

Amphenol°

The Company

Amphenol Canada Corp. a subsidiary of Amphenol Corporation, is an international leader in the manufacture of Filtered Connectors and Specialty Interconnect Devices, and has been pioneering EMI and EMP technologies for more than 40 years.

Located in Toronto, Canada, our ISO 9001 certified facility employs approximately 400 people. Our activities are dedicated to the design, development and manufacture of EMI/EMP filter connector products which are used in Commercial, Industrial, Communications, Military and Aerospace applications world-wide. Our expertise in understanding and supporting our customers' filter interconnect needs has earned Amphenol Canada a reputation of quality and excellence among the world's leading users of electronic components.

What is a Filtered Connector?

A *filtered connector* is the combination of filter elements in a connector, forming one neat, compact interconnect device that can filter unwanted EMI. The most popular configuration is when

capacitors are mounted inside the connector between each of the contacts and the connector ground shell.

Benefits

- **Better EMI Control** With minimized lead inductances and short, direct paths to ground of the filter, performance will typically out perform the same filter components on a P.C.B. by a factor of three to one.
- **PCB Space Savings** Incorporating filter elements into the connector, enables simplification of the required filter schematic for the necessary performance plus a savings of 2-4 square inches.
- Cost Savings Filter elements, such as inductors and capacitors, must no longer be purchased, stocked, assembled or tested. Fewer components means greater reliability at lower cost.
- **Easy EMI/RFI Upgrade** These compact filtered connectors fit standard non-filtered connector footprints. For improved EMC performance, simply replace the existing connector with a filtered connector.
- **EMC Compliance & Immunity** EMI that is generated from the electronic device, radiated or conducted, will be re-directed to chassis ground through the connector shell. This same device will also protect the system from external EMI/RFI noise (such as radio transmitters, ESD, or natural phenomena such as lightning) in the same way.

Choosing the Right Capacitance for Your Filter Connector

- (1) Determine the highest frequency that the filter connector needs to pass unaffected.
- (2) Which frequencies are causing trouble, either with emissions or with immunity to interference?
- (3) Scan the Insertion Loss charts on page 2 to select a filter which provides little or no insertion loss (filtering) at the frequency determined from step 1, yet gives the greatest possible insertion loss at the frequencies determined in step 2.

Nominal Insertion Loss values described in this catalog are based on the Mil-STD-220 test method - a 50 ohm balanced load and source impedance. Different systems will differ from this and

hence, the filter connector may perform differently. The final decision will be determined from actual EMI/RFI testing of the equipment in question.

D-Sub Series



FCC17 Series

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Micro-Ribbon Series



FCC57 Series

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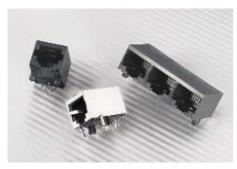
RF Series



456 Series

Capacitively Decoupled RF Connectors	23-35
capacitively becoupled it confiectors	23-33

Modular Jacks



FRJ/FRJA Series

Filtered & Shielded -See Modular Jack Catalogue

FCC17 & FCC57 Series

ELECTRICAL DATA

Contact Resistance: 15 milliohms maximum per MIL-STD-1344 Method 3002 **Insulation Resistance:** 3000 megohms minimum per MIL-STD-1344 Method 3003.1

Current Rating: 5 Amps DC maximum

2 Amps RF filtering maximum

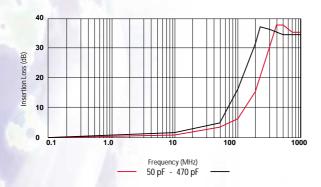
FCC17 Combo: 20-40 Amps

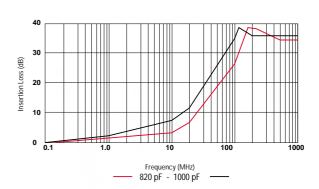
Filter Performance:

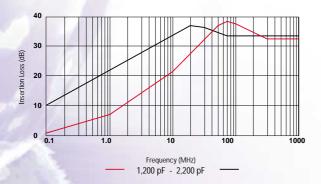
Filter Capacitance (pF) @25°C, 1 kHz, 1.0 VRMS		50 ± 15%	180 ± 15%	330 ± 15%	470 ± 15%	820 ± 15%	1000 ± 15%	1200 ± 15%	2200 ± 15%	5600 ± 20%	47000 ± 20%
Dielectric Material: NPO or	X7R										
Insertion Loss (dB)											
(per MIL-STD-220 @	.5 MHz									3	15
25°C)	1 MHz								1	5	20
	5 MHz				1	1	1	1	5	11	27
	10 MHz			1	2	3	3	4	8	16	32
	50 MHz		4	7	11	16	16	17	23	32	32
	100 MHz	2	12	15	22	30	30	30	32	32	32
	200 MHz	12	27	28	30	32	32	32	32	32	32
	1000 MHz	32	32	32	32	32	32	32	32	32	32
Working Voltage (VDC)		300	300	300	300	200	200	200	200	200	50
DWV (VDC) *		600	600	600	600	600	600	600	600	600	150

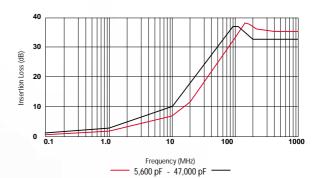
NOTE: A larger range of capacitors available - consult factory.

Typical Insertion Loss Performance (dB) (Per MIL-STD-220, no load)







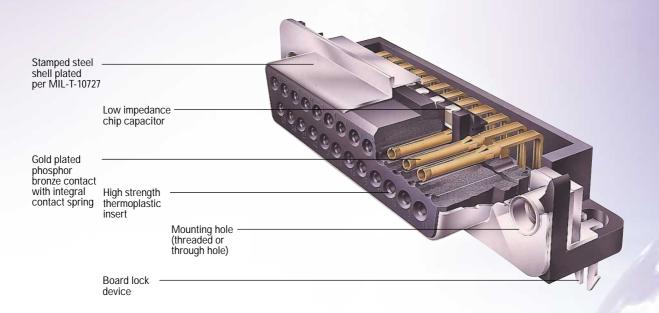


^{*} FCC57 connectors can be specified to meet the requirements of FCC Docket 20780, Part 68, Subpart F (1000 VAC for one minute. Consult factory for details). FCC17 and FCC57 connectors can withstand a transient voltage spike of 700 V with a rise time of 1 µsec (500 V for 47000 pF). FCC17 and FCC57 connectors can be specified to meet higher DWV and transient voltage requirement (consult factory).

FCC17 & FCC57 Series

MECHANICAL DATA

FCC17 Series Construction



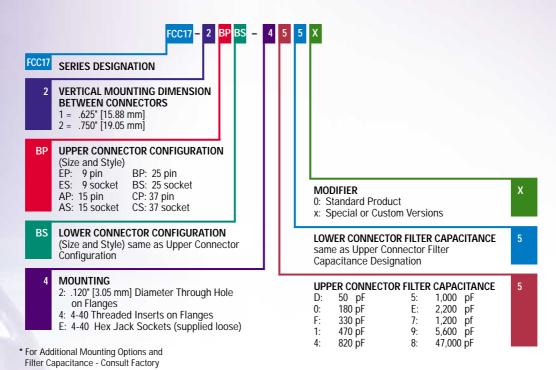
FCC17 & FCC57 Mechanical & Environmental Data

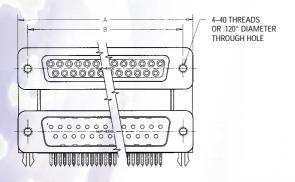
MATERIALS

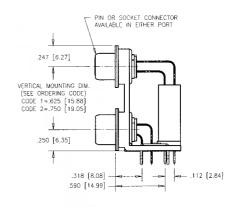
MATE	ERIALS			ENVIRONMENTA	A L
FCC17		FCC57		FCC17 & FCC57	
Shell	Stamped Steel;	Shell	Stamped Steel,	OPERATING TEMPERATURE	• -40°C to +85°C
	Tin Plated		Zinc or Aluminum Diecast; Tin Plated	TEMPERATURE CYCLING	• To MIL-STD-1344, Method 1003, Test Cond. A
Contacts	15µ inches [0.38 microns] Au over Ni	Phosphor Bronze; 30µ inches [0.76 microns] Au over Ni Optional 50µ inches [1.27 microns] Au available	HUMIDITY	• To MIL-STD-1344, Method 1002, Type I, Test Condition C	
			VIBRATION	• To MIL-STD-1344, Method 2005, Test Cond. III	
	FCC17 Combo Copper Alloy		Au available	DURABILITY	• 200 Cycles Minimum, to MIL-STD-1344, Method 2016
	30µ inches [0.76 microns] Au over Ni			UL File # CSA File #	E135615 LR68598
Inserts	High Strength Thermoplastic. Complies with UL flammability requirements of 94V-O per UL-STD-94.	Inserts	High Strength Thermoplastic. Complies with UL flammability requirements of 94V-O per UL-STD-94.		

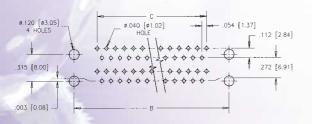
FILTERED STACKED D-SUB CONNECTORS

Ordering Information – Stacked D-Sub









PCB LAYOUT

Dimensions

Connector size	Α	В	С
9 / 9	1.213 [30.81]	.984 [24.99]	.432 [10.97]
15 / 15	1.541 [39.14]	1.312 [33.32]	.756 [19.20]
25 / 25	2.088 [53.04]	1.852 [47.04]	1.304 [33.12]
37 / 37	2.729 [69.32]	2.500 [63.50]	1.956 [49.68]

Consult factory for alternative arrangements

FILTERED D-SUB CONNECTORS

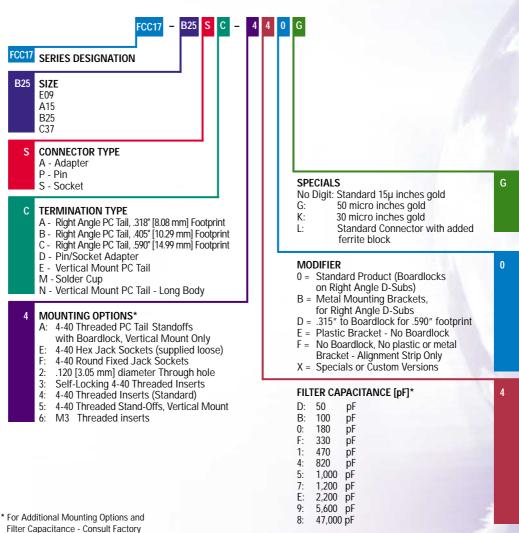
Specifications

Filter Characteristics: See Page 2 **Electrical Data:** See Page 2 Material and Finishes: See Page 3 **Environmental Data:** See Page 3 UL File #: E135615 CSA File #: LR68598



These products are protected by U.S. Patent # 4500159

Ordering Information – D-Sub

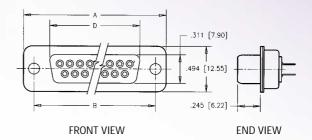


Filter Capacitance - Consult Factory

FILTERED D-SUB CONNECTORS

Pin

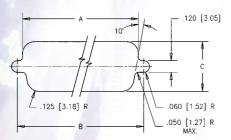
Socket



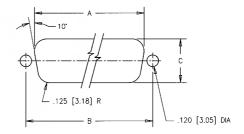
All Dimensions in Inches (mm)

Shell Size	Standard Number of Contacts	А	В	C (for pin connector)	D (for socket connector)
Е	9	1.213 [30.81]	.984 [24.99]	.666 [16.92]	.643 [16.33]
Α	15	1.541 [39.14]	1.312 [33.32]	.994 [25.25]	.971 [24.66]
В	25	2.088 [53.04]	1.852 [47.04]	1.534 [38.96]	1.511 [38.38]
С	37	2.729 [69.32]	2.500 [63.50]	2.182 [55.42]	2.159 [54.84]

Mounting Dimensions



FRONT MOUNTING CUT-OUT

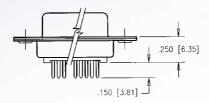


REAR MOUNTING CUT-OUT

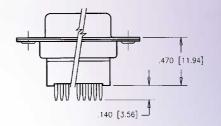
Size	Mounting	А	В	С
	Front	.875 [22.23]	.984 [24.99]	.512 [13.00]
9	Rear	.807 [20.50]	.984 [24.99]	.449 [11.40]
45	Front	1.200 [30.48]	1.312 [33.32]	.512 [13.00]
15	Rear	1.134 [28.80]	1.312 [33.32]	.449 [11.40]
25	Front	1.744 [44.30]	1.852 [47.04]	.512 [13.00]
25	Rear	1.673 [42.49]	1.852 [47.04]	.449 [11.40]
07	Front	2.389 [60.68]	2.500 [63.50]	.512 [13.00]
37	Rear	2.326 [59.08]	2.500 [63.50]	.449 [11.40]

FILTERED D-SUB CONNECTORS

Vertical Mount



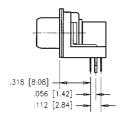
Termination Type E



Termination Type N

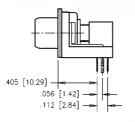
Right Angle, with Boardlocks & Plastic Mounting Brackets

.318" FOOTPRINT



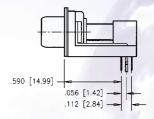
Termination Type A with Modifier option O

.405" FOOTPRINT



Termination Type B with Modifier option O

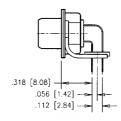
.590" FOOTPRINT



Termination Type C with Modifier option O

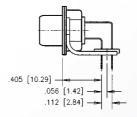
Right Angle, with Metal Mounting Brackets

.318" FOOTPRINT



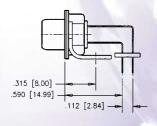
Termination Type A with Modifier option B

.405" FOOTPRINT



Termination Type B with Modifier option B

.590" FOOTPRINT

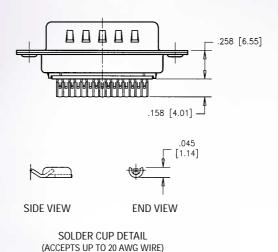


Termination Type C with Modifier option B

FILTERED D-SUB CONNECTORS

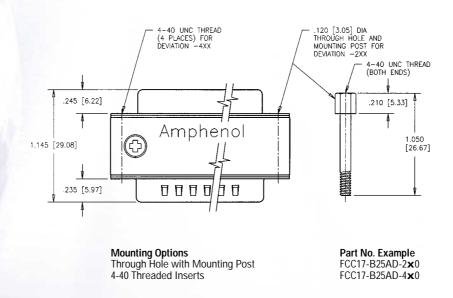
Solder Cup Termination

Termination type M



Pin-to-Socket Adapter

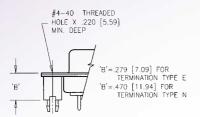
Termination type D



x = To complete the P/N, see page 5 to assign Filter Capacitance Code. For electrical and mechanical specifications, see pages 2 and 3.

FILTERED D-SUB CONNECTORS

Mounting Options (on Flange)Shown for Vertical Mount Connectors. Codes 2, 3, 4, 6, E and F also available on right angle connectors.



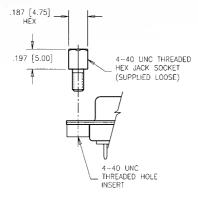
-Axx 4-40 Threaded Standoffs with Boardlocks (Vertical Mount only) Mounting code A



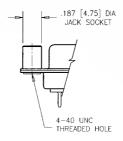
.120" (3.05 mm) diameter thru hole Mounting code 2



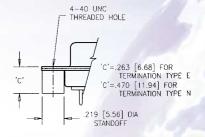
-3xx, 4xx and 6xx 4-40 Threaded Inserts - Self locking 4-40 Threaded inserts (standard) M3 threaded inserts Mounting codes 3, 4 and 6



-Exx 4-40 Hex Jack Sockets (supplied loose) Mounting code E

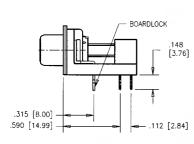


-F**xx** 4-40 Round fixed Jack Sockets Mounting code F

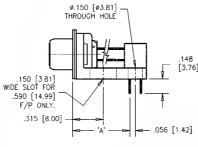


-5**x**x 4-40 Threaded Standoff (vertical mount only) Mounting code 5

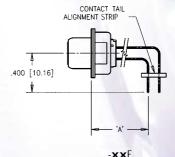
Bracket Options & Specials



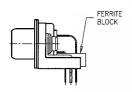
-**xx**D .315" to Boardlock for .590" Footprint only Modifier option D



-xxF Plastic bracket only Modifier option E



Alignment Strip Only No bracket or boardlocks Modifier option F



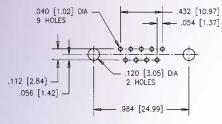
FERRITE Consult Factory for details

Termination	"A"
Type	Dimension
А	.318 (8.08)
В	.405 (10.29)
С	.590 (14.99)

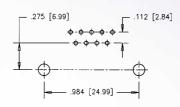
FILTERED D-SUB CONNECTORS

PCB Layout

9 SIZE

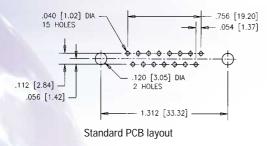


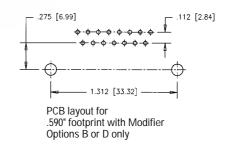
Standard PCB layout



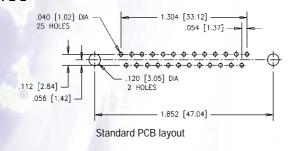
PCB layout for .590" footprint with Modifier Options B or D only

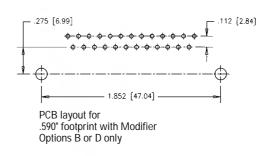
15 SIZE



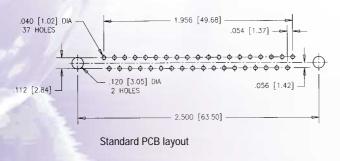


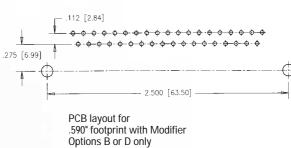
25 SIZE





37 SIZE





COMBO D-SUB FILTER CONNECTORS

Specifications

Filter Characteristics: See Page 2
Electrical Data: See Page 2
Material and Finishes: See Page 3
Environmental Data: See Page 3
UL File #: E135615
CSA File #: LR68598



These products are protected by U.S. Patent # 4500159

Ordering Information - Combo D-Sub



^{*} For Additional Mounting Options and Filter Capacitance - Consult Factory

COMBO D-SUB FILTER CONNECTORS

Insert Arrangements - Male Front View



Shell Size E Arrangement 2W2 No. of Signal Contacts 0 No. of Power Contacts 2

Consult factory for availability



Shell Size A Arrangement 3W3 No. of Signal Contacts 0 No. of Power Contacts 3

Keyed Version also available Consult factory for availability



Shell Size B Arrangement 5W5 No. of Signal Contacts 0 No. of Power Contacts 5

Keyed Version also available Consult factory for availability



Shell Size B Arrangement 9W4 No. of Signal Contacts 5 No. of Power Contacts 4

Consult factory for availability



Shell Size B Arrangement 13W3 No. of Signal Contacts 10 No. of Power Contacts 3

Consult factory for availability



Shell Size B Arrangement 17W2 No. of Signal Contacts 15 No. of Power Contacts 2

Consult factory for availability



Shell Size C Arrangement 27W2 No. of Signal Contacts 25 No. of Power Contacts 2

Consult factory for availability



Shell Size C Arrangement 8W8 No. of Signal Contacts 0 No. of Power Contacts 8

Consult factory for availability



Shell Size C Arrangement 21WA4 No. of Signal Contacts 17 No. of Power Contacts 4

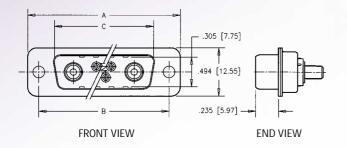
Consult factory for availability

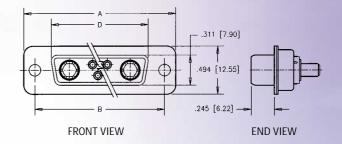
Consult Factory for Additional Arrangements and Polarization

COMBO D-SUB FILTER CONNECTORS

Pin

Socket

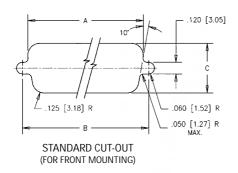


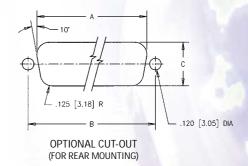


All Dimensions in Inches (mm)

Shell Size	А	В	C (for pin conn. only)	D (for socket conn. only)
Е	1.213 [30.81]	.984 [24.99]	.666 [16.92]	.643 [16.33]
Α	1.541 [39.14]	1.312 [33.32]	.994 [25.25]	.971 [24.66]
В	2.088 [53.04]	1.852 [47.04]	1.534 [38.96]	1.511 [38.38]
С	2.729 [69.32]	2.500 [63.50]	2.182 [55.42]	2.159 [54.84]

Mounting Dimensions

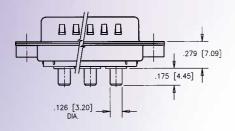




Size	Mounting	А	В	С
_	Front	.875 [22.23]	.984 [24.99]	.512 [13.00]
E	Rear	.807 [20.50]	.984 [24.99]	.449 [11.40]
^	Front	1.200 [30.48]	1.312 [33.32]	.512 [13.00]
Α	Rear	1.134 [28.80]	1.312 [33.32]	.449 [11.40]
D	Front	1.744 [44.30]	1.852 [47.04]	.512 [13.00]
В	Rear	1.673 [42.49]	1.852 [47.04]	.449 [11.40]
0	Front	2.389 [60.68]	2.500 [63.50]	.512 [13.00]
С	Rear	2.326 [59.08]	2.500 [63.50]	.449 [11.40]

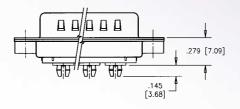
COMBO D-SUB FILTER CONNECTORS

Straight PCB



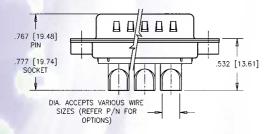
Termination type E

Press Fit



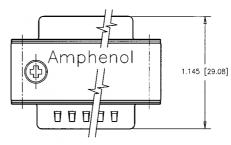
Termination type R

Solder Cup



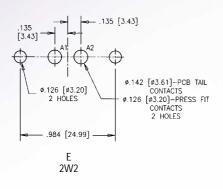
Termination types: K, L, M

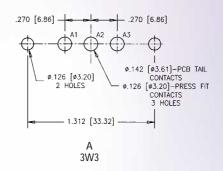
Adapter - Pin/Socket

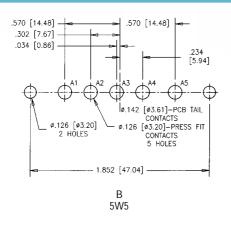


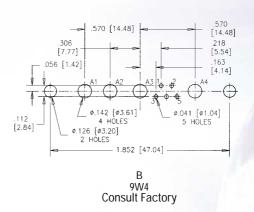
Termination type: D

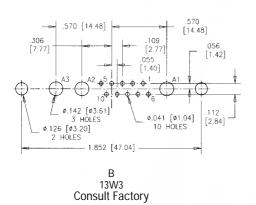
PCB Layout - Straight PCB & Press Fit

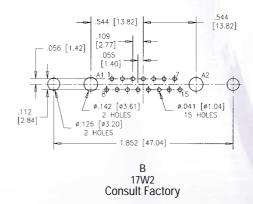






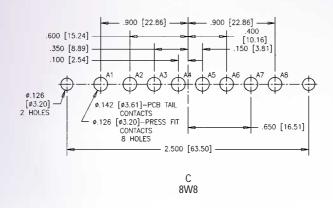


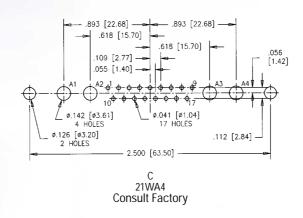


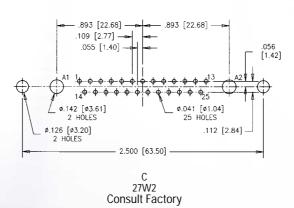


COMBO D-SUB FILTER CONNECTORS

PCB Layout - Straight PCB & Press Fit







FILTERED MICRO-RIBBON CONNECTORS

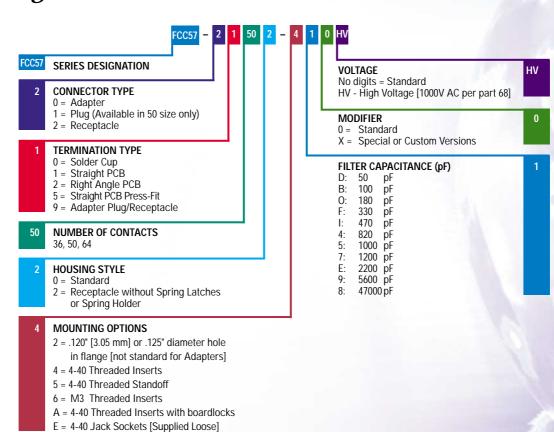
Specifications

Filter Characteristics: See Page 2
Electrical Data: See Page 2
Material and Finishes: See Page 3
Environmental Data: See Page 3
UL File #: E135615
CSA File #: LR68598



These products are protected by U.S. Patent # 4500159

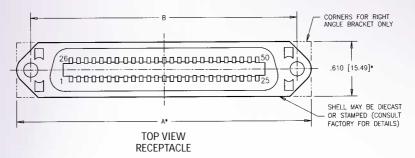
Ordering Information



High voltage capacitors available (contact factory)

FILTERED MICRO-RIBBON CONNECTORS

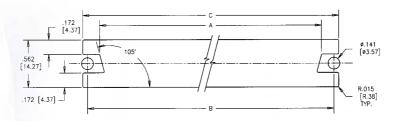
Receptacle - 36, 50, 64 Size



Connector Size	А	В
36	2.637 [66.98]	2.350 [59.69
50	3.260 [82.80]	2.947 [74.85]
64	3.835 [97.41]	3.542 [89.97]

Dimensions are different for DieCast Shells Consult Factory for details

Panel Mounting Dimensions - 36 / 50 / 64 size



REAR MOUNT
[.050 MAX. PANEL THICKNESS]

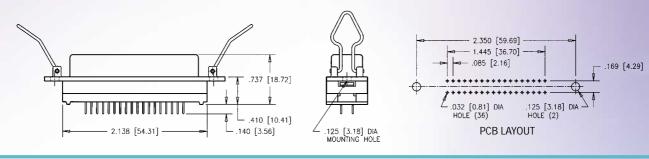
Connector Size	А	В	В
36	2.043 [71.05]	2.350 [59.69]	2.450 [85.20]
50	2.656 [92.36]	2.947 [74.85]	3.062 [106.48]
64	3.251 [113.06]	3.542 [89.97]	3.657 [127.18]

FCC57 Series 36 Size

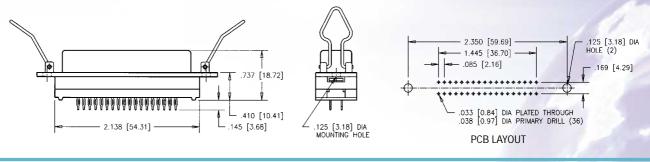
FILTERED MICRO-RIBBON CONNECTORS

Receptacle

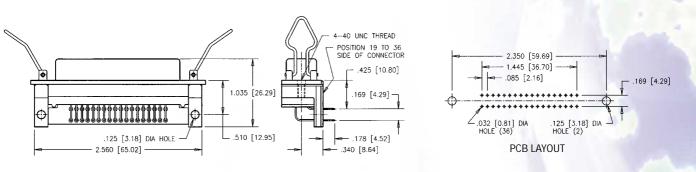
STRAIGHT PCB (FCC57 - 21360 - 1 x 0)



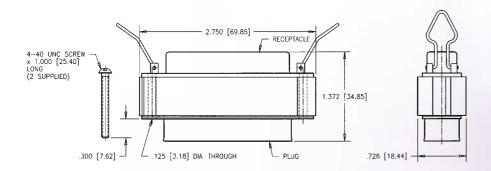
STRAIGHT PRESS-FIT (FCC57 - 25360 - 1 x 0)



RIGHT ANGLE PCB (FCC57 - 22360 - 1 x 0)



Adapter PLUG/RECEPTACLE (FCC57 - 09360 - 1 X 0)

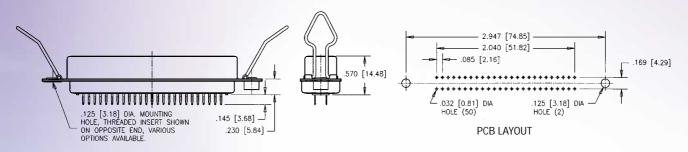


FCC57 Series 50 Size

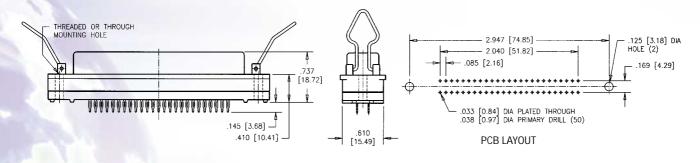
FILTERED MICRO-RIBBON CONNECTORS

Receptacle

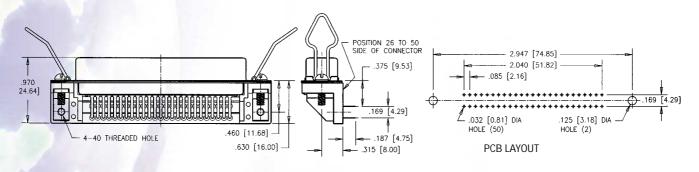
STRAIGHT PCB (FCC57 - 21500 - x x 0)



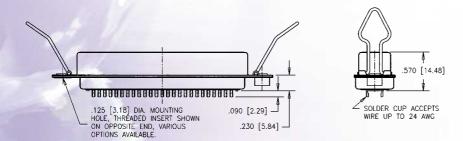
STRAIGHT PRESS-FIT (FCC57 - 25500 - x x 0)



RIGHT ANGLE PCB (FCC57 - 22500 - x x 0)



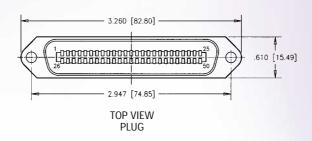
SOLDER CUP (FCC57 - 20500 - x x 0)



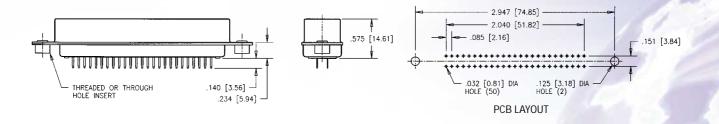
FCC57 Series 50 Size

FILTERED MICRO-RIBBON CONNECTORS

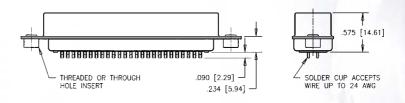
Plug



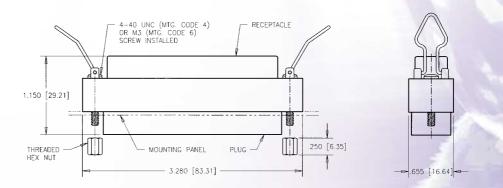
STRAIGHT PCB (FCC57 - 11500 - x x 0)



SOLDER CUP (FCC57 - $10500 - x \times 0$)



Adapter PLUG/RECEPTACLE (FCC57 - 09500 - x x 0)

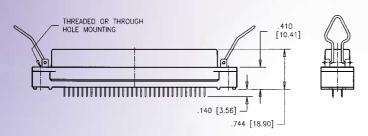


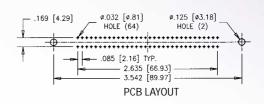
FCC57 Series 64 Size

FILTERED MICRO-RIBBON CONNECTORS

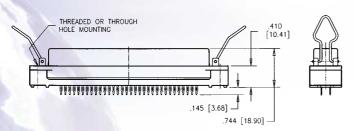
Receptacle

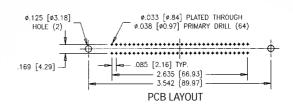
STRAIGHT PCB (FCC57 - 21640 - x 0)



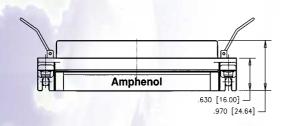


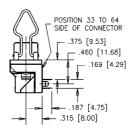
STRAIGHT PRESS-FIT (FCC57 - 25640 - x x 0)

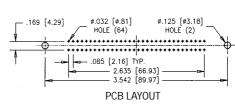




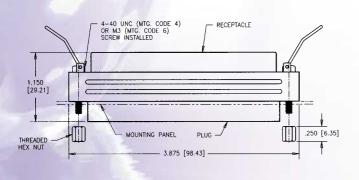
RIGHT ANGLE PCB (FCC57 - 22640 - x x 0)

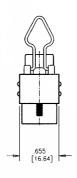






ADAPTER* (FCC57 - 09640 - x x 0)





*Consult Factory

CAPACITIVELY DECOUPLED RF CONNECTORS

Specifications

Mechanical Data:

Shell: Zinc Diecast or Brass; Nickel plated

Insulator Body: Thermoplastic Contact Insulator: Nylon or Teflon

Center Contact: Phosphor Bronze or Berylium Copper;

Gold plated (456-107S is silver plated)

UL File #: E135615 **CSA File #**: LR68598

Filter Performance:		
Capacitance		10,000 pF
Working Voltage		200 VDC (500AC Rear Mt)
DWV		600 VDC (1000VDC for Rear Mt)
Filter Insertion Loss (dB)	1 MHz	4
(per MIL-STD-220	5 MHz	16
@ 25°C and	10 MHz	18
no load)	30 MHz	25
	50 MHz	30
	1000 MHz	30

^{*} OTHER CAPACITANCE VALUES ARE AVAILABLE. CONSULT THE FACTORY FOR DETAILS

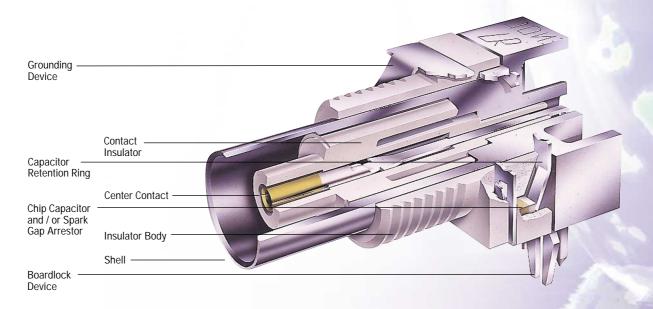


These products are protected by U.S.Patent # 4,772,221.

Amphenol's 456 Series of RF connectors provides capacitive decoupling between the connector body and the mounting panel. EMI on the coaxial shield is shunted to the chassis ground through capacitors, while not affecting the DC and power supply frequencies. This reduces ground loop problems and provides a mechanism to harmlessly dissipate ESD to chassis ground.

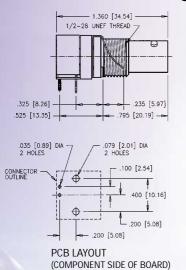
The RF parameters of these connectors are the same as their non-filtered counterparts. Filtering does not affect the signal contact, but only the shell-to-ground connection. Capacitively decoupled RF connectors are intermateable and inter-changeable with standard non-filtered versions.

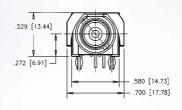
456 Series Construction

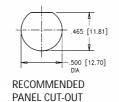


CAPACITIVELY DECOUPLED RF CONNECTORS

Rear Mount BNC, Right Angle, PCB

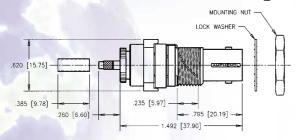






Туре	50 Ω	75 Ω
Filtered	456-117	456-717
Filtered (10,000pF), 1000V Spark Gap	456-117S	456-717S
Filtered (10,000pF), 1000V Spark Gap, 1 M Ω Resistor	456-117F	456-717F
Grounded	456-117G	456-717G
Non-Filtered. Panel Insulated (no ground spring)	456-117NF	456-717NF

Rear Mount BNC, Crimp, Cable Size RG179



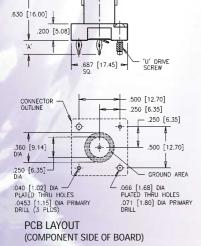


RECOMMENDED PANEL CUT-OUT

Туре	50 Ω	75 Ω
Filtered	456-208	456-218
Grounded	456-208G	456-218G

Note: Also available with Spark gap and / or resistor * Other Cable Sizes Available. Consult Factory.

Vertical Mount BNC, Press-Fit

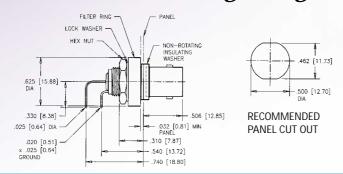


		Board		
Туре	50 Ω	75 Ω	Thickness	"A"
Filtered		456-107A	.125 (3.18)	.170 (4.32)
Non-Filtered		456-107ANF	.125 (3.18)	.170 (4.32)
Filtered		456-107B	.200 (5.08)	.255 (6.48)
Non-Filtered		456-107BNF	.200 (5.08)	.255 (6.48)

– Consult Factory for Part Number

CAPACITIVELY DECOUPLED RF CONNECTORS

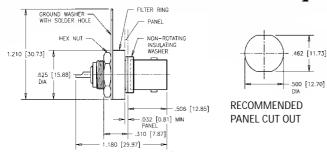
Front Mount BNC, Right Angle PCB



Туре	50 Ω	75 Ω
Filtered		456-107
Consult factory	for part number	

Front Mount BNC packaging consists of connector, insulating washer, filter ring, lock washer and hex nut.

Front Mount BNC, Solder-Cup



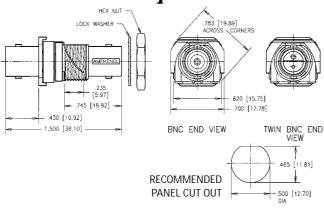
Туре	50 Ω	75 Ω
Filtered	456-107SG	456-107TG
		13.6

456-107S has silver plated contact (50 Ω)

* Overall part length 1.180 (29.97) for 456-107S 1.245 (31.62) for 456-107SG & 456-107TG

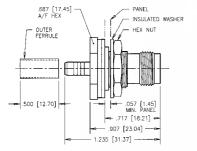
Front Mount BNC packaging consists of connector, insulating washer, filter ring, ground washer and hex nut

Jack-to-Jack Adapter



	Туре	50 Ω	75 Ω
BNC:	Filtered	456-915	456-917
Twin BNC:	Filtered	456	-920

TNC Bulkhead Jack, Crimp (RG58/U Cable)





RECOMMENDED PANEL CUT OUT

Туре	50 Ω	75 Ω
Filtered	456-102	
	ry for part number	1000

Packaging consists of connector, mounting hardware, panel insulator, crimp ferrule and heat shrink tubing.