Options
Title: ALS162 Transmitter
Author: henningM1r
Output Language: Python
Generate Options: QT GUI

Complexity: 1.64mbal

Import
Import: np

Import
Import: pmt

Variable
ID: samp_rate
Value: 192k

Variable
ID: subframes_minute
Value: 40

Variable
ID: freq_ALS162
Value: 162k

Note
Note:

Note that these waveforms are in perfect sync to each other

Null Source out → in **Throttle** Sample Rate: 1 out → in **Null Sink**

Tag Object
ID: minute_tag
Offset: 60
Key: key
Value: min
Source ID: src

Vector Source
Vector: (0,0,0,0,0,0,1,0,0...
Tags: min
Repeat: Yes

example ALS162 encoded bit-stream full length: must be 60 elements, the last element must be a 2
===
here:
time: 17:43
weekday: Monday
Date: 01.05.23

ZMQ SUB Source
Address: tcp://1....0.1:55552
Timeout (msec): 100
Pass Tags: No
Filter Key:

Repeat
Interpolation: 40

repeat time bits

Python Module
ID: ALS162_codes

Vector Source
Vector: list(8*[0]) + list...
Tags:
Repeat: Yes

derivative of waveforms for bit positions

Vector Source
Vector: list(1*[+1,-1,-1,+...
Tags:
Repeat: Yes

derivative of waveform for 0

Vector Source
Vector: list(1*[+1,-1,-1,+...
Tags:
Repeat: Yes

derivative of waveform for 1

Vector Source
Vector: list(subframes_min...
Tags:
Repeat: Yes

derivative of waveform for 2 (new minute)

Waveform Selector

selects the waveform to the corresponding symbol 0, 1 or 2

Add

superimpose bit position codewords into empty 32 time-slices

Short To Float
Scale: 1

Short To Float
Scale: 1

Virtual Sink
Stream ID: 0_a

Virtual Sink
Stream ID: 0_b

Virtual Source
Stream ID: 0_a

Virtual Source
Stream ID: 0_b

Repeat
Interpolation: 4.8k

Repeat
Interpolation: 4.8k

each bit streches a number of "samp_rate" samples, i.e. fill one full second

IIR Filter
Feed-forward Taps: 1, 0
Feedback Taps: 0, 1

integrator to obtain the desired base band waveform

Multiply Const
Constant: 208.333u

normalize signal to range [-1, 1]

Virtual Sink
Stream ID: 1

QT GUI Time Sink
Name: Baseband ALS162 Signal
Number of Points: 384k
Sample Rate: 192k
Autoscale: No

QT GUI Time Sink
Name: ALS162 symbols
Number of Points: 384k
Sample Rate: 192k
Autoscale: No

QT GUI Frequency Sink
Name: Modulate...al_frequency
FFT Size: 1024
Center Frequency (Hz): 0
Bandwidth (Hz): 192k

QT GUI Time Sink
Name: Modulate..._signal_time
Number of Points: 768k
Sample Rate: 192k
Autoscale: No

Signal Source
Sample Rate: 192k
Waveform: Cosine
Frequency: 162k
Amplitude: 1
Offset: 0
Initial Phase (Radians): 0

modulation signal to shift the pass band signal up to 162 kHz

Constant Source
Constant: 1

Virtual Source
Stream ID: 1

Magnitude and Phase To Complex

as the ALS162 signal is mainly defined by its phase

Multiply

TCP Sink
Mode: Server
Port: 55.553k

QT GUI Frequency Sink
Name: Baseband...al_frequency
FFT Size: 2048
Center Frequency (Hz): 0
Bandwidth (Hz): 192k