TI Coefficient Calculator (TIBQ)

Download Link

- https://www.ti.com/tool/COEFFICIENT-CALC?keyMatch=BIQUAD%20COEFFICIENT%20CALCULATOR

Summary

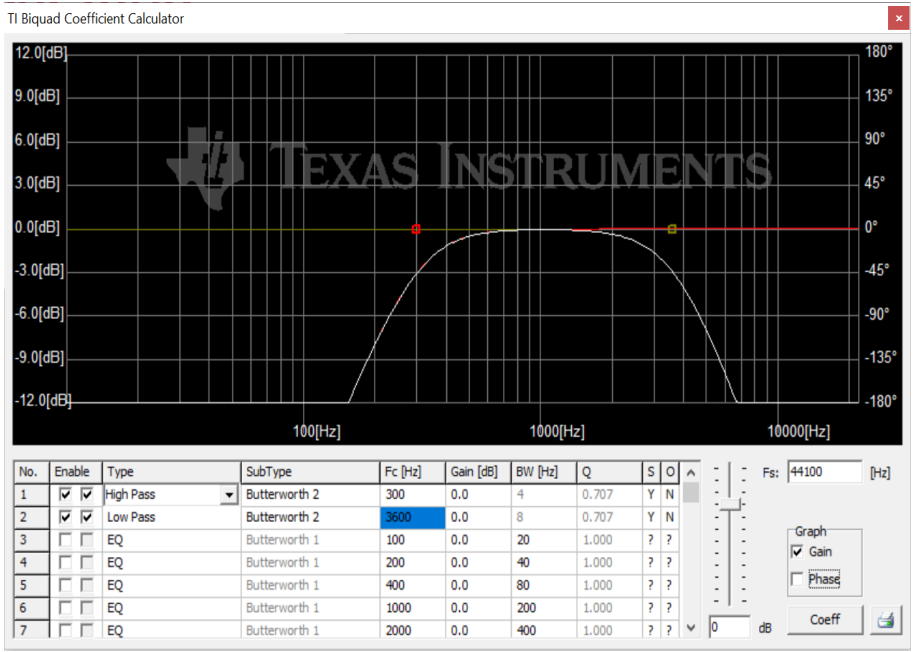
- The TIBQ Coefficient Calculator is a tool that can be used to generate IIR and/or Biquad filter coefficients.

- This tool allows the user to select the type of filter needed (Low Pass, High Pass, Base boost, Notch, etc) as well as input the filter characteristics such as the -3dB point, gain, and BW.

- The tool can then generate the coefficients for the filter that was selected. These coefficients can be used to configure the codec.

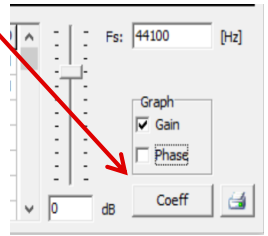
Basic Operation

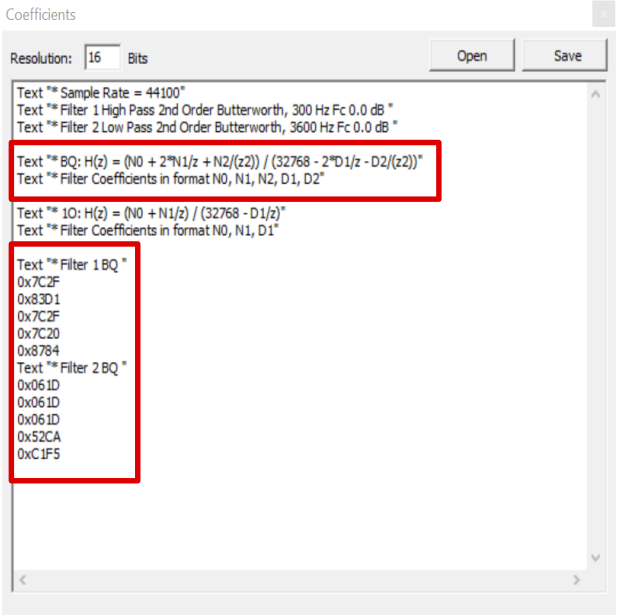
- Once the TIBQ calculator is opened, you may select the type and subtype of filter using the drop down menus.
- The Fc can also be configured by clicking in the box and entering the desired Fc.
- In this case, a 2nd order bandpass filter with knees at 300Hz and 3.6kHz was created. Gain was kept at 0dB.



Generating 2nd order Coefficients

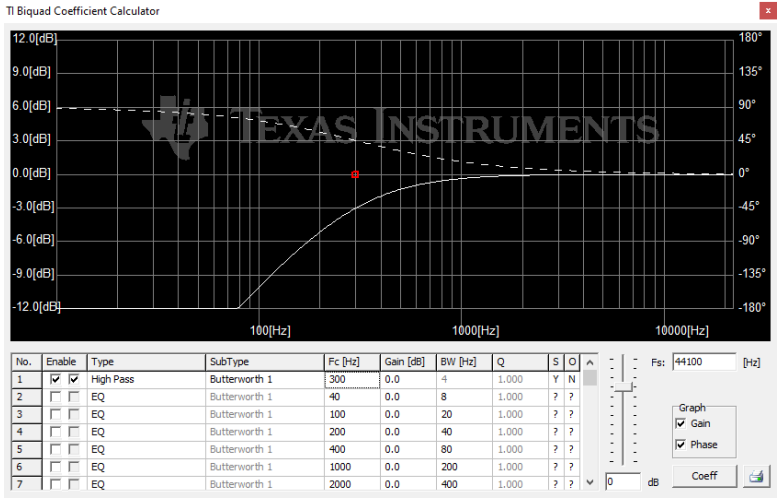
- When the filter has been created, you can click on the *Coeff* button on the bottom right.
- This will open a new window with the coefficients of the filter that the user created.
- There is text above that shows the format of the generated Biquad coefficients. In this example, N0 = 7C2F and N1 = 83D1 etc..





Generating 1st order Coefficients

- In this case, a 1st order high pass filter with knees at 300Hz Gain was kept at 0dB.
- There is text above that shows the format of the generated 1st order coefficients. In this example, N0 = 7D51 and N1 = 82AF and D1 = 7AA3



Configuring Codec

- Once the coefficients have been generated, all that is left is to configure the codec.
- For example for TLV320AIC3120, register for 1st order IIR ADC Coefficient is on page 4 register 8 to 13 as shown below:

7.3.10.4.3.1 First-Order IIR Section

The transfer function for the first-order IIR filter is given by Equation 1.

$$H(z) = \frac{N_0 + N_1 z^{-1}}{2^{15} - D_1 z^{-1}} \quad (1)$$

The frequency response for the first-order IIR section with default coefficients is flat at a gain of 0 dB.

Table 7-13. ADC First-Order IIR Filter Coefficients

FILTER	FILTER COEFFICIENT	ADC COEFFICIENT	DEFAULT (RESET) VALUES
First-order IIR	N0	Page 4 / register 8 and page 4 / register 9	0x7FFF (decimal 1.0 – LSB value)
	N1	Page 4 / register 10 and page 4 / register 11	0x0000
	D1	Page 4 / register 12 and page 4 / register 13	0x0000