

Features

- High Stop-Band Rejection
- Absorptive Design
- Can be Cascaded for Multiple Notches
- On-device Temperature Measurement
- Compact Form-factor
- Control and Power over USB 2.0

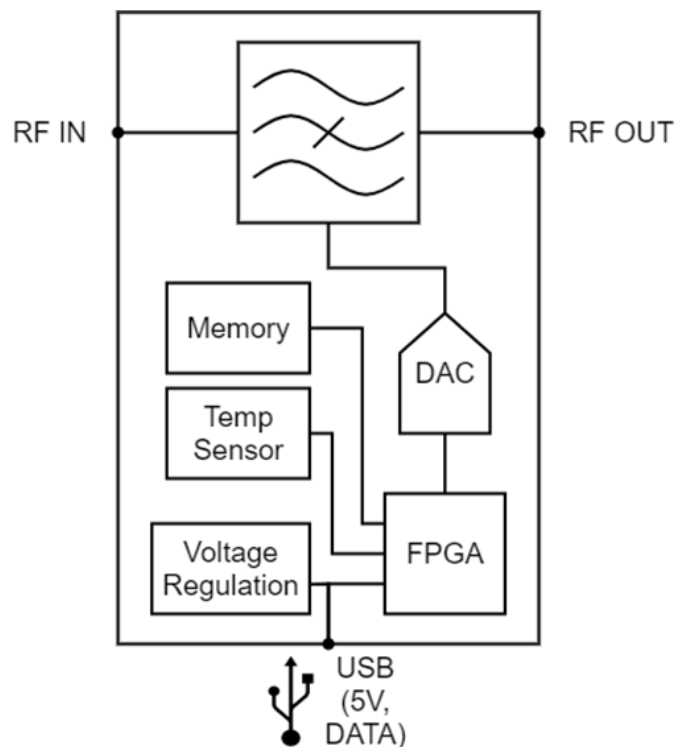
Applications

- LTE Co-Channel Interference
- Jamming Mitigation
- Communications Receivers
- ESM Receiver Protection
- TR Modules
- Electronic Warfare

General Description

TF10400 is a unit for a high-rejection, tunable, absorptive notch filter that is designed and packaged to make evaluation and testing straightforward. The unit can be controlled through the provided graphical user interface or python API.

Functional Block Diagram



Electrical Specifications

Parameter	Symbol	Specification	Conditions
Tuning Range	Fc	835 to 965 MHz	
Tuning Resolution		1 MHz typical	
Tuning Accuracy		0.14 MHz typical	
Rejection		44.6dB min, 54.5 typical, 70.7dB max	Notch Performance
-3dB Bandwidth		71.1 MHz min, 74.6 MHz typ, 79.2 MHz max	Notch Performance
-20dB Bandwidth		10.9 MHz min, 11.8 MHz typ, 13.3 MHz max	Notch Performance
Passband Frequency		500 to 1200 MHz	See Note 1
Insertion Loss	IL	1.1dB maximum	Valid only in passband (See Note 1)
Return Loss		10dB minimum	
Group Delay		5.6ns maximum	
Tuning Speed		20μs	Full Scale (See Note 2)
IIP3		TBD dBm typical	Passband 2-Tone Test (See Note 3)
Passband RF Power		+30dBm maximum	
Notch RF Power		+10dBm maximum	
Supply Voltage		5V	USB
Minimum Signal to Notch Spacing		40 MHz	Half Max 3dB Bandwidth

Temperature

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Operating Temperature	OTR	-40		+60	°C	
Storage Temperature	STR	-40		+60	°C	

Hardware Interface

Name	Type	Hardware	Manufacturer	Manufacturer PN#
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

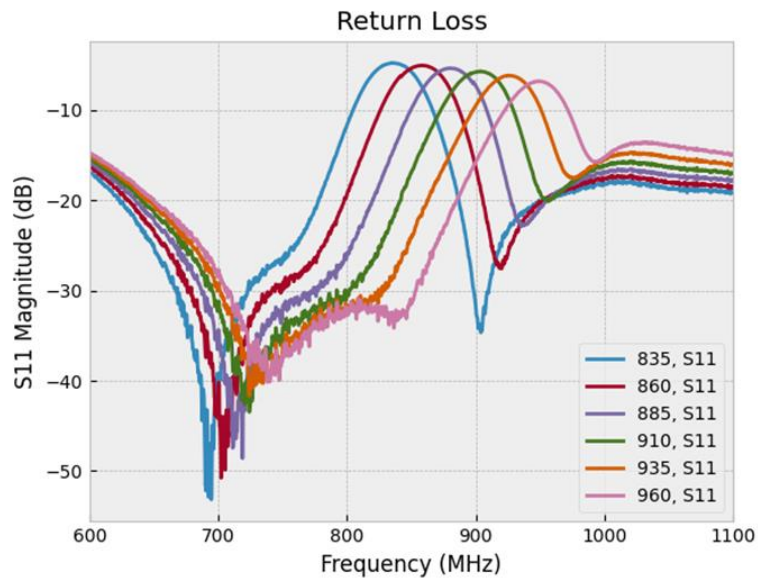
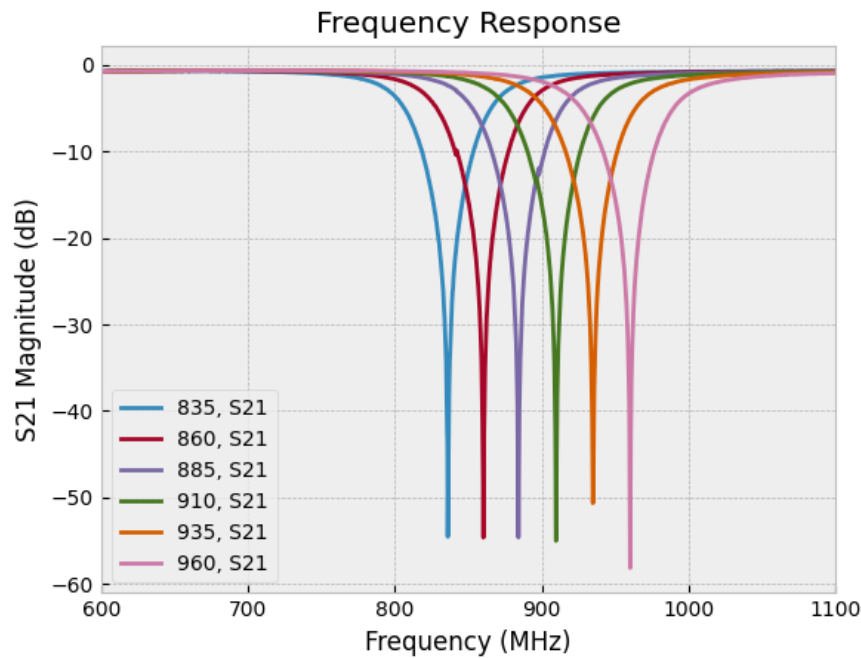
Notes

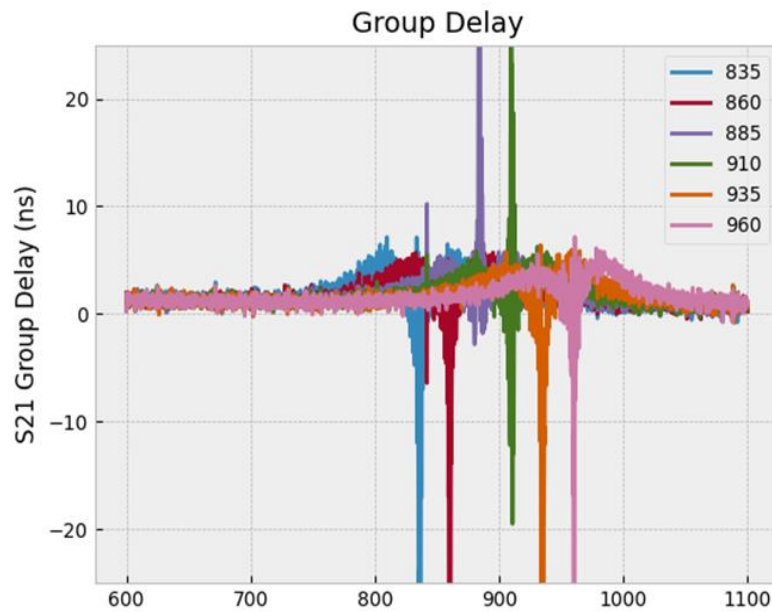
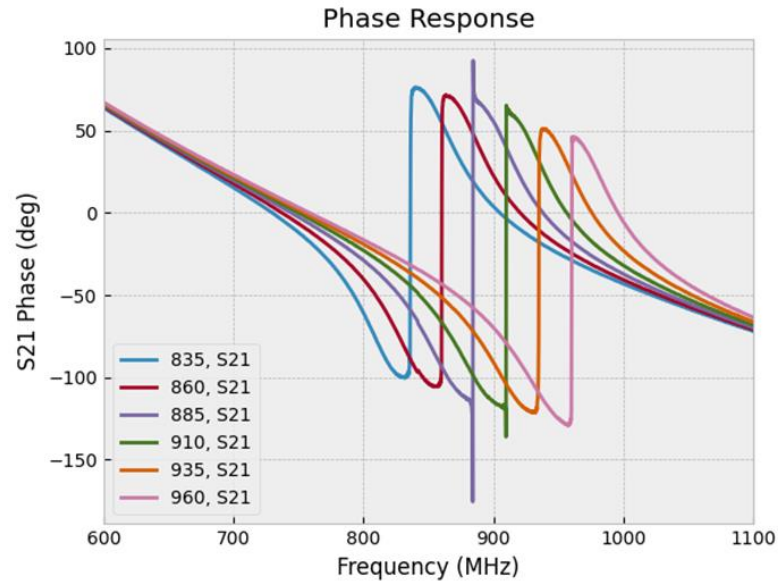
Note 1	Passband is defined as the frequency range between the 3 dB insertion loss points outside of the notch filter tuning range.
Note 2	Tuning speed is approximated for this unit. Actual tuning speed of the filter will depend on voltage driver and control interface latency.

Note 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.

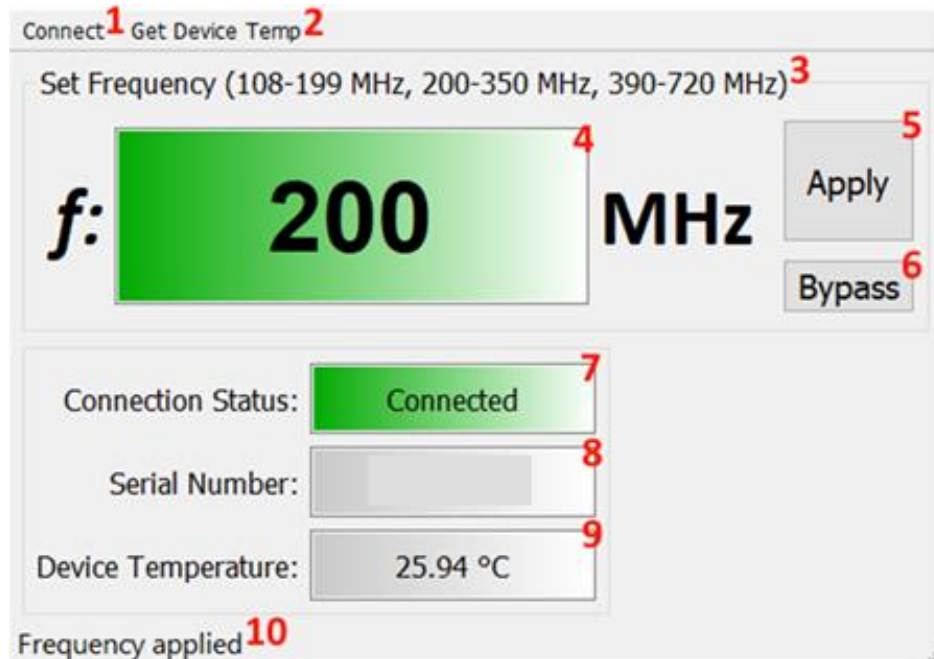
Simulation plots





Filter Control Software

The Tunable Filter 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:

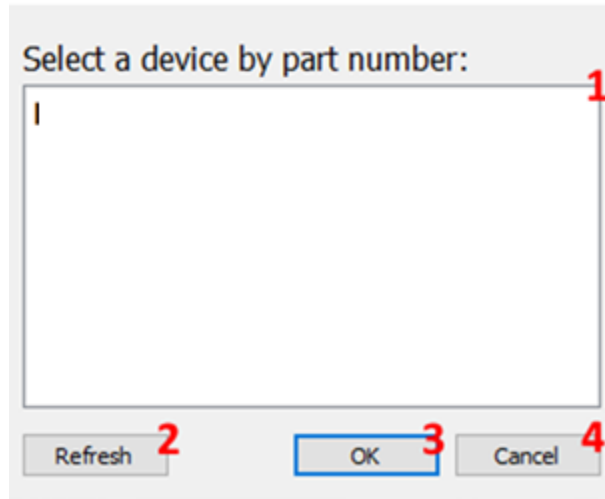


Index	Name	Function
1	Connect Button	Opens the connection browser
2	Get Temperature Button	Reads device temperature and updates respective field
3	Frequency Tuning Range(s)	Tuning range of notch. ¹
4	Frequency Input Field	Field to type desired frequency setpoint
5	Apply Frequency Button	Applies frequency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

Notes

Note 1	Some devices have multiple ranges of valid tune states. Values between listed
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	ranges are invalid (e.g., 375 MHz in the example). Bounds of listed ranges are inclusive.
Note 2	Pressing ENTER also applies the value in the Frequency Input Field.
Note 3	Not all devices have a bypass state. The button is unavailable in this case.
Note 4	Device temperature is read on initial connect but will only update when Get Device Temp is pressed.

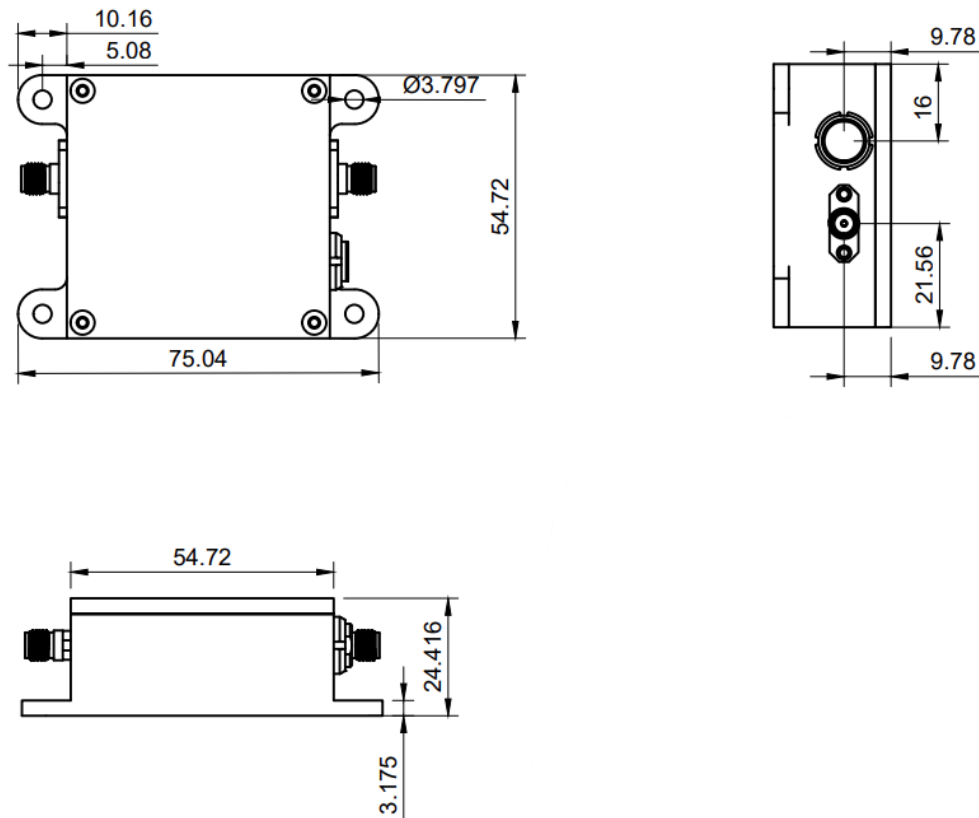


Index	Name	Function
1	Discovered Device List	Shows a list of all discovered Tunable Filters.
2	Refresh List Button	Re-searches for available Tunable Filters and updates list.
3	OK Button	Connects to selected part number. ¹
4	Cancel Button	Cancels connection attempt and closes browser. ²

Notes

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

Outline Drawing



All units in mm

Revision History

Date	Rev	Author	Details of Revision
07-22-25	A	AR	Added outline drawing
04-16-25	0	AR	Initial Version