LARK

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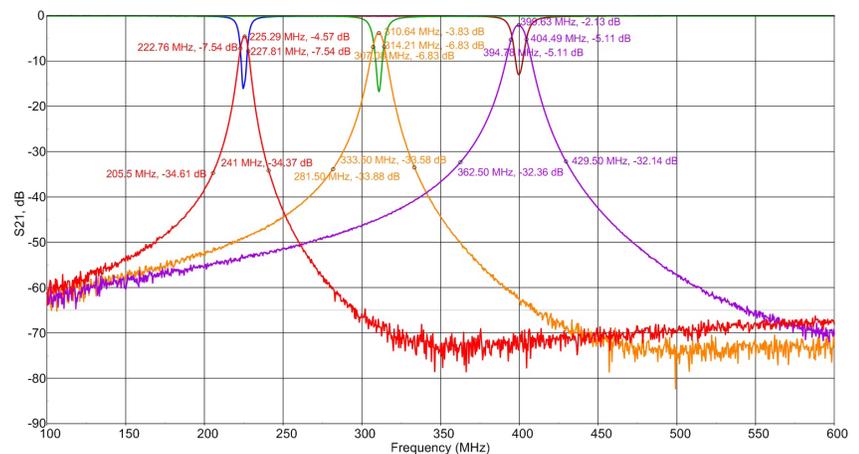
These filters are ideal for Software Defined Radio (SDR), Multi-Band Radios, IFF, etc. Custom Tunable Bandpass Filters are available.
For more information, please visit bench.com/lark/rf-components-solutions

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.

$$\text{Tuning Words} = \frac{F_{desired} - F_{low}}{F_{High} - F_{low}} \times 250$$

Example:

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

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

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	00000000	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
		11111111	All PIN Diodes Turned Off

Frequency Tuning Accuracy: ± 1 MHz. Measurements were taken from model TMC225-400-2AA
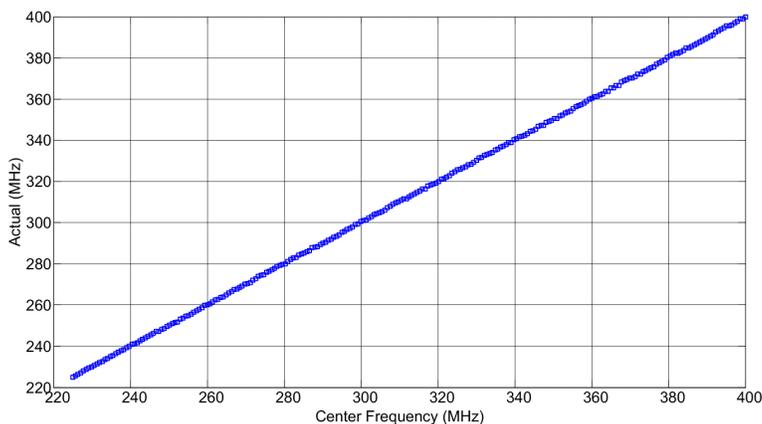
Power Supply and Control Interface:

Symbol	Parameter	Condition	Min	Max
V_{CC}	Supply Voltage		+4.75	+5.25
V_{IL}	Low Level Input Voltage	A0-A7		+0.8
V_{IH}	High Level Input Voltage	A0-A7	2	
V_{ILS}	Strobe Low Level Input Voltage	Strobe		0.3 x Vcc
V_{IHS}	Strobe High Level Input Voltage	Strobe	0.7 x Vcc	

Timing Characteristics:

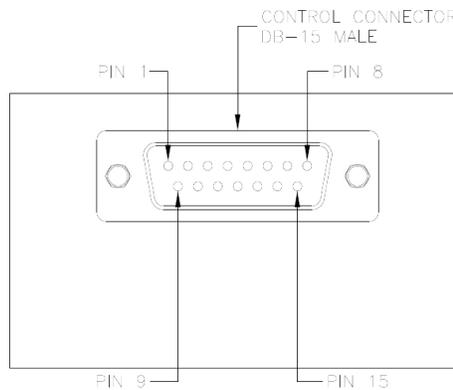| Symbol	Parameter	Value (Typ.)
t_S	Setup time, A0-A7 to STB	200 ns
t_H	Hold time, A0-A7 from STB	6 µs
t_{SH}	STB high time	25 µs
t_W	STB pulse width	20 ns
t_{ACC}	Access time from STB to RF Out	50 µs
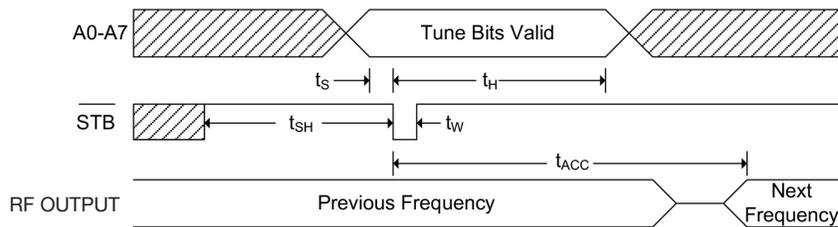
Strobe Rate: 2 KHz max.

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
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