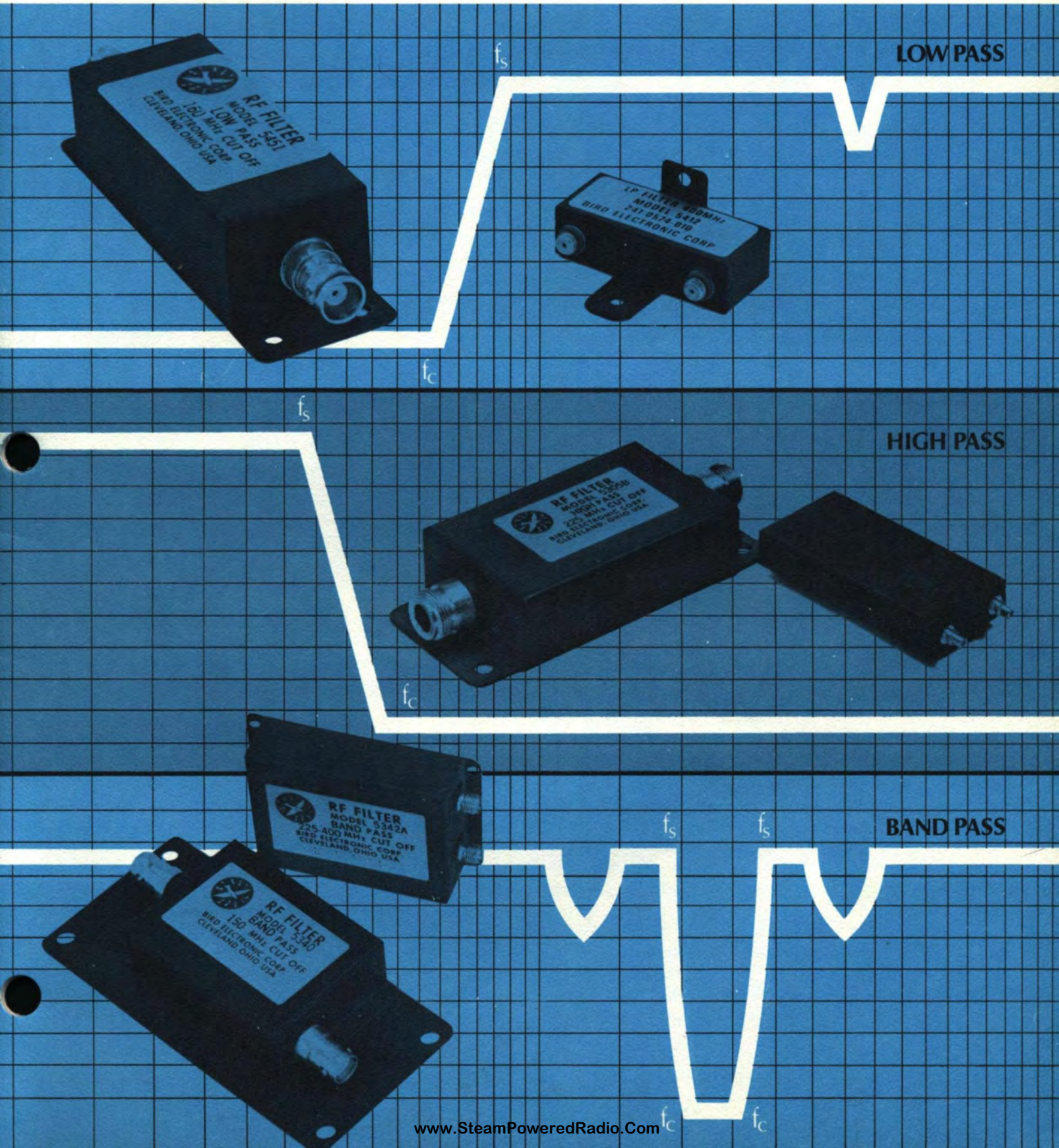
RF

BIRD

FILTER CATALOG

QUALITY COAXIAL RF FILTERS & FILTER/COUPLERS



Bird Electronic Corporation is recognized as a long-time industry leader in the design and manufacture of quality RF Filters and Filter-Couplers (and Filter-Couplers with switches). Our coaxial Filter designs range from 10 watt to 50 kilowatt units; low pass, band-pass and high pass models are available in discrete ranges from 2 MHz through 2700 MHz.

Proven design-concepts provide you with the highest practical stopband attenuation and minimum pass-band insertion loss, using either lumped element or distributed coaxial techniques. There are many standard sizes and shapes of Filters to fit your available equipment space – a wide choice of RF connector and connector/cable assemblies is also available in "already-designed" Filters.

The Filter tables in this catalog list salient electrical characteristics and mechanical specifications of approximately 220 Bird Filters and Filter-Couplers. These are representative of over 400 actual designs available; if none exactly suit your production quantity application, we can modify or design and add another.

Where your need is for a small quantity, you will probably find a Filter in the listing which satisfies your basic specification – many units are available from stock, small quantity builds generally take 90 days.

Above we've displayed an assortment of our units to give you an idea of the many variations available – covering the diverse needs of the RF communications industry. Many of our designs are used in high reliability military programs (see back cover) and thousands of these units are presently in service. Many models are subjected to stringent environmental and qualification tests. We hope that you will call on us whenever your program calls for a good and reliable RF Filter. Our sales engineers and designers are at your service to assist you in the "bread-boarding" phases of your program; our Production Department is organized to provide you with OEM quantities of Filters with a minimum of planning lead-time.

Catalog No. FC-2/9

Litho in U.S.A.

BIRD Coaxial RF Filters*

50 ohms nominal

LP = LOW PASS HP = HIGH PASS BP = BAND PASS M = MALE FEM = FEMALE

Model	Type	PASSBAND				STOP BAND		MECHANICAL SPECIFICATIONS	
		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5319C	LP	**0.7-1**	***1000***	0.5	1.4	2-300	60	11½ x 5 x 3	Fem N
5319D	LP	**1.5-2**	***1000***	0.5	1.4	4-300	60	11½ x 5 x 3	Fem N
5319H	LP	**7-10**	***1000***	0.5	1.4	20-300	60	11½ x 5 x 3	Fem N
5466	LP	**1-25**	***10***	1.0	1.3	30 31-100 100-850	40 60 40	4½ x 1 15/64 x 1	Fem BNC
5467	LP	**2-30**	***75***	0.5	1.35	35 40 100-1000	5 30 60	4½ x 1 15/64 x 1	Fem BNC
5315	LP	**2-25** **26-30**	***1000*** ***750***	0.5	1.3	35-37 37-40 40-1000	25 40 60	10 3/16 x 4 x 2	Fem HN
5315A	LP	**2-25** **26-30**	***1000*** ***750***	0.5	1.3	35-37 37-40 40-1000	25 40 60	10 3/16 x 4 x 2	Fem N
5315B	LP	**2-25** **26-30**	***1000*** ***750***	0.5	1.3	35-37 37-40 40-1000	25 40 60	10 3/16 x 4 x 2	Fem C
5315D	LP	**2-25** **26-30**	***1000*** ***750***	0.5	1.3	35-37 37-40 40-1000	25 40 60	10 3/16 x 4 x 2	Fem UHF
5317	LP	**2-32** **33-35**	***1000*** ***750***	0.5	1.4	40 43 46-1000	10 35 60	10 3/16 x 4 x 2	Fem HN
5319	LP	**2-30**	***3kW***	0.5	1.4	40-300	60	14 3/8 x 5 11/16 x 2 7/8	Fem HN
5320	LP	**2-30**	***3kW***	0.5	1.4	40-300	60	14 3/8 x 5 11/16 x 2 7/8	Fem LC
5320A	LP	**2-30**	***3kW***	0.5	1.4	40-300	60	13 3/4 x 5 11/16 x 2 7/8	1 5/8" EIA Flg.
5322	LP	**2-30**	***3kW***	0.4	1.5	40-300	60	9 1/8 x 5 11/16 x 2 13/16	Fem LC
5322A	LP	**2-30**	***3kW***	0.4	1.5	40-300	40	9 1/8 x 5 11/16 x 2 13/16	Fem N
5400	LP	**3-30**	***100***	0.25	1.5	50 60 75-1000	30 40 50	2 3/8 x 25/32 x 25/32	RG-58/U & Solder Term

**Filters in this summary of representative designs are arranged in ascending order of cut-off frequencies and RF power levels for easy selection.*

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		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5323	LP	**2-25** **26-30**	***7kW*** ***5kW***	0.5	1.4	40-250	60	$19\frac{1}{16}$ x $5\frac{11}{16}$ x $2\frac{13}{16}$	$1\frac{5}{8}$" EIA Flg.
5317A	LP	**2-30** **31-35**	***1000*** ***750***	0.5	1.4	40 43 46-1000	10 35 60	$10\frac{3}{16}$ x 4 x 2	Fem N
5317B	LP	**2-32** **32-35**	***1000*** ***750***	0.5	1.4	40 43 46-1000	10 35 60	$10\frac{3}{16}$ x 4 x 2	Fem C
5524	LP	**30-48** **30-76**	***10*** ***10***	0.8 0.8	1.3 1.3	60-500 96-500	60 60	Dual Filters $1\frac{29}{32}$ x $2\frac{1}{2}$ x $\frac{15}{32}$	Solder Terminals
5525	LP	**30-48**	***25***	0.8	1.3	60-500	60	$2\frac{57}{64}$ x 1 x $\frac{15}{32}$	Right Angle MB
5526	LP	**30-76**	***25***	0.8	1.3	96-500	60	$2\frac{57}{64}$ x 1 x $\frac{15}{32}$	Fem MB
5528	LP	**30-76**	***25***	0.8	1.3	96-500	60	$2\frac{1}{2}$ x 1 x $\frac{15}{32}$	Solder Terminals
5529	LP	**30-76**	***25***	0.5	1.3	116-135 135-400	60 70	$4\frac{3}{4}$ x $2\frac{3}{8}$ x $\frac{3}{4}$	Fem BNC
5463E	LP	**30-76**	***50***	0.4	1.4	96-500 160-260	60 100	$5\frac{3}{8}$ x $2\frac{1}{2}$ x $\frac{15}{16}$	Fem BNC
5359B	BP	**30-76**	***50***	0.75	1.5	0.5-22 96-1000	60 60	$3\frac{7}{8}$ x $2\frac{5}{8}$ x 1	Fem N
5465	LP	**30-76**	***75***	0.8	1.3	96-2000	60	$4\frac{1}{2}$ x $1\frac{15}{64}$ x 1	Fem BNC
5463B	LP	**30-76**	***100***	0.5	1.3	96 100-500	30 60	$4\frac{5}{8}$ x $2\frac{1}{2}$ x $\frac{15}{64}$	Fem BNC
5463D	LP	**30-76**	***100***	0.5	1.3	96-500	60	$4\frac{5}{8}$ x $2\frac{1}{2}$ x $\frac{15}{16}$	Fem BNC
5378	BP	**30-76**	***20***	1.0	1.5	10-25 98-1000	40 60	6 x $2\frac{7}{32}$ x $\frac{59}{64}$	Fem TNC
5544	HP	**30-88**	***30***	0.9	1.4	1-20 20-24	60 40	$2\frac{1}{2}$ x $1\frac{3}{8}$ x $\frac{17}{32}$	M SMB
5468	LP	**20-100**	***10***	0.5	1.4	125-1500	60	$4\frac{1}{2}$ x $1\frac{15}{64}$ x 1	Fem TNC

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5131	BP	**45-105**	***15***	1.0	1.6	33.7-39.7 36.7 120-175 175-400 400-1000	25 30 20 45 40	6 x 2¾ x 1	Fem BNC
5482	LP	**88-108**	***3kW***	0.20	1.30	176-1000	55	10 x 5 x 3	1⅝" EIA Flg.
3111C	LP	**88-108**	***5kW***	0.15	1.15	176-1000	55	14½ x 5 x 3	1⅝" Unfl.
3111H	LP	**88-108**	***5kW***	0.15	1.15	176-1000	55	15⅞ x 5 x 3	1⅝" EIA Flg.
5178	LP	**88-108**	***15kW***	0.15	1.25	176-1000 695-720 505-520	>60 <60 <60	56¾ x 4½ Dia.	3⅛" EIA Flg.
5177	LP	**88-108**	***30kW***	0.10	1.15	176-1000 525-605	60 <60	56¾" x 7½ Dia.	3⅛" EIA Flg.
5179	LP	**88-108**	***50kW***	0.10	1.15	176-1000 525-605	60 <60	56¾ x 7½ Dia.	3⅛" EIA Flg.
5370	BP	**45-110**	***10***	1.0	1.5	10-30 130-600	60 60	6⅛ x 3 5/32 x 59/64	Fem BNC RG-141 A/U
5443	LP	**80-140**	***100***	0.4	1.3	170-2000	60	3 29/32 x 1¼ x 1	Fem BNC M-BNC
5329	LP	**85-115**	***500***	0.3	1.4	165-500	40	8 x 4 x 2	Fem N
5410	LP	**117-136**	***20***	0.3	1.3	234-272 272-450 450-1000	45 40 50	3 x 43/64 x 15/32	Solder Term
5443A	LP	**80-140**	***100***	0.4	1.3	170-2000	60	3 29/32 x 1¼ x 1	Fem BNC
5340A	BP	**118-150**	***25***	0.5	1.5	10-60 60-76 195-1000	80 60 35	4¾ x 2⅜ x ¾	Fem BNC
5290	LP	**100-160**	***150***	0.4	1.4	200 225-2000	50 90	7 3/16 x 1½ x 1 13/16	DIC-2532 SC
5481	LP	**118-160**	***3kW***	0.2	1.3	236-1000	55	10¾ x 5 x 3	Fem LC

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		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5298	LP	**100-165**	***100***	0.5	1.5	215-2000	40	$5\frac{37}{64}$ x $1\frac{3}{8}$ x 1	Fem N
5287	LP	**148-174**	***100***	0.25	1.3	300-2000	40	4 x $1\frac{1}{4}$ x 1	M-N Fem N
5371	BP	**85-190**	***10***	1.0	1.5	10-60 215-600	25 60	$6\frac{1}{8}$ x $3\frac{5}{32}$ x $\frac{59}{64}$	Fem BNC RG-141 A/U
5110	BP	**85-190**	***15***	0.75	1.7	55-65 60 250-700 700-up	15 20 45 25	6 x $2\frac{3}{4}$ x 1	Fem BNC
5111	BP	**85-190**	***15***	0.75	1.7	55-65 60 250-700 700-up	15 20 45 25	6 x $2\frac{3}{4}$ x 1	Fem BNC
5376A	BP	**116-152**	***40***	0.4	1.4	10-60 220-4000	60 60	$5\frac{31}{64}$ x $1\frac{17}{32}$ x $2\frac{1}{8}$	Fem SMA
5480	LP	**108-148**	***1000***	0.2	1.3	216-1000	60	11 x 5 x 3	Fem LC
5376	BP	**116-152**	***40***	0.4	1.4	10-60 220-400	60 60	$5\frac{31}{64}$ x $1\frac{17}{32}$ x $2\frac{1}{8}$	Fem N
5451	LP	**118-152**	***100***	0.3	1.3	237-2000	60	4 x $1\frac{15}{64}$ x 1	Fem BNC
5451A	LP	**118-152**	***100***	0.3	1.3	232-2000	60	4 x $1\frac{15}{64}$ x 1	Fem BNC
5451B	LP	**118-152**	***100***	0.3	1.3	232-2000	60	4 x $1\frac{15}{64}$ x 1	M SMC
5451C	LP	**118-152**	***100***	0.3	1.3	232-2000	60	4 x $1\frac{15}{64}$ x 1	Fem BNC
5451D	LP	**118-152**	***100***	0.3	1.3	232-2000	60	$3\frac{1}{2}$ x $1\frac{15}{64}$ x 1	Fem BNC
5451E	LP	**118-152**	***100***	0.3	1.3	232-2000	60	$3\frac{1}{2}$ x $1\frac{15}{64}$ x 1	Fem BNC Fem N
5451H	LP	**118-152**	***100***	0.5	1.5	236-1000	40	$3\frac{1}{2}$ x $1\frac{15}{64}$ x 1	Fem BNC
5451J	LP	**118-152**	***100***	0.3	1.3	232-2000	60	4 x $1\frac{15}{64}$ x 1	Fem N

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		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5451L	LP	**118-152**	***100***	0.3	1.3	232-2000	60	$3\frac{7}{8} \times 1\frac{15}{64} \times 1$	QC
540CL	LP	**103-156**	***60***	0.5	1.35	206 210 220-260 260-500	70 75 80 65	$4\frac{1}{2} \times 1\frac{15}{64} \times 1$	Fem BNC
5272	LP	**116-160**	***45***	0.4	1.20	232-2000	45	$3 \times 1\frac{15}{64} \times 1$	Cable M BNC #3/8-32 THD
5273	LP	**116-160**	***200***	0.4	1.20	232-2000	45	$3 \times 1\frac{15}{64} \times 1$	Cable M BNC #3/8-32 THD
5368B	BP	**226-238**	***25***	0.5	1.3	10-80 80-178 113-119 167.5-178.5 282.5-297.5 282-440 440-4000	60 40 45 45 45 40 60	$3\frac{3}{4} \times \frac{3}{4} \times 1$	FEM TNC & Solder Term
5248	LP	**215-260**	***100***	0.3	1.3	400 425-800 800-2000	40 60 80	$3 \times 1\frac{1}{4} \times 1$	Fem BNC Fem N
5424	LP	**200-270**	***25***	0.3	1.3	360-650 650-5000	60 80	$2\frac{27}{32} \times \frac{43}{64} \times \frac{15}{32}$	M SMB
5447	LP	**225-300**	***100***	0.25	1.3	450-2000	60	$4 \times 1\frac{15}{64} \times 1$	Fem BNC
5447A	LP	**225-300**	***100***	0.25	1.3	450-2000	60	$4 \times 1\frac{15}{64} \times 1$	Fem BNC
5120	LP	**150-330**	***15***	1.0	1.8	425-800 800-up	45 25	$6 \times 2\frac{3}{4} \times 1$	Fem BNC
5121	LP	**150-330**	***15***	1.0	1.8	425-800 800-up	45 25	$6 \times 2\frac{3}{4} \times 1$	Fem BNC
5420	LP	**200-340**	***25***	0.4	1.5	430-1100 1100-5000	40 60	$2\frac{1}{4} \times \frac{15}{32} \times \frac{43}{64}$	M SMB
5236	LP	**200-400**	***50***	0.5	1.3	550-900 900-1300 1300-1600	60 100 80	$4\frac{1}{64} \times 1\frac{3}{8} \times 1$	Fem BSM Special
5238A	LP	**200-400**	***50***	0.5	1.3	550 570-800 800-1300	50 70 100	$4\frac{1}{64} \times 1\frac{3}{8} \times 1$	Fem BNC
5500	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$4\frac{1}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Fem Micro-dot, RG142

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		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5250	LP	**200-400**	***50***	0.5	1.4	450 500 600-1400	20 48 60	$4\frac{7}{16} \times 1\frac{17}{64} \times \frac{3}{4}$	Fem BNC Male BNC
5251	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$4\frac{1}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Fem MB
5253	LP	**200-400**	***50***	0.5	1.4	450 500 600-1400	20 48 60	$3\frac{13}{16} \times 1\frac{17}{64} \times 1\frac{3}{8}$	Fem MB
5255	LP	**220-400**	***50***	0.25	1.25	450 600-700 700-1470 1470-1670 1670-2000	5 40 60 35 60	$3\frac{35}{64} \times 1\frac{1}{4} \times \frac{3}{4}$	Cable, M-BNC Fem BNC
5256	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$3\frac{3}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Cable w/conn. Microdot 51-258
5256A	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$3\frac{3}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Cable with M-N Microdot 51-258
5257	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$4\frac{1}{8} \times 1\frac{17}{16} \times \frac{3}{4}$	Fem MB
5247	LP	**200-400**	***50***	0.4	1.38	450 520 900-1300	17 58 80	$6\frac{1}{4} \times 1\frac{7}{16} \times 1$	Mtg. Plate Cable Assy. MB Conn.
5256B	LP	**200-400**	***50***	0.3	1.38	520-900 900-1300 1300-1480	58 80 58	$3\frac{3}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Right Angle Fem SMA
5259	LP	**220-400**	***50***	0.25	1.25	450 600-700 700-1470	5 40 60	$3\frac{35}{64} \times 1\frac{1}{4} \times \frac{3}{4}$	Fem BNC Cable, M-BNC
5246	LP	**200-400**	***50***	0.4	1.38	450 520 900-1300 1300-1480 1480-1650 1650-2000	17 58 80 58 30 60	$6\frac{1}{4} \times 1\frac{7}{16} \times 1$	Cable, MB Cable - Unserv.
5241	LP	**200-400**	***50***	0.5	1.4	450 500 600-1400	20 48 60	$3\frac{3}{8} \times 1\frac{21}{32} \times \frac{3}{4}$	Fem MB Cable Assy.
5242	LP	**200-400**	***50***	0.3	1.38	450-520 520-900 900-1300	12 58 80	$3\frac{3}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	M-N Fem N
5244	LP	**200-400**	***75***	0.5	1.4	450 500 600-1400 1400-1450 1650-2000	20 48 60 30 60	$3\frac{3}{8} \times 1\frac{17}{64} \times \frac{3}{4}$	Right Angle BSM Conn.

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5261	LP	**220-400**	***200***	0.5	1.35	450 600-700 700-1250 1250-2000	20 50 80 40	$5\frac{3}{8}$ x $2^{10}H^{16}$ x $1\frac{5}{32}$	Fem BNC
5261A	LP	**220-400**	***200***	0.5	1.35	450 600-700 700-1250	20 50 80	$5\frac{3}{8}$ x $2\frac{1}{16}$ x $1\frac{5}{32}$	Fem BNC
5267	LP	**200-400**	***1500***	0.5	1.50	450 480-1700	58 80	$7\frac{1}{2}$ x $4\frac{1}{4}$ x $2\frac{3}{4}$	Fem HN QC
5199C	LP	**200-400**	***10kW***	0.25	1.3	450 480-800 800-1300 1700	40 70 90 80	$32\frac{33}{64}$ x 6 x 6	$3\frac{1}{8}$ EIA Flg.
5412	LP	**225-400**	***2.5***	0.35	1.3	450 500-1200 1200-2000	18 40 60	$1\frac{5}{8}$ x $1\frac{13}{64}$ x $\frac{25}{32}$	Microdot Screw-on
5416	LP	**225-400**	***10***	0.8	1.4	450 500-625 480-5000	38 50 60	$2\frac{1}{2}$ x $\frac{43}{64}$ x $\frac{15}{32}$	M SMB RG-188
5364	BP	**225-400**	***10***	0.3	1.38	10-100 175 450 550-800 800-4000	30 20 10 58 80	$3\frac{7}{8}$ x $1\frac{1}{8}$ x $\frac{3}{4}$	Fem MB M SMC
5282	LP	**225-400**	***10***	0.7	1.4	450-2000	40	$2\frac{1}{2}$ x $\frac{37}{64}$ x $\frac{17}{64}$	M SMC
5423	LP	**225-400**	***10***	1.0	1.5	450 490-1000 1000-5000	38 60 80	$3\frac{1}{2}$ x $\frac{43}{64}$ x $\frac{15}{32}$	Fem BNC Fem SMC
5307	HP	**225-400**	***10***	0.5	1.4	200 10-170	5 40	$2\frac{3}{4}$ x $1\frac{3}{8}$ x $\frac{1}{2}$	M SMB
5420B	LP	**200-340**	***25***	0.4	1.5	430-5000	40	$2\frac{3}{4}$ x $\frac{43}{64}$ x $\frac{15}{32}$	Fem OSSM
5421	LP	**225-400**	***25***	0.5	1.3	450 490-1200 1200-5000	15 40 60	$\frac{3}{4}$ x $\frac{43}{64}$ x $\frac{15}{32}$	M SMB & Cable with Fem SMC
5421D	LP	**225-400**	***25***	0.5	1.3	450 490-1200 1200-5000	15 40 60	$2\frac{3}{4}$ x $\frac{43}{64}$ x $\frac{15}{32}$	M SMC & RG-188 with Fem SMC
5421E	LP	**225-400**	***25***	0.5	1.3	450 490-5000	15 40	$2\frac{3}{4}$ x $\frac{43}{64}$ x $\frac{15}{32}$	Fem OSSM
5422	LP	**225-400**	***25***	0.35	1.3	450 490-1200 1200-5000	20 40 60	$2\frac{7}{32}$ x $\frac{43}{64}$ x $\frac{15}{32}$	M SMC and Cable

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Model	Type	PASSBAND				STOP BAND		MECHANICAL SPECIFICATIONS	
		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5270	LP	**225-400**	***25***	0.3	1.5	550-1100	30	$4\frac{13}{16} \times 2\frac{15}{32} \times 1\frac{53}{64}$	Fem BNC
5284	LP	**225-400**	***25***	0.7	1.4	450 460-2000	50 60	$3 \times 1\frac{7}{64} \times \frac{9}{16}$	Fem SMA
5503	LP	**225-400**	***25***	0.75	1.4	450-1000	30	$1\frac{5}{8} \times \frac{63}{64} \times \frac{15}{32}$	M SMB & Cable with Fem SMB
5406	LP	**225-400**	***25***	0.2	1.3	670-1200	60	$3\frac{1}{2} \times \frac{43}{64} \times \frac{15}{32}$	M SMC
5425	LP	**225-400**	***25***	0.85	1.5	700-5000	60	$2\frac{27}{32} \times \frac{15}{32} \times \frac{43}{64}$	One Ft. Cables
5547B	HP	**225-400**	***25***	0.5	1.5	10-150	70	$2\frac{7}{8} \times 1\frac{3}{8} \times \frac{3}{4}$	Fem BNC
5610	BP	**Tunable 225-400**	***25***	3.0	1.3	±5 MHz of f_0 ½ f_0 to 2 f_0	32 60	$6\frac{3}{4} \times 4 \times 1\frac{15}{32}$	M SMC
5543	HP	**225-400**	***30***	0.4	1.4	10-160	80	$2\frac{27}{32} \times 1\frac{3}{8} \times \frac{17}{32}$	M SMB
5274	LP	**225-400**	***45***	0.5	1.30	450-460 460-2000	40 50	$3 \times 1\frac{5}{64} \times 1$	Cable M-BNC #$\frac{3}{8}$-32 THD
5268A	LP	**225-400**	***50***	0.8	1.5	450-2000	60	$4 \times 1\frac{3}{4} \times \frac{15}{16}$	Fem N
5268B	LP	**225-400**	***50***	0.8	1.5	450-2000	60	$4 \times 1\frac{3}{4} \times 1$	Fem SMA
5268G	LP	**225-400**	***60***	0.8	1.5	450-2000	60	$4 \times 1\frac{3}{4} \times \frac{15}{16}$	Fem SMA
5452	LP	**225-400**	***75***	0.6	1.4	450-4000	40	$5 \times 1\frac{11}{32} \times \frac{59}{64}$	M-BNC
5453	LP	**225-400**	***75***	0.65	1.4	450-4000	40	$5 \times 1\frac{11}{32} \times \frac{17}{32}$	Fem N Fem BNC
5457	LP	**225-400**	***100***	0.65	1.4	450 460-4000	38 40	$4\frac{1}{2} \times 1\frac{11}{32} \times \frac{59}{64}$	M-BNC Fem BNC
5269	LP	**225-400**	***100***	0.4	1.4	450-2000	40	$4\frac{1}{4} \times 1\frac{15}{16} \times 1$	Rt Angle Fem BNC-MBNC

BIRD Coaxial RF Filters

50 ohms nominal

LP = LOW PASS HP = HIGH PASS BP = BAND PASS M = MALE FEM = FEMALE

Model	Type	PASSBAND				STOP BAND		MECHANICAL SPECIFICATIONS	
		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
560DL	LP	**225-400**	***100***	0.4	1.4	450-2000	40	$3\frac{7}{8} \times 1\frac{59}{64} \times 1$	Right Angle Fem SMA
5305	HP	**225-400**	***100***	0.4	1.4	10-160	80	$4\frac{9}{16} \times 2 \times 1$	Fem TNC
5305A	HP	**225-400**	***100***	0.4	1.4	10-160	80	$4\frac{9}{16} \times 2 \times 1$	Fem BNC
5305B	HP	**225-400**	***100***	0.4	1.4	10-160	80	$4\frac{9}{16} \times 2 \times 1$	Fem N
5275A	LP	**225-400**	***150***	0.6	1.35	450-1000	50	$3\frac{7}{8} \times 1\frac{59}{64} \times 1$	Fem SMA
5380	LP	**225-400**	***150***	0.25	1.35	500 550 570-2800 2800-5000	12 50 60 30	$5\frac{1}{64} \times 1\frac{3}{8} \times 1$	Fem N
5235	LP	**225-400**	***150***	0.35	1.4	550-950 950-1225	60 90	$5\frac{45}{64} \times 1 \times 1\frac{3}{8}$	Spec. SC
5275	LP	**225-400**	***200***	0.4	1.3	450-460 460-2000	40 50	$4\frac{15}{64} \times 1\frac{59}{64} \times 1$	M-BNC #$\frac{3}{8}$-32 THD
5265	LP	**225-400**	***200***	0.4	1.5	450-1750	60	$7\frac{1}{4} \times 2\frac{5}{16} \times 3\frac{3}{4}$	M-N Fem N
5223	LP	**225-400**	***200***	0.5	1.35	450 500 600-1200 1200-2000	5 25 55 30	$4\frac{17}{64} \times 5\frac{7}{64} \times 1\frac{5}{32}$	Fem N
5200	LP	**225-400**	***200***	0.5	1.35	450 500 600-700 700-1200 1200-2000	5 25 55 60 30	$4\frac{15}{16} \times 6\frac{3}{8} \times 1\frac{3}{16}$	Fem N
5210	LP	**225-400**	***200***	0.3	1.3	470 520	5 25	$4\frac{15}{16} \times 6\frac{3}{8} \times 1\frac{3}{16}$	Fem N
5220	LP	**225-400**	***200***	0.5	1.35	450 500 600-1100	5 25 55	$5\frac{1}{32} \times 5\frac{3}{32} \times 1\frac{3}{16}$	Fem N M-N
5262	LP	**225-400**	***200***	0.5	1.4	450 520-2000	30 80	$5\frac{3}{8} \times 2\frac{1}{16} \times 1\frac{5}{32}$	Fem N
5262A	LP	**225-400**	***200***	0.5	1.4	450 520-2000	30 80	$5\frac{3}{8} \times 2\frac{1}{16} \times 1\frac{5}{32}$	Fem SMA

BIRD Coaxial RF Filters

50 ohms nominal

LP = LOW PASS HP = HIGH PASS BP = BAND PASS M = MALE FEM = FEMALE

Model	Type	PASSBAND				STOP BAND		MECHANICAL SPECIFICATIONS	
		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5262B	LP	**225-400**	***200***	0.5	1.4	450 520-2000	30 80	$5\frac{3}{8}$ x $2\frac{1}{16}$ x $1\frac{5}{32}$	M SMB
5222	LP	**225-400**	***250***	0.5	1.35	450 500 600-1200 1200-2000	5 25 55 30	$5\frac{1}{32}$ x $5\frac{3}{16}$ x $\frac{31}{32}$	Fem N M-N
5263	LP	**225-400**	***800***	0.5	1.5	450 525-675 675-1000 1000-1400 1400-1600	30 60 80 40 80	6 x 3 x $1\frac{13}{16}$	Rt. Angle Fem N and Fem N
5264	LP	**225-400**	***1000***	0.5	1.5	450 500-600 600-1000 1000-1300 1300-1600	30 60 80 40 80	$6\frac{1}{32}$ x $3\frac{1}{32}$ x $1\frac{53}{64}$	QC
5342A	BP	**225-400**	***10***	0.5	1.5	450-500 10-100 500-4000	18 40 40	3 x $1\frac{7}{8}$ x $\frac{3}{4}$	Fem SMA
5448	LP	**300-400**	***100***	0.25	1.3	600-2000	60	4 x $1\frac{15}{64}$ x 1	Fem BNC
5448A	LP	**300-400**	***100***	0.25	1.3	600-2000	60	4 x $1\frac{15}{64}$ x 1	Fem BNC
5448B	LP	**300-400**	***100***	0.25	1.3	450 540 600-2000	8 40 60	4 x $1\frac{15}{64}$ x 1	Fem N
5309	HP	**310-400**	***10***	1.0	1.5	10-270	40	$2\frac{1}{2}$ x $1\frac{5}{8}$ x $\frac{1}{2}$	M SMB
5432	LP	**220-405**	***20***	0.25	1.3	660-4050	35	$2\frac{27}{32}$ x $\frac{43}{64}$ x $\frac{5}{8}$	Fem BNC
5449	LP	**220-405**	***40***	0.75	1.4	450-4050	43	5 x $1\frac{11}{32}$ x $1\frac{5}{16}$	M-BNC
5361	BP	**406-550**	***100***	0.4	1.5	10-310 609 680-900	50 15 50	$4\frac{7}{16}$ x $1\frac{17}{32}$ x $2\frac{1}{8}$	Fem N
5361A	BP	**406-550**	***100***	0.4	1.5	10-310 609 680-900	50 15 50	$4\frac{7}{16}$ x $1\frac{17}{32}$ x $2\frac{1}{8}$	Fem N
5191	LP	**200-520**	***1000***	0.5	1.5	1100-2750	60	$11\frac{15}{16}$ x $2\frac{3}{8}$ Dia.	M LC Fem LC

BIRD Coaxial RF Filters

50 ohms nominal

LP = LOW PASS HP = HIGH PASS BP = BAND PASS M = MALE FEM = FEMALE

Model	Type	PASSBAND				STOP BAND		MECHANICAL SPECIFICATIONS	
		Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)	Nominal Dimensions (In Inches)	RF Connectors
5150	LP	**295-610**	***50***	0.5	1.8	750-1600	50	$4\frac{5}{16}$ x $5\frac{1}{4}$ x $1\frac{5}{32}$	Fem BNC
5433	LP	**395-705**	***20***	0.25	1.3	1185-7050	35	$2\frac{27}{32}$ x $\frac{43}{64}$ x $\frac{5}{8}$	Fem BNC
5450	LP	**395-705**	***40***	0.7	1.4	790-4500 4501-5000 5501-7051	45 35 20	6 x $1\frac{5}{16}$ x $1\frac{11}{32}$	Fem BNC Cable M-BNC
5186	LP	**695-1000**	***40***	0.6	1.4	1390-3499 3500-4700 4701-10000	45 35 25	$5\frac{9}{32}$ x 1 x Cable	Fem BNC M-BNC
5186A	LP	**695-1000**	***50***	0.5	1.4	1390-3499 3500-4700 4701-10000	40 45 25	$5\frac{7}{16}$ x 1 Dia.	Fem SMA
5187	LP	**695-1000**	***20***	0.25	1.3	2085-2750	35	$3\frac{57}{64}$ x $\frac{1}{2}$ Dia.	Fem BNC
5188	LP	**1030-1090**	***25***	0.5	1.3	2180-7000 7000-11990	60 40	$3\frac{9}{32}$ x $\frac{1}{2}$ Dia.	Special
5280	LP	**540-1100**	***5***	0.5	1.75	1250 1700-3000 3000-up	15 60 35	$4\frac{1}{4}$ x $\frac{13}{16}$ x $1\frac{15}{16}$	Fem BNC
5184	LP	**950-1200**	***10***	0.5	1.4	2000-8200 8200-10000	60 40	28.5 x 1 Dia.	Fem SC Cable M-BNC
5197	LP	**950-1220**	***10***	0.5	1.4	2000-8200 8200-10000	60 40	$5\frac{9}{16}$ x $\frac{1}{2}$ Dia.	Fem C Special Cable
5181	LP	**960-1220**	***10***	0.5	1.4	2000-8200 8200-10000	60 40	$5\frac{43}{64}$ x $\frac{1}{2}$ Dia.	Cable BNC and Special
5181A	LP	**960-1220**	***10***	0.5	1.4	2000-8200 8200-10000	60 40	$6\frac{5}{16}$ x $\frac{1}{2}$ Dia.	M-C Fem C
5173	LP	**1000-1600**	***25***	0.3	1.3	2700-7000 7000-10000	60 40	$4\frac{31}{64}$ x $\frac{1}{2}$ Dia.	Special
5194	LP	**1700-2400**	***2500***	0.2	1.4	3400-9600 except 3600-4500	40 30	$5\frac{29}{32}$ x $3\frac{1}{2}$ Dia.	$1\frac{5}{8}$" EIA Flg.
5198	LP	**1700-2400**	***1250***	0.25	1.4	3400-8100 8100-10000	40 25	$5\frac{29}{32}$ x $3\frac{1}{2}$ Dia.	$1\frac{5}{8}$" EIA Flg.
5182A	LP	**2270-2290**	***25***	1.5	1.5	2900-9500	60	$4\frac{25}{32}$ x $\frac{1}{2}$ Dia.	Special

BIRD Low Pass Filter-Couplers

50 ohms nominal

	PASSBAND				STOP BAND	
Model	Passband Frequencies MHz	Watts Ave.	Insertion Loss dB (Max.)	Max. Insertion VSWR	Stop Band MHz	Attenuation dB (Min.)
3111A	88-108	5000	0.15	1.15	176-1000	60*
3111F	88-108	5000	0.15	1.15	176-1000	60*
3110	88-108	1000	0.10	1.15	176 180-1000	30 35
3109	88-108	3000	0.10	1.15	176-1000	30
3111B	88-108	5000	0.15	1.15	176-1000	60*
3111G	88-108	5000	0.15	1.15	176-1000	60*
3111E	88-108	5000	0.15	1.15	176-1000	60*
3111	88-108	5000	0.15	1.15	176-1000	60*
3108	88-108	5000	0.15	1.20	176-1000	60*
3330A	88-108	15kW	0.15	1.25	176-1000 505-520 695-720	60 <60 <60
3330E	88-108	15kW	0.15	1.25	176-1000 505-520 695-720	60 <60 <60
3338	88-108	30kW	0.15	1.20	176-1000 520-605	60 <60
3339	88-108	50kW	0.10	1.15	176-1000 520-605	60 <60
3303H	225-400	25	0.7	1.5	450-5000	40
3301	116-136 137-152	50	0.4 0.5	1.2	232-2000	60
3301B	116-152	25	0.5	1.5	232-2000	40
3340	116-152	50	0.5	1.35	232-2000	60
3305	116-150	50	0.5	1.3	232-270 270-300 300-2000	70 65 60
3304	290-315	150	0.35	1.25	560-2000	60
3312	225-400	20	0.8	1.5	450 460-1200	45 60
3300	225-400	50	0.4	1.38	450 520-4000	10 60
3315	225-400	50	0.4	1.38	450 500-800 800-2600	28 58 70
3341	225-400	50	0.7	1.35	450 460-2000	40 50
3328A	225-400	100	1.0 X 0.4 R	1.35 X 1.25 R	450-700 700-1000 1000-2000	32 37 54
3302	225-400	100	0.5	1.38	450-520 540-750 800-1000	20 60 70
3107	225-400	1200	0.20	1.4	450-600 601-2000	30 50

*Attenuation less than 60dB @ 505-520 MHz and 695-720 MHz

**Coupler set at any point to provide 133 ua

***3.3V DC reference voltage required with 3305 couplers, with a parallel resistance of 3300 ohms

BIRD Low Pass Filter-Couplers

50 ohms nominal

LP = LOW PASS HP = HIGH PASS BP = BAND PASS M = MALE FEM = FEMALE FTC = FEED-THRU CAPACITOR

COUPLER DATA

RF Coupler	DC Output Connectors	Coupler Output	into Load at	F.S. Watts	F.S. Accuracy	RF Connectors
45dB	(F) FEM BNC	133 ua	5000Ω	300-1000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	300-1000**	± 5%	Unfl.
45dB	(F) FEM BNC	133 ua	5000Ω	300-1000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	300-1000**	± 5%	EIA Flg.
43dB	(F) FEM BNC	133 ua	5000Ω	1000	± 5%	1⅝"
±3dB	(R) FEM BNC	133 ua	5000Ω	1000	± 5%	Unfl.
43dB	(F) FEM BNC	133 ua	5500Ω	1000-3000**	± 5%	1⅝"
±3dB	(R) FEM BNC	133 ua	5500Ω	1000-3000**	± 5%	Unfl.
45dB	(F) FEM BNC	133 ua	5000Ω	3000-5000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	3000-5000**	± 5%	Unfl.
45dB	(F) FEM BNC	133 ua	5000Ω	3000-5000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	3000-5000**	± 5%	EIA Flg.
45dB	(F) FEM BNC	133 ua	5000Ω	1000-3000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	1000-3000**	± 5%	EIA Flg.
45dB	(F) FEM BNC	133 ua	5000Ω	1000-3000**	± 5%	1⅝"
	(R) FEM BNC	133 ua	5000Ω	1000-3000**	± 5%	Unfl.
–	(F) FEM BNC	30 ua	1500Ω	5000	± 5%	1⅝"
	(R) FEM BNC	30 ua	1500Ω	1000	± 5%	EIA Flg.
–	(F) FEM BNC	100 ua	3000Ω	15kW	± 5%	3⅛"
	(R) FEM BNC	100 ua	3000Ω	1.5kW	± 5%	Unfl.
	(F) FEM BNC	100 ua	3000Ω	10kW	± 5%	3⅛"
–	(R) FEM BNC	100 ua	3000Ω	1kW	± 5%	Unfl.
–	(F) FEM BNC	200 ua	400Ω	30kW	± 5%	3⅛"
	(R) FEM BNC	200 ua	400Ω	3kW	± 5%	Flg.
–	(F) FEM BNC	100 ua	3000Ω	50kW	± 5%	3⅛"
	(R) FEM BNC	100 ua	3000Ω	5kW	± 5%	Flg.
–	(F) FTC	0.5V DC	500Ω	6.25	± 5%	Fem SMA
	(R) FTC	.35V DC	5000Ω	1.5	± 5%	
–	(F) FTC	100 ua	5650Ω	40	± 5%	SMC
	(R) FTC	100 ua	2825Ω	8	± 5%	RG-188 M-BNC
–	(F) FTC	0.5V DC	500Ω	6.25	± 5%	Fem SMA
	(R) FTC	.35V DC	5000Ω	1.5	± 5%	
–	(F) FTC	1.0V DC	5000Ω	50	± 5%	Fem SMA
–	(R) FTC	1.0V DC	5000Ω	10	± 5%	
–	(F) FTC	1.5V DC***	15000Ω	10	±10%	Right Angle
	(R) FTC	1.5V DC***	15000Ω	10	±10%	SMB
–						
	(F) FTC	1.0V DC	5000Ω	100	±10%	TNC Plug
–	(F) FTC	1.0V DC	5000Ω	10	±10%	Fem TNC
	(F) FTC	1.0V DC	5000Ω	20	± 5%	Fem SMC
–	(R) FTC	1.0V DC	5000Ω	4	± 5%	
	(F) FTC	203 ua	1700Ω	50	± 5%	Fem SMB
	(R) FTC	203 ua	1700Ω	50	± 5%	N Pressure
–	(F) FTC	50 ua	3000Ω	50	± 5%	Fem N
	(R) FTC	50 ua	3000Ω	30	± 5%	Fem BNC
–						
	(F) FTC	1.0V DC	5000Ω	50	± 5%	Fem SMA
	(R) FTC	1.0V DC	5000Ω	10	± 5%	
Has	(F) FTC	2.3-3.0V DC Pos.	****	30	±10%	Fem N
Elect.	(R) FTC	2.3-3.0V DC Neg.	****	30	±10%	Right Angle
Switch						SMA
–	(F) FTC	1.0V DC	5000Ω	100	± 7%	Similar to
	(R) FTC	1.0V DC	5000Ω	25	± 7%	Fem N
						UG-1050 Slide on
	(F) FTC	1.0V DC	5000Ω	1000	± 5%	M-SC
	(R) FTC	1.0V DC	5000Ω	250	± 5%	Fem SC

****Couplers externally terminated 5600 ohms to ground and 33000 ohms to a Bias supply*
-12V DC Bias for (F) coupler +12V DC Bias for (R) coupler

Are filters necessary? Yes, but don't overspecify.

Modern r-f communications equipment requires the use of good filters. But, do you specify for the overall system or do you tailor the design to the job that must be done?

By Herbert H. Heller, Sr. Staff Engineer
Bird Electronic Corp., Cleveland (Solon), Ohio

Filters are necessary. There was a time, however, when some responsible engineers did not agree. Early in the history of r-f communications filters were called "a rubber glove for a leaky fountain pen." The implication was that with a properly designed and tuned transmitter, undesirable signals in the output could be kept low enough (for the requirements of that period) without using filters.

Today, keeping harmonics and spurious signals 40dB below the level of the fundamental is no longer satisfactory. Requirements for 80dB suppression are common and we have cooperated on a few requests for 100 and 120dB. Just as a reminder, that means one trillionth of the main signal level, or a picowatt for every watt.

Attenuation is only one of the parameters. Some others are: insertion loss and vswr, sharpness of cut-off, hi-pass, band-pass or low-pass, size and weight, power carrying capacity, connectors, paint, labeling and mounting features. While most wattmeters and terminating loads can be sold from stock, most filters are built to specifications on one or more of these parameters. Here are some pointers on specifying a filter to avoid overdesign and to save.

R-f coaxial filters, in this discussion, are passive transmission devices used with coax cables or rigid lines. They contain distributed or lumped reactance components. They present a fairly well matched 50-ohm line section to desired signals in the passband, and "attenuate" undesired harmonics, unmultiplied source components ("subharmonics"), intermodulation products, etc. by reflecting them back to their source. In other words, they have a low vswr on one side of the cut-off frequency and a high vswr on the other side (in the stop band).

Fig. 1 represents ideal low-pass filter transmission-attenuation characteristics. But, in practice, the passband has a fraction of 1dB insertion loss and the rise to stop band attenuation is not that abrupt.

Fig. 2 identifies the various terms which we use. The cut-off frequency, f_c, is the frequency at which the insertion loss is the maximum allowable value as specified by you (e.g., 0.3dB). The inception of the stop band, f_s, is the frequency at which the attenuation first reaches the minimum specified value (e.g., 60dB). For a typical low-pass filter f_s is 1.12 to 1.25 times f_c and, 1/2 f_s is the lowest fundamental the 2nd harmonic of which will be attenuated by the minimum specified value (e.g., 60dB). Thus, the filtered passband lies between 1/2 f_s and f_c.

Let's illustrate on an extreme example how careful selection of attenuation characteristics can reduce size and cost:

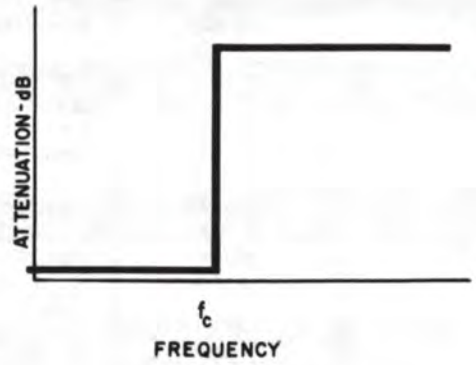

Fig. 1: Ideal low-pass filter transmission-attenuation characteristics.

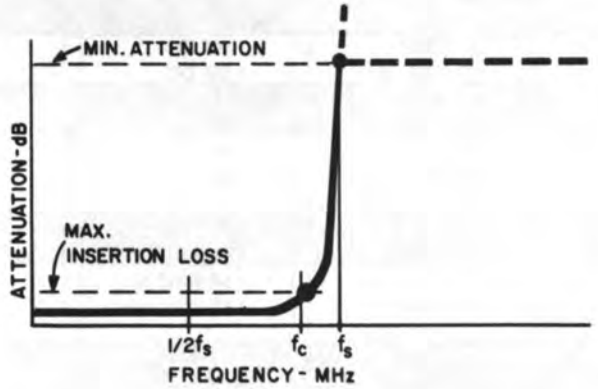

Fig. 2: Various terms used in this article are illustrated here.

Assume the request was for a low-pass filter with a cut-off frequency of 260MHz, and attenuation of 100dB at 430MHz (Fig. 3a). While these are feasible specs., it was revealed that overall system specification required 430MHz to be 100dB below the desired fundamental signal, which varied from 215MHz to 260MHz. Since the transmitter's harmonic output was already more than 40dB below the fundamental, the filter only had to contribute 60dB attenuation (Fig. 3b). Next, with the requested 260MHz cut-off frequency and 60dB attenuation, f_s would occur at about 312MHz. The first troublesome harmonic, however, was 215x2 or 430MHz. Moving f_s to 430MHz where it was needed, placed f_c at 360 MHz. This removed the highest available fundamental of 260MHz from the knee of the curve well into a region of lower insertion loss (Fig. 3c). The 0.3dB or more gain of this change represents over 70W for a 1kW signal.

All of this, of course, is quite basic. But, basic problems – such as reversed connections in a dc circuit – are the most frequent stumbling blocks to successful performance.

Sometimes one parameter can only be improved at the expense of another. A steeper cut-off characteristic, for instance, is obtainable by either adding more tuned circuits, which in turn results in a larger box, or by changing existing element values in a manner that usually increases the passband insertion loss. In the previous example, the needed cut-off characteristics were not abrupt, which permitted a design with economies in space, losses, time and dollars.

Specifying requirements for certain frequency bands opens up additional opportunities for economy. A transmitter frequency of 400MHz, for instance, may require 80dB attenuation at 800MHz, 70dB at 1200MHz and 60dB at 1600 and 2000MHz. The first impulse is to

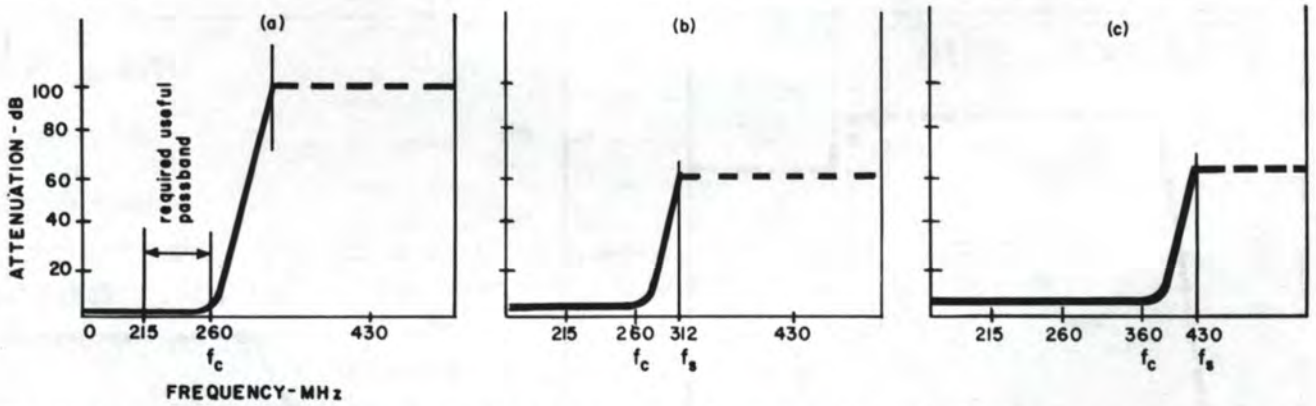

Fig. 3(a): A low-pass filter with a cut-off frequency of 260MHz and an attenuation of 100dB at 430-MHz was specified. (b) But, investigation revealed that over-all system specs required 430MHz to be 100dB below the desired fundamental. As the harmonic output was already 40dB below the fundamental, only 60dB attenuation was required of the filter. (c) Next, as the first troublesome harmonic was 430MHz, moving f_s to 430MHz placed f_c at 360MHz, thereby removing the highest available fundamental of 260MHz well into a region of lower insertion loss.

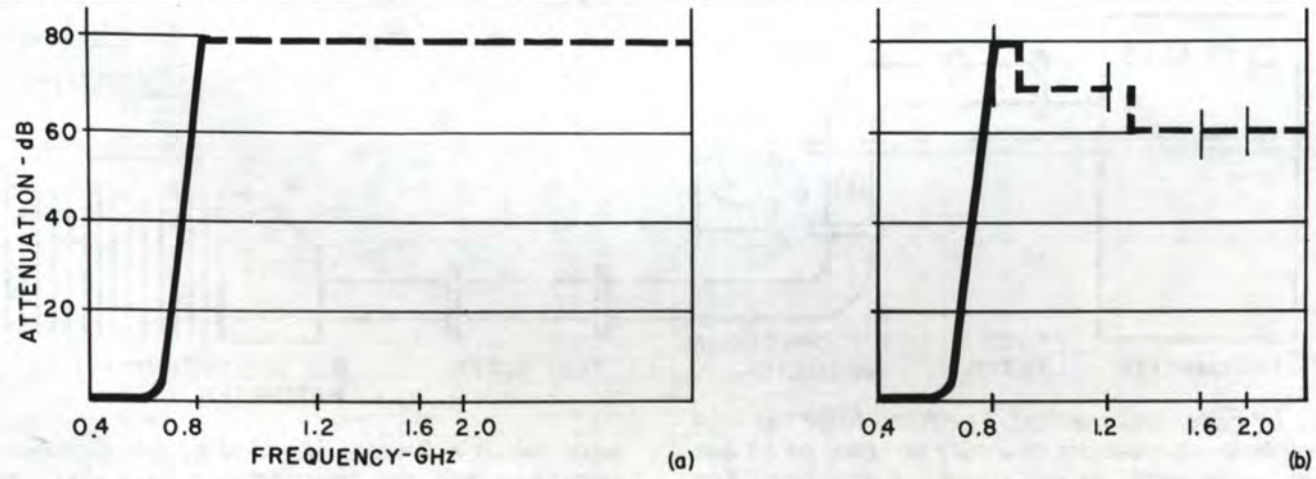

Fig. 4(a): Requirements are for 80dB attenuation at 800MHz, 70 at 1200 and 60 at 1600 and 2000. First impulse is to order a filter with 80dB rejection from 800MHz on up through the 10th harmonic. (b) But, a filter with 80dB at the 2nd, 70dB at the 3rd and 60dB at the 4th and 5th is cheaper and smaller.

order a filter with 80dB rejection from 800MHz on up through the tenth harmonic (Fig. 4). On the other hand, tailoring the design to the requirements may easily cut size and loss in half: a filter with 80dB at the 2nd, 70dB at the 3rd, 60dB at the 4th and 5th harmonics is not only smaller, but engineering and test department savings are reflected in the final quote and result in faster service. If the transmitter has no significant output above the fifth harmonic, attenuation there need not be measured and quality-controlled in the production of the filter (it usually is high). If there are undesirable signals in the higher harmonic regions, some advantages can sometimes be gained by using two different filters in tandem (Fig. 5). The first unit provides the desired cut-off and most of the rejection characteristic, while the second unit just adds attenuation at high frequencies.

The interpretation of test results requires a thorough understanding of the test conditions and the instruments used. To illustrate, assume that when a filter is inserted between a transmitter and an r-f absorption wattmeter indicating 100W, the output reading drops to 71W. This leads to the erroneous conclusion that the passband insertion loss was 1.5dB. Not so: First, the signal had significant harmonic content which the filter duly rejected. The broadband wattmeter had indicated the total power of fundamental and harmonic frequencies before the filter was placed in the line. Secondly, the vswr of a resistive termination wattmeter is much lower than that of a filter. Typical values are 1.05 against 1.35, resulting in a reflected power difference of 2.3W out of 100; or 0.1dB. Finally, the filter may have detuned the transmitter and caused a reduction in output power. (At signal-generator level this is avoided by heavy padding, which is impractical for power testing.)

The method we prefer is shown in Fig. 6.

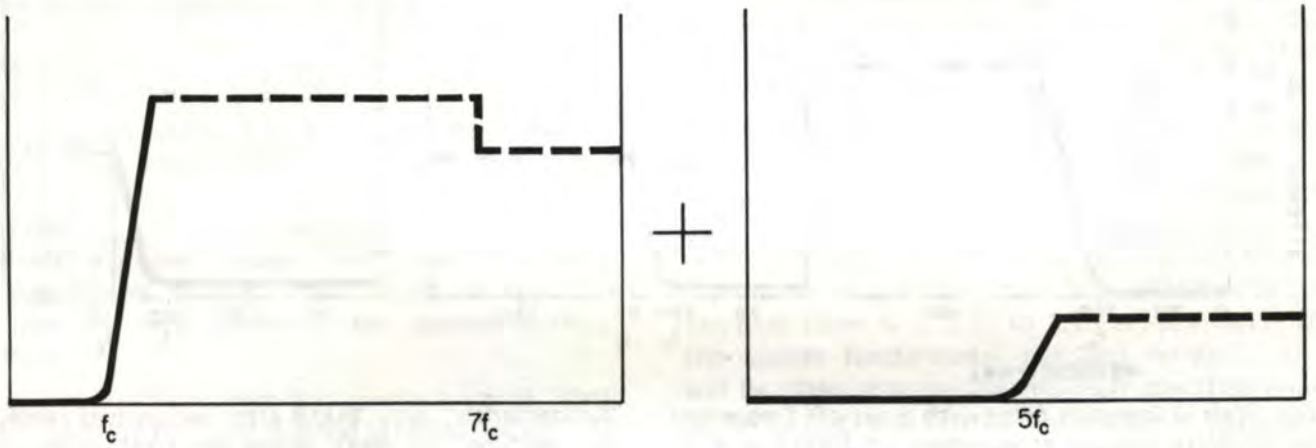

Fig. 5: Two different filters in tandem can sometimes be advantageous if there are unwanted signals in the higher harmonic regions. The first provides the desired cut-off and most of the rejection characteristic. The second just adds attenuation at high frequencies.

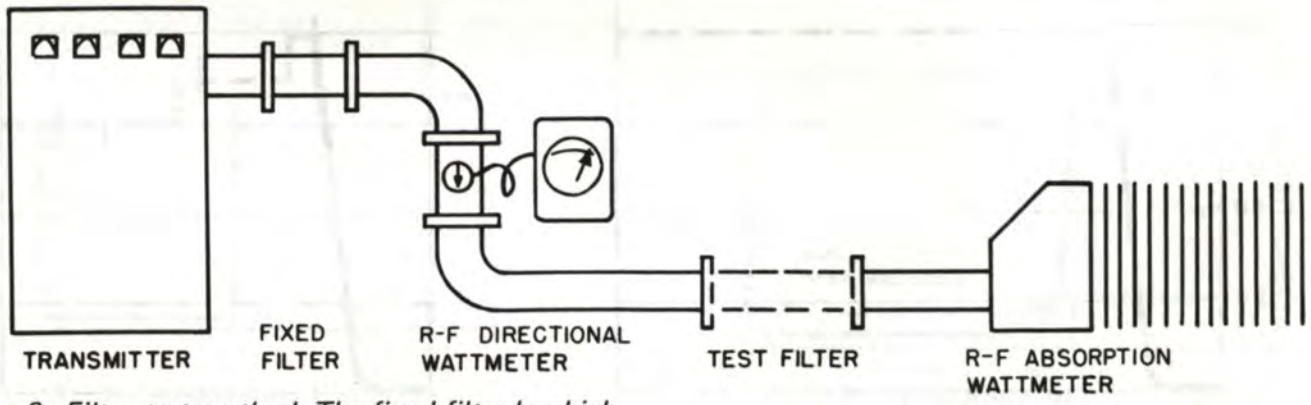

Fig. 6: Filter test method. The fixed filter has high harmonic attenuation to insure removal of all but the fundamental at all stages of the test. The proper output level is read on both wattmeters and then the test filter is inserted. Transmitter output is increased until the absorption wattmeter reading is the same as before. The net power increase (forward minus reflected) is noted on the directional wattmeter and the insertion loss calculated from the ratio of the before and after directional wattmeter indications. The filter which was thought to have 1.5dB insertion (I^2R) loss now resulted in a ratio of 100/110W or about 0.4dB.

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customer filter specifications

Note: New filter designs can only be considered for quantity requirements due to engineering and development costs. Smaller quantities may be subject to development costs.

NAME _____ TITLE _____

COMPANY _____ PHONE _____

ADDRESS _____

The following minimum information is needed. We will respond with a prompt equipment proposal.

pass band

☐ Low Pass
☐ High Pass
☐ Band Pass

Frequency Range _____ MHz to _____ MHz
Max. Insertion Loss _____ dB
Max. Insertion VSWR _____
Line Impedance _____ Ohms
Max. Power _____ Watts Average
_____ Watts Peak
Type of Transmission _____

stop band

Frequency Range and Min. Attenuation

_____ MHz to _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz

other stop band

BAND PASS FILTERS ONLY

_____ MHz to _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz

environmental requirements

Temperature Range: Operating _____ °C; Non-Operating _____ °C
Altitude _____ Feet
Humidity _____ % RH
Shock & Vibration _____

mechanical

Max. Size L _____ x W _____ x H _____
Max. Weight _____ Oz. or _____ Lbs.
Connector Types _____ Input _____ Output
Method of Mtg. _____
Finish _____

quotation requirements

Sample Quantity _____ Units
Production Quantity _____ Units
Delivery _____

Please sketch your mechanical requirements below noting location of RF connectors, mounting bosses, etc.

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Line Impedance _____ Ohms
Max. Power _____ Watts Average
_____ Watts Peak
Type of Transmission _____

stop band

Frequency Range and Min. Attenuation

_____ MHz to _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz

other stop band

BAND PASS FILTERS ONLY

_____ MHz to _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz
_____ dB at _____ MHz

environmental requirements

Temperature Range: Operating _____ °C; Non-Operating _____ °C
Altitude _____ Feet
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Max. Size L _____ x W _____ x H _____
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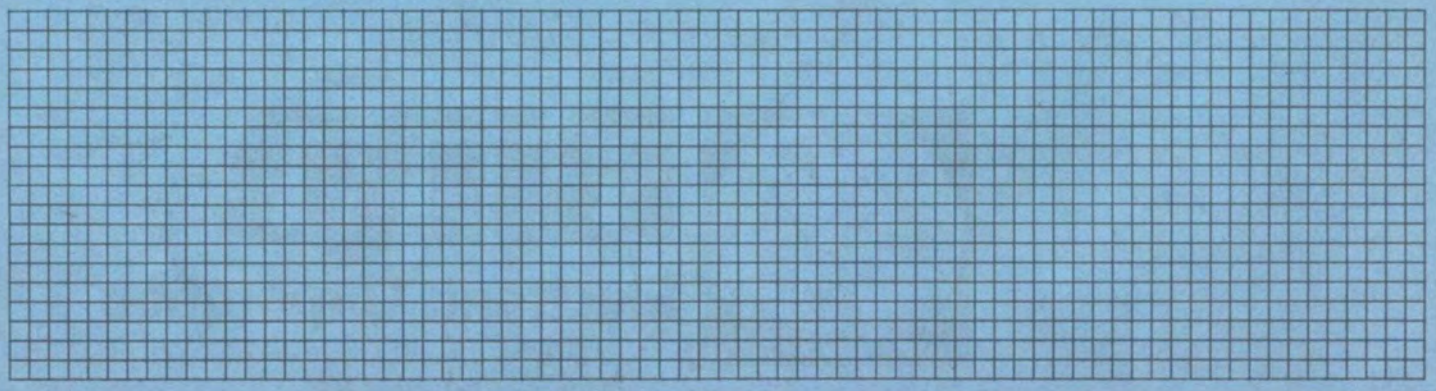

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