Experiment # 4

Frequency Modulation - Supplement

1 Building and Running Your Model

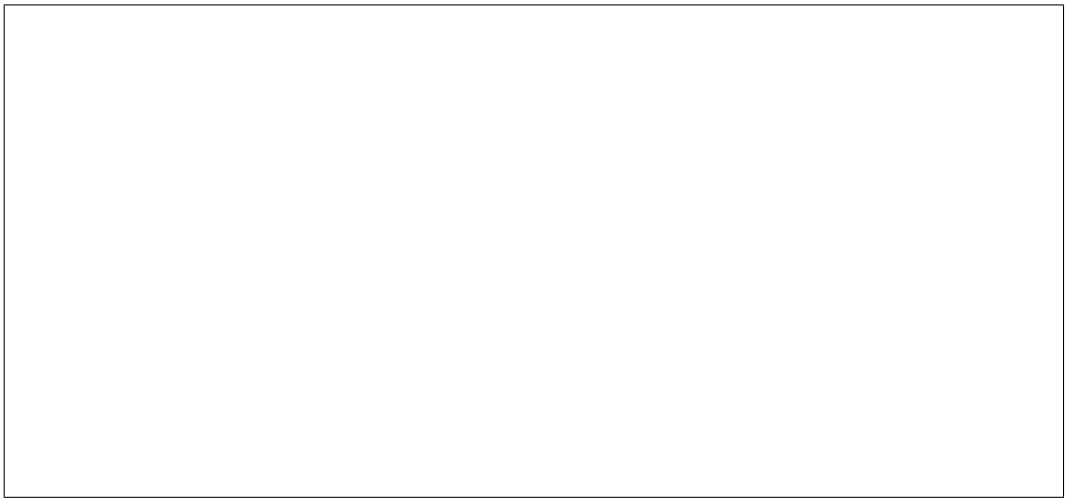
In this part of the experiment you will modify your FM *m*odulator and download it to the DSP target hardware. You will keep the parameters used in the simulation part of this experiment to build your modulator on the target hardware. Initially, use a 1Vpp, 500Hz sinusoid as your message signal.

You can cut and paste your whole FM modulator system onto the basic model found in `work/template/direct.mdl`. You do not need to substitute any blocks (such as the `DSP constant` block). However, two gains must be inserted for the demodulator to work properly with the `Simulink` blocks used. Insert at the input to the modulator a gain of $1/(2 \hat{} 29)$ and at the output another gain of $(2 \hat{} 29)$. This will cause the data word at the input to be shifted *right* prior to entering the modulator and at the output it will be shifted *left* by the same amount prior to entering the channel combiner.

1. **Time Domain and Frequency Domain Results**

   You can use the `Matlab` script to view the data or the FFT capability of the oscilloscope to view the frequency domain of each of the channels. If your oscilloscope does not allow you to perform an FFT on the input signal, use the program.

   - *On one channel you have the straight-through input signal and on the other you have your modulated signal. Based on your simulation, is your system working properly? How can you tell? Use the plots you believe necessary to explain this.*



- *Using the signal generator, vary the frequency of the input by about 300Hz, up and down. Report and explain the effect on the* **spectrum** *of the output (modulated) signal. Do it in steps of 100Hz, if necessary.*

- *Find one frequency of the input signal at which the carrier frequency component (in the frequency domain) is greatly attenuated. Explain why this happened. Alternatively, you can determine that frequency first and THEN adjust the input to it and see if it works as expected.You will need to adjust the* `Matlab` *program appropriately to see this.*