

Description

The QF1D512 “SaFIRE” is a programmable digital filter designed for seamless insertion in the serial data path of a digital signal or used as an FIR coprocessor. The device can be easily programmed using the Quickfilter Design Software to support virtually any FIR digital filter configuration. This specific circuit example shows the device operating between the analog inputs and outputs of a codec to provide a complete audio crossover network. In this configuration exceptionally high quality filtering generally seen only in high end systems is available over a broad range of ADC data rates with resolutions up to 24 bits.

Crossover Features

Digital Filter

- Single chip solution handles both high and low pass functions
- Customer selectable sampling rate and crossover frequency
- Based on 48 kHz sampling & 1500 Hz crossover...
 - Perfectly flat combined response over entire frequency band
 - 100dB attenuation in stop band
 - Better than 24dB per octave attenuation in transition band
- Reprogrammable in circuit

Data Rates

- up to 500k samples per second easily exceeds audio needs

Interface

- Configuration Interface: SPI 4-wire (all 4 modes supported)
- Data Interface: Fully programmable SPI and synchronous serial modes (I2S, SPDIF) – operates with a wide variety of ADC’s
- 3.3V I/O, all 5-V tolerant
- Operates off serial data clock (20MHz max)
- Can daisy chain multiple devices
- Programmable Bypass mode (e.g. process raw data, or to configure ADC)

Power

- Scales with input data rate
 - 0.827 mW @ 24ksps
 - 1.65 mW @ 48ksps
 - 3.30 mW @ 96ksps

Design Tools

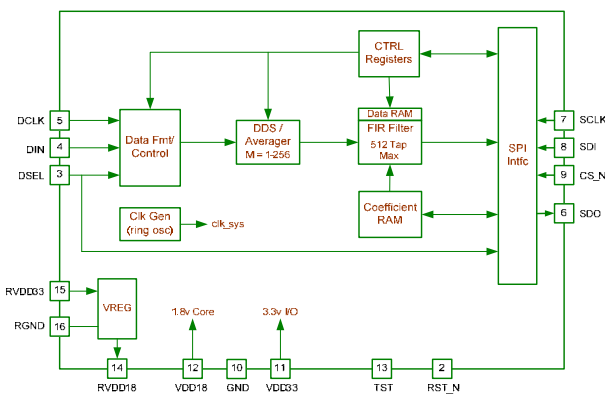
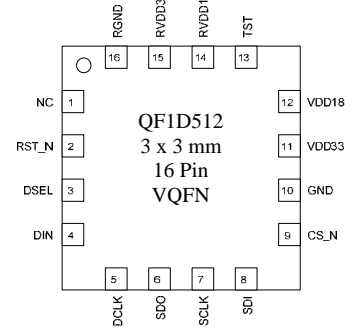
- Create a complete filter design using Quickfilter Design Software
- Designer simply enters key parameters... the tools handle the rest!

Development Kit

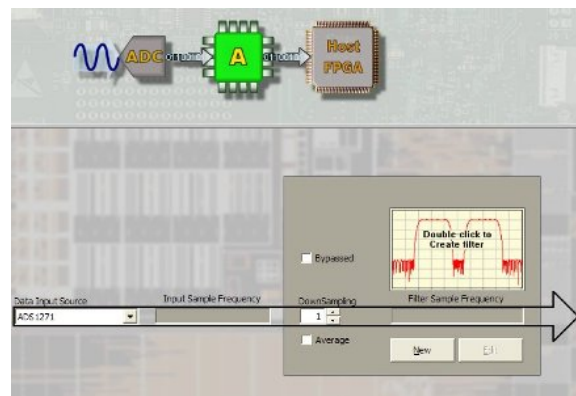
- QF1D512-DK (\$199): includes all hardware and software necessary to design, implement, and test a complete filter design. No separate power supply or controller board is needed. Final resulting frequency response is shown on PC screen.
- Audio Mojo daughter board (\$59): provides analog outputs to allow results to be connected directly to speakers.

Other

- Package: 16- pin QFN (3 X 3 mm)
- Temperature range: -40 to +85°C
- 3.3V and 1.8V supplies
- Internal linear voltage regulator may be used for single rail operation

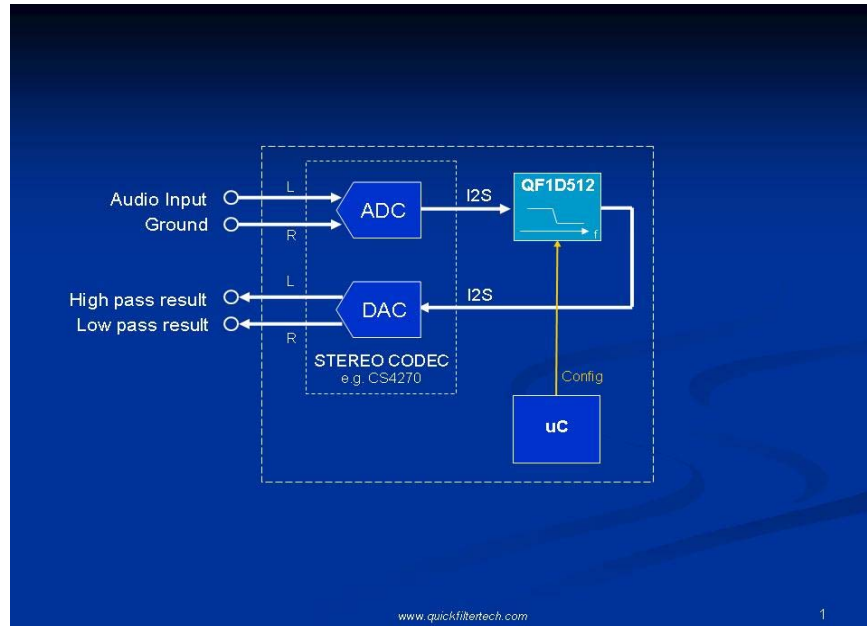


Device Functional Block Diagram



QuickPro™ Design Software

Application Block Diagram



Complete crossover network with one QF1D512



Quickfilter Development Kit



Example of Actual Filter Output FFT

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