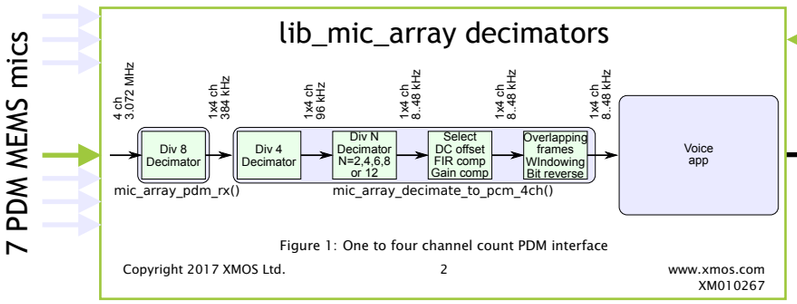

CLKs

CLK I2C I2S

SAMPLING_FREQUENCY_HZ = 48000

DAC CS43L21

Stereo

L = R

3.5 mm headset jack

F1 = Anti-alias low-pass filter @ 24 kHz

f_0/F_s = 24/48 = 0.5

Q = 0.707

Main example has 4096 samples per batch

NYQUIST_FREQUENCY_HZ = 24000

NUM_FFT_POINTS_COMPLEX = 2048

HZ_PER_BIN = 24000/2048 = 11.71875

PROCESS_FREQUENCY_HZ = 48000

NUM_SAMPLES_PER_BATCH = 4096

T_S(ms) = 85.33

F1 and **is a** second order biquad IIR filter, direct form I, as in [1].
Params are as in [2], part **LPF**

W1 = Windowing? (None = "square")

dsp_fft_bit_reverse

Num complex FFT bins = 1024

dsp_fft_forward

dsp_fft_split_spectrum

Alternative has 2048 samples per batch

PROCESS_FREQUENCY_HZ = 48000

NUM_SAMPLES_PER_BATCH = 2048

T_S(ms) = 42.67

NYQUIST_FREQUENCY_HZ = 24000

NUM_FFT_POINTS_COMPLEX = 1024

HZ_PER_BIN = 24000/1024 = 23.4375

Two (complex) spectra of each

Covering (ms) = 21.33

NUM_FREQ_POINTS_COMPLEX =

NUM_FREQ_POINTS_REAL = 512

512 bins * 21.4375 Hz/bin =

bandwidth (Hz) = 12000

Same bandwidth!

Two (complex) spectra of each

Covering (ms) = 42,67

NUM_FREQ_POINTS_COMPLEX = NUM_FREQ_POINTS_REAL = 1024

1024 bins * 11.71875 Hz/bin = bandwidth (Hz) = 12000

Two spectra to process (magnitude, power etc.)

[1] https://en.m.wikipedia.org/wiki/Digital_biquad_filter

[2] **Cookbook formulae for audio equalizer biquad filter coefficients** by Robert Bristow-Johnson, at http://shepazu.github.io/Audio-EQ-Cookbook/audio-eq-cookbook.html

Øyvind Teig
10Jun2022

https://www.teigfam.net/oyvind/home/technology/219-my-beep-brrr-notes/ (this example has not been coded)