



$NYQUIST_FREQUENCY_HZ = 8000$
 $NUM_FFT_POINTS_COMPLEX = 512$
 $HZ_PER_BIN = 8000/512 = 15.625$

F2 is second order biquad IIR filters, direct form I, as in [1]. Params are as in [2], part LPF

F2 = Anti-alias low-pass filter @ 4kHz
 $f_0/F_s = 4/16 = 0.25$
 $Q = 0.707$

W1 = Windowing?
(None = "square")

dsp_fft_bit_reverse

Num complex FFT bins = 512

dsp_fft_forward

dsp_fft_split_spectrum

Two (complex) spectra of each

Covering (ms) = 32
 $NUM_FREQ_POINTS_COMPLEX = NUM_FREQ_POINTS_REAL = 256$
 $256 \text{ bins} * 15.625 \text{ Hz/bin} = \text{bandwidth (Hz)} = 4000$

Two spectra to process (magnitude, power etc.)

Alternative has 512 samples per batch

$PROCESS_FREQUENCY_HZ = 16000$
 $NUM_SAMPLES_PER_BATCH = 512$
 $T_s(\text{ms}) = 32$
 $NYQUIST_FREQUENCY_HZ = 8000$
 $NUM_FFT_POINTS_COMPLEX = 256$
 $HZ_PER_BIN = 8000/256 = 31.25$

Two (complex) spectra of each

Covering (ms) = 16
 $NUM_FREQ_POINTS_COMPLEX =$
 $NUM_FREQ_POINTS_REAL = 128$
 $128 \text{ bins} * 31.25 \text{ Hz/bin} =$
 $\text{bandwidth (Hz)} = 4000$
 Same bandwidth!

[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>