

tyco

Electronics



QuadraX Contacts, Connectors and Cables

Introduction**Product Facts**

- 2 mm centerlines
- Designed per ARINC 600 - Supplement 14
- Fits into keyed connector inserts for connectors such as: ARINC 404 & 600, General Purpose Rectangular (GPR), MIL-DTL-38999 style, BACC65/EPXB, and custom interconnects
- Single piece dielectric design simplifies termination and improves reliability
- Size 8 shells are designed for standard hex crimp per M2252/5-01 and M22520/5-45
- 24 AWG contacts are designed for crimp tooling M22520/2-01 and Daniels K-709
- Shells are keyed for proper orientation inside connector insert blocks
- Rear Release/Rear Remove cable versions and Front Release/Front Remove PCB versions
- Utilizes standard insertion/extraction tool

A multi-signal contact system consisting of two differential pairs (matched impedance) used with quadaxial Ethernet and Fiber Channel cables. Available in shell size 8 (keyed); 24 AWG pin and socket contacts, Hex Crimp version as well as pin PCB tail solderable versions. Adaptable to a variety of connectors (ARINC 600, 404, D-Subminiature connectors, MIL-DTL-38999 style, etc.)

Designed for use in high speed applications such as Gigabit Ethernet, IEEE 802.3Z and Fiber Channel X3T11.2 for use on Commercial Avionics Systems, Aircraft Data Networks, Military Communications and In-Flight Entertainment Systems.

Materials

Contacts, shells, ferrules
Copper alloy with gold over nickel finish. One-piece thermoplastic dielectric.

Technical Documents**Product Specification**

108-2131

Application Specification

114-13123

Test Report

502-1182 (Quadrax Rectangular Connector)

Performance Characteristics

Maximum mating force per contact assembly – 2.75 lbf.

Minimum un-mating force per contact assembly – 1.25 lbf.

Durability – 500 mating/unmating cycles

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Mylar is a registered trademark of Dupont Teijin Films U.S.

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Electrical Characteristics

- Designed for use with 100 Ohm and 150 Ohm characteristic impedance star quad cable. Reference contact chart on page 6.
- Signal integrity testing was completed per SFF-8410 (see engineering test report 502-1182).
- Characteristic impedance: 100 Ohm ± 10 Ohm nominal (measured 102.85 Ohms)
- Near end cross talk (NEXT) in the time domain: 0.89% measured on Tek 11801C Digital Sampling Oscilloscope
- Eye Patterns (Differential Mode, 1 meter and 11.2 meter cable test lengths)
The minimum output eye opening for a 1V launch voltage measured at 50% of the period is:
1 meter, 100 MHz Eye Opening 928.53 mV
1 meter, 1.25 GHz Eye Opening 839.77 mV
11.2 meter, 100 MHz Eye Opening 761.60 mV
11.2 meter, 1.25 GHz Eye Opening 315.20 mV

Return Loss

1 Meter Cable Length

Frequency MHz	dB	VSWR*
50	34.33	1.039
62	36.03	1.032
102	40.21	1.02
502	21.21	1.191
1002	13.34	1.549
1954	9.32	2.039
2950	10.27	1.884

11.2 Meter Cable Length

Frequency MHz	dB	VSWR*
50	35.26	1.035
62	36.87	1.029
102	38.90	1.023
502	26.02	1.105
1002	14.62	1.456
1798	11.74	1.698
2502	13.34	1.549
3702	6.54	2.781

*calculated

Insertion Loss

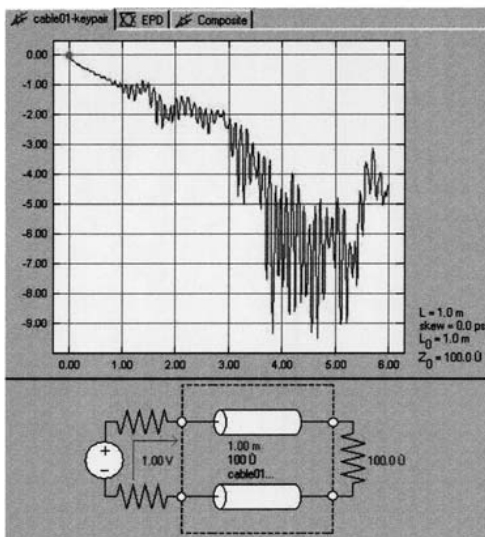
1 Meter Cable Length

Frequency MHz	dB
50	0.13
62	0.19
102	0.27
502	0.87
1002	1.39
2002	2.48
3002	3.29

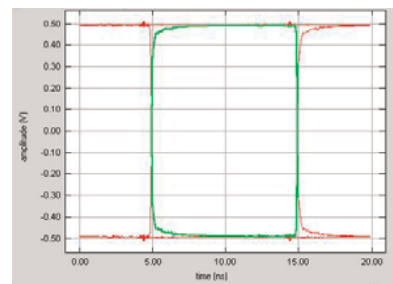
11.2 Meter Cable Length

Frequency MHz	dB
50	1.87
62	2.13
102	2.72
502	6.38
1002	10.06
1798	15.69
2502	19.47
3702	28.20

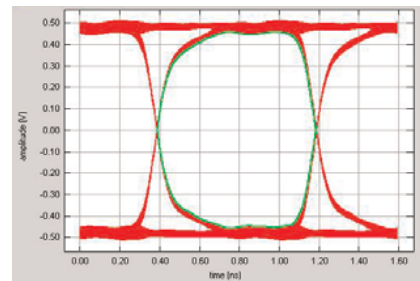
Typical Insertion Loss



Eye Pattern (Time Domain Measurement of Voltage vs. time)

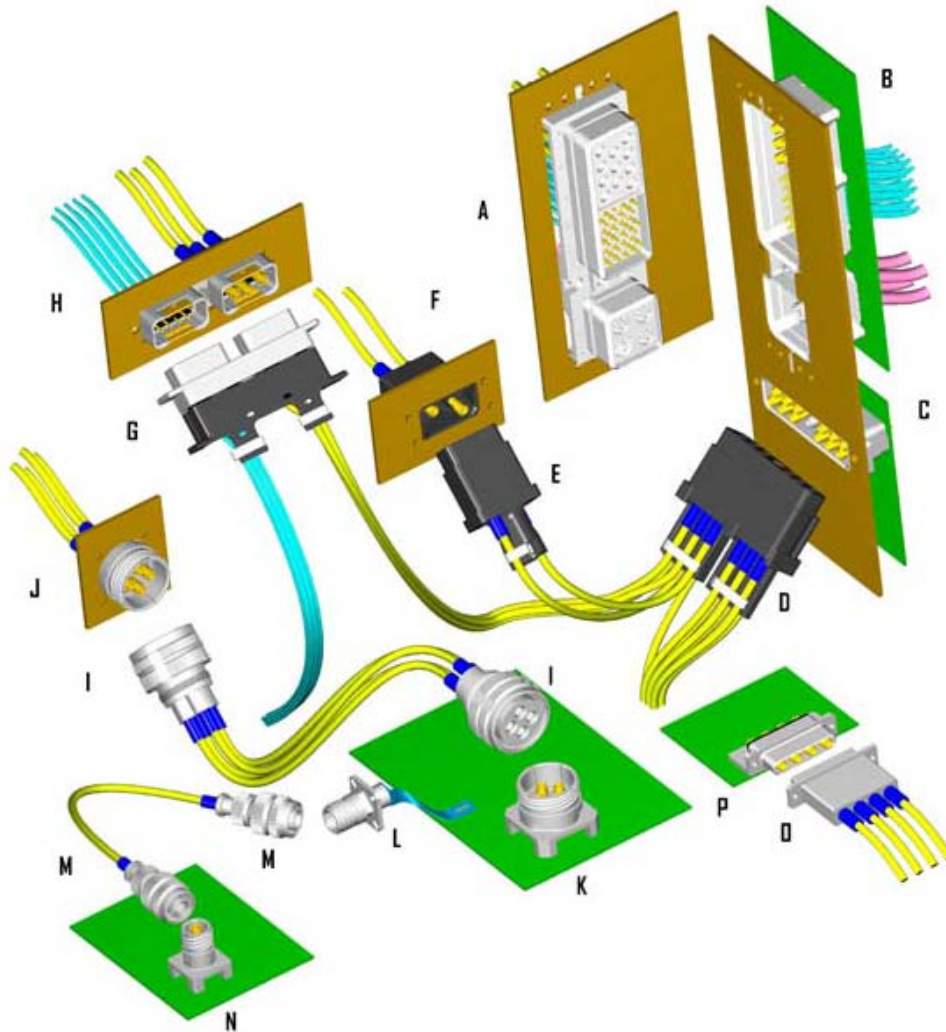


100 base-T (100 Mbps Data Rate)



1000 base-T (1 Gbps Data Rate)

Product Family Overview



LEGEND

ARINC 600 Connectors:

- A Size 2 Plug Assembly with Q11 Quadrax Insert
- B Size 2 Receptacle Assembly with Q11 PCB Tail Quadrax

Quadrax Rectangular Connectors:

- C 12 Position Receptacle
- D 12 Position Plug Assembly with Strain Relief and Seal Boots
- E 2 Position Plug Assembly with Strain Relief and Seal Boots
- F 2 Position Panel Mount Receptacle with Strain Relief and Seal Boots

General Purpose Rectangular Connectors:

- G GPRB2 Plug, Dual Insert Configuration w/3 Pos. Quadrax Insert
- H GPRB2 Receptacle, Dual Insert Configuration w/3 Pos. Quadrax insert

38999 Style Circular Connectors:

- I Size 19 Plug, 4Q4 Quadrax arrangement with Seal Boots
- J Size 19 Receptacle, 4Q4 Quadrax arrangement, Panel Mount Configuration w/Seal Boots
- K Size 19 Receptacle, 4Q4 Quadrax arrangement, PCB Mount
- L Size 9 Receptacle, 1Q1 Quadrax arrangement, Panel Mount w/Custom Flex Circuit Assembly for direct attachment to printed circuit board
- M Size 9 Plug, 1Q1 Quadrax arrangement with Seal Boot
- N Size 9 Receptacle, 1Q1 Quadrax arrangement, PCB Mount

D-Sub Style Quadrax Rectangular Connectors:

- O Plug with Seal Boots (In Development - Contact Tyco Electronics)
- P Receptacle, Blind Mate Shell, for right-angle PCB mount (In Development - Contact Tyco Electronics)

QUADLITE Quadaxial Cables

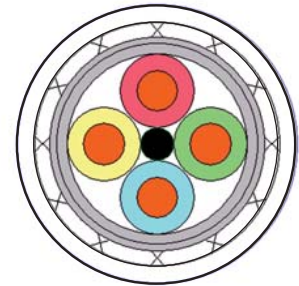
Product Facts

- 100 Ohm and 150 Ohm cables
- Materials rated from -85°F to +392°F [-65°C to +200°C]
- Low outgassing materials (PTFE, FEP)
- Custom design capabilities
- Proven technologies and materials

100 Ohms - 200°C

100 Ohms - 150°C

Raychem Part Number	CEC-RWC-18687	CEC-RWC-18664
Conductor AWG Size (19 Strand)	24	24
Conductor Material:	SCCA	SCCA
Nom. Conductor Diameter (in.):	0.0235	0.0235
Insulation Material:	FEP	FEP
Nom. Insulation OD± 0.002 (in.):	0.042	0.042
Nom. Cable OD (in.):	0.166	0.167
Nom. Cable Weight (lbs/1 kft):	24.7	22.9
Shield Material:	Flat SCC/Round SCC	Alum. Mylar®/Round TCC
Jacket Material:	FEP	FEP
Impedance ± 10% (Ω):	100 Ohms	100 Ohms
Temp. Rating:	200°C	150°C
Nom. Capacitance (pF/ft):	13.0	13.0
Nom./Max. Attenuation (dB/100 Ft).	10 MHz 2.3/2.7 100 MHz 8.0/9.2	10 MHz 2.3/2.7 100 MHz 8.0/9.2
Min. NEXT (dB)	47 32	47 32
Min. SR (dB)	23 16	23 16

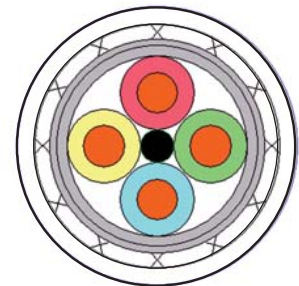


100BASE-T Ethernet

150 Ohms - 200°C

150 Ohms - 150°C

Raychem Part Number	CEC-RWC-18684	CEC-RWC-18680
Conductor AWG Size (19 Strand)	26	26
Conductor Material:	SCCA	SCCA
Nom. Conductor Diameter (in.):	0.0235	0.0235
Insulation Material:	FEP	FEP
Nom. Insulation OD± 0.005 (in.):	0.058	0.058
Nom. Cable OD (in.):	0.200	0.201
Nom. Cable Weight (lbs/1 kft):	30.6	30.9
Shield Material:	Flat SCC/Round SCC	Alum. Mylar®/Round SCC
Jacket Material:	FEP	FEP
Impedance ± 10% (Ω):	150 Ohms	150 Ohms
Temp. Rating:	200°C	150°C
Nom. Capacitance (pF/ft):	9.0	9.0
Nom./Max. Attenuation (dB/100 Ft).	531 MHz 13 1062 MHz 21	531 MHz 13 1062 MHz 21
Nom. Delay Skew (ps/ft)	3	3



Fiber Channel

Mylar is a registered trademark of DuPont Teijin Films U.S.

Crimp Contacts

Product Facts

- One-piece dielectric inserts for easy assembly and lowest applied cost
- Available with silicone seal boots rated for 50,000 ft. altitude immersion
- Crimp type, screw machined, 24 AWG contacts
- Quadrax size 8 shells are keyed per ARINC 600 for correct orientation inside connector inserts



Contacts ⁽¹⁾

Part Number	Description	Dim. A
1445626-1	Contact, Pin, Solder Tail	.228 [5.79]
1445626-2	Contact, Pin, Solder Tail	.422 [10.72]
1445626-3	Contact, Pin, Solder Tail	.181 [4.60]
1445626-4	Contact, Pin, Solder Tail	.297 [7.54]
1445626-5*	Contact, Pin, Solder Tail	.297 [7.54]

Hex Crimp

1445692-1	Contact Kit, Pin, Crimp	0.218
1445692-3**	Contact Kit, Pin, Crimp, (with wire seal boot)	0.218
1445693-1	Contact Kit, Socket, Crimp	0.218
1445693-3**	Contact Kit, Socket, Crimp, (with wire seal boot)	0.218

Reference cables: Tensolite NF24Q100, NF26Q100, 24443/03130X-4(LD), 2443/9P025X-4(LD); Raychem CEC-RWC-18687, Raychem CEC-RWC-18664

Hex Crimp

1445692-5**	Contact Kit, Pin, Crimp (with wire seal boot)	0.218
1445692-6	Contact Kit, Pin, Crimp	0.218
1445693-5**	Contact Kit, Socket, Crimp (with wire seal boot)	0.218
1445693-6	Contact Kit, Socket, Crimp	0.218

Reference cables: DRAKA F4703-3, F4704-4

Hex Crimp

1877039-1	Contact Kit, Pin, Crimp	0.231
1877039-2**	Contact Kit, Pin, Crimp (with wire seal boot)	0.231
1877040-1	Contact Kit, Socket, Crimp	0.231
1877040-2**	Contact Kit, Socket, Crimp (with wire seal boot)	0.231

Reference cables: Tensolite 26473/02006X-4(LD); Raychem CEC-RWC-18684, Raychem CEC-RWC-18680

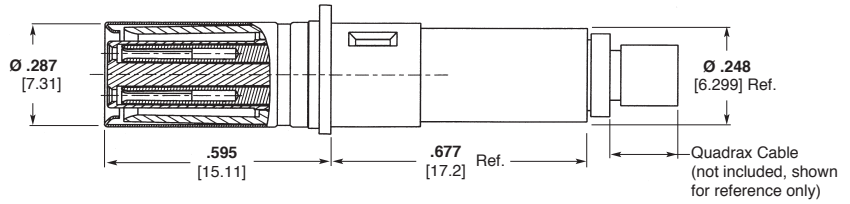
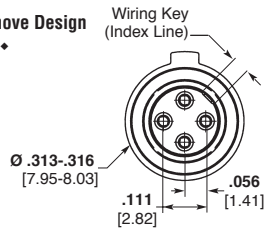


1811010-1	Socket kit with heat-shrink tubing
1811269-1	Pin kit with heat-shrink tubing

*Tails are solder dipped
 **Used with Quadrax rectangular and circular connectors
 (1) For other cables, contact Tyco Electronics.

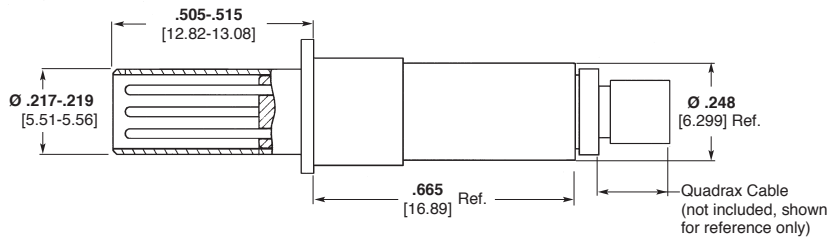
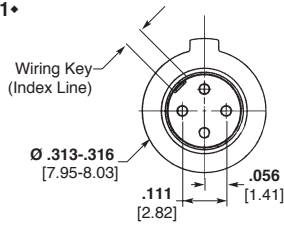
Size 8 Quadrax Socket Contact — Crimp Style
Rear Release/Rear Remove Design
Part Number 1445693-1*

♦ -3 w/boot



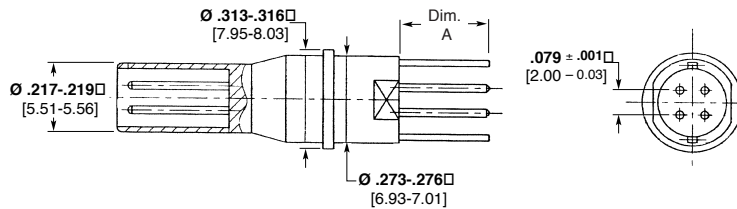
Size 8 Quadrax Pin Contact — Crimp Style
Rear Release/Rear Remove Design
Part Number 1445692-1*

♦ -3 w/boot

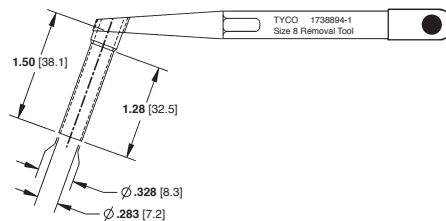


Size 8 Quadrax PCB Pin Contact
Front Release/Front Remove Design
Part Number 1445626-1**

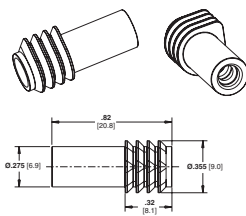
** various tail lengths



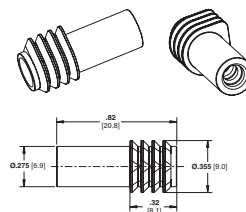
Size 8 Quadrax Extraction Tool
Part No. 1738894-1



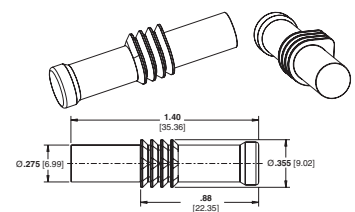
Seal Boots



Wire Seal Boot
P/N 1811481-1
Cable O.D. .140/.176



Wire Seal Boot
P/N 1811943-1
Cable O.D. .170/.210



Solid Seal Boot
P/N 1811633-1

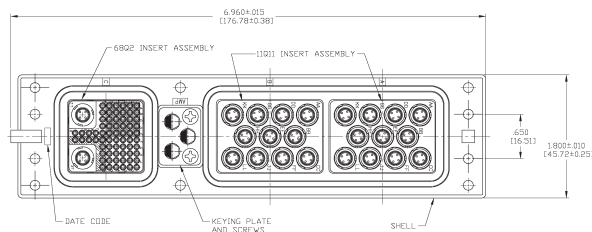
ARINC Size 8 Quadrax Connectors

Product Facts

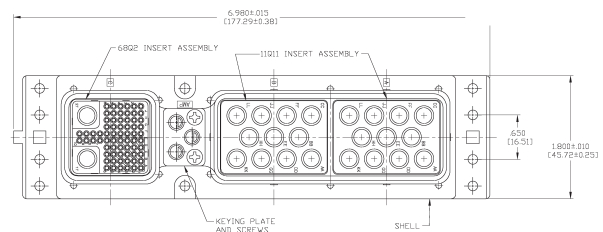
- Utilizes four size 24 screw-machined contacts with standard crimp tooling per M22520/2-01 and M22520/5-01 for ease of termination
- Front release/front removable PCB mount contact design for use in ARINC 600 receptacle connectors
- Rear release/rear remove crimp contact design for use in ARINC 600 plug connectors & receptacles
- Quadrax housing is keyed to assure mating alignment
- Contacts are on 2 mm centerline per ARINC 600 specification
- To extract Quadrax contact from connector insert, use Extraction Tool Part Number 58284-1
- Per Supplement 14 to ARINC Specification 600



ARINC Size 2 Connectors	Insert Arrangement			Style	Shell Features	Contacts
Part No.	Type	A	B			
1484406-2	Receptacle	Q11	Q11	68Q2	Front Release Front Remove	Electroless Nickel Plated, no clinch nuts Size 22 signal & Quadrax contacts supplied loaded in inserts; post extension = .25 [6.35]
1484407-2	Plug	Q11	Q11	68Q2	Rear Release Rear Remove	Electroless Nickel Plated, no clinch nuts Crimp style size 22 signal and Quadrax contacts supplied unloaded
1663032-1	Receptacle	150	150	11Q2	Front Release Front Remove	Chromate with six 4-40 clinch nuts Signal, Power and Quadrax contacts supplied loaded in inserts; post extension = .25 [6.35]
1663900-1	Receptacle	Q11	Q11	85	Front Release Front Remove	Chromate, no clinch nuts Signal, Power and Quadrax contacts supplied loaded in inserts; post extension = .25 [6.35]
1484620-1	Receptacle	Q11	Q11	85	Front Release Front Remove	Electroless Nickel Plated, with ten 4-40 clinch nuts Signal, Power and Quadrax contacts supplied loaded in inserts; post extension = .15 [3.81]
1484621-1	Plug	Q11	Q11	85	Rear Release Rear Remove	Electroless Nickel Plated, no clinch nuts Crimp contacts
ARINC Size 3 Connectors	Insert Arrangement			Style	Shell Features	Contacts
Part No.	Type	A D	B E			
1663018-1	Receptacle	150 150	150 150	11Q2 11Q2	Front Release/ Front Remove	Electroless Nickel Plated No contacts
1663018-2	Receptacle	150 150	150 150	11Q2 11Q2	Front Release/ Front Remove	Electroless Nickel Plated Signal, Power and Quadrax contacts supplied loaded in inserts; post extension signal and power = .25 [6.35]; Quadrax = .200 [5.08]
1663018-3	Receptacle	150 150	150 150	11Q2 11Q2	Front Release Front Remove	Chromate with fourteen 6-32 clinch nuts Signal, Power and Quadrax contacts supplied loaded in inserts, post extension = .25 [6.35]
1663019-1	Plug	150 150	150 150	11Q2 11Q2	Rear Release Rear Remove	Electroless Nickel Plated No contacts
1663019-2	Plug	150 150	150 150	11Q2 11Q2	Rear Release Rear Remove	Electroless Nickel Plated Crimp contacts
1663019-3	Plug	150 150	150 150	11Q2 11Q2	Rear Release Rear Remove	Chromate Crimp contacts



**Receptacle, Assembly Size 2
Front Release/Front Remove
Part No. 1484406-2 shown**

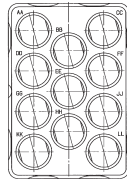


**Plug, Assembly Size 2
Rear Release/Rear Remove
Part No. 1484407-2 shown**

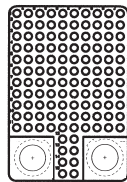
ARINC Size 8 Quadrax Connectors (Continued)

Contact Inserts & Arrangement Codes - Shell Size 2 or 3

Shell Module A, B, D or E

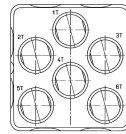


Q11 1, 2, 3
11 Size 8 Quadrax
Metal

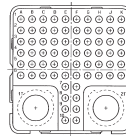


118Q2 2,3, 4
118 Size 22
2 Size 8 Quadrax

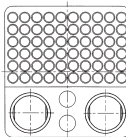
Shell Module C or F



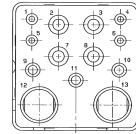
Q6 1, 2, 3
6 Size 8 Quadrax
Metal



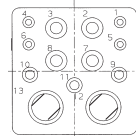
68Q2 2, 3, 4
68 Size 22
2 Size 8 Quadrax



62Q2 2, 3, 4
60 Size 22
2 Size 16
2 Size 8 Quadrax



11Q2 1, 2, 3
4 Size 20
4 Size 12
3 Size 16
2 Size 8 Quadrax



13CQ2 2, 3
4 Size 20
3 Size 16
4 Size 12
2 Size 8 Quadrax

Notes:

1. Available for plug or receptacle with rear release/remove contacts.
2. Available for receptacle only with all contacts front release/remove.
3. Standard size 8 contacts will not fit in Quadrax size 8 inserts. Also, Quadrax size 8 contacts will not fit into standard size 8 inserts.
4. Available for plug only with all contacts rear release/remove.

Rectangular Connectors

Product Facts

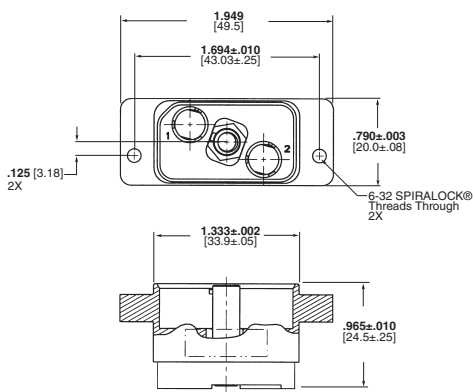
- High performance rectangular connector
- Available in 2, 4, and 12 positions
- Designed for use with wire seal boots and rated for use up to 50,000 ft. altitude
- Center jackscrew design for fast, reliable mating
- Aluminum shells are keyed and polarized, and are available with lightweight plastic backshell strain reliefs
- Provides excellent density in a rectangular profile for packaging flexibility.
- Qualified to Boeing Part Standard BPS-C-193



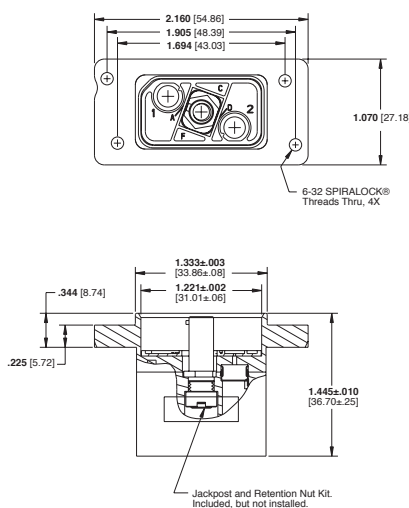
Position	Part No.	Type	Mounting Style	Style	Polarization	Note:
2	1604896-2	Receptacle	PCB	Front Release/Front Remove	Flat	
	1604897-5*	Receptacle	Panel Mount	Rear Release/Rear Remove	Flat	
	1604898-5*	Plug	Free-Hanging	Rear Release/Rear Remove	Flat	
	1604905-1	Backshell - (1 pc)	-	-	-	Use w/1604897-5 or 1604898-5
4	1738949-2	Receptacle	PCB	Front Release/Front Remove	Flat	
	1738950-2*	Receptacle	Panel Mount	Rear Release/Rear Remove	Flat	
	1738951-2*	Plug	Free-Hanging	Rear Release/Rear Remove	Flat	
	1738955-1	Backshell - (1 pc)	-	-	-	Use w/1738950-2 or 1738951-2
12	1604798-2	Receptacle	PCB	Front Release/Front Remove	Flat	
	1604799-5*	Receptacle	Panel Mount	Rear Release/Rear Remove	Flat	
	1604800-5*	Plug	Free-Hanging	Rear Release/Rear Remove	Flat	
	1604874-1	Backshell - Receptacle (2 pc)	-	-	-	Use w/1604799-5
	1604874-2	Backshell - Plug (2 pc)	-	-	-	Use w/1604800-5

*Jackscrew/Jackpost hardware included but not installed

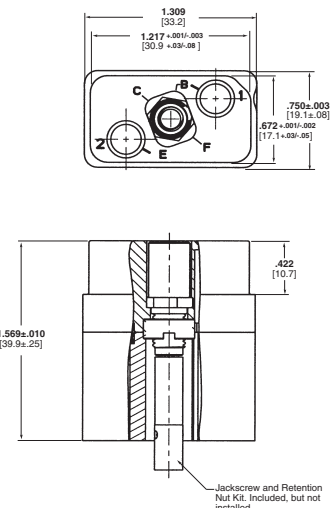
2 Position



PCB Mount Receptacle (Part No. 1604896)

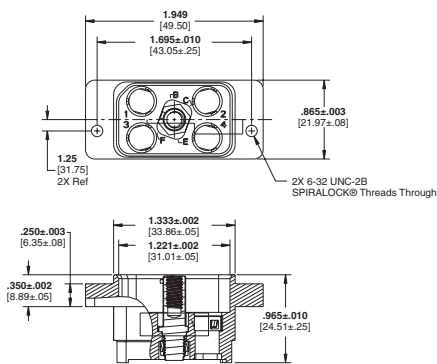


Panel Mount Receptacle (Part No. 1604897)

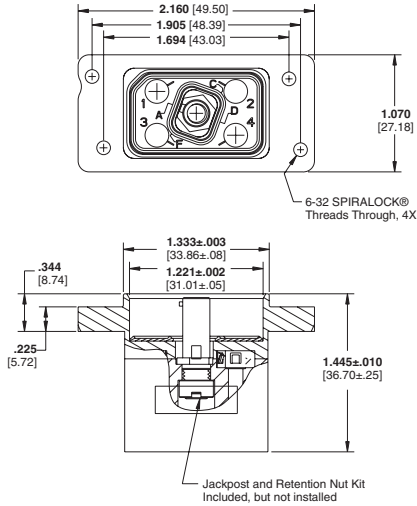


Free-Hanging Plug (Part No. 1604898)

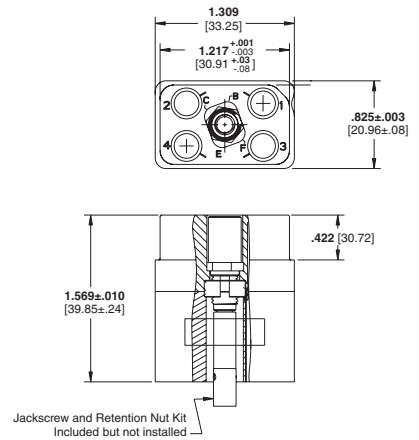
4 Position



PCB Mount Receptacle (Part No. 1738949)

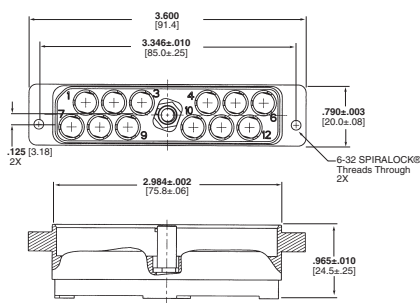


Panel Mount Receptacle (Part No. 1738950)

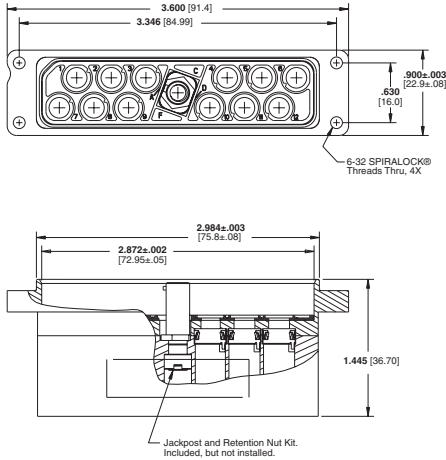


Free-Hanging Plug (Part No. 1738951)

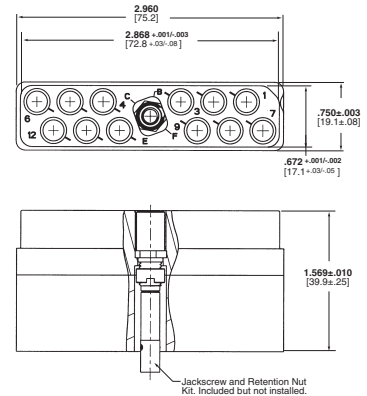
12 Position



PCB Mount Receptacle (Part No. 1604798)



Panel Mount Receptacle (Part No. 1604799)



Free-Hanging Plug (Part No. 1604800)

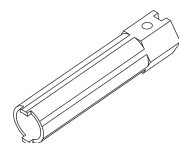
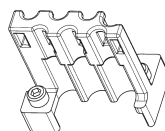
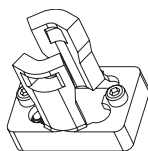
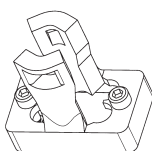
Accessories

2 Position Backshell/Strain Relief Kit
Part No. 1604905-1
(for plug & receptacle)

4 Position Backshell/Strain Relief Kit
Part No. 1738955-1
(for plug and receptacle)

12 Position Backshell/Strain Relief Kit
Part No. 1604874-1 for receptacle;
Part No. 1604874-2 for plug

Wrench, Retention Nut, Jackscrew and Jackpost, Quadrax Rectangular Connector
Part No. 1604972-1



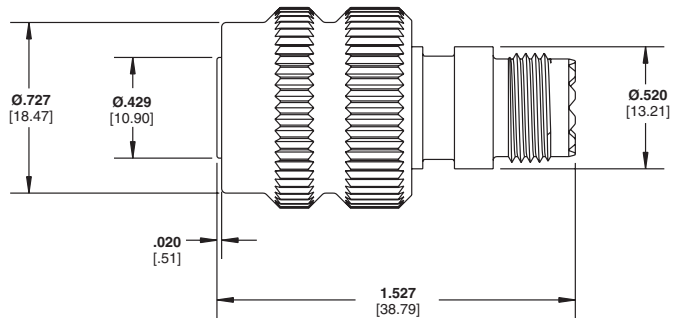
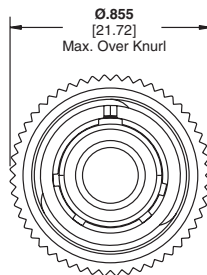
Custom MIL-DTL-38999 Series III Style Circular Connectors

Product Facts

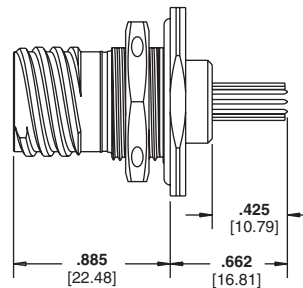
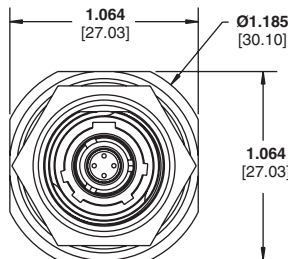
- Available in various shell sizes: 9 (1Q1), 17 (2Q2), 19 (4Q4) and 25 (8Q8)
- Designed for use with wire seal boots for sealing and optimized alignment
- Front metal-shell design provides a full ground plane
- Lightweight composite rear shell available in size 19 for reduced weight
- Accepts standard backshells



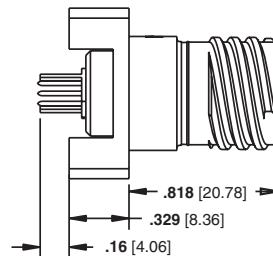
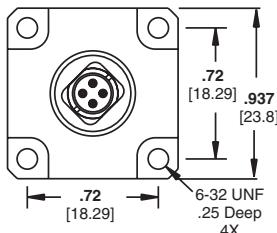
Plug, Shell Size 9
Single Quadrax, RR-RR
Part No. 1877384



Receptacle, Shell Size 9, 38999 Style
Single Quadrax, FR-FR
Jam Nut Style
Part No. 1738916



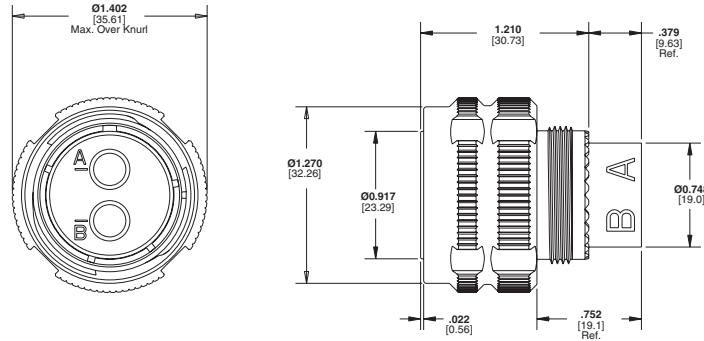
Receptacle, Shell Size 9, 38999 Style
Single Quadrax, FR-FR
PCB Mount with Stand-offs
(Contacts shown for reference only)
Part No. 1811184



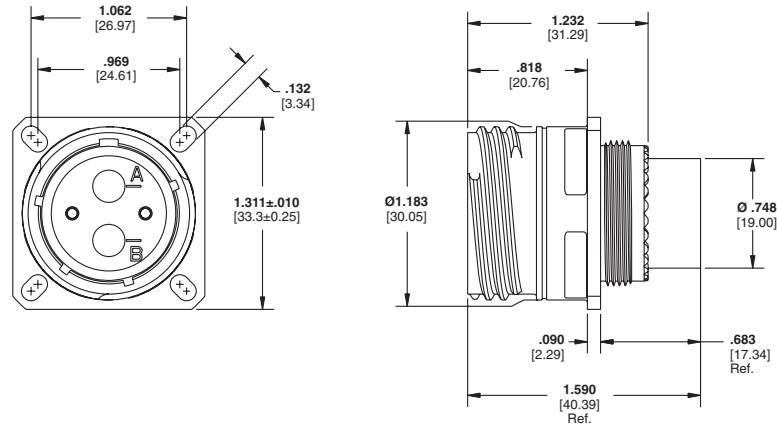
**Contacts sold separately,
see page 6.**

Custom MIL-DTL-38999 Series III Style Circular Connectors (Continued)

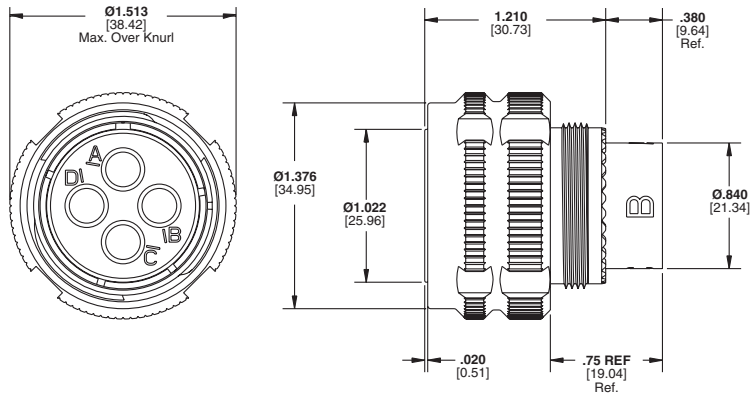
Plug, Shell Size 17,
38999 Style
Arrangement 2Q2, RR-RR
Part No. 1877775



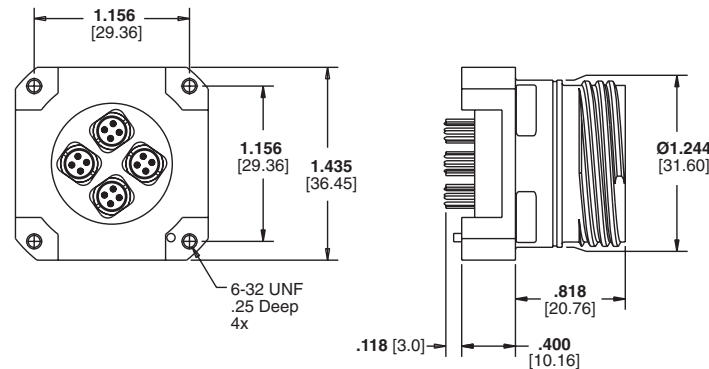
Receptacle, Shell Size 17, 38999 Style
Arrangement 2Q2, RR-RR
Part No. 1877774



Plug, Shell Size 19
38999 Style
Arrangement 4Q4, RR-RR
Part No. 1811902



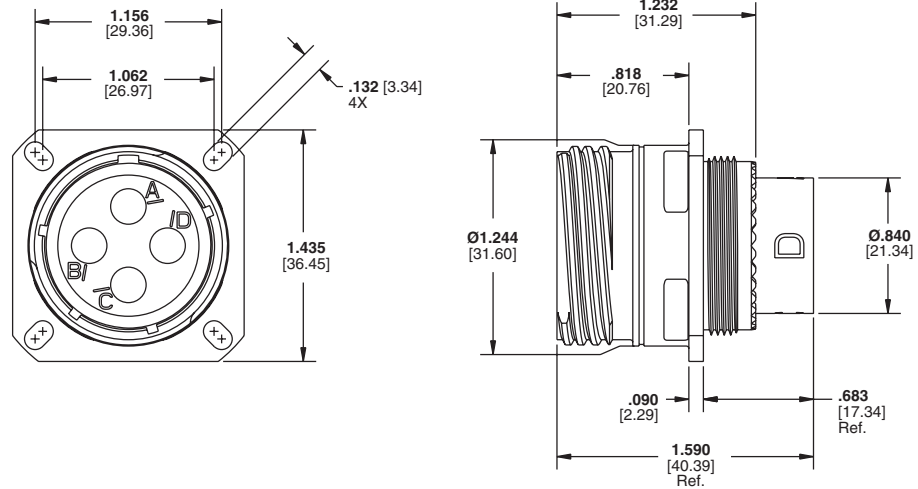
Receptacle, Shell Size 19, 38999 Style
w/4 Quadrax Contacts FR-FR
(Contacts shown for reference only)
Part No. 1738974



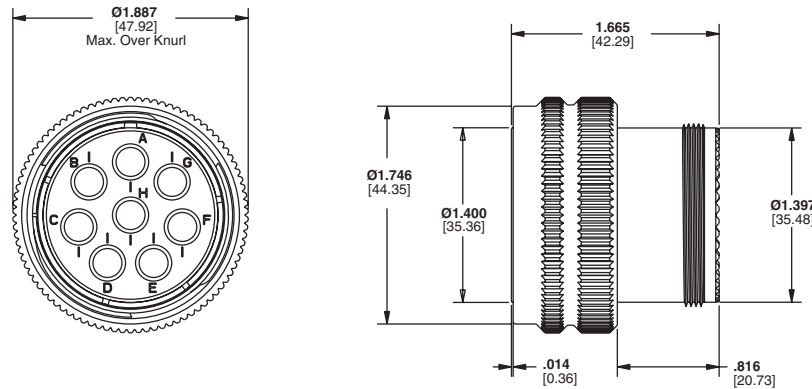
Contacts sold separately,
see page 6.

Custom MIL-DTL-38999 Series III Style Circular Connectors (Continued)

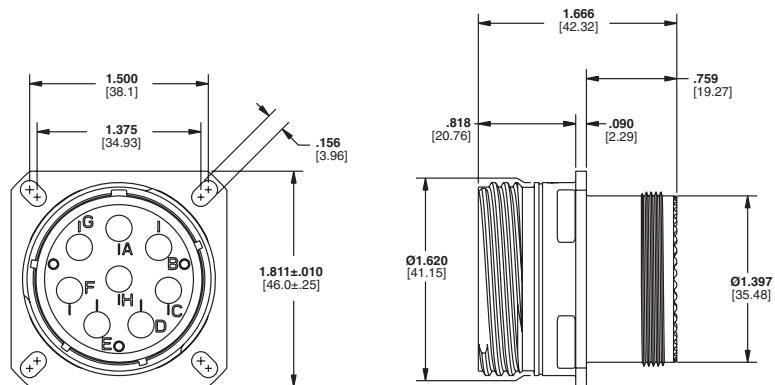
Receptacle, Shell Size 19, 38999 Style
Arrangement 4Q4, RR-RR
Part No. 1811901



Plug, Shell Size 25
38999 Style
Arrangement 8Q8, RR-RR
Part No. 1811928



Receptacle, Shell Size 25 38999 Style
Arrangement 8Q8, RR-RR
Part No. 1811927



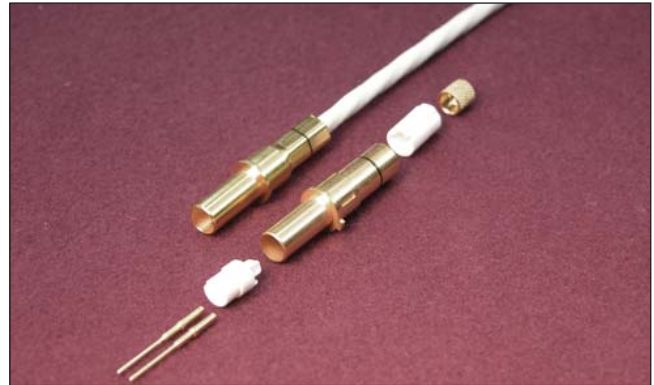
Contacts sold separately,
see page 6.

Custom Solutions

100 Ohm Differential Pair twin-axial Contact

Product Facts

- Designed to meet the requirements of ARINC Specification 810 for 100 Ohm size 8 non-concentric twin-axial contacts.
- Works in all connectors accepting ARINC 600 style Quadrax contacts



Custom Cable and Flex Assemblies

Product Facts

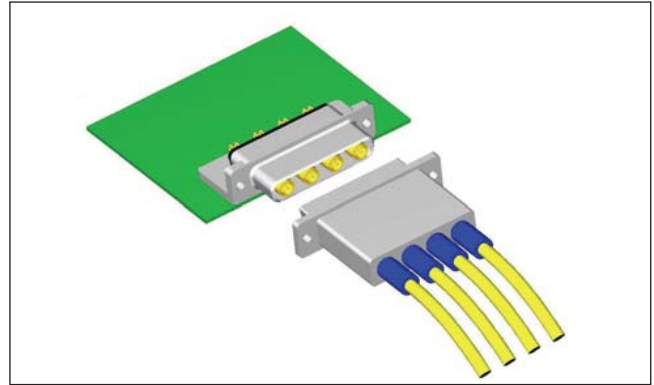
- Quadrax contacts and connectors can be provided as custom cable and flex assemblies for customer specific applications.



D-Subminiature Connector Assemblies

Product Facts

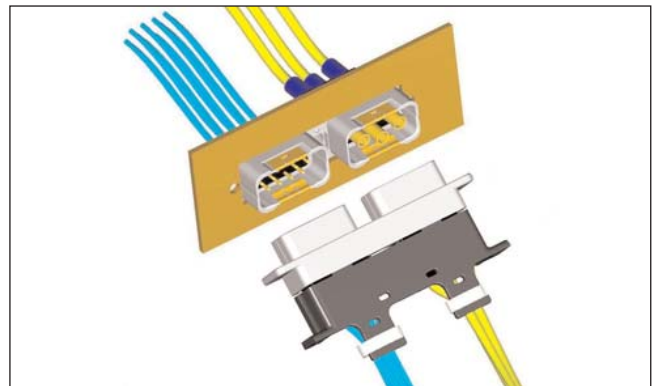
- Designed to provide a ruggedized in-line solution for Quadrax cable to printed circuit board mount applications, in a blind-mateable D-subminiature configuration.
- Quadrax contacts ground directly to connector shell.



General Purpose Rectangular (GPR) Connector Assemblies

Product Facts

- Quadrax inserts are available for the rugged, modular General Purpose Rectangular connector, facilitating the mix of high speed signals with a variety of other power, fiber optic, signal, and coax insert configurations in a single connector system.



Manufactured under license with Radiall S.A.

Contact Tyco Electronics for additional information on any of these custom solutions.



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1654012 5M GIC CGX 3-06