

FEATURES

- Quasi-elliptic Bandpass Design
- L-band Tuning Range
- Can Be Cascaded for Sharper Roll-off
- On-Device Temperature Measurement
- Compact Form-factor
- Control and Power over USB 2.0

Specifications

- Tuning Range: 1650 – 2120 MHz
- Insertion Loss: 6.3 dB typical
- Return Loss: 16 dB typical

APPLICATIONS

- Jamming Mitigation
- Communications Receivers
- ESM Receiver Protection
- TR Modules
- Electronic Warfare

GENERAL DESCRIPTION

IM1101DC is a reconfigurable, quasi-elliptic bandpass filter, designed and packaged to make evaluation and testing straightforward.

FUNCTIONAL BLOCK DIAGRAM

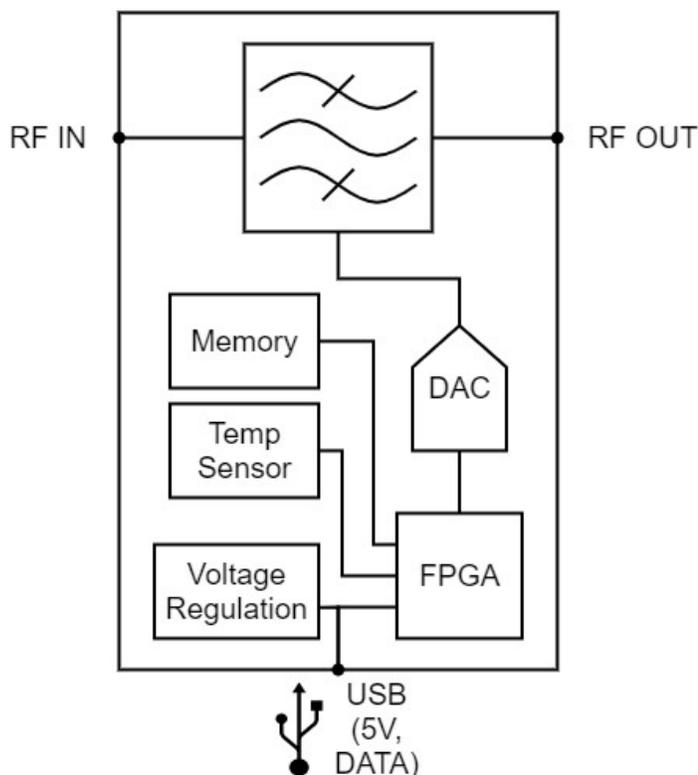


Figure 1. Functional Block Diagram

*Specifications subject to change without notice

SPECIFICATIONS

Specifications are for the IM1101DC L-band bandpass demo unit.

Table 1. Electrical Specifications

PARAMETER	TEST CONDITION/COMMENTS	MIN	TYP.	MAX	UNITS
Tuning Range	Filter center frequency	1650		2120	MHz
Tuning Resolution			5		MHz
Passband					
Insertion Loss	At center frequency	4.37	6.3	7.4	dB
Return Loss	Within -3 dB bandwidth	11.56	16	38.48	dB
-3 dB Bandwidth		170.67	229.87	280	MHz
-20 dB Bandwidth		448	520.46	591.33	MHz
Group Delay	Within -3 dB bandwidth	3.58	4.77	6.57	ns
Tuning Speed	See Note 1		20		μs
Stop Band	See Note 2				
Rejection – 10%	Average loss 10% away from center frequency		14		dB
Rejection – 20%	Average loss 20% away from center frequency		28		dB
Rejection – 30%	Average loss 30% away from center frequency		25		dB
IIP3	Passband 2-Tone Test (See Note 3)	28.91	30.96	32.67	dBm

NOTES:

1. Tuning speed is approximated for this demo unit. Actual tuning speed of the filter will depend on voltage driver and control interface latency.
2. Reduction in stop band rejection from 20% to 30% is due to reentrant effects.
3. IIP3 is determined using the fundamental tone in the passband and the highest 3rd order product produced. Tone spacing of 0.5 MHz was used.

*Specifications subject to change without notice

ABSOLUTE MAXIMUM RATINGS*Table 2. Absolute Maximum Ratings*

PARAMETER	RATING
Supply Voltage	5V (USB)
Passband RF Power	20dBm
Stopband RF Power	20dBm
Ambient Operating Temperature	-40 to 60 °C
Storage Temperature	-40 to 60 °C

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TYPICAL PERFORMANCE DATA

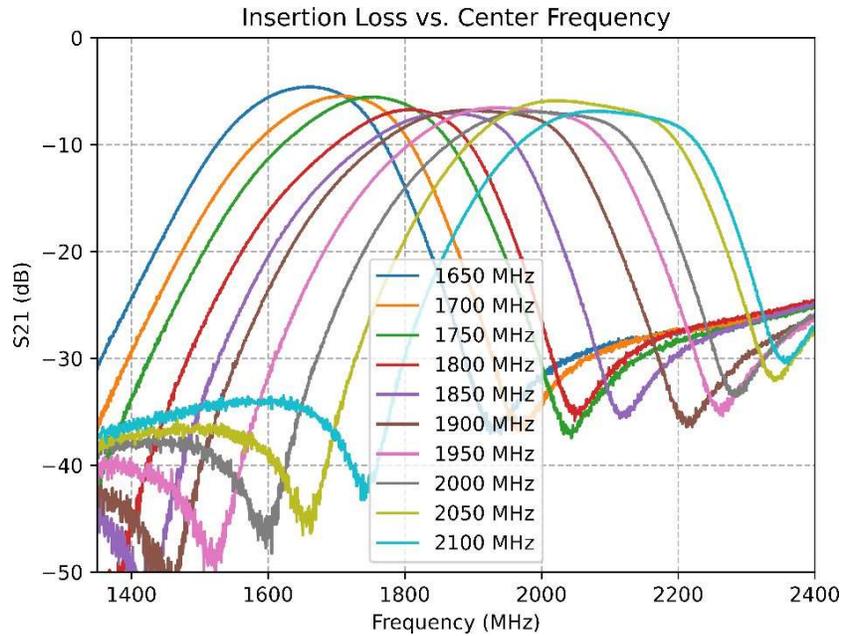


Figure 2. Filter Insertion Loss vs Center Frequency

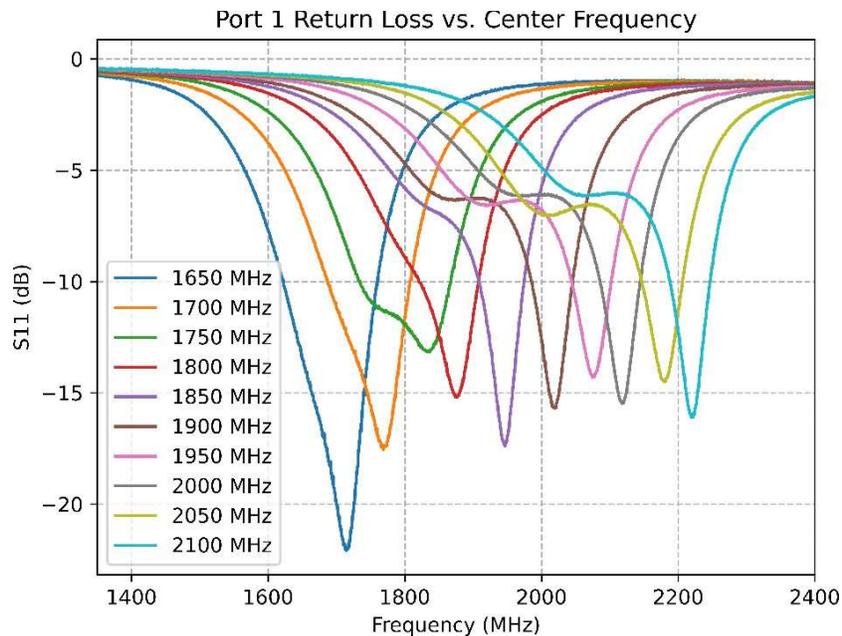


Figure 3. Filter Return Loss vs Center Frequency

*Specifications subject to change without notice

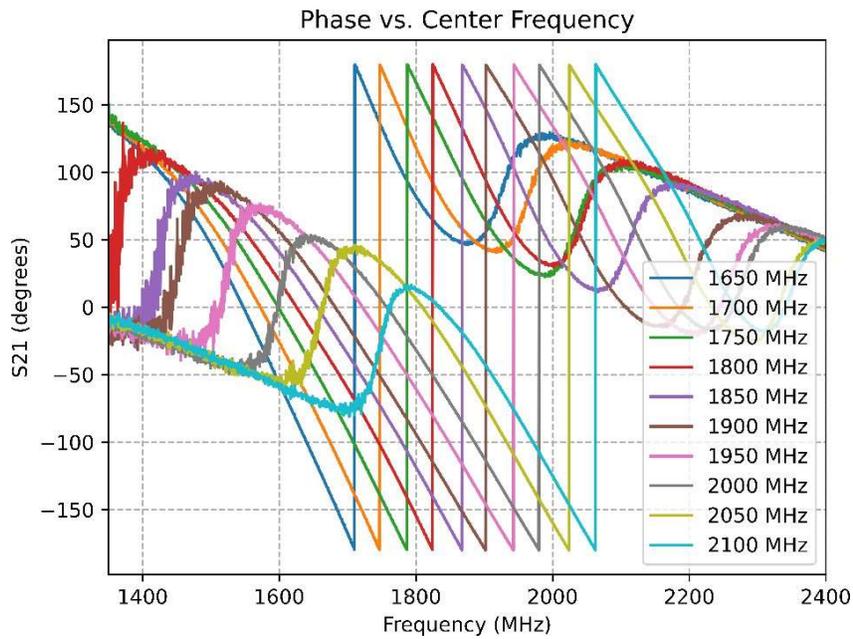


Figure 4. Filter Phase vs Center Frequency

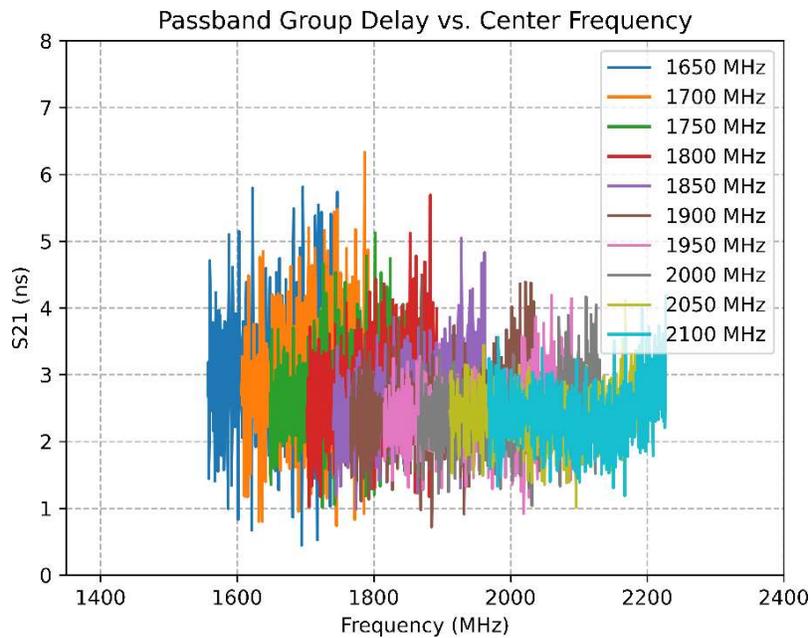


Figure 5. Filter Group Delay vs Center Frequency

*Specifications subject to change without notice

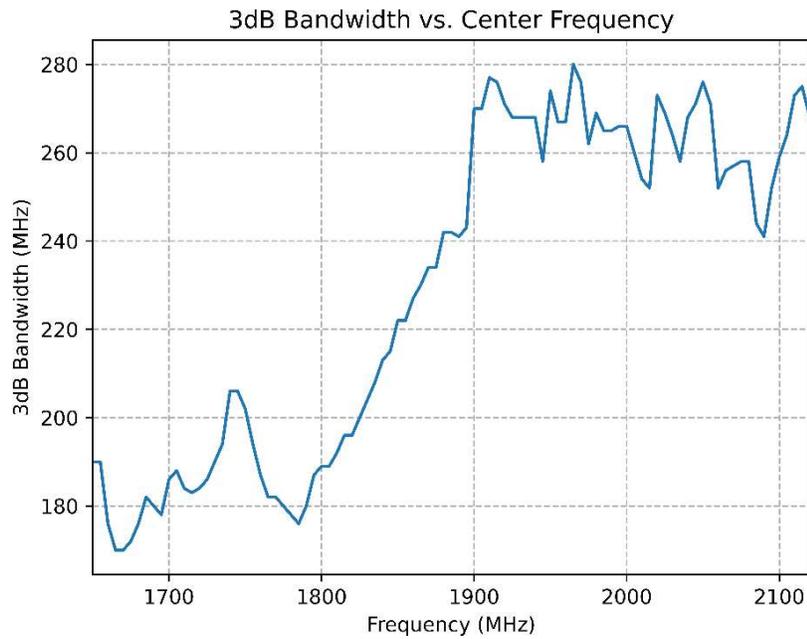


Figure 6. Filter -3dB Bandwidth vs Center Frequency

HARDWARE INTERFACE

Table 3. Connectors

NAME	TYPE	HARDWARE	MANUFACTURER	MANUFACTURER PART NUMBER
RF1	RF Input / Output	SMA Female	Amphenol RF	132146
RF2	RF Input / Output	SMA Female	Amphenol RF	132146
Power / Control	USB	USB Mini-B	Amphenol ICC	MUSB15104

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FILTER CONTROL SOFTWARE

The IM Tunable Filter Demo unit is provided with control software for ease of testing. To run, connect the filter and the provided USB thumb drive to the same Windows machine. Launch *TunableFilter.exe*. The user interface is detailed below in Figure 7 and Figure 8:

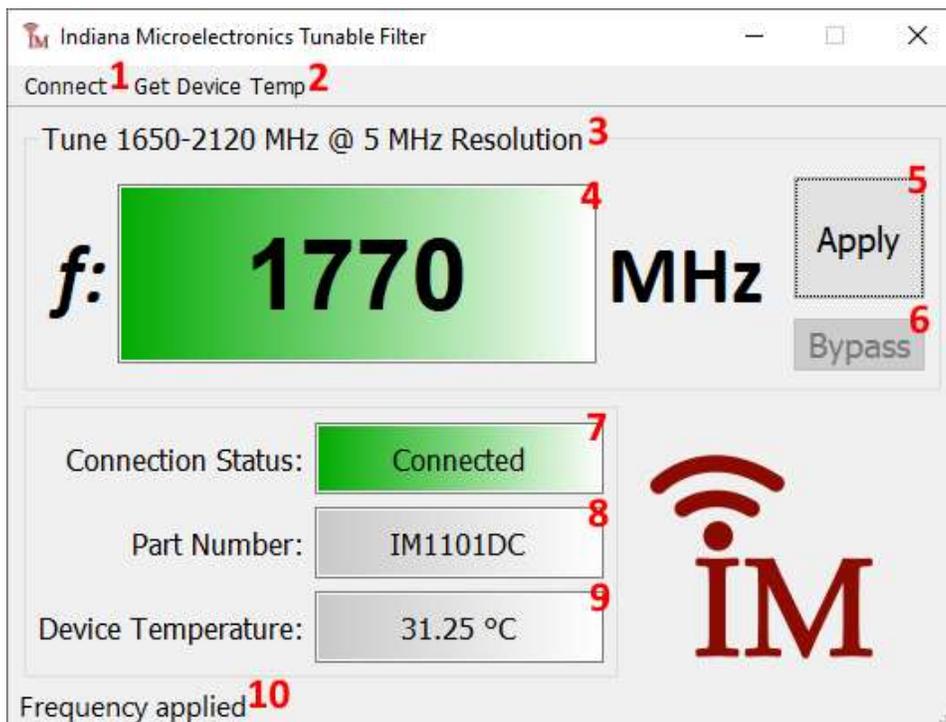


Figure 7. Tunable Filter Control Software

INDEX	NAME	FUNCTION
1	Connect Button	Opens the connection browser (see Figure 8, Table 5)
2	Get Temperature Button	Reads device temperature and updates respective field
3	Frequency Tuning Range(s)	Tuning range and resolution of filter. See Note 1
4	Frequency Input Field	Field to type desired frequency setpoint
5	Apply Frequency Button	Applies frequency typed in Frequency Input Field. See Note 2
6	Bypass State Enable	Applies Bypass (all-pass) state to filter, if applicable. See Note 3
7	Connection Status	Shows status of connection to Tunable Filter
8	Connected Device Part Number	Shows Part Number of connected Tunable Filter
9	Connected Device Temperature	Shows last read Device Temperature. See Note 4
10	Status Bar	Temporarily shows relevant messages and errors

Table 4. Control Software Details

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NOTES:

1. Frequencies between and including the listed bounds at the provided resolution interval are valid. For example, 1650, 1655, 1660, etc. as shown for the example device in Figure 7. Values within the bounds but outside of provided resolution (e.g. 1653) will be automatically rounded. Note that some devices have multiple ranges of valid tune states. Values between listed ranges are invalid.
2. Pressing ENTER also applies the value in the Frequency Input Field.
3. Not all devices have a bypass state. The button is unavailable in this case.
4. Device temperature is read on initial connect but will only update when Get Device Temp is pressed.

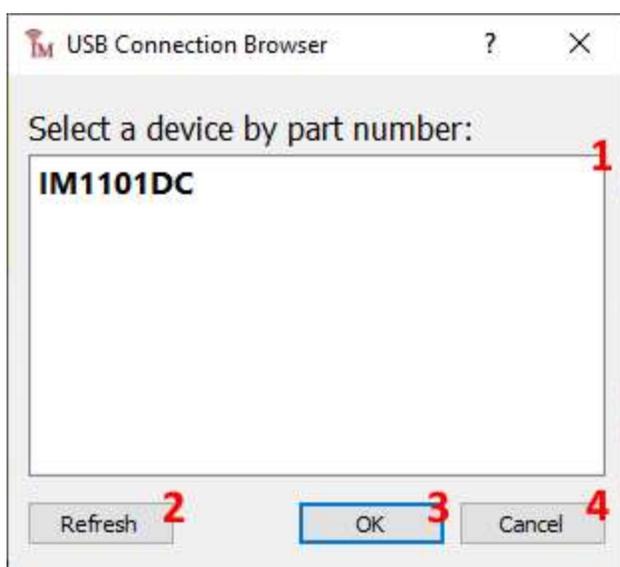


Figure 8. Control Software Connection Browser

INDEX	NAME	FUNCTION
1	Discovered Device List	Shows a list of all discovered IM Tunable Filters.
2	Refresh List Button	Re-searches for available IM Tunable Filters and updates list
3	OK Button	Connects to selected part number. See Note 1
4	Cancel Button	Cancels connection attempt and closes browser. See Note 3

Table 5. Connection Browser Details

NOTES:

1. Desired Part number must be highlighted in list when pressed. Double-clicking desired serial number also initiates connection.
2. Equivalent to closing window with X button.

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