

**Options**  
**Title:** A Sign in Space  
**Author:** Gabriel Otero Pérez  
**Description:** Demod... message  
**Output Language:** Python  
**Generate Options:** QT GUI

**Variable**  
**Id:** samp\_rate  
**Value:** 1M

**File Source**  
**File:** ...Space-GBT.sigmf-data  
**Repeat:** No  
**Add begin tag:** ()  
**Offset:** 0  
**Length:** 0

**IChar To Complex**  
**Vector Input:** No

**Throttle**  
**Sample Rate:** 1M

**RMS AGC**  
**Alpha:** 10u  
**Reference:** 1

**PLL Carrier Tracking**  
**Loop Bandwidth:** 3.14159m  
**Max Freq:** 628.319m  
**Min Freq:** -628.319m

**Variable**  
**Id:** PLL\_BW\_Hz  
**Value:** 500

**Variable**  
**Id:** PLL\_Limit\_Hz  
**Value:** 100k

**Import**  
**Import:** pi

**QT GUI Frequency Sink**  
**Name:** Visualiz...the specturm  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** 1M

**Complex To Float**

**QT GUI Frequency Sink**  
**Name:** I and Q components  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** samp\_rate

**Hilbert**  
**Num Taps:** 65

**Complex to Imag**

**Multiply Conjugate**

**Variable**  
**Id:** subcarrier\_freq  
**Value:** 263.148k

**Signal Source**  
**Sample Rate:** 1M  
**Waveform:** Cosine  
**Frequency:** 263.148k  
**Amplitude:** 1  
**Offset:** 0  
**Initial Phase (Radians):** 0

**Multiply**

**QT GUI Frequency Sink**  
**Name:** Side band  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** samp\_rate

**Low Pass Filter**  
**Decimation:** 100  
**Gain:** 1  
**Sample Rate:** samp\_rate  
**Cutoff Freq:** samp\_.../200\*0.8  
**Transition Width:** sa...00\*0.1  
**Window:** firdes.WIN\_HAMMING  
**Beta:** 6.76

**QT GUI Frequency Sink**  
**Name:** Side ban...d, fine tune  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** samp\_rate/100

**Multiply Conjugate**

**QT GUI Frequency Sink**  
**Name:** Z[n] = y[n]\*[n-1]  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** samp\_rate

**Frequency Xlating FIR Filter**  
**Decimation:** 100  
**Taps:** lowpass\_taps  
**Center Frequency:** baudrate  
**Sample Rate:** samp\_rate

**QT GUI Frequency Sink**  
**Name:** Z[n] = y...-1] More res  
**FFT Size:** 4.096k  
**Center Frequency (Hz):** 0  
**Bandwidth (Hz):** samp\_rate/100

**Low-pass Filter Taps**  
**Id:** lowpass\_taps  
**Gain:** 1  
**Sample Rate (Hz):** samp\_rate  
**Cutoff Freq (Hz):** sa... \* 0.8  
**Transition Width (Hz):** ...0.1  
**Window:** firdes.WIN\_HAMMING  
**Beta:** 6.76

**QT GUI Time Sink**  
**Number of Points:** 1.024k  
**Sample Rate:** samp\_rate  
**Autoscale:** No

**Complex To Real**

**QT GUI Constellation Sink**  
**Name:** BPSK Constellation  
**Number of Points:** 1.024k  
**Autoscale:** No

**Variable**  
**Id:** baudrate  
**Value:** 52.6k

**Costas Loop**  
**Loop Bandwidth:** 1m  
**Order:** 2

**QT GUI Constellation Sink**  
**Name:** BPSK Constellation  
**Number of Points:** 1.024k  
**Autoscale:** No

**QT GUI Time Sink**  
**Number of Points:** 10k  
**Sample Rate:** baudrate  
**Autoscale:** No

**Symbol Sync**  
**Timing Error Detector:** Gardner  
**Samples per Symbol:** 19.0114  
**Expected TED Gain:** 1  
**Loop Bandwidth:** 10m  
**Damping Factor:** 1  
**Maximum Deviation:** 10m  
**Output Samples/Symbol:** 1  
**Interpolating Resampler:** MMSE, 8 tap FIR

**Complex To Real**

**Complex To Real**

**QT GUI Time Sink**  
**Number of Points:** 100k  
**Sample Rate:** 52.6k  
**Autoscale:** No

**Decimating FIR Filter**  
**Decimation:** 1  
**Taps:** syncword\_bits[::-1]/...

**Variable**  
**Id:** syncword\_hex  
**Value:** 034776C7272895B0

**Variable**  
**Id:** syncword\_bits  
**Value:** 2\*np.unpackbits(np...

**Variable**  
**Id:** syncword\_string  
**Value:** 00000011...10110110000

**Tag Debug**  
**Name:**  
**Key Filter:** sync\_marker  
**Display:** On

**Correlate Access Code - Tag**  
**Access Code:** 00000...10110000  
**Threshold:** 4  
**Tag Name:** sync\_marker

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**Access Code:** 00000...10110000  
**Threshold:** 4  
**Tag Name:** sync\_marker

**Frame Splitter F**  
**Key:** sync\_marker  
**Frame Length:** 17.848k

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**Key:** sync\_marker  
**Frame Length:** 17.848k

**Multiply Const**  
**Constant:** -1

**CCSDS Pseudo Randomizer**  
**Data Format:** Float Bits

**CCSDS Turbo Decode**  
**Base:** 223  
**Octets:** 5  
**Code Type:** Rate 1/2  
**Iterations:** 2  
**Sigma:** 707m  
**Update Sigma:** ON

**PDU to Tagged Stream**  
**Length tag name:** packet\_len

**File Sink**  
**File:** final\_decoded\_frames.u8  
**Unbuffered:** Off  
**Append file:** Overwrite

**Null Sink**