SON - ARDUINO EFFECTS BOX

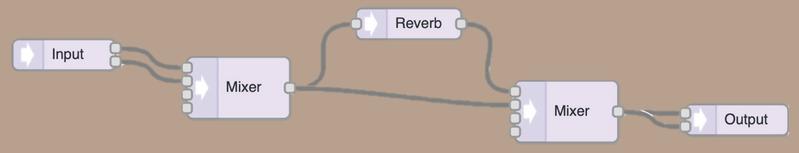
Teensy AudioShield

When combined together, the Teensy 4.0 and its companion audio adapter (see figure below) constitute a great platform for embedded real-time audio signal processing providing a stereo audio input and output, interfacing possibilities with sensors, etc.

During this project, I created an Arduino-based Effects-Box, applying different effects to an audio file, with an amplificated output.

Reverb

Reverberation, in acoustics, is a persistence of sound, after a sound is produced. This effect has been digitally implemented with two mixers and a modification of the gain (amplification level) on the mixer.



Granular

Granular synthesis is a sound processing technique that involves chopping up a piece of audio into teeny-tiny particle fragments called “grains.” By micro-sampling these grains, which are typically 5 to 200 milliseconds (ms) long, you can synthesize new sounds and patterns.

At low speeds of playback, the result is a kind of soundscape, often described as a cloud, that is manipulatable in a manner unlike that for natural sound sampling or other synthesis techniques. At high speeds, the result is heard as a note or notes of a novel timbre. By varying the waveform, envelope, duration, spatial position, and density of the grains, many different sounds can be produced.

BitCrusher

A Bitcrusher is an audio effect that produces distortion by reducing of the resolution or bandwidth of digital audio data. The resulting quantization noise may produce a "warmer" sound impression, or a harsh one, depending on the amount of reduction.

The filter has been implemented by modifying the sample rate.