SOFTWARE DATA SHEET

DSP56307EVM EFCOP DEMO ADAPTIVE NOTCH FILTER

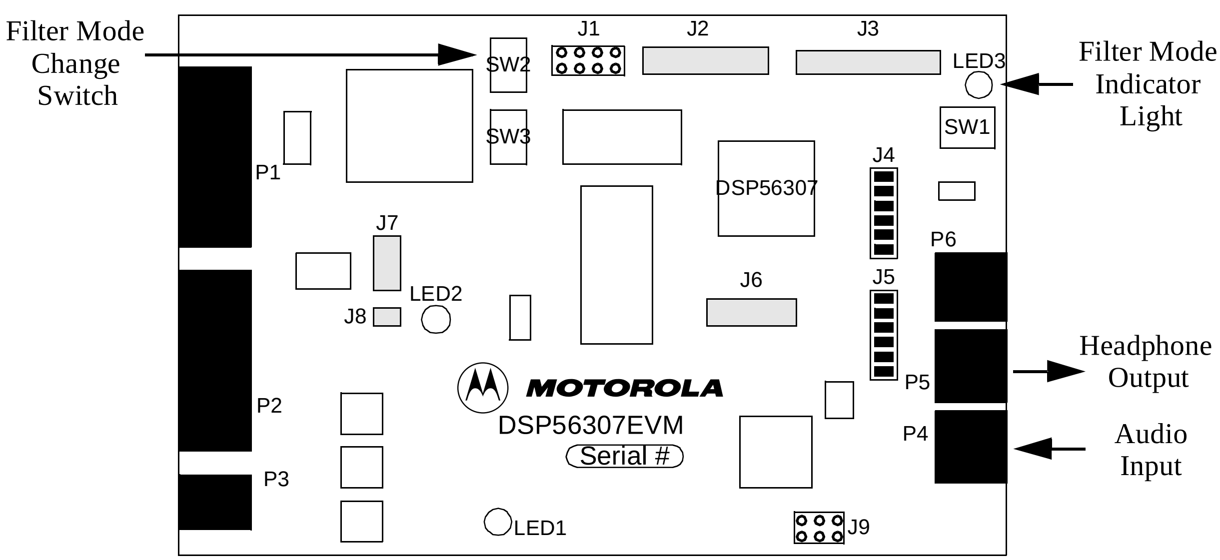
Description

This demo runs on the DSP56307EVM and implements an adaptive notch filter to cancel a tone of unknown frequency from an audio signal. The input signal is digitized using the on board codec, then input to the DSP. The DSP creates a tone and then adds the tone to the audio signal. The tone changes about every five seconds to show how the filter adapts to a new tone.

This demo also shows the advantages of the Enhanced Filter Co-Processor (EFCOP) of the DSP56307. The EFCOP is a peripheral module designed as a general purpose, fully programmable complex filter. The EFCOP has optimized modes of operation to perform complex FIR filtering, IIR filtering, adaptive FIR filtering and multi-channel FIR filtering. The EFCOP allows filter operations to be completed concurrently to the DSP56300 Core with minimal CPU intervention. The adaptive filter is implemented two ways: using only the DSP Core and using the Core and the EFCOP. This demo shows that the EFCOP can reduce the MIPS of applications using filtering operations.

Procedures

The figure below shows the DSP56307EVM with the connections, jumper setting, and other components needed for this demo. The jumpers on J1 and J9 must be removed and the jumpers on J4 and J5 must be connected as shown in the figure. The user must provide an audio input to the codec input jack and can listen to the output of the demo through a pair of headphones connected to the headphone output jack. The demo code must be loaded into the DSP56307 through the OnCE/JTAG Port. Refer to the DSP56307EVM User's Manual for more information how to setup and load code into the EVM.



This document contains information on a new product. Specifications and information herein is subject to change without notice.

This demo has three modes of operation: no filtering, EFCOP filtering, and Core filtering. The user can change between modes by pressing the SW2 button and the LED3 light indicates which mode is active. The first mode outputs the audio signal plus the tone with no filtering and LED3 is off when this mode is active. The second mode outputs the audio signal plus the tone filtered using the EFCOP. The last mode outputs the audio signal plus the tone filtered using only the DSP Core. LED3 flashes in proportion to the number of MIPS being used when the two filtering modes are active. LED3 flashes longer when the Core filter is active than when the EFCOP filter is active, because the Core filter uses more MIPS than the EFCOP filter. However, the audio quality of both filters is the same. Thus, the LED illustrates how amount of MIPS reduction achieved by the EFCOP for this application. A more detailed comparison of the DSP performance of the two filters is shown below.

Performance

A comparison of the performance of the Core filter and the EFCOP filter is shown in the table below. All memory numbers are given in 24-bit words. The X Memory is used for the filter taps for both filters. The Y Memory is used for the filter coefficients and the delay buffer (1000 words) for each filter. The P memory includes the initialization routines for each filter.

Measuring the actual MIPS of the EFCOP filter routine would result in a much higher number. However, most of these MIPS are used waiting for the EFCOP to complete the FIR processing. In a real life application, other processing can be completed while the EFCOP is operating. Thus the MIPS used while waiting for the EFCOP to complete the FIR processing were removed from the MIPS calculation below.

	MIPS	X Memory	Y Memory	P Memory
Core Filter	3.208	134	1137	94
EFCOP Filter	0.176	132	1132	44

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