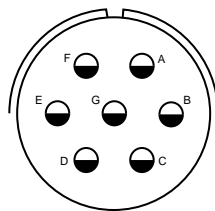
The following shows the most popular insert arrangements within the Cylindrical Connector families of MS/Standard MIL-DTL-5015 and the Heavy Duty QWLD/Heavy Duty QWL series of MIL-DTL-22992. See page 41 for these series connector descriptions and for reference to detailed connector catalogs. This illustrated listing represents the most readily available patterns within these series. If you require other arrangements than what are shown here, consult Amphenol for further availability. MS/Standard connectors have over 200 insert pattern arrangements available, and within these patterns any size 4, 8 or 12 contact cavities can be incorporated with coax contacts. However, you need to consult Amphenol, Sidney NY for availability and ordering information. All coax contacts in the Standard and Heavy Duty series come pre-installed in connectors.



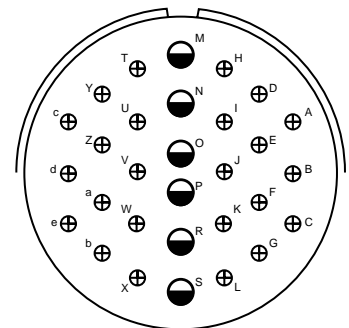
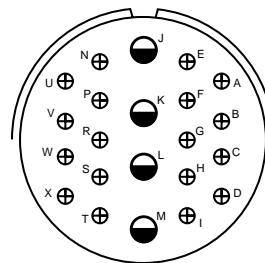
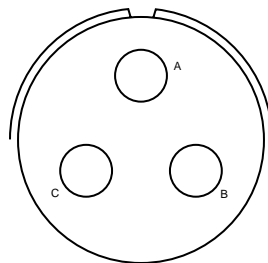
front face of pin inserts illustrated



Insert Arrangement	16-10	18-10	18-16	20-4
Available in Connector Series	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL
Service Rating	A	A	C	D
Number of Contact	3	4	1	4
Contact Size	12	12	12	12



Insert Arrangement	20-15	20-16	24-2	24-11
Available in Connector Series	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL
Service Rating	A	A	D	A
Number of Contact	7	2 7	7	3 6
Contact Size	12	12 16	12	8 12



Insert Arrangement	28-6	28-11	32-8
Available in Connector Series	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL	MS/Standard, QWLD, QWL
Service Rating	D	A	A
Number of Contact	3	4 18	6 24
Contact Size	4	12 16	12 16

Rectangular Connector Overview

Printed Circuit Board and LRM Interconnects

Amphenol provides an impressive array of Rectangular Interconnection products to meet the needs of high density systems such as opto-electrical backplanes used in many applications that include: medical equipment, IC chip testers, tele-communications, military and commercial aviation, military ground vehicles, GPS systems, space and industrial applications.

Low Mating Force Rectangular Connectors with Brush Contacts

See *Catalog 12-035* for complete information on this series.

- Designed to provide reliable interconnection means with printed circuit boards
- Qualified to MIL-DTL-55302
- Incorporates Brush Contacts - multiple points of contacts and very low insertion force achieved through the intermeshing of 0.007 inch diameter wires
- Excellent durability - over 20,000 cycles of mating/unmating without performance degradation
- High density available - 2, 3 and 4 row contact arrangements with 10 to 100 contacts per row
- Four body styles allow for flexibility: applications for parallel boards, perpendicular boards, wire to board, end to end boards, card extenders
- Hybrids are available - combinations of signal contacts with coax, power or fiber optics

NOTE: MIL-DTL-55302 supersedes MIL-C-55302.

Power Strip Connectors - A Wide Variety of Contacts in the Thermoplastic Molded Housing of Rectangular Connectors

See *Product Data #206* for complete information on this series.

- Designed to provide a modular interconnect with standard MIL-DTL-38999 Series II power contacts, and also available with brush contacts, coax contacts and/or fiber optic termini
- Allows for 2 to 12 Size 12 contacts or 2 to 24 Size 16 contacts per connector
- Offered with crimp, solder cup or solder tail termination
- Available in a variety of color housings

LRM (Line Replaceable Module) Interconnects

See *Catalog 12-037* for complete information on this series, and consult *Amphenol Aerospace* for incorporation of high speed contacts in LRM interconnects.

- Line replaceable modular interconnects with very high contact densities, for attachment to printed circuit boards
- The brush contact is the standard contact for the LRM due to its low mating force, stable electrical performance and extended service life.
- Design flexibility with combinations of other types of contacts: power, high speed coax, triax, differential twinax, and quadrx contacts, fiber optic MT ferrules, high speed differential pairs, or high power RADSOK® sockets. Flex circuitry also available
- RF module inserts are also available with arrangements of RF and high speed shielded contacts in combinations with brush contacts
- Combinations of module and backplane inserts, tailored to meet customer needs
- One bay, two bay, three bay or more configurations with many shell designs available
- Staggered grid patterns (180 contact pattern grid in 8 rows) or more compact GEN-X patterns (236 contact pattern grid in 8 rows)



Low Mating Force PCB Connector with combination of signal Brush contacts and Coax contacts



Power Strip Connector designed for a wide versatility of contacts can incorporate coax contacts



Two LRM Connectors with Inserts of Staggered Brush Contacts and Inserts of Coax Contacts

GENERAL ORDERING INFORMATION

Amphenol Rectangular Connectors are normally ordered with signal or brush contacts. To order connectors with shielded contacts:

- Select the coax contacts designed for the cable being used from the chart on next page of this catalog.
- Select the Rectangular Series desired. (See features of series referenced here.) The catalog referenced for each series will guide you in determining the connector style and arrangement required for your application. (catalogs are on-line at www.amphenol-aerospace.com)
Catalog 12-035 - Low Mating Force Rectangular Connectors
Catalog 12-037 - LRM (Line Replaceable Module Interconnects)
- Consult Amphenol, Sidney, NY with the pertinent cable, contact criteria, and connector style desired for complete connector part number.

Coax Contacts for Rectangulars Printed Circuit Board and LRM Interconnects

Amphenol® Coaxial Contacts can be incorporated into Amphenol Rectangular Connectors. Rectangular Connectors offer these features for contact termination flexibility:

- Low Mating Force PCB connectors can incorporate:
 - size 16 and size 12 Coax contacts (same coaxial contacts as used in 38999 cylindricals)
- LRM module and backplane connectors can incorporate the following contacts (refer to Amphenol LRM catalog 12-037 for most common insert patterns with high speed contacts, and consult Amphenol Aerospace for more information)
 - size 8, 10 or 12 Coax contacts (SAE AS39029 type)
 - other coax types
 - size 8 Quadrx and Differential Twinax contacts
- Flexibility of designing in combinations of contact types in one rectangular body

COAX CONTACTS FOR USE IN LOW MATING FORCE PCB RECTANGULAR 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 Tensolite 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-E)	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-R)					
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)					
RG-316, RG-179	21-33650-11 (L-2092-C)	21-33729-11† (L-2092-P)†					
RG-178, Gore CXN3403	21-33650-18 (L-2092-K)	21-33729-18 (L-2092-K)					

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

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

CONTACT ORDERING: Example number given in chart 21-33122-564 should be ordered as 21-033122-564; example number 21-33650-11 should be ordered as 21-033650-011. Adding Zeros is necessary for Amphenol ordering process on all contact numbers.

Rectangular Connector Overview

Rack and Panel Connectors

Amphenol provides an impressive array of Rectangular Interconnection products to meet the needs of high density systems such as opto-electrical backplanes used in many applications that include: medical equipment, IC chip testers, telecommunications, military and commercial aviation, military ground vehicles, GPS systems, space and industrial applications.

- ARINC 600 and R27 Rack and Panel connectors can incorporate:
 - size 8 Coax contacts
 - size 1 and size 5 Coax (consult Amphenol Canada)
 - size 12 Twinax contacts
 - size 8 Quadrax contacts
 - size 8 Differential Twinax contacts

ARINC 600 Rack and Panel Rectangular Connectors

See Amphenol Canada Publication SL-379, ARINC 600 Rack and Panel Connectors for complete information.

- The ARINC 600 is the successor to the ARINC 404 for many of the new avionics designs and offers lower mating force contacts, increased contact count and a front release, floating keying system
- ARINC 600 Connectors are a recognized standard rack and panel connector for aircraft applications with both environmental and non-environmental versions available
- Designed to meet all relevant ARINC 600 connector specifications
- Front removable keying posts
- Up to 800 size 22 contact positions in one connector
- Contact options: standard contacts are power/signal crimp rear release in sizes 12, 16, 20 and 22 in crimp or PCB; or shielded coax, concentric twinax, quadrax contacts; or fiber optics
- Waveguide connections

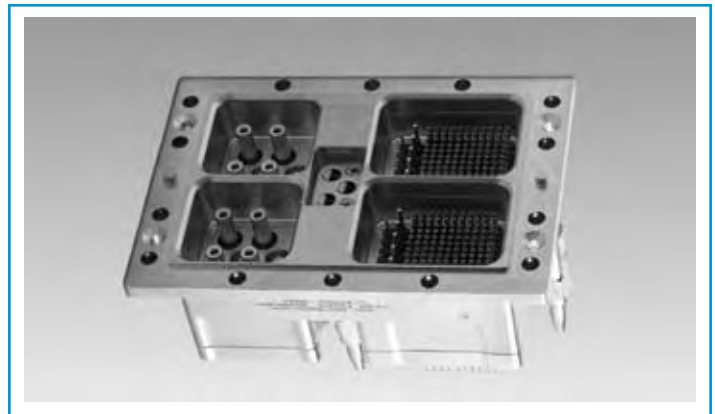
R27 Rack and Panel Rectangular Connectors

See Amphenol Canada Publication for R27 Series Connectors for complete information.

- The R27 Series is a robust rectangular connector designed to meet or surpass all the requirements of the MIL-DTL-83527 specification and EN 3682 European Standard.
- Well suited for harsh environments - enhanced environmental sealing, robust and durable shells, EMI shielding spring
- Filtered or non-filtered
- Connectors, shells, inserts, termination modules and contacts are sold separately or fully assembled
- Interchangeable insert patterns with ARINC 600 models
- Contact options: standard contacts are power/signal crimp rear release in sizes 12, 16, 20 and 22 in crimp or PCB; or shielded coax, concentric twinax, quadrax contacts; or fiber optics



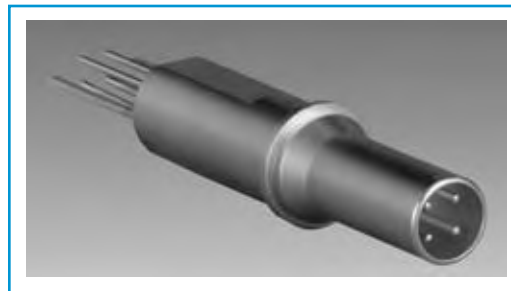
ARINC 600 Rack and Panel Connectors are high density connectors that can incorporate high speed shielded contacts



R27 Series Rack and Panel Connector can incorporate high speed shielded contacts



Coax Contact , Size 8 for use in ARINC Rack and Panel Connectors



Quadrax Contact , Size 8 for use in ARINC Rack and Panel Connectors

Quadrax, Differential Twinax, Coax & Twinax Contacts

Rack and Panel Connectors

application data

ARINC 600 & R27 Rack and Panel Connectors

QUADRAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS						
Cable	Contact Part Number (Termination Instruction Sheet)**		Impedance (Ohms)	Contact Size	Crimping Tools	
	Pin	Socket			Inner Contact	Outer Contact
Tensolite NF24Q100, 24443/9P025X-4(LD), S280W502-4, 24443/03130X-4(LD)	21-33382-21 (L-2119-AH)	21-33383-21 (L-2119-AH)	100	8	M22520/2-01 with Positioner Daniels K709 (M22520/2-37)	M22520/5-01 with Die Set M22520/5-45 (Location B)
Draka Fileca F-4703-3	21-33382-31 (L-2119-I)	21-33383-31 (L-2119-I)	100			
Draka Fileca F-4704-5, NF22Q100	21-33382-101 (L-2119-AS)†	21-33383-101 (L-2119-AS)†	100			
JSFY02-1	21-33382-71 ↑	21-33383-71 ↑	110			
Tensolite 26473/02006X-4(LD), Gore RCN8328	21-33382-61 (L-2119-L)	21-33383-61 (L-2119-L)	150		M22520/2-01 with Positioner Daniels K709 (M22520/2-37)	M22520/5-01 with Die Set M22520/5-45 (Location A)

DIFFERENTIAL TWINAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS						
Cable	Contact Part Number (Termination Instruction Sheet)**		Impedance (Ohms)	Contact Size	Crimping Tools	
	Pin	Socket			Inner Contact	Outer Contact
ABS0386WF24	21-33378-21 (L-2119-G)	21-33379-21 (L-2119-G)	100	8	M22520/2-01 with Positioner Daniels K709 (M22520/2-37)	M22520/5-01 with Die Set M22520/5-45 (Location A & B)
ASNE0272TK22	21-33378-31 (L-2119-G)	21-33379-31 (L-2119-G)	100			
ASNE0272TK24	21-33378-41 (L-2119-G)	21-33379-41 (L-2119-G)	100			
Tensolite 24463/9P025X-2(LD)	21-33378-51 ↑	21-33379-51 ↑	100			
GC875TM24H	21-33378-61 (L-2119-AU)	21-33379-61 (L-2119-AU)	77			
	21-33378-71 ↑	21-33379-71 ↑	110			

COAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS					
Cable	Contact Part Number (Termination Instruction Sheet)**		Contact Size	Crimping Tools	
	Pin	Socket		Inner Contact	Outer Contact
RG-179	21-33676-1 (L-2090-B)	21-33675-1 (L-2090-A)	8	M22520/2-01 with Positioner K1275	M22520/10-01 with Die Set M22520/10-05 (A)
5M2869-001	21-33676-2 ↑	21-33675-2 ↑			

PCB QUADRAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS				
PCB Quadrax Contacts	Contact Part Number		Impedance (Ohms)	Contact Size
	Pin	Socket		
PCB (.346 Length)		21-33397-171	100	8
PCB (.473 Length)	21-33398-261			

CONTACT ORDERING: Example number given in chart 21-33382-21 should be ordered as 21-033382-021; example number 21-33382-101 should be ordered as 21-033382-101. 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.

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/service_instructions.asp

TWINAX CONTACTS FOR USE IN ARINC 600 & R27 CONNECTORS					
Cable	Contact Part Number (Termination Instruction Sheet)**		Contact Size	Crimping Tools	
	Pin	Socket		Inner Contact	Outer Contact
EPD 32263, 10612, GSC-12-2548-00	21-33631-4† (L-2092-U)†	21-33632-3 (L-2092-J)	12	MH992 with Positioner K1365	GS200-1 with Positioner GP959

Additional Contact Styles from Amphenol

Amphenol has today's broadest range of interconnection solutions for military, commercial and industrial applications. As a worldwide interconnection product leader, Amphenol can meet not only connector needs, but also contact needs of all types. In addition to the shielded and high frequency contacts shown in this publication, Amphenol offers many other contact styles:

PRINTED CIRCUIT BOARD SIGNAL AND POWER CONTACTS

Amphenol has a full range of printed circuit tail contacts for signal and power applications, available in both solder termination and compliant pin tails. They offer significant savings in system installed costs. Custom designs are available to meet customer needs. Catalog 12-170*, Amphenol® Cylindrical Connectors for PCB Applications, provides information on connectors available with PCB contacts which include MIL-DTL-38999, MIL-DTL-26482, and MIL-DTL-5015.

THERMOCOUPLE CONTACTS

Available for MIL-DTL-5015, MIL-DTL-22992, MIL-DTL-26482, MIL-DTL-26500, MIL-DTL-38999, MIL-DTL-83723 and other series connectors. Thermocouples are designed for temperature measuring applications, and are available in both pin and socket configurations in alumel, chromel, iron and constantan materials. Refer to each of the MIL series catalogs.

WIRE WRAP CONTACTS

Available for MIL-DTL-26482 and MIL-DTL-38999 series connectors. See catalog 12-090* (38999, Series I & II) for part numbers and dimensional data.

FLEX TERMINATION ASSEMBLIES FOR PCB APPLICATION

Flex circuits are available for MIL-DTL-38999, MIL-DTL-5015 and MIL-DTL-26482, as well as for special products such as EMI/EMP filter connectors and rectangular LRM connectors. The APC division of Amphenol manufactures and markets Amphenol printed circuit boards and flexible/rigid-flex products. Sculptured Flexible Circuits with built-in terminations plug into a printed circuit board and create a self-locking terminal pad which eliminates the need for an additional interconnect to the PCB. See catalog 12-170* and consult Amphenol for further information.

FIBER OPTIC TERMINI

Amphenol offers high performance fiber optic termini within MIL-DTL-38999 cylindricals and within LRM, PCB and rack & panel rectangular interconnects. Other space application fiber optic connectors and hermaphroditic connectors are available with fiber optics, as well as Amphenol backplanes and VITA-46 interconnects. The fiber optic termini choices include:

- MIL-PRF-29504 pin and socket termini. High precision, pre-radiused ceramic ferrules to help improve insertion loss performance and reduce polishing time. Single mode and multi-mode versions.
- HD20 pin and socket termini with the same benefits of the MIL-PRF-29504 termini, but smaller for increased density
- 90° pin and socket termini
- ARINC 801 termini - genderless fiber optic termini that use a precision 1.25 mm ceramic ferrule. Precision inserts with guide pins and keyed termini. Multi-mode and single mode.
- MT ferrules - Industry standard, very high density plastic ferrules available in either 12-fiber or 24-fiber versions, in multi-mode PC, single mode PC, and single mode APC configurations.

Many connectors can have combinations of fiber optics and other contact types. See catalog 12-352, Amphenol® Fiber Optic Interconnect Products for Military, Aerospace and Harsh Environments. (online at www.amphenol-aerospace.com)

* 12-170 and 12-090 will be combined within Catalog # 12-C1, Amphenol's new combined 38999 connector catalog; consult Amphenol for more information.



PC Tail Signal and Power Contacts and Custom PC Tail Designs



Compliant Pin (Press Fit) Contacts for Solderless Mounting to PC Boards



Sculptured Flex Circuits



Fiber Optic MT Ferrule Termini in 38999 Connectors



MIL-PRF-29504 Fiber Optic Termini in LRM Connectors

Additional Contact Styles from Amphenol, cont.

Amphenol offers broad flexibility to connector users. Our contact engineers can help in the selection of the best contact style and functionality for your interconnect needs. Here are more Amphenol contact choices:

FILTER PI TYPE TUBULAR AND PLANAR ARRAY CONTACT ASSEMBLIES

Amphenol filter/transient protection connectors utilize filter contact designs to provide protection for sensitive electronic circuits; protection in VHF, UHF, HF and other filter ranges. Amphenol filter connectors offer the advantage of internal housing of the filter device within a wide range of connector packages - virtually all major Mil-spec cylindricals and rectangular series. Housing the filter protection within the connector eliminates costly and bulky exterior discrete protection devices. Header assemblies (see right) allow for easy separation and easy termination of connectors when attaching to flex or pc boards. They allow for electrical testing that would adversely affect sensitive diodes, MOV's or filter capacitors. See Amphenol EMI Filter/Transient Protection Connector Catalog 12-120* for further information.

RADSOK® HIGH POWER CONTACTS

Amphenol's RADSOK® contact design is a hyperbolic, stamped grid configuration within the socket cylinder. As the male pin is inserted, axial members in the female socket half deflect, imparting high current flow across the connection with minimal voltage loss. Another advantage of the RADSOK® contact is low insertion force. The RADSOK® contact has been incorporated into three of the large industrial families of connectors; the GT series, the P-Lok series and 5015 types. These connectors, known as Amphe-Power® connectors, can handle up to 150% higher amperages. Amphenol Industrial Operations division also provides a wide range of power to board interconnects utilizing the RADSOK® technology. These provide high amperage connection to busbars, wires and circuit boards. See Amphenol Industrial Brochure, SL-391. (online at www.amphenol-industrial.com) RADSOK® contacts are being further introduced into military/aerospace products. High power RADSOK® is now developed into applications for engine connectors for Commercial Air, and are also being designed into LRM interconnects for high speed data transfer.

LOW MATING FORCE HIGH CYCLE, BRISTLE BRUSH CONTACTS

Amphenol bristle brush or B³ contacts are made up of multiple stands of high tensile wire that are bundled together. 70% to 90% reduction in mating/unmating forces is achieved over conventional contacts, and the brush contact has proven durability and long contact life. Hybrid Low Mating Force connectors can be designed with combinations of brush and coax/twinax/power contacts or fiber optic termini. See pages 45 & 46 of this publication, and refer to Amphenol catalog 12-035, Low Mating Force Rectangular Connectors for more information on Brush contacts (online at www.amphenol-aerospace.com).

LRM Surface Mount Connectors also use brush technology as the standard contact type, but can have other contact types combined in the module and backplane inserts. There is a high level of design versatility in LRM designs - one bay, two bay, three bay, or more configurations with many shell designs, plus the ability to combine contact types. See pages 45 & 46 of this publication, and refer to Amphenol LRM catalog 12-037.

STANDARD CRIMP CONTACTS

Crimp contacts are used throughout the connector industry for standard interconnection. Amphenol supplies crimp contacts that are designed and qualified to various military/customer specifications and M39029 slash sheets. Numerous contact sizes and finishes are available for use with front or rear release connector applications.



Filter Contact Devices Internally Housed in Connectors Protect Sensitive Circuits

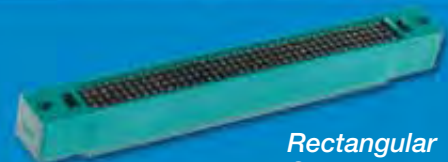
Filtered Connector and Header Assembly



RADSOK® High Power Contacts and Connectors



Brush Contact Technology



Rectangular Connectors with Brush Contacts



* 12-120 will be combined within Catalog # 12-C1, Amphenol's new combined 38999 connector catalog; consult Amphenol for more information.

Guide for Selecting High Frequency Contacts and Cables

Date _____

Amphenol Salesperson _____

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

CUSTOMER INFORMATION

Customer Company Name _____
 Engineer Name _____
 Program _____
 Forecast _____

CABLE INFORMATION

Cable Part Number* _____
 Cable Manufacturer _____
 Cable Type: Coaxial Twinax
 Triax Quadrax
 Cable Impedance _____

* if not an RG-Number complete below information:

O.D. of Inner Wire _____	AWG of Inner Wires _____	
No. of Inner Wire Strands _____	Material of Inner Wires _____	
O.D. of Inner Insulation _____	Material of Inner Insulation _____	
O.D. of First Braid _____	Braid Type _____ (flat, round, wrap)	Braid AWG _____
O.D. of First Jacket _____	Jacket Material _____	
O.D. of Second Braid _____	Braid Type _____ (flat, round, wrap)	Braid AWG _____
O.D. of Second Jacket _____	Jacket Material _____	

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

CONNECTOR INFORMATION

Connector Family: TV-R LJT-R JT-R
 Other _____
 Insert Arrangement Desired _____
 Shell Style _____
 Shell Plating _____

CONTACT INFORMATION

Type: Coaxial Concentric Twinax Triax
 Differential Twinax* Quadrax*
 Size*: 8 12 16
 Contact Impedance Matched? Yes No
 50Ω 75Ω 100Ω 150Ω Other _____

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

PERFORMANCE INFORMATION

Electrical Protocol _____
 VSWR Requirement 1. to 1. _____ Cross Talk _____ db
 Operating Frequency _____ Attenuation _____ Insertion Loss _____
 Operating Voltage _____ VAC (RMS) _____ DC
 Current Outer Contact _____ Amp Current Inner Contacts _____ Amp
 Application Temperature _____ Environmental Requirement _____