



QF Audio Mojo Startup Guide

QF1D512 SavFIRe™ Digital Filter

1. Introduction

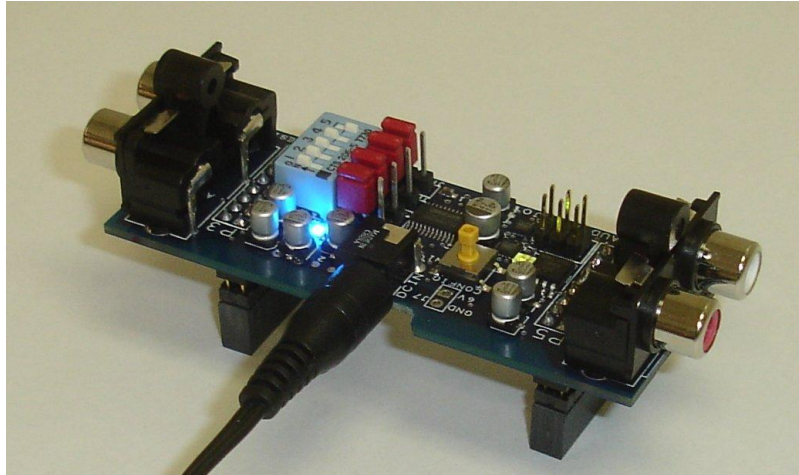
The QF1D512 – Audio Mojo is an application-specific development board, simplifying the development of precision filtering for audio applications, including equalizers and crossovers used for sound shaping in speakers, headphones and headsets. The board utilizes two QF1D512 SavFIRe™ (Simple and versatile FIR engine) chips, an audio codec, and a microcontroller for configuration. It can be used as a standalone evaluation tool or in conjunction with the [QF1D512-DK Development Kit](#).

Specifications

Parameter	Min	Typ	Max	Conditions	Measurement
Vboard	6Vdc	9Vdc	12Vdc		
Vanalog		5Vdc			
Vd33		3.3Vdc			
Vd18		1.8Vdc			
Line Level In		1Vrms			Audio Precision
Line Level Out		1Vrms			Audio Precision
SNR		80dB			Audio Precision
THD		80dB			Audio Precision
Dynamic Range		75dB			Audio Precision

QF1D512 – Audio Mojo as a standalone evaluation tool:

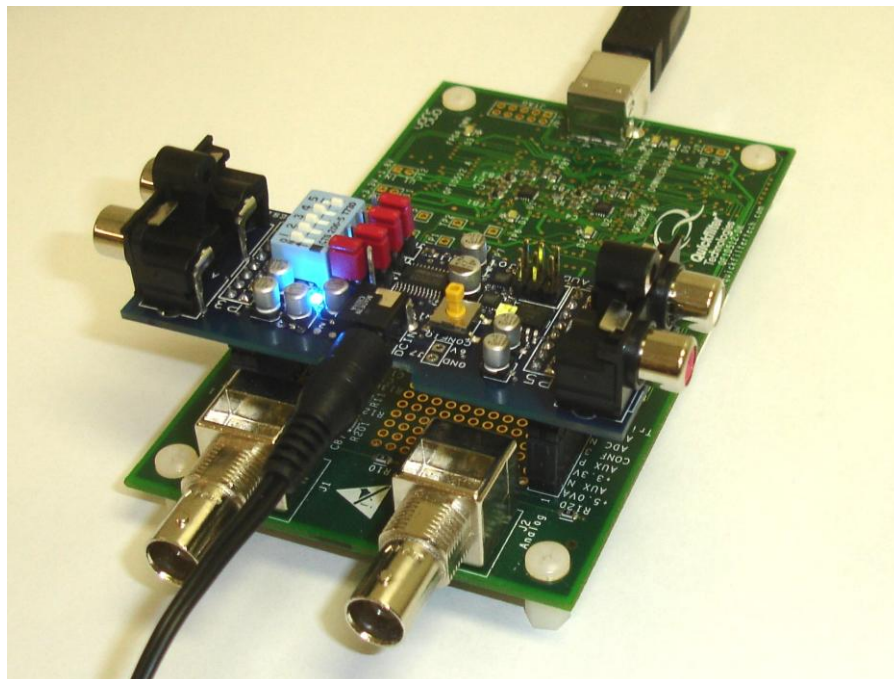
When used in a standalone mode, the Audio-Mojo board requires just a 5V external power supply. The user provides an analog input source(s). The filtered responses can then be monitored at the analog outputs. The same hardware can be used to split a single input into two frequency-separated channels, e.g. an audio crossover, or as a two-channel equalizer. Two sets of example filters are stored in non-volatile memory on the Audio-Mojo to illustrate both modes of operation.



Audio Mojo Stand-Alone Mode – Jumper settings

QF1D512 – Audio Mojo as an add-on to the QF1D512-DK Development Kit

The Audio-Mojo can be plugged onto the QF1D512-DK Development Kit to allow viewing of filter performance as well as to edit or create new filter responses. Once the filters are designed to the user's satisfaction, they can be downloaded into non-volatile memory on the Audio-Mojo board which can subsequently be used in a standalone mode in the user's application.



Audio Mojo Development Kit Mode – Jumper settings

Kit Contents

Audio MoJo Kit

- QF1D512 – Audio Mojo Development Board
- Startup Guide
- Programming Cable wiring diagram

QF1D512 Development Kit

- Quickfilter Pro Design Software CD
- QF1D512 Development Kit Board
- USB and analog input cables
- USB drivers, Data Sheet, and schematics
- Startup Guide

User Supplied

- Stereo RCA audio cables
- AC/DC Power Supply (5V – 12VDC with 1.3mm jack)
- Programming cable

The basic structure of the QF1D512 – Audio MoJo is shown in Figure 1.

Connect the Audio Mojo board to an audio source using the stereo RCA cables (user supplied).

The Audio Codec accepts the analog audio input signal and digitizes it. There are three options for routing the digital audio stream that is output by the codec. The stream can be routed through the QF1D512 SavFIRe parts for on-board filtering. It can bypass the onboard parts and be routed off-board to the two QF1D512s on the QF1D512-DK Development Board for filtering. It can be routed through the on-board SavFIRe parts and then sent through the SavFIRe parts on the DK board and be filtered by all four devices. The digital stream is returned to the codec for conversion back into analog audio. These options are selectable using the jumper settings on the Audio MoJo board. Figure 1A details the position of the jumpers for each option. In addition, the dip switch can be used to select both the audio sampling rate as well as the serial interface configuration. The settings for the dip switch are detailed in Figure 1B.

Connect the output of the Audio Mojo board to an audio output device (speakers, headphones, a PC audio card AUX input, etc.) or an analysis tool (spectrum analyzer, oscilloscope, etc.) to review the results.

The Audio Mojo board receives power from an external power supply (5V – 12V DC, 1A user supplied) or from the DK development board.

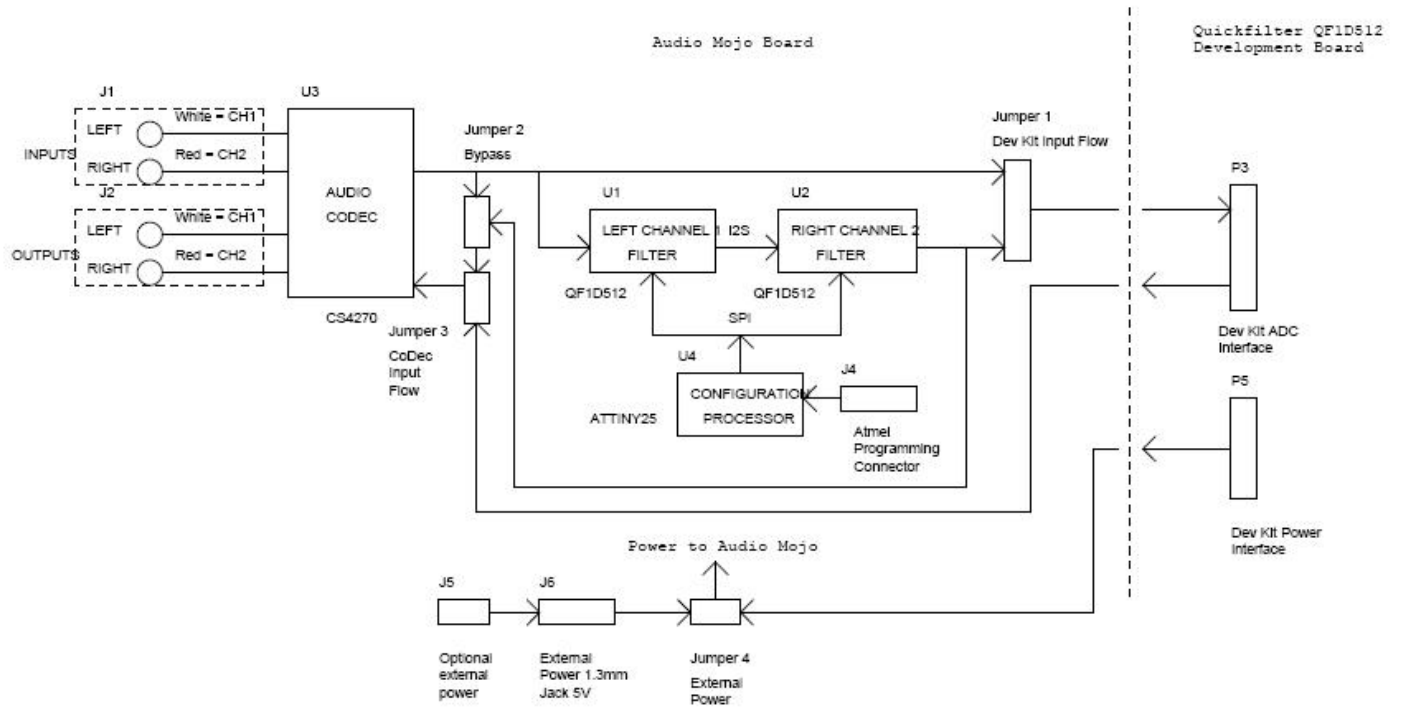
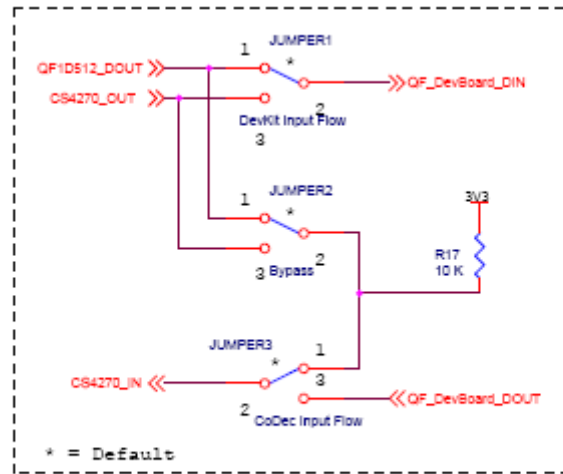
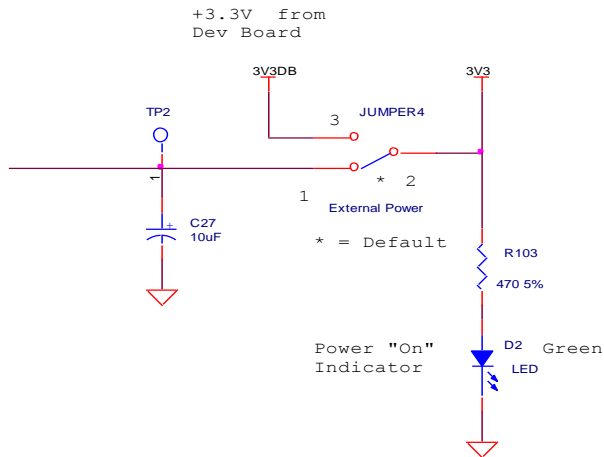


Figure 1. QF1D512 – Audio Mojo Block Diagram

Development of the configuration files used to implement any given filtering scheme are developed and tested within the Quickfilter Pro software (included in the QF1D512 – Development Kit and available as a free download from the Quickfiltertech.com website).



QF1D512's running on Audio Mojo board

	3	2	1	
Jumper4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	*
Jumper3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	*
Jumper2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	*
Jumper1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	*

* = Default

QF1D512's running on Dev Board

	3	2	1
Jumper4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Jumper3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jumper2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jumper1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

QF1D512's running on Audio Mojo and Dev Board

	3	2	1
Jumper4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Jumper3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jumper2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Jumper1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

CoDEC in Loop back mode, Monitor no filtering

	3	2	1
Jumper4	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Jumper3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Jumper2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jumper1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 1A Audio MoJo Jumper Settings

```

Switches 1 & 2, Mode 0, Model
*00 = Single-Speed
01 = Double-Speed
10 = Single, 44.1kHz
11 = Quad Speed

Switches 3 & 4, MCLK Divider

Switch 1 2 3 4
* 0 0 0 0 = 48 kHz
  1 0 0 0 = 44.1 kHz
  0 1 0 0 = 96 kHz
  1 1 0 0 = 192 kHz

Switch 5, I2S or Left Justify
0 = Left Justified
*1 = I2S digital format

Read Cirrus Logic data sheet for
CS4270 for additional modes

* = Shipped Default
  
```

Figure 1B Audio MoJo Dip Switch Settings

2. Stand Alone Operation

Orient the board as shown below in Figure 2.

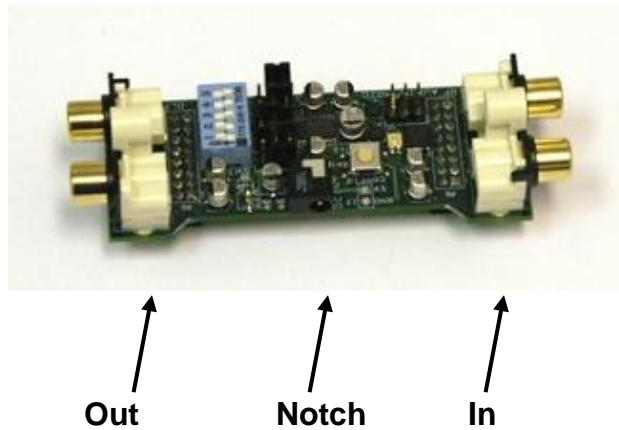


Figure 2 Audio MoJo Dip Stand Alone Orientation

Set jumpers and switches as described in Section 1 for stand alone operation. Connect RCA cables to input source and to external speakers. Connect the external power supply. Press the switch to change between the two default filter configurations.

3. Operation with the QF1D512 Development Kit

Configure the jumpers and switches as described in Section 1 for operation with the development kit (note configure Jumper 4 for receiving power from the development kit). **DO NOT CONNECT AN EXTERNAL POWER SUPPLY.** Mount the Audio MoJo board on the QF1D512 Development Kit (use the headers closest to the BNC connectors; notch is facing the BNC connectors). Connect the Audio MoJo board to an input source and external speakers using the RCA connectors. Configure Quickfilter Pro software for use with the Audio MoJo board by:

- Selecting Advanced User Mode under the Options menu
- Selecting Dual Serial mode from the Target drop-down selector on the tool bar
- Selecting "Audio-MoJo_DK" for the Data Input Source drop-down selector in the Chip Configuration Panel

Load pre-defined filters or design your own (see QF1D512 User's Guide included on the CD with the QF1D512 development kits and QFAB001 located at www.quickfiltertech.com/html/qfilter_page.php?content_id=66). If the user wishes to program new filters into the Audio MoJo board, a cable (not supplied) needs to go from connector J4 on the QF1D512 development kit to connector J5 on the Audio MoJo board. The wiring diagram for this cable is shown in Figure 3.

Audio MoJo Dev Kit Programming Cable

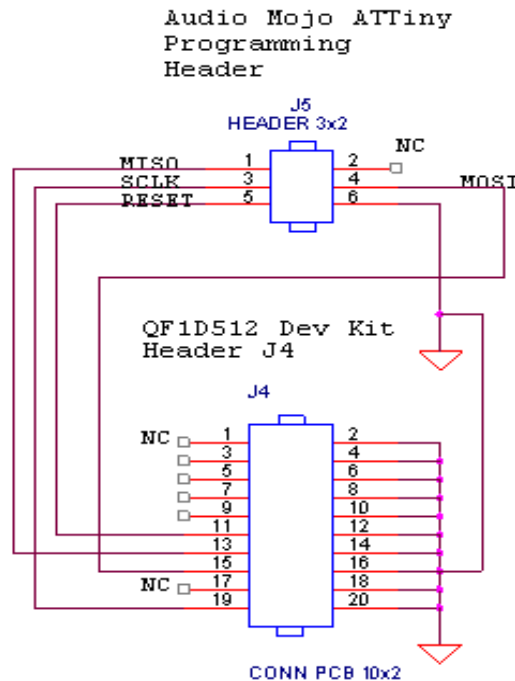


Figure 3 Audio MoJo Programming Cable Wiring Diagram

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