

This diagram illustrates a complex software-defined radio (SDR) receiver system, specifically designed for ALS162 signal processing. The system is composed of several interconnected blocks, each performing a specific function in the signal chain.

Input and Initial Processing:

- The system starts with a **Virtual Source Stream ID: 1** providing a phase signal.
- This signal is processed by a **Rational Resampler** (Interpolation: 1, Decimation: 8, Fractional BW: 0) to reduce computational complexity.
- The output is then multiplied by a constant (70) to handle positive and negative values.

Phase Shift and Frequency Processing:

- The signal is split into two paths: one for phase shift and one for frequency processing.
- The **Phase Shift** block (Units: Radians) applies a phase drift correction by shifting the phase to the opposite direction towards zero.
- The **Frequency Xlating FIR Filter** (Decimation: 1, Taps: variable_low_pass_filt...) processes the signal.
- The output is then processed by a **Low-pass Filter Taps** block (ID: variable_...s_filter_taps, Gain: 750, Sample Rate: 192k, Cutoff Freq: 1k, Transition Width: 250, Window: Blackman, Beta: 6.76).

AGC and Signal Amplification:

- The **AGC2** block (Attack Rate: 100m, Decay Rate: 10m, Reference: 1, Max Gain: 750) amplifies the signal.
- The output is then processed by a **Variable to Message** block (Variable: 0, Message Variable Name: ampli) to get phase shift value from probe function.

Complex to Arg and Moving Average:

- The signal is converted to a complex signal using the **Complex to Arg** block.
- The output is then processed by a **Moving Average** block (Length: 1k, Scale: 1m, Max Iter: 4k, Length of Vectors: 1) to remove glitches from a noisy phase.

Phase Compensation and IIR Filter:

- The signal is then processed by a **Phase Compensation** block (Virtual Sink Stream ID: 7) to compute phase compensation.
- The output is then processed by an **IIR Filter** (Feed-forward Taps: (+4,+1,...), Feedback Taps: 0) to obtain the derivative of the phase signal.

Rational Resampler and Virtual Sink:

- The signal is then processed by a **Rational Resampler** (Interpolation: 1, Decimation: 8, Taps: Fractional BW: 0) to reduce overall computational complexity of the decoder.
- The output is then processed by a **Virtual Sink** block (Stream ID: 1) to thresholders of the differentiated signal.

Thresholding and Bit Detection:

- The signal is then processed by a series of **Threshold** blocks (Low, High, Initial State) to detect bit values.
- The output is then processed by a **Float To Char** block (Scale: 1) to convert the signal to a character.
- The output is then processed by a **Char To Float** block (Scale: 1) to convert the character back to a float.
- The output is then processed by a **Virtual Sink** block (Stream ID: 5) to ALS162 bit detector.

Bit-Detector ALS162 and ZMQ PUSH Message Sink:

- The signal is then processed by a **Bit-Detector ALS162** block (Scaling: 8, Sample Rate: 192k, Tolerance: 2m, Debug: False) to detect bit values.
- The output is then processed by a **ZMQ PUSH Message Sink** block (Address: tcp://1...0.1.55555, Timeout (msec): 900) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Message Debug and PDU Vectors:

- The output is then processed by a **Message Debug** block (PDU Vectors: Off) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 2 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 2) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 3 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 3) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 4 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 4) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 5 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 5) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 6 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 6) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 7 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 7) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 8 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 8) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 9 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 9) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 10 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 10) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 11 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 11) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 12 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 12) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 13 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 13) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 14 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 14) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 15 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 15) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 16 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 16) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 17 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 17) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 18 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 18) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 19 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 19) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 20 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 20) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 21 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 21) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 22 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 22) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 23 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 23) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 24 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 24) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 25 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 25) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 26 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 26) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 27 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 27) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 28 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 28) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 29 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 29) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 30 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 30) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 31 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 31) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 32 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 32) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 33 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 33) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 34 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 34) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 35 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 35) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 36 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 36) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 37 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 37) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.

Virtual Source Stream ID: 38 and Bit-Detector ALS162:

- The signal is then processed by a **Virtual Source** block (Stream ID: 38) to provide signal to a ZMQ server to further decode the bits to human-readable data & time information.