



Tunable Bandpass Filters

Lark Engineering's DIGITAL CONTROL filters are the new upcoming series of fast switching variable frequency filters that can make life easier for frequency hopping and secure communications systems. It provides a less complicated alternative to controlling and encrypting signals.

Key features (Typ.)

Impedance :	50 Ohms
Frequency bands :	90-200 MHz, 200-400 MHz,
	400-700 MHz, 700-1000 MHz
Inband max RF power handling :	+30 dBm (Input)*
Inband IP3 :	+40 dBm (input)*
Passband VSWR :	<2.1 @ Fc
-3 dB BW :	2.2 to 10%
Bandpass center frequency accuracy	± 1MHz
Tuning speed :	<50 microseconds
Tuning control:	8 bits parallel
Operating temperature :	-40°C to +85°C
Center frequency drift :	80 PPM/°C
Power supply:	5V @ 500 mA
Dimensions (HxWxL :	1.5" x 2.5" x 3.250"
*depends on the %BW	

Typical Response



These filters are ideal for Software Defined Radio (SDR), Multi-Band Radios, IFF, etc. Custom Tunable Bandpass Filters are available. For more information, please visit bench.com/lark/rf-components-solutions



Tunable Band-Pass Filters

The filter uses an 8 bits word parallel interface to tune the frequency up to 250 steps across the entire operating frequency range. There are 251 tuning words from 00000000 to 11111010. The last 5 tune words are reserved for special functions. The binary tuning word is calculated using the following expression.

Tuning Words =
$$\begin{array}{c} F & -F \\ \frac{\text{desired}}{\text{low}} & \text{low} \end{array} \times 250 \\ F & -F \\ \text{High} & \text{low} \end{array}$$

Example:

To tune the filter to 300 MHz, using 225-400 MHz band filter, the tuning word is:

Tuning Words = $\frac{300-225}{400-225}$ x 250 = 107=01101011

Note: Round off to the nearest integer.

Tuning Words for Some Selected Frequencies:

	Desired Frequency MHz	Rounded-Off Integer	Binary Bits Word for Turning Code	Comment
	225	0	0000000	Lowest Frequency
	255	43	00101011	
	285	86	01010110	
	300	107	01101011	
	330	150	10010110	
	345	171	10101011	
	360	193	11000001	
	390	236	11101100	
	400	250	11111010	Highest Frequency
	Reserved for Special Functions		11111011 to 11111110	RF I/O Isolation, Filter Blanked
			1111111	All PIN Diodes Turned Off

Frequency Tuning Accuracy: ± 1 MHz. Measurements were taken from model TMC225-400-2AA



Power Supply and Control Interface:

Symbol Parameter		Condition	Min	Max
Vcc	Supply Voltage		+4.75	+5.25
VIL	Low Level Input Voltage	A0-A7		+0.8
V _{IH} High Level Input Voltage		A0-A7	2	
VILS Strobe Low Level Input Voltage		Strobe		0.3 x Vcc
V _{IHS} Strobe High Level Input Voltage		Strobe	0.7 x Vcc	

Timing Characteristics:

Symbol	Parameter	Value (Typ.)	
ts	t _s Setup time, A0-A7 to STB		
t _H	Hold time, A0-A7 from STB	6 µs	
t _{SH} STB high time		25 µs	
t _w	tw STB pulse width		
t _{ACC} Access time from STB to RF Out		50 µs	



Strobe Rate: 2 KHz max.

Input Output RF Connectors: SMA Female

Power Supply and Control Connector: DB-15 Male

Pin No.	Reference	Description]
1	A2	Tune bit 2	
2	A3	Tune bit 3	1
3	A4	Tune bit 4	
4	A5	Tune bit 5	
5	A6	Tune bit 6	
6	A7	Tune bit 7 (MSB)	
7	GND	Ground	
8	VCC	+5 VDC, ± 5%	
9	GND	Ground	
10	-	No Connection	
11	GND	Ground	
12	GND	Ground	
13	STB	Strobe	
14	A0	Tune bit 0 (LSB)	
15	A1	Tune bit 1	



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