Electronics Final Research Project

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Project Description:

This project is intended to be an implementation of a real time digital filter using AT89C51, ADC0808

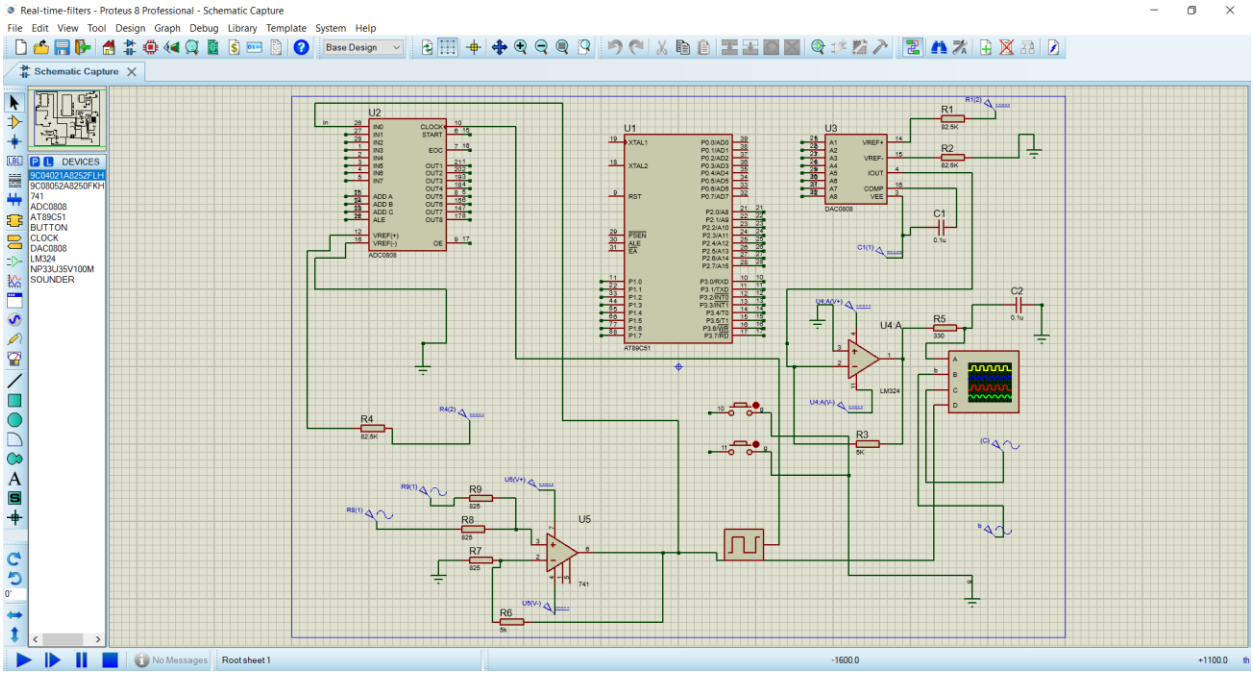
And DAC0808. The designed filter takes summed input signal (low frequency + high frequency) as a

weighted summer and filter it as the user selects [High pass , Low pass , Notch].

Specifications:

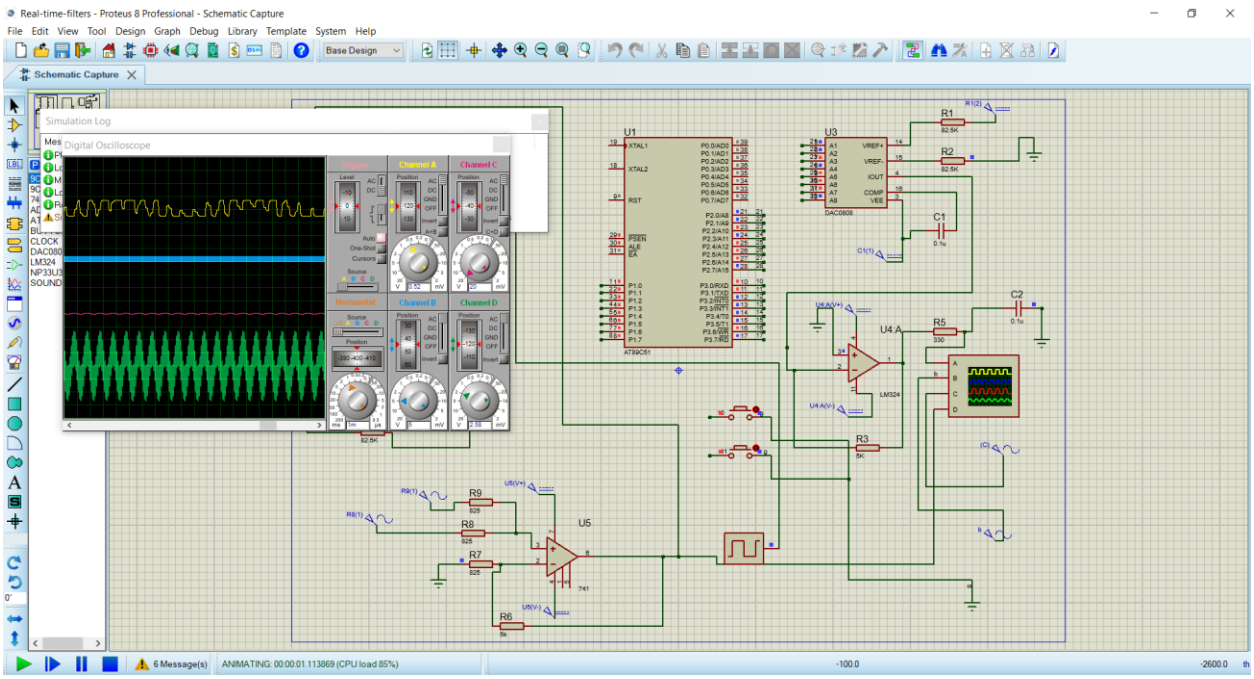
- Filter Type: FIR filter (we use FIR because it is more stable depending on input values only unlike IIR which depends on output value).
- Sampling Frequency : 500 kHz.
- Filter order : 10^{th} Order.
- Noisy signal components : 2 .
- Oscilloscope output : 4 channels [First : the output signal , Second : the low frequency component , Third : the high frequency component , Forth : the summed signal]

Schematic Diagram :

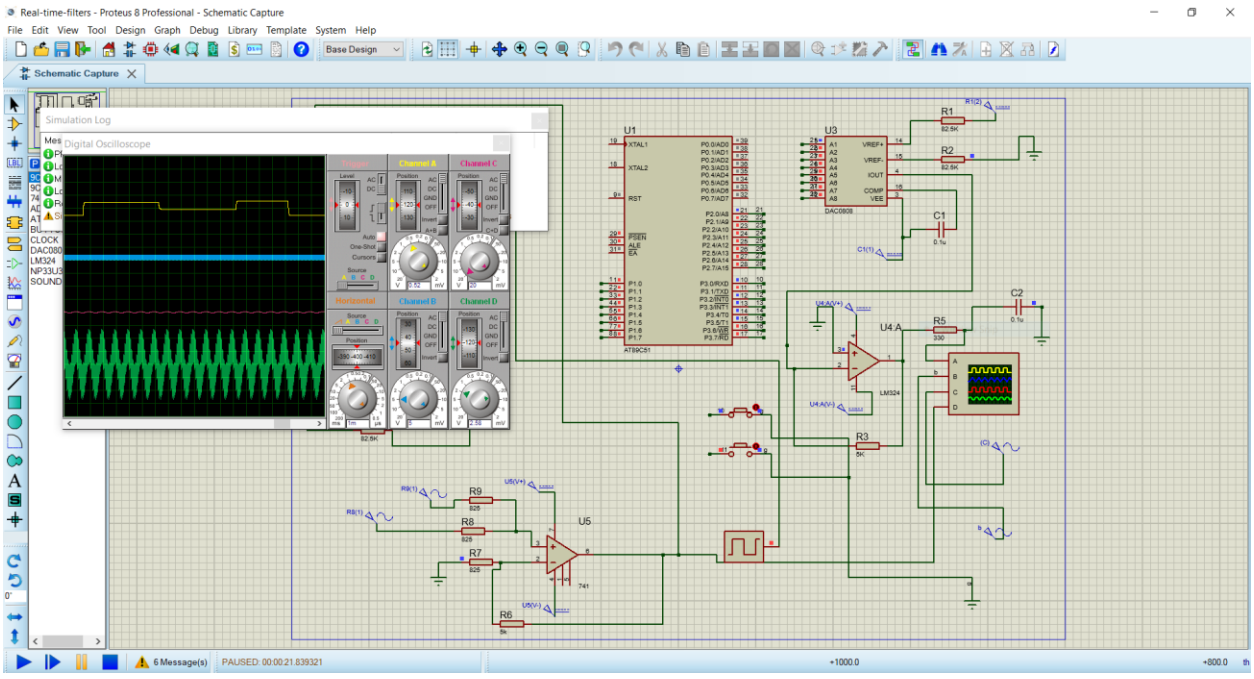


Output samples :

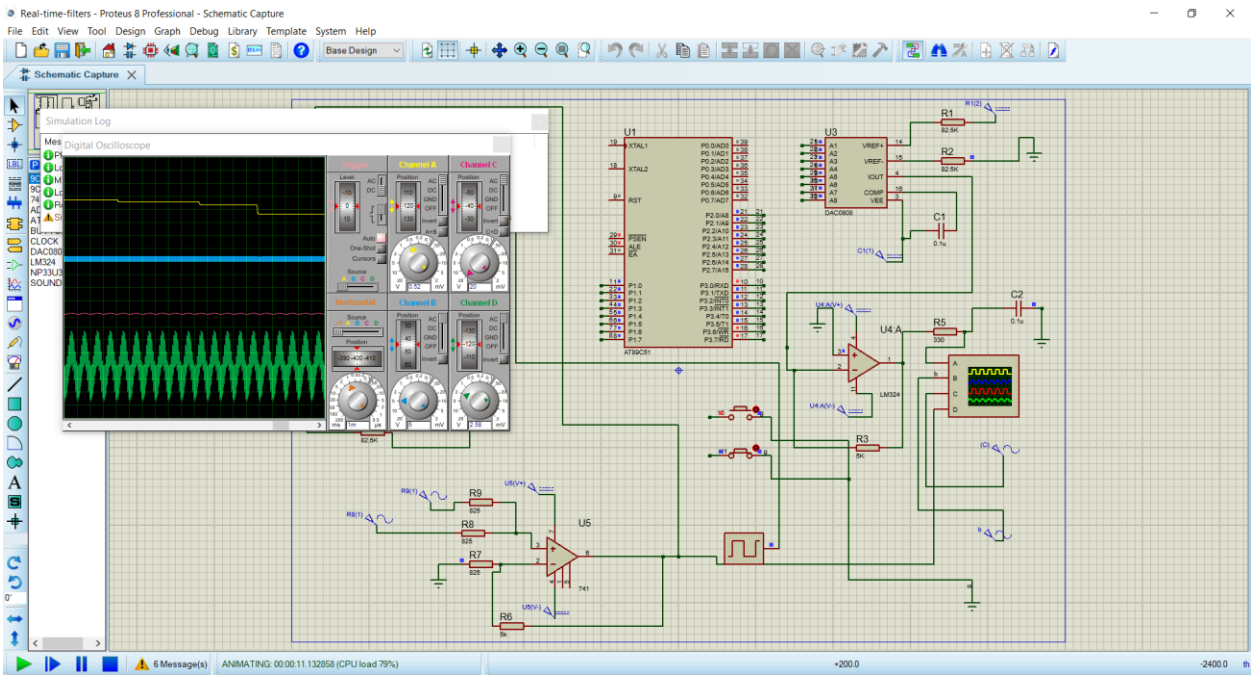
Output signal without filteration :



Output signal after high pass filter :



Output signal after low pass filter :



Th notch filter is selected if you pressed both buttons of H & L together .

Limitations :

To design a good digital online filter with good response we need to take some restrictions in considerations :

- The sampling frequency need to be high 300 kHz : 500kHz is a good range
- Hence fore we need the cut off frequencies to be very high so the noise attenuated will be alos high which some way is not practical and makes simulation crashes.
- If we stayed at the lower cut offs , we need a very high order of the filter (very large number of coefficients) which is not possible with the low memory of AT89C51 .
- Also, increasing the number of coefficients affects the processing time which in turn affects the response sent to DAC .