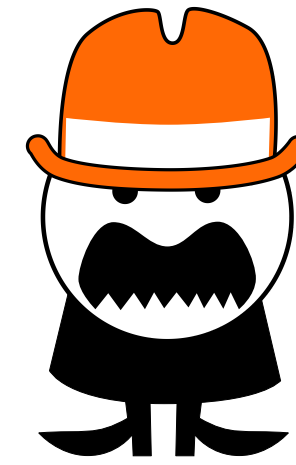


# The Inspector (gr-inspector)

## A Signal Analysis Toolbox for GNU Radio

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### Introduction

The Inspector is an out-of-tree module for GNU Radio. The goal was to develop a **signal analysis toolbox** with the following real-time capabilities:

- Automatic detection of continuous signals
- Automatic signal extraction
- OFDM parameter estimation and synchronization
- GUI feedback

This project was initiated as a Google Summer of Code project and developed in cooperation with the Communications Engineering Lab of the Karlsruhe Institute of Technology.

### Components

**Signal Detector** is able to perform energy detection on a continuous input signal.

**Inspector GUI** visualizes the detected signal edges. Users can select signals manually and feed-back results from analysis blocks.

**Signal Separator** uses FIR filters for every detected/selected input signal to mix, filter and decimate this signal out of the input spectrum. Output is a message of vectors with samples of all signals.

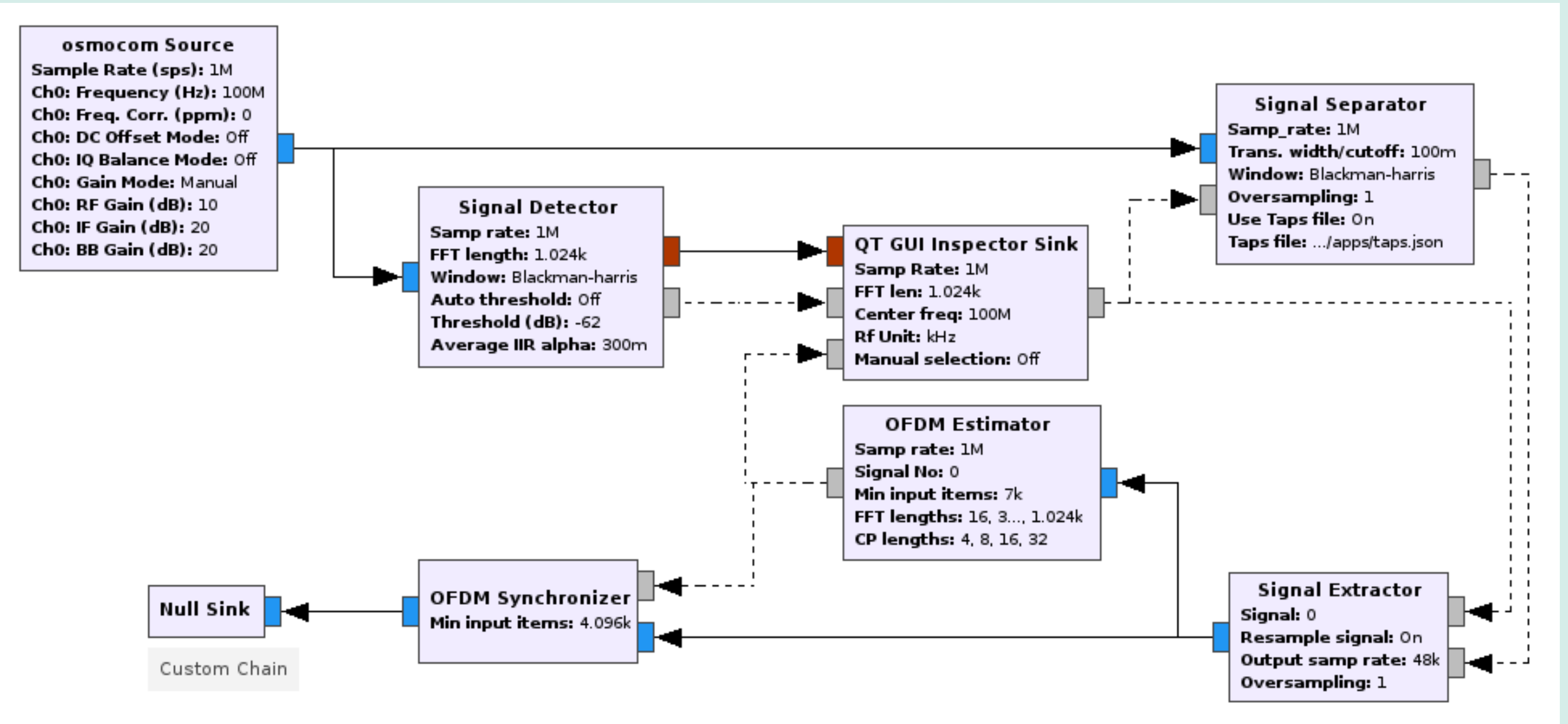
**Signal Extractor** passes one signal from the Separator output as complex stream. The input samples can be resampled to satisfy a constant output sample rate.

**OFDM Estimator** is able to estimate the OFDM parameters subcarrier spacing, symbol time, FFT length and CP length.

**OFDM Synchronizer** performs a frequency synchronization of the OFDM signal and stream tags are inserted at OFDM symbol beginnings.

### Flowgraph

The toolbox was developed with the following main flowgraph in mind.



- Signal Extractor block assures the possibility to add **custom chains** for each signal
- Analysis blocks can **feedback results** to GUI block

### GUI



- Displays input spectrum with **markers for detected signals**
- Info text** next to each signal (center frequency, bandwidth and analysis results)
- Each signal can be filtered and processed in **own chain(s)**
- Signals can be selected manually

### Applications

- Spectrum monitoring
- Explore real-world signals
- Access to radio for beginners
- Live (FM) demodulation
- Batch processing of signals

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