QF1D512

Programmable Single Channel Digital Filter

Description

A single channel, programmable digital filter designed for seamless insertion in the serial data path of a digital signal or used as an FIR coprocessor. A circuit example below shows the QF1D512 operating between an ADC and an MCU. The device can be programmed using the Quickfilter Design Software which supports most FIR digital filter configurations. The FIR filter has 512 taps capable of generating "brick wall" filters such as a low pass filter with a 1 kHz cutoff frequency, 140dB of rejection, and a total transition band of only 10 Hz. The filter can operate over a broad range of ADC data rates – from 10sps up to 500ksps and can support ADC's with resolutions ranging from 12 to 24 bits.

Applications

- Wireless Sensor Networks
- Leak Detection
- Industrial control and monitoring
- Digital Sensors
- Medical patient monitoring & diagnostic equipment
- Military/Avionics

Features

Digital Filter
- Maximum 512-tap symmetric or 256-tap non-symmetric digital FIR filter
- 12 - 24 bit data words, up to 32 bit coefficients
- Programmable Box-car Averager and Down-sampler pre-FIR, including bypass mode
- Reprogrammable in circuit

Data Rates
- 10sps up to 500ksps

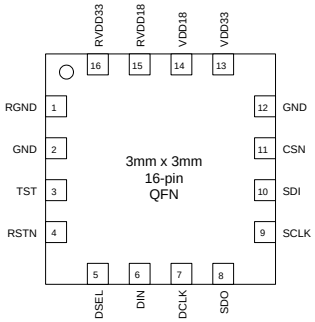
Interface
- Configuration Interface: SPI 4-wire (all 4 modes supported)
- Data Interface: Fully programmable SPI and synchronous serial modes – operates with a wide variety of ADC's
- 3.3V I/O, all 5-V tolerant
- Operates off serial data clock (20MHz max.)
- Can daisy chain multiple devices
- Programmable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

Power
- Scales with input data rate, and
- Scales with filter length, e.g. for 512 taps:
  - <1mW @ 1ksps
  - ~ 2mW @ 10ksps
  - ~ 5mW @ 100ksps

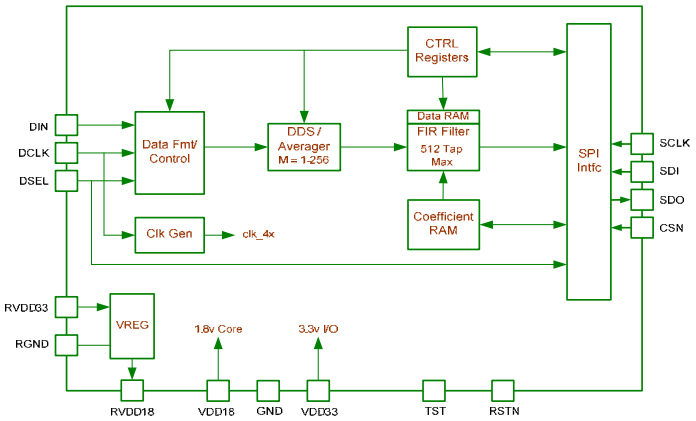
Design Software & Filter Types
- Create a complete filter design using Quickfilter Design Software
- Supports many filter types including Lowpass, Notched Lowpass, Highpass, Bandpass, Dual Bandpass, Bandstop, and Dual Bandstop
- Parks-McClellan & Windows Sinc filter algorithms

Development Kit
- $199: Includes all of the hardware and software necessary to design, implement, and test a complete filter design
- USB for both data and power

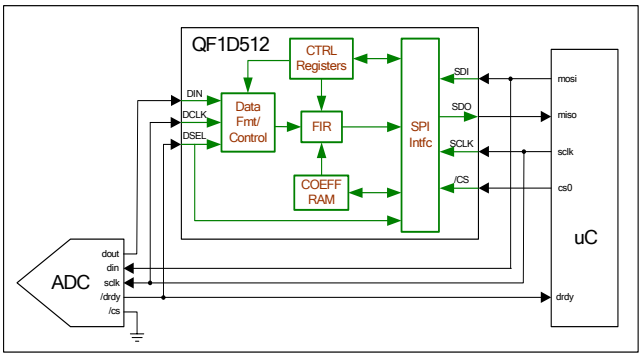
Other
- Package: 16- pin QFN (3 X 3 mm)
- Temperature range: -40 to +85°C
- 3.3V and 1.8V supplies
- Internal linear voltage regulator may be used for single rail operation



Block Diagram



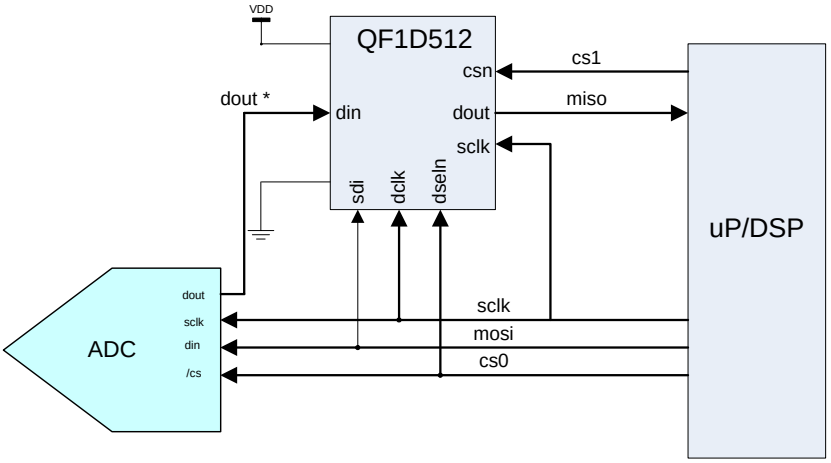
Typical Application



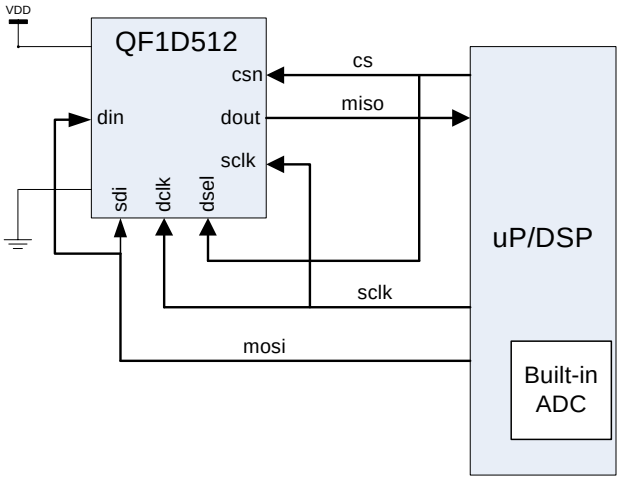
Serial Connection between ADC and Host – CS tied to GND

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Quickfilter reserves the right to change or discontinue these products without notice.

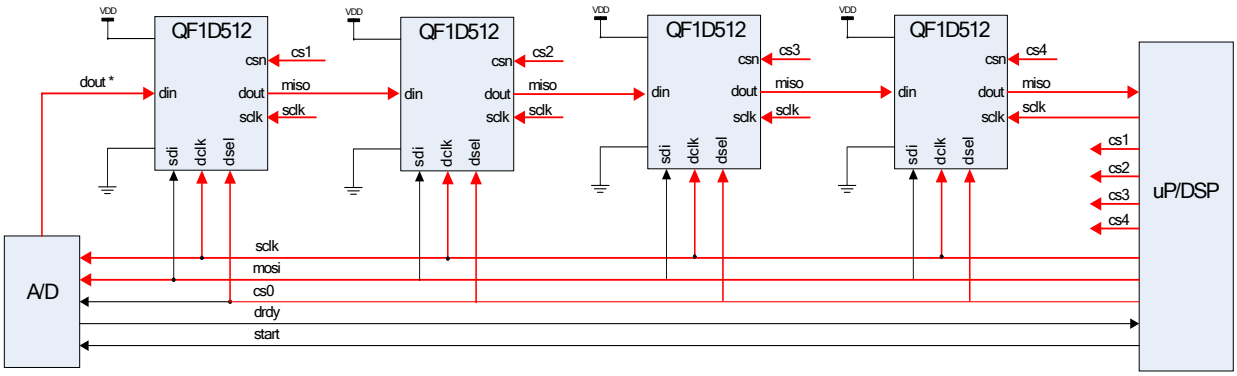
Additional Application Examples



Serial SPI – with CS



Slave SPI Co-processor – uC with embedded ADC



Daisy Chain (serial) for Multi-channel, Cascaded Filtering, Filter & Down-sampler