TX/RX digital data using the UV5R

Written by Lior
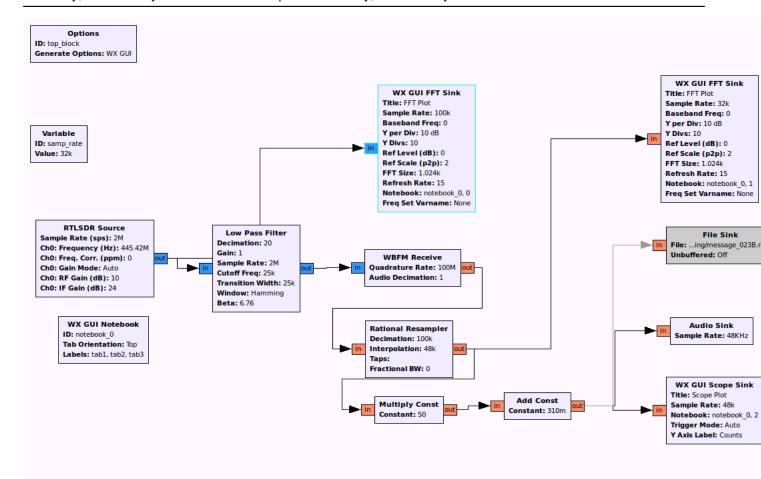Tuesday, 19 February 2013 06:19 - Last Updated Monday, 25 February 2013 06:41

While messing around with the hacked UV5R, I noticed that its capable of transmitting and receiving two tones using software. After messing around a bit, I thought of using AFSK by switching between two tones, but I could only get about 1200 baudrate. However, I wanted to see if I can get more speed, so 9600 baud would be nice. Rob (WX9O) suggested on the yahoo groups that the RDA1846 has the ability to disable the high and low pass audio filter, which should allow the radio to do 9600 GMSK .

Looking at the programming manual, register 58 can be set to disable the hpf/lpf or the pre/de-emph. For now I was going to test to see if the radio can send 9600 GMSK. For this test I used the hacked radio for transmitting and a SDR dongle (the $20 ones) for receiving. I have not changed the antenna on the radio yet, but placed the antenna about 3 feet away from the uv5r. The UV5R was transmitting on the lowest power possible with 0 volts going into the bias power. I used gnuradio to capture the signal and record it. The headphone output from my soundcard was plugged in directly into the UV5R (no filtering).
I tested by transmitting a 1KHz,2KHz,3KHz,4KHz tones generate by the chip as well as this a raw file which contains GMSK data generate with gmskmodem.

Here is the gnuradio connections used for capture

Options
ID: top_block
Generate Options: WX GUI

Variable
ID: samp_rate
Value: 32k

WX GUI FFT Sink
Title: FFT Plot
Sample Rate: 100k
Baseband Freq: 0
Y per Div: 10 dB
Y Divs: 10
Ref Level (dB): 0
Ref Scale (p2p): 2
FFT Size: 1.024k
Refresh Rate: 15
Notebook: notebook_0, 0
Freq Set Varname: None

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RTLSDR Source
Sample Rate (sps): 2M
Ch0: Frequency (Hz): 445.42M
Ch0: Freq. Corr. (ppm): 0
Ch0: Gain Mode: Auto
Ch0: RF Gain (dB): 10
Ch0: IF Gain (dB): 24

Low Pass Filter
Decimation: 20
Gain: 1
Sample Rate: 2M
Cutoff Freq: 25k
Transition Width: 25k
Window: Hamming
Beta: 6.76

WBFM Receive
Quadrature Rate: 100M
Audio Decimation: 1

File Sink
File: ...ing/message_023B.r
Unbuffered: Off

WX GUI Notebook
ID: notebook_0
Tab Orientation: Top
Labels: tab1, tab2, tab3

Rational Resampler
Decimation: 100k
Interpolation: 48k
Taps:
Fractional BW: 0

Audio Sink
Sample Rate: 48KHz

Multiply Const
Constant: 50

Add Const
Constant: 310m

WX GUI Scope Sink
Title: Scope Plot
Sample Rate: 48k
Notebook: notebook_0, 2
Trigger Mode: Auto
Y Axis Label: Counts