FIR Filter Builder

Description

Design and create lowpass, highpass, bandpass, and bandstop finite impulse response (FIR) filters with up to 14,819 coefficients at a sampling rate of 244.1 kHz. The Moku:Lab's fluid iPad interface allows you to quickly design your filter in both the frequency and time domains, enabling you to fine tune your filter's response to suit your specific application. Select between four frequency response shapes, five common impulse responses, and up to eight window functions.

Features

- Design filters in the time domain or in the frequency domain using common impulse responses and window functions
- Upload your own filter coefficients, or define your own custom impulse response mathematically using an equation editor
- View your filter's transfer function, impulse and step response, or group and phase delay
- Save measurement data to SD card or the cloud at the touch of a button

Specifications

Inputs

Input characteristics

Channels	2
Input control matrix coefficients	-20 to +20
Input impedance	50 Ω / 1 MΩ
Input coupling	AC / DC
Input attenuation	0 dB / 20 dB
Input voltage range	± 0.5 V into 50 Ω with 0 dB attenuation ± 5 V into 50 Ω with 20 dB attenuation

Filter characteristics

Pre-filter

Input offset range	± 1 V
Input offset resolution	100 µV
Input gain range	-40 dB to +40 dB
Input gain resolution	0.1 dB

Post-filter

Output offset range	± 2 V
Output offset resolution	100 µV
Output gain range	-40 dB to +40 dB
Output gain resolution	0.1 dB

General filter characteristics

Sampling rates	122.1 kHz, 244.1 kHz, 488.3 kHz, 976.6 kHz, 1.953 MHz, 3.906 MHz, 7.813 MHz, 15.63 MHz
Number of coefficients	2 to 232 @ 15.63 MHz
	2 to 464 @ 7.813 MHz
	2 to 928 @ 3.906 MHz
	2 to 1856 @ 1.953 MHz
	2 to 3712 @ 976.6 kHz
	2 to 7424 @ 488.3 kHz
	2 to 14819 @ 244.1 kHz and 122.1 kHz
Design domains	Time (impulse response) Frequency (frequency response)

Filter design / configuration

Display options	Magnitude / Phase Impulse / Step Response Group / Phase Delay
Frequency response	Lowpass, highpass. bandpass, bandstop
Impulse response	Rectangular, Sinc, Triangular, Gaussian, Equation, Custom
Window	None, Bartlett, Hanning, Hamming, Blackman, Nuttall, Tukey, Kaiser
Minimum filter cut-off frequency	Sampling rate / 10,000 • e.g., f_{min} = 12.21 Hz @ 122.1 kHz
Maximum filter cut-off frequency	Sampling rate / 2 (approximately) • e.g., f_{max} = 59.81 kHz @ 122.1 kHz