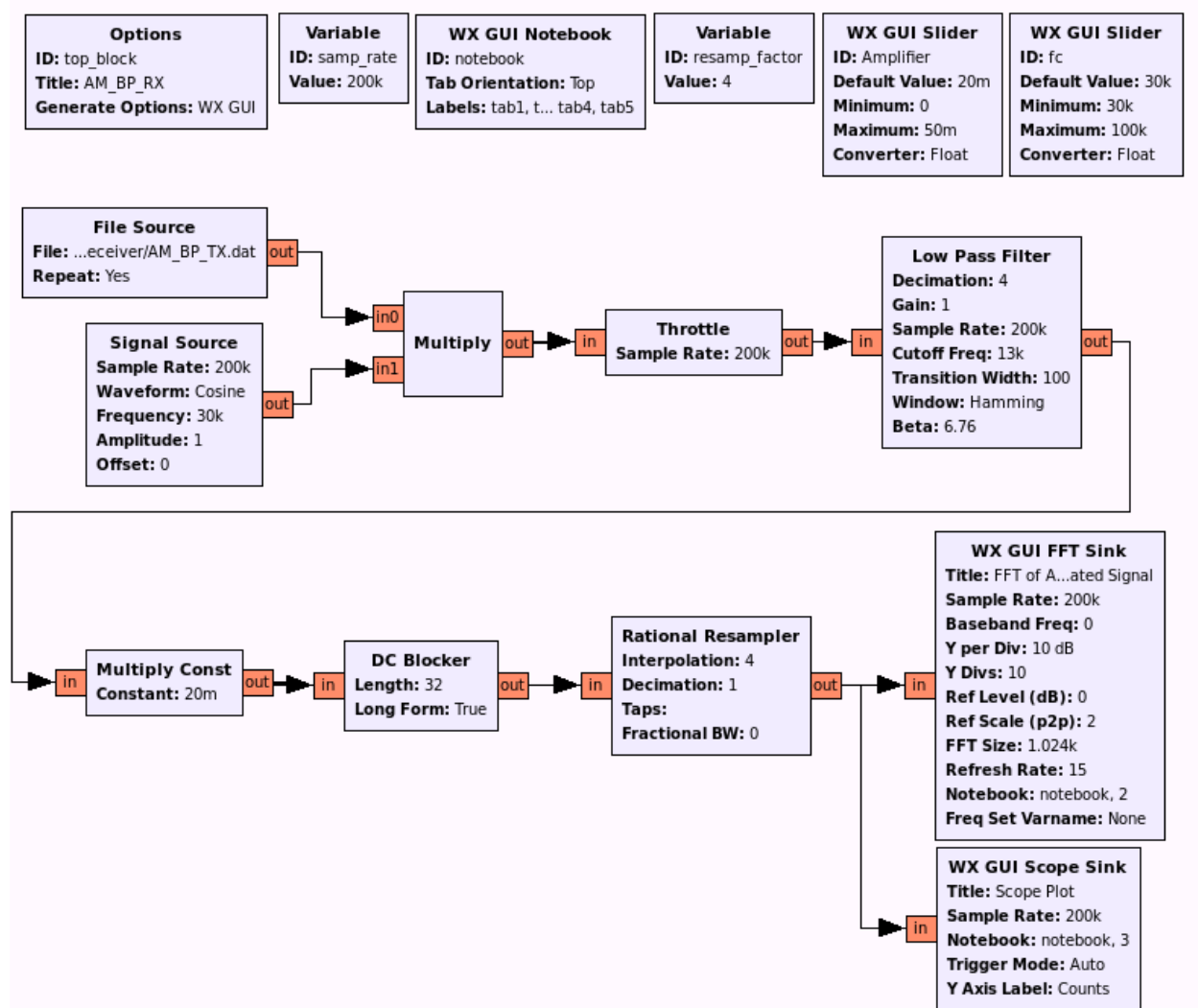


AM Receiver

V. AM Demodulation:

1) To recover the message from an AM modulated signal we first need eliminate effect of carrier frequency by multiplying the received signal with the carrier waveform and low pass filtering of it to obtain the baseband signal $(1+k_a m(t))$. The baseband signal is then passed through the DC blocker to obtain $k_a m(t)$.

The following flowgraph shows the structure of AM demodulator.



2) Using the source sink you can load the AM modulated signal that you save in the previous step. Double click on the File Source block and upload the Sinusoidal AM modulated signal. Set Repeat to Yes. This will cause the data to repeat so that you have a continuously playing signal.

3) As the frequency of the modulated signal in the previous step was 4 KHz you can set the cutoff frequency of the lowpass filter to 5KHz to only pass the sinusoidal message and omit the higher frequency components. Other parameters of the filter are chosen as following.

Properties: Low Pass Filter

Parameters:

ID	low_pass_filter_0
FIR Type	Float->Float (Decimating)
Decimation	resamp_factor
Gain	1
Sample Rate	samp_rate
Cutoff Freq	5000
Transition Width	100
Window	Hamming
Beta	6.76
Core Affinity	
Min Output Buffer	0
Max Output Buffer	0

Documentation:

Cancel OK

4) The output of the lowpass filter is multiplied with a constant value to intensify the power of received signal. The amplifier's gain is controlled by a WX GUI Slider with following properties:

Properties: WX GUI Slider

Parameters:

ID	Amplifier
Label	
Default Value	0.02
Minimum	0
Maximum	0.05
Num Steps	100
Style	Horizontal
Converter	Float
Grid Position	
Notebook	

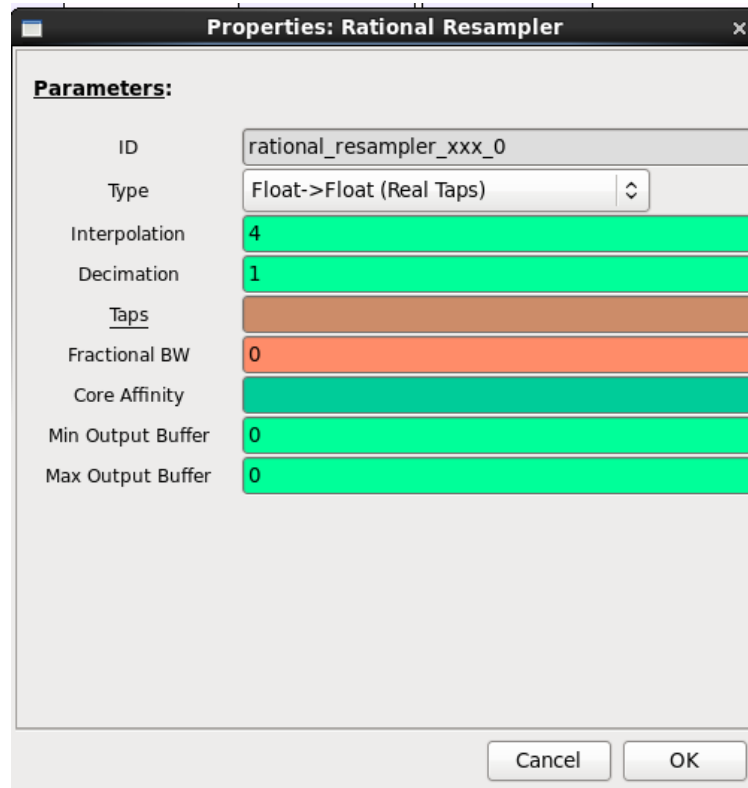
Documentation:

This block creates a variable with a slider. Leave the label blank to use the variable id as the label. The value must be a real number. The value must be between the minimum and the maximum. The number

Cancel OK

5) The DC Blocker is used to block the DC component.

6) The Decimation rate of the Low pass filter is set to four. So for recovering the signal frequency, we need to use a Rational Resampler to restore the original sampling rate. Double click on the Rational Resampler block and set the decimation and interpolation factors as following.



7) The following figures show the demodulated signal and its spectrum. You can also use the above demodulator for other AM modulated waveforms of previous step by adjusting the parameters of the lowpass filter based on their properties.

