

**LARK  
ENGINEERING  
COMPANY**  
*The Filter Source*

**PRODUCT  
SELECTION  
GUIDE**



# LARK ENGINEERING COMPANY

A Division of Baier and Baier, Inc.

Lark Engineering Company is a leading supplier of RF and Microwave filters with ISO 9001 and ISO 14001 certifications. The company was established in 1987 with the goal to design and manufacture quality products to meet or exceed the customer's individual needs and requirements. Currently, Lark Engineering's products are being utilized in major digital and analog wireless devices ranging in use from communications systems to test equipment and military systems. Lark Engineering also produces filters for GPS, Cellular, ISM, PCN, PCS and many other wireless applications. For each customer, Lark Engineering is committed to providing the very best quality of filters and is dedicated to meeting our customers Microwave and Radio Frequency filter needs. Our commitment to quality and customer service has been a cornerstone of the company since its inception.

Today, with an ever-changing industry, Lark Engineering continues to be the leader in RF and Microwave filters by focusing on design, quality and customer service. We offer an extensive product mix with filters and Multiplexers that satisfy requirements from 100 KHz to 20 GHz. Our web based filter design tool allows you to design Band Reject, Surface Mount Combine, High Power Ceramics and many other filters. Many of our filters can be sampled in as little as 10 days.



## Lark Engineering Standard Filter Capabilities include the following:

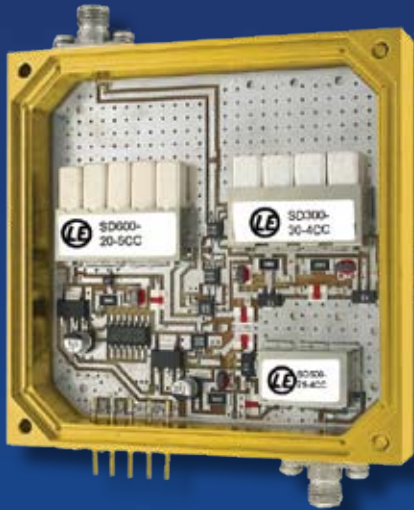
BANDPASS	CENTER FREQUENCY RANGE	3db BW (% OF Fc)	CONFIGURATION
MC	1 – 5000 MHz	2 – 50	Miniature PCB Mount / SMA
SMC	5000 – 15000 MHz	3 – 20	SMT Combine
MS	1 – 5000 MHz	2 – 50	SMT Leadless
SD	250 – 5000 MHz	1 – 10	SMT Leadless Ceramic
SDP	800 – 2000 MHz	3 – 7	High Power Ceramic
3B	1000 – 18000 MHz	1 – 50	Combine Coaxial Connectors
4B	1000 – 18000 MHz	1 – 50	Combine Coaxial Connectors
2C	50 – 400 MHz	1 – 2.5	Cavity
3C	400 – 2000 MHz	0.2 – 3.5	Cavity
4C	800 – 2500 MHz	0.2 – 3.5	Cavity
5C	1000 – 3000 MHz	0.2 – 3.5	Cavity
6C	2000 – 7500 MHz	0.2 – 3.5	Cavity
BAND REJECT	CENTER FREQUENCY RANGE	3db BW (% OF Fc)	CONFIGURATION
SDN	800 – 2500 MHz	1 – 5	SMT Leadless Ceramic
HIGHPASS	CUT OFF FREQUENCY RANGE		CONFIGURATION
HMS	10 – 1500 MHz		SMT Leadless
HMC	10 – 2000 MHz		Miniature PCB / SMA
LOWPASS	CUT OFF FREQUENCY RANGE		CONFIGURATION
LMS	1 – 2500 MHz		SMT Leadless
LMC	1 – 3500 MHz		Miniature PCB / SMA

Please call Lark Engineering if your requirements fall outside of our standard range.

## Switch Filter Systems

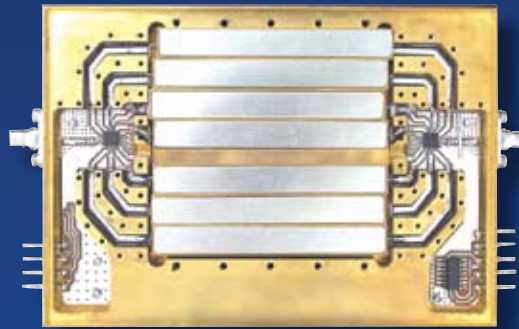
Lark's new Switch Filter Systems are designed with a wide array of Switch Filter Banks and low noise amplifiers. They are available in Ceramic and Lumped Element configurations, low profile connectorized packages and a wide frequency range. Switch Filters are ideally suited for receiver applications and assisting in overall system performance.

### Switch Filter Amplifier- SFA series



SPECIFICATION	STANDARD
Frequency	100 to 3000 MHz
3dB Bandwidth	1 to 40%
Nominal Impedance	50 Ω
Gain	10 to 40 dB
Return Loss	18 dB Typical 14 dB Min.
Noise Figure	1.5-5.0 dB Typical
Number of channels	2, 3, 4, 5, and 6
Switching Speed	300 ns Max.
Bias	+ 10 V DC, + 5 V DC
Shock	5 G's
Gross Leak	Mil STD 202 Method 112 Condition D
Fine Leak 10 <sup>-7</sup>	Mil STD 202 Method 112 Test Condition C
Vibration	5 G's
Humidity	95%
Altitude	+/- 50,000 ft
Package	SMA, feed thru pins, or SMT

### Switch Filter Bank- SFB series




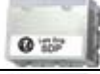

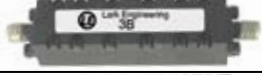

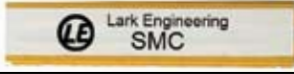


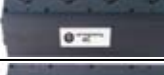
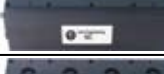
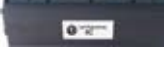






SPECIFICATION	STANDARD
Frequency	100 to 3000 MHz
3dB Bandwidth	1 to 40%
Nominal Impedance	50 Ω
Max Insertion Loss	3 - 7 dB
Return Loss	14 dB Min.
Number of channels	2, 3, 4, 5, 6, 7, and 8
Switching Speed	300 ns Max.
Bias	-5 V DC / + 5 V DC
Shock	5 G's
Gross Leak	Mil STD 202 Method 112 Condition D
Fine Leak 10 <sup>-7</sup>	Mil STD 202 Method 112 Test Condition C
Vibration	5 G's
Humidity	95%
Altitude	+/- 50,000 ft
Package	SMA, feed thru pins, or SMT

Contact Lark Engineering with your specific needs

## ELECTRICAL SPECIFICATIONS

1 MHz to 20 GHz

Series	Configuration	Center Frequency (Fc)	Number of sections	Nominal Impedance	Max. VSWR	Max. Input Power (avg.)	Max. Input Power (peak)	
<b>BANDPASS FILTERS</b>								
<b>MS</b>		Surface Mount	1 to 5000 MHz	3 to 6	50 Ω	1.5/1	2 W	20 W
			1 to 6500 MHz	2 to 10	50 to 300 Ω	1.3/1	10 W	50 W
<b>MC</b>		Miniature	1 to 5000 MHz	3 to 6	50Ω	1.5/1	2 W	20 W
			0.1 to 6500MHz	2 to 10	50 to 300 Ω	1.3/1	20 W	100 W
<b>SD</b>		Ceramic	250 to 5000 MHz	2 to 6	50Ω	2/1	1 W	2 W
			200 to 6000 MHz	2 to 10	50 to 75 Ω	1.5/1	10 W	50 W
<b>SDP</b>		High Power	800 to 2000 MHz	2 to 4	50Ω	1.5/1	50 W	250 W
		Surface Mount	650 to 2250 MHz	2 to 5	50 to 75 Ω	1.3/1	50 W	250 W
<b>SDN</b>		Band Reject	800 to 2500 MHz	3 to 6	50 Ω	2/1	1 W	2 W
		Surface Mount	400 to 3500 MHz	2 to 8	50 to 75 Ω	1.5/1	2 W	10 W
<b>3B</b>		Comblin	1000 to 18000 MHz	3 to 10	50 Ω	1.5/1	Up to 20 W	Up to 200 W
			1000 to 20000 MHz	2 to 14	50 Ω	1.3/1	Call Lark	Call Lark
<b>4B</b>		Miniature	1000 to 18000 MHz	3 to 8	50 Ω	1.5/1	Up to 10 W	Up to 100 W
		Comblin	1000 to 20000 MHz	2 to 14	50 Ω	1.3/1	Call Lark	Call Lark
<b>SMC</b>		Surface Mount	5000 to 15000 MHz	2 to 6	50 Ω	1.5/1	Call Lark	Call Lark
		Comblin						
<b>2C</b>		Hi-Q	50 to 400 MHz	3 to 6	50 Ω	1.5/1	Up to 8 W	Up to 37.5 W
		Cavity	50 to 500 MHz	2 to 7	50 to 100 Ω	1.3/1	Call Lark	Call Lark
<b>3C</b>		Hi-Q	400 to 2000 MHz	3 to 6	50 Ω	1.5/1	Up to 30 W	Up to 30 W
		Cavity	400 to 2500 MHz	2 to 7	50 Ω	1.3/1	Call Lark	Call Lark
<b>4C</b>		Hi-Q	800 to 2500 MHz	3 to 6	50 Ω	1.5/1	Up to 50 W	Up to 200 W
		Cavity	750 to 2500 MHz	2 to 7	50 Ω	1.3/1	Call Lark	Call Lark
<b>5C</b>		Hi-Q	1000 to 3000 MHz	3 to 6	50 Ω	1.5/1	Up to 7.5 W	Up to 30 W
		Cavity	800 to 4000 MHz	2 to 7	50 Ω	1.3/1	Call Lark	Call Lark
<b>6C</b>		Hi-Q	2000 to 7500 MHz	3 to 6	50 Ω	1.5/1	Up to 7.5 W	Up to 30 W
		Cavity	2000 to 9000 MHz	2 to 7	50 Ω	1.3/1	Call Lark	Call Lark
<b>LOWPASS FILTERS</b>			CUT OFF FREQUENCY					
<b>LMS</b>		Surface Mount	1 to 2500 MHz	3 to 6	50 Ω	1.5/1	2 W	20 W
			0.5 to 3000 MHz	2 to 10	50 to 300 Ω	1.3/1	10 W	50 W
<b>LMC</b>		Miniature	1 to 3500 MHz	3 to 6	50 Ω	1.5/1	2 W	20 W
			0.5 to 5500 MHz	2 to 10	50 to 300 Ω	1.3/1	20 W	100 W
<b>HIGHPASS FILTERS</b>			CUT OFF FREQUENCY					
<b>HMS</b>		Surface Mount	10 to 1500 MHz	3 to 6	50 Ω	1.5/1	2 W	20 W
			1 to 2500 MHz	2 to 10	50 to 300 Ω	1.3/1	10 W	50 W
<b>HMC</b>		Miniature	10 to 2000 MHz	3 to 6	50 Ω	1.5/1	2 W	20 W
			1 to 3000 MHz	2 to 10	50 to 100 Ω	1.3/1	20 W	100W

## ENVIRONMENTAL SPECIFICATIONS

ISO 9001 and ISO 14001 Certified

<b>Shock</b>	<b>Vibration</b>	<b>Humidity (% Relative)</b>	<b>Temp. Range (Operating)</b>	<b>Temp. Range (Non-Operating)</b>			<b>Series</b>
<b>BANDPASS FILTERS</b>							
20 G's	10 G's	95%	-40°C to +85°C	-65°C to +125°C	Standard		<b>MS</b>
75 G's	30 G's	95%	-55°C to +125°C	-65°C to +150°C	Special		
20 G's	10 G's	95%	-40°C to +85°C	-65°C to +125°C	Standard		<b>MC</b>
75 G's	30 G's	100%	-55°C to +125°C	-65°C to +150°C	Special		
20 G's	10 G's	95%	-40°C to +85°C	-65°C to +125°C	Standard		<b>SD</b>
75 G's	30 G's	100%	-55°C to +125°C	-65°C to +150°C	Special		
15 G's	5 G's	90%	-30°C to +85°C	-54°C to +100°C	Standard		<b>SDP</b>
75 G's	30 G's	100%	-54°C to +100°C	-62°C to +150°C	Special		
15 G's	5 G's	90%	-30°C to +85°C	-54°C to +100°C	Standard		<b>SDN</b>
75 G's	30 G's	100%	-54°C to +100°C	-62°C to +150°C	Special		
25 G's	10 G's	95%	-40°C to +85°C	-65°C to +125°C	Standard		<b>3B</b>
50 G's	20 G's	100%	-55°C to +125°C	-65°C to +150°C	Special		
25 G's	10 G's	95%	-40°C to +85°C	-65°C to +125°C	Standard		<b>4B</b>
50 G's	20 G's	100%	-55°C to +125°C	-65°C to +150°C	Special		
Call Lark	Call Lark	95%	-40°C to +85°C	-54°C to +100°C	Standard		<b>SMC</b>
20 G's	10 G's	95%	-25°C to +85°C	-54°C to +125°C	Standard		<b>2C</b>
20 G's	15 G's	100%	-54°C to +85°C	-54°C to +125°C	Special		
20 G's	10 G's	95%	-25°C to +85°C	-54°C to +125°C	Standard		<b>3C</b>
20 G's	15 G's	100%	-54°C to +85°C	-62°C to +125°C	Special		
20 G's	10 G's	95%	-25°C to +85°C	-54°C to +125°C	Standard		<b>4C</b>
25 G's	20 G's	100%	-54°C to +85°C	-54°C to +125°C	Special		
20 G's	10 G's	95%	-25°C to +85°C	-54°C to +125°C	Standard		<b>5C</b>
25 G's	20 G's	100%	-54°C to +85°C	-54°C to +125°C	Special		
20 G's	10 G's	95%	-25°C to +85°C	-54°C to +125°C	Standard		<b>6C</b>
25 G's	20 G's	100%	-25°C to +85°C	-54°C to +125°C	Special		
<b>LOWPASS FILTERS</b>							
20 G's	10 G's	95%	-55°C to +85°C	-65°C to +125°C	Standard		<b>LMS</b>
50 G's	15 G's	100%	-55°C to +100°C	-65°C to +125°C	Special		
20 G's	10 G's	95%	-55°C to +85°C	-65°C to +125°C	Standard		<b>LMC</b>
50 G's	15 G's	100%	-55°C to +100°C	-65°C to +125°C	Special		
<b>HIGHPASS FILTERS</b>							
20 G's	10 G's	95%	-55°C to +85°C	-65°C to +125°C	Standard		<b>HMS</b>
50 G's	15 G's	100%	-55°C to +100°C	-65°C to +125°C	Special		
20 G's	10 G's	95%	-55°C to +85°C	-65°C to +125°C	Standard		<b>HMC</b>
50 G's	15 G's	100%	-55°C to +100°C	-65°C to +125°C	Special		

# LARK ENGINEERING CAPABILITES

## **Satcom Diplexer**

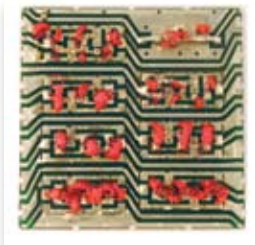
In response to the current market demand for a lighter filter with a reduced form factor while maintaining competitive electrical performance, Lark offers its Compact Satcom Diplexers. Our new design saves both space and weight for all systems working in the Satcom bands.

- Standard Diplexer Dimensions: 21.00" L x 6.50" W x 5.00" H
- Compact Diplexer Dimensions: 6.25" L x 3.00" W x 2.00" H



## **Ceramic Diplexers**

Lark Engineering's family of ceramic diplexers is based on our stand-alone ceramic filter series. The ceramic diplexer series uses a PCB / PWB board carrier with outputs in the corners and an axial port along the opposite side to provide the best channel-to-channel isolation. Through the addition of input matching circuitry, the ceramic diplexer is able to provide the best common junction match. Our design algorithms are capable of matching any two non-contiguous passbands using various filter configurations.



## **Triplexers and Multiplexers**

Along with the Diplexer series of filters, Lark also offers Triplexers and Multiplexers. By creating a basic network of three or more bandpass series filters, a Triplexer or Multiplexer is able to separate the pass-band frequencies and apply the signal to isolated terminals. The passband of the individual network may be contiguous or separated by overlapping stopbands.



## **Ultra Compact Ceramic Filters**

When board space is a premium and getting the best performance in a very small footprint is a must, Lark can offer ultra compact ceramic filters with resonator sizes as small as 1.5mm. The filter performance you need from a standard ceramic filter but in a size equal to or smaller than 8x8mm depending on the number of resonators.

## **Elliptic Function Filters**

Elliptic designs are available for very sharp rejection responses. This type of response can be used on Lump Element, Ceramic and Cavity filter designs.

## **Cross Coupled Cavities**

To improve rejection in your filter without increasing the filters size, Lark offers a cross coupled cavity filter design. Using a Semi-Elliptical arrangement; resonators are cross-coupled to approach zeros in transmission. The zeros in transmission can be placed in the upper or lower side of the Rejection skirt depending on your needs.

## **True Tune™ Test Fixtures**

With designs becoming more and more complex, it is essential that the performance of the filters be similar on a test fixture as on your board. Lark Engineering will take your PCB / PWB and create a test fixture to fine tune the filters. This will significantly reduce the need for final tuning in production by matching the impedance and capacitance associated with your board. Lark offers this service to its customers to facilitate their time to market and success.



## **Legacy Filters**

In addition to our surface mount and ceramic bandpass filters, Lark Engineering continues to offer the 2B, TO-8 and Tubular filter series. The 2B series is an interdigital configuration ranging in center frequency from 1,000 to 12,000MHz. The TO-8 series is offered in Lowpass, Highpass and Bandpass, and range in center frequency from 10 to 5000 MHz. The Tubular series offers Bandpass, Lowpass and Highpass filters ranging in center frequency of 60 to 8000 MHz.



# LARK ENGINEERING FILTER DESIGN TOOL



Visit our web site **FILTER DESIGN TOOL** at [www.larkengineering.com](http://www.larkengineering.com). **CLICK ON THE FILTER DESIGN TOOL ICON.** Just follow the simple steps to determine the optimal filter Lark Engineering can offer for your requirements. At any time you can click on the **HELP** button and use the **FILTER DESIGN DEMO** for directions and examples.

**FILTER DESIGN INDEX**

Click here to design, insert, and/or save

\* For Frequencies or Bandwidths out of our Standard Range Contact our [Application Engineering Dept.](#)

BANDPASS	Fc RANGE	3db BW (% of Fc)	CONFIGURATION
MC	1-5000 MHz	2 TO 50	MENATURE PCB MOUNT / SMA
SMC	3000-15000 MHz	3 TO 20	SMT LEADLESS
SD	1-5000 MHz	2 TO 50	SMT LEADLESS
SD	250-3000 MHz	1 TO 10	SMT LEADLESS CERAMIC
High Power, Coaxial (SDC)	800-2000 MHz	3 TO 7	HIGH POWER CERAMIC
SD	1000-18000 MHz	1 TO 30	COMBLINE COAX CONNS.
SD	1000-18000 MHz	1 TO 30	COMBLINE COAX CONNS.
SD	30-400 MHz	1 TO 2.3	CAVITY
SD	400-2000 MHz	0.2 TO 3.5	CAVITY
SD	800-2500 MHz	0.2 TO 3.5	CAVITY
SD	1000-3000 MHz	0.2 TO 3.5	CAVITY
SD	2000-7500 MHz	0.2 TO 3.5	CAVITY
BAND REJECT			
SDR	800-2500 MHz	1 TO 5	SMT LEADLESS CERAMIC
HIGH PASS			
HSR			
HSR			
LOW PASS			
LSD			
LSD			

**1** Select a **FILTER SERIES** in the left hand column. If you are not sure which series to use, check out our **Filter Index** page.

**SMC (Surface Mount Combine)**

Enter your filter requirements and click the "Design Now" button.  
The requirements outside our standard range contact our Application Engineering Dept.

Center Frequency:  MHz  
The frequency range for this program is (300000hz - 1200000hz). (Please consult Lark Engineering for filter ranges (12000hz - 100000hz).)

Maximum Bandwidth:  MHz  
(Allowable 3db bandwidth for Band Pass is 10 - 20% of Center Frequency)

Insertion Loss:  dB max.  
Loss at center frequency or across a passband you define below.

IL Passband:  MHz

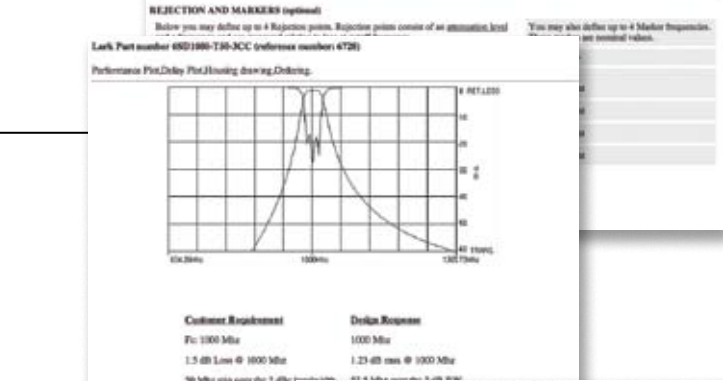
Group Delay:  ns at center

Rejection:  dB

IO Connectors:

**REJECTION AND MARKERS (optional)**  
 Below you may define up to 4 Rejection points. Rejection points consist of an attenuation level. You may also define up to 4 Marker frequencies. See manual values.

**2** Enter your filter requirements... your desired frequency, bandwidth, Insertion Loss, etc.



**3** Click the "Design Now" button. If your filter design is outside of Lark's standard range, forward your captured requirements to Lark via e-mail: [Sales@larkengineering.com](mailto:Sales@larkengineering.com), or fax to: 949-240-7910.

**REQUEST FOR QUOTE**

To Request a quote complete the following for:

Name:  (YOUR NAME) Company:  (YOUR COMPANY NAME)

Phone:  (YOUR PHONE #) Address:  (YOUR ADDRESS #)

Fax:  (YOUR FAX #) City:  (YOUR CITY)

Email:  (YOUR E-MAIL) State:  (YOUR STATE)

Zip:  (YOUR ZIP CODE #) Country:  (YOUR COUNTRY)

Part Number	Reference Number	Quantity
6SD1000-T50-3CC	6726	1300

Additional Information Here (Special Electrical/Environmental Specifications):

Submit Request    Print the Form

**Physical Dimensions**

Length: 3" (76.2 mm)  
 Width: .8" (20.32 mm)  
 Height: .31" (7.87 mm)  
 IO Pad Size (Type 1)  
 Isolation Gap (G) = .14"

For your convenience, a request for quote form is available on our website.

LARK ENGINEERING COMPANY

(949) 240-1233

[FILTERS](#)

[NEW PRODUCTS](#)

[WEB TOOLS](#)

[APPLICATION NOTES](#)

[DOCUMENTS](#)

[CONTACT LARK](#)



Samples of custom designs for some filter series can ship within 10 days.

[FILTER PLOT ARCHIVE](#)

[TRACK SHIPMENTS](#)

[FIND A REP](#)

**FILTER  
DESIGN  
TOOL**

ISO 9001: 2000 Certified | ISO 14001: 2004 Certified

27282 Calle Arroyo, San Juan Capistrano, Ca. 92675 | [sales@larkengineering.com](mailto:sales@larkengineering.com)

## LARK ENGINEERING COMPANY

A Division of Baier and Baier, Inc.

27282 Calle Arroyo  
San Juan Capistrano, California 92675

[www.larkengineering.com](http://www.larkengineering.com)  
[sales@larkengineering.com](mailto:sales@larkengineering.com)

Phone: 949-240-1233  
Fax: 949-240-7910