

GNURadio

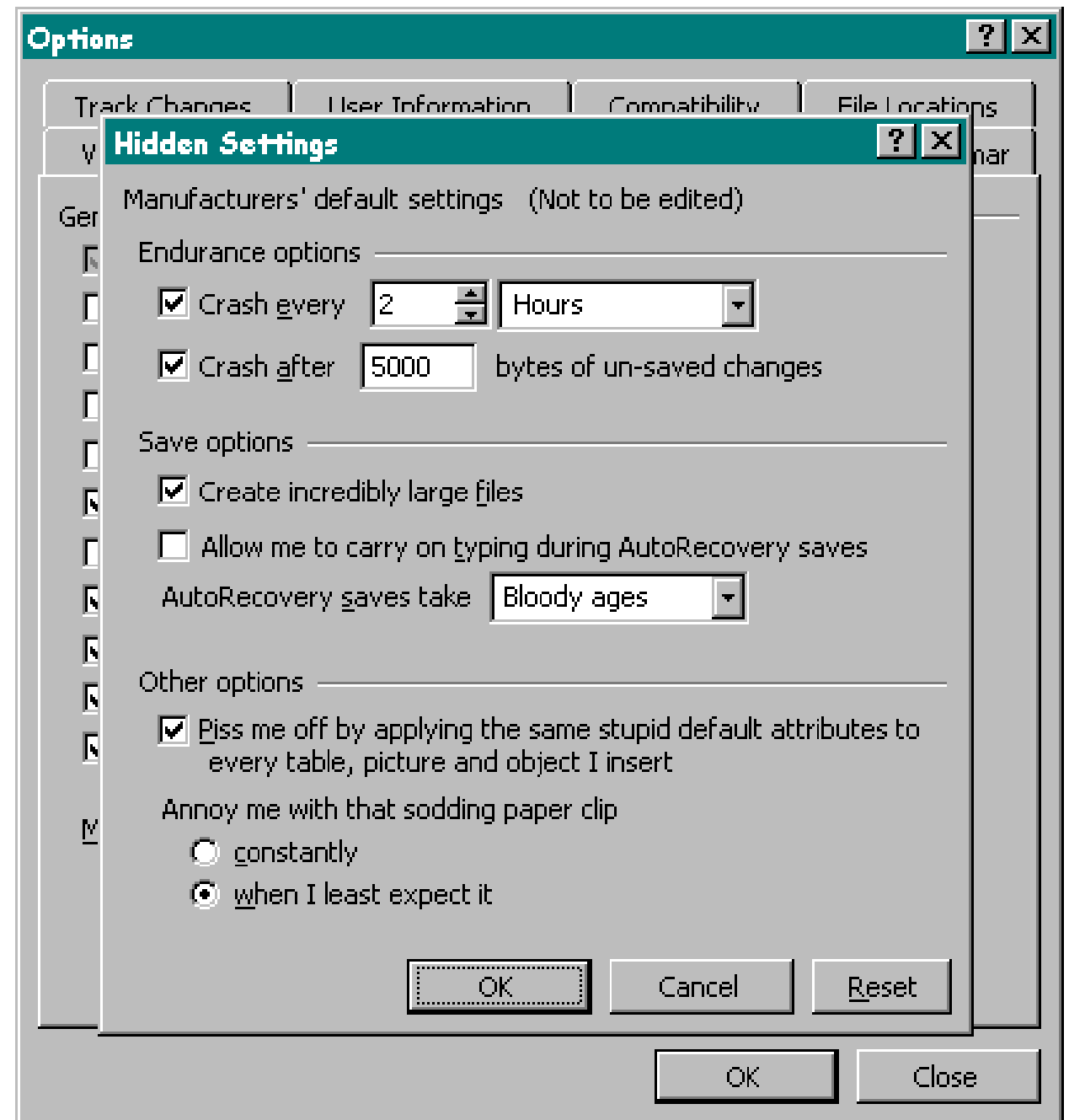


.... Linux
.... internet
.... veel geduld





GNURadio en windows...?
niet onmogelijk, maar.....





GNUradio

sources

Audio source

File source

Signal source

Noise source

hardware interfaces

RX hardware

RTL-SDR

USRP

HackRF

....

Waterfall sink

sample rate:

base band freq:

dynamic range:

ref level:

ref scale:

FFT size:

refresh rate:

.....

bewerking

DSP blocks

Filters

Converters

(De)modulators

....

FFT sink

sample rate:

base band freq:

ref level:

FFT size:

refresh rate:

.....

GUI scope sink

sample rate:

trigger mode:

.....

sinks

Audio sink

File sink

TX hardware

instrumentation



berekeningen gebruiker interactie

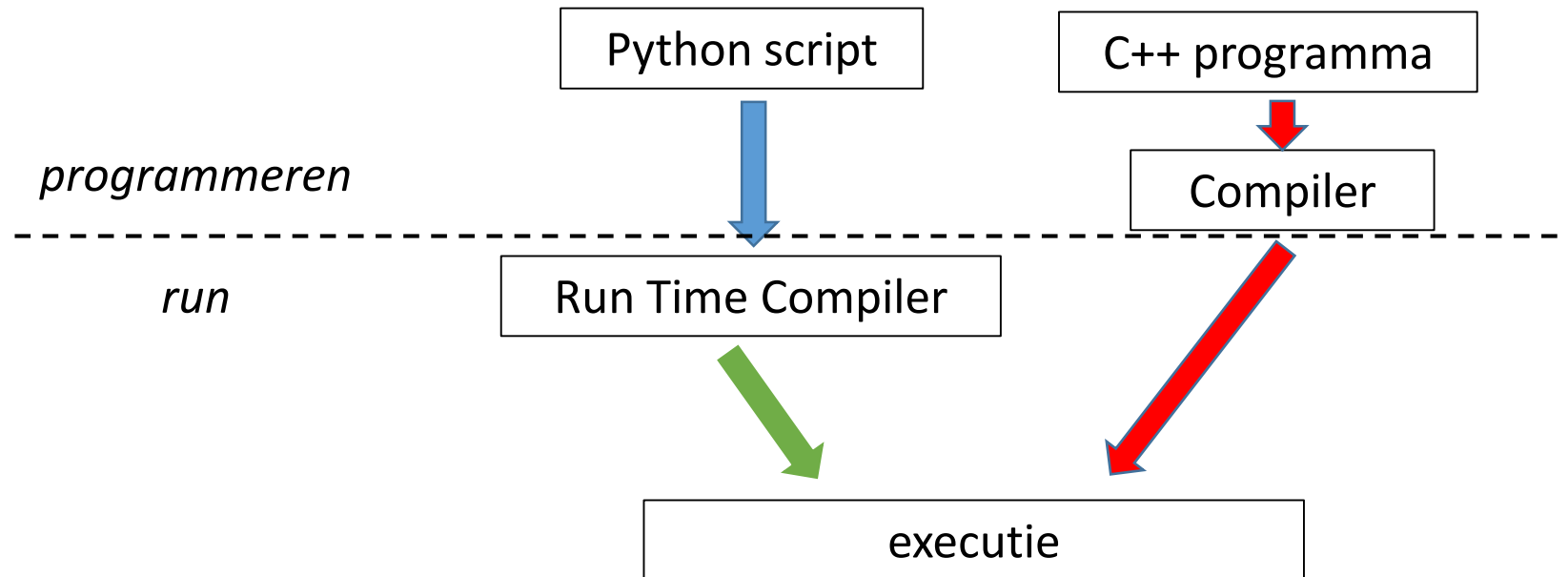
Multipliers	slider
Decimators	checkbox
Mixers	text
(De)modulators	tabs
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speciale routines

Bit slicer	GPS
Audio source	GSM
File source	ADS-B
Signal source	Acars
Noise source	AIS
-----	PSK
	WiFi
	Radar

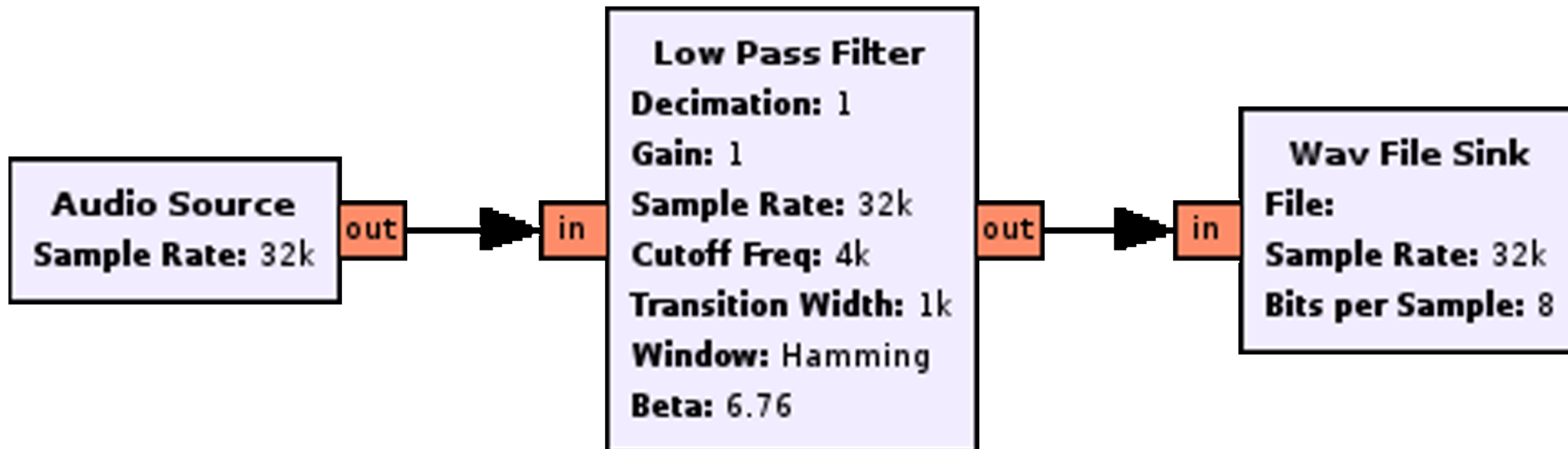
GNUradio

framework is geprogrammeerd in Python: interpreted (managed) language
time critical berekeningen in C++: machine language

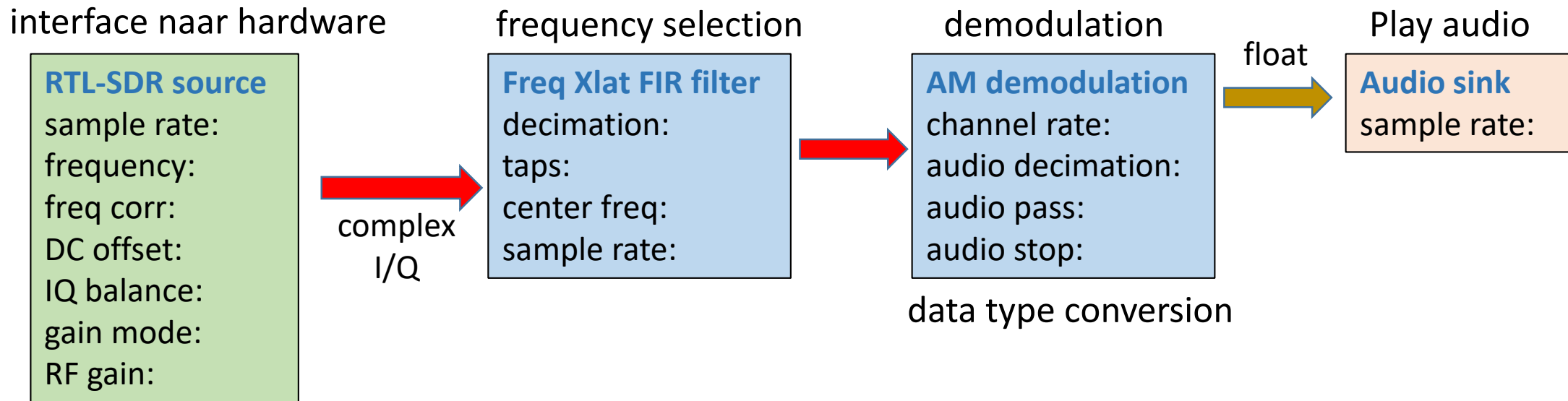


GNUradio

- input en output definiëren
- voor elke DSP-stap geschikt blok selecteren
- parameters per blok instellen
- numeriek formaat (complex, float, integer, binary,...)
- blokken voor instrumentatie en user interface
- grafisch alle blokken verbinden



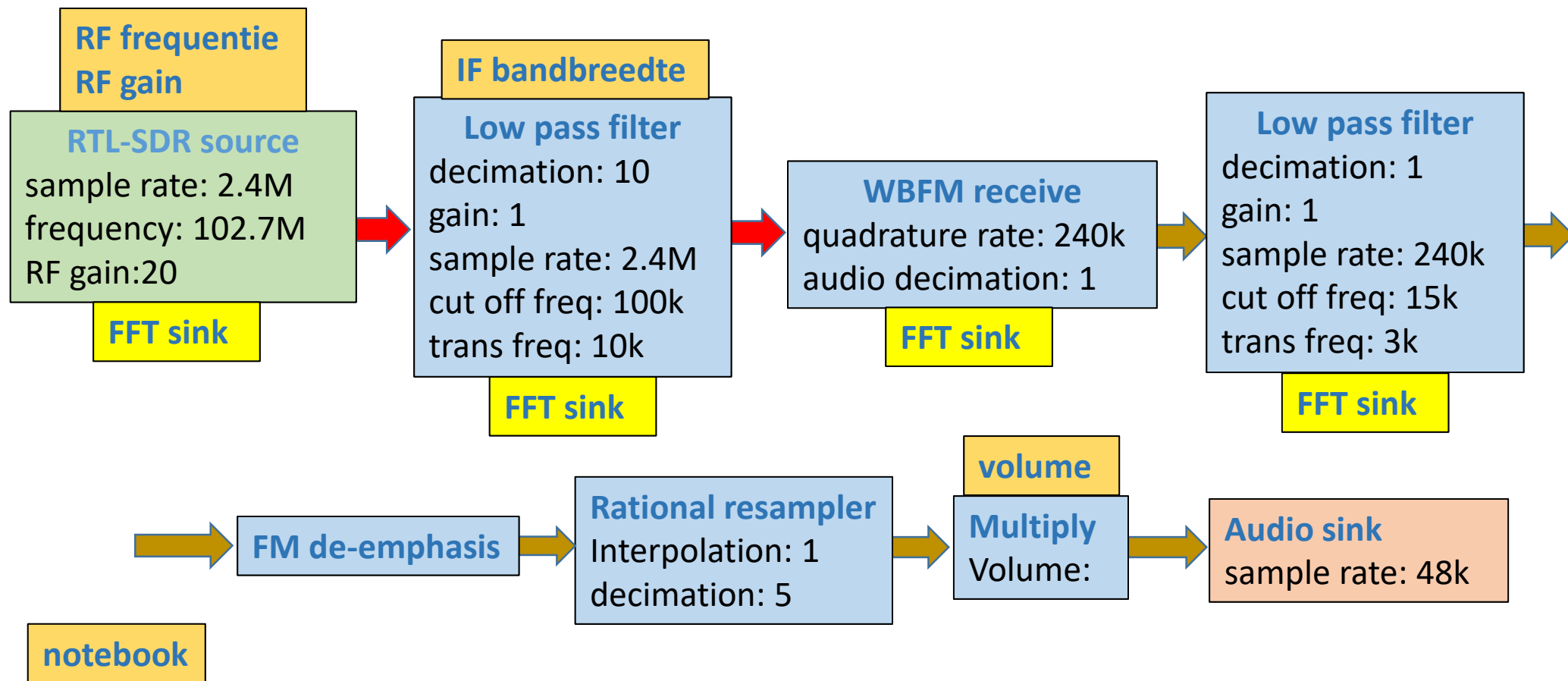
GNUradio



Voorwaarden:

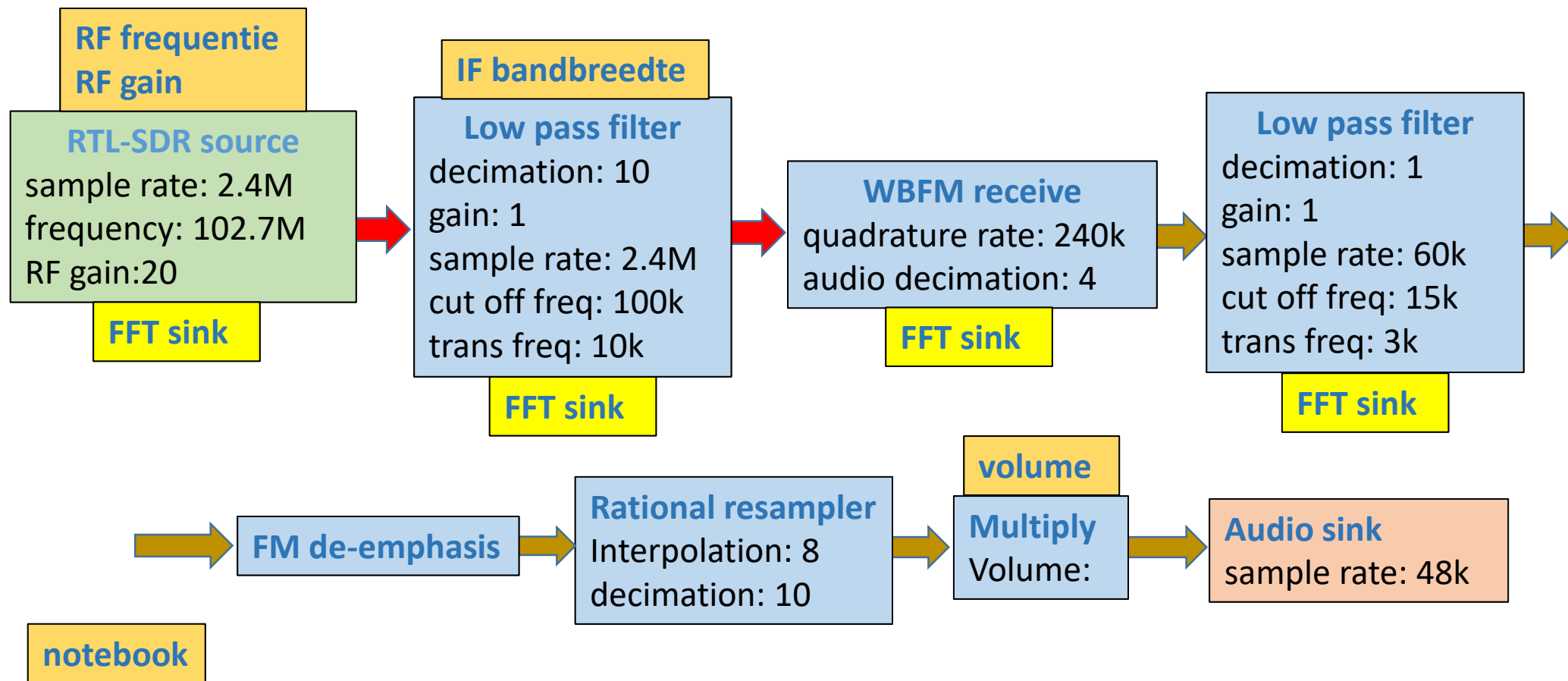
- sample rate tussen 2 blokken moet hetzelfde zijn
- data types tussen 2 blocks moet hetzelfde zijn: complex, float, integer, byte, ...

GNUradio



FM ontvanger (mono)

GNUradio



FM ontvanger (mono)

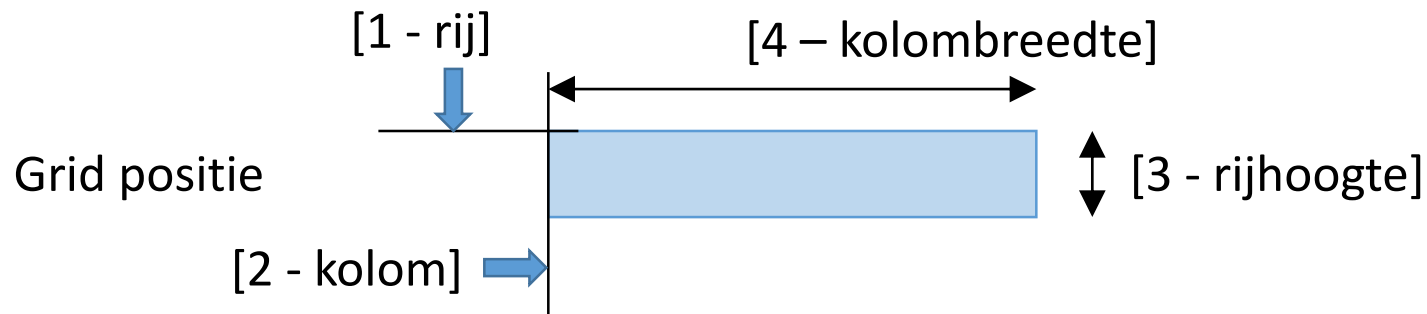


GNUradio GUI WX-componenten

Slider

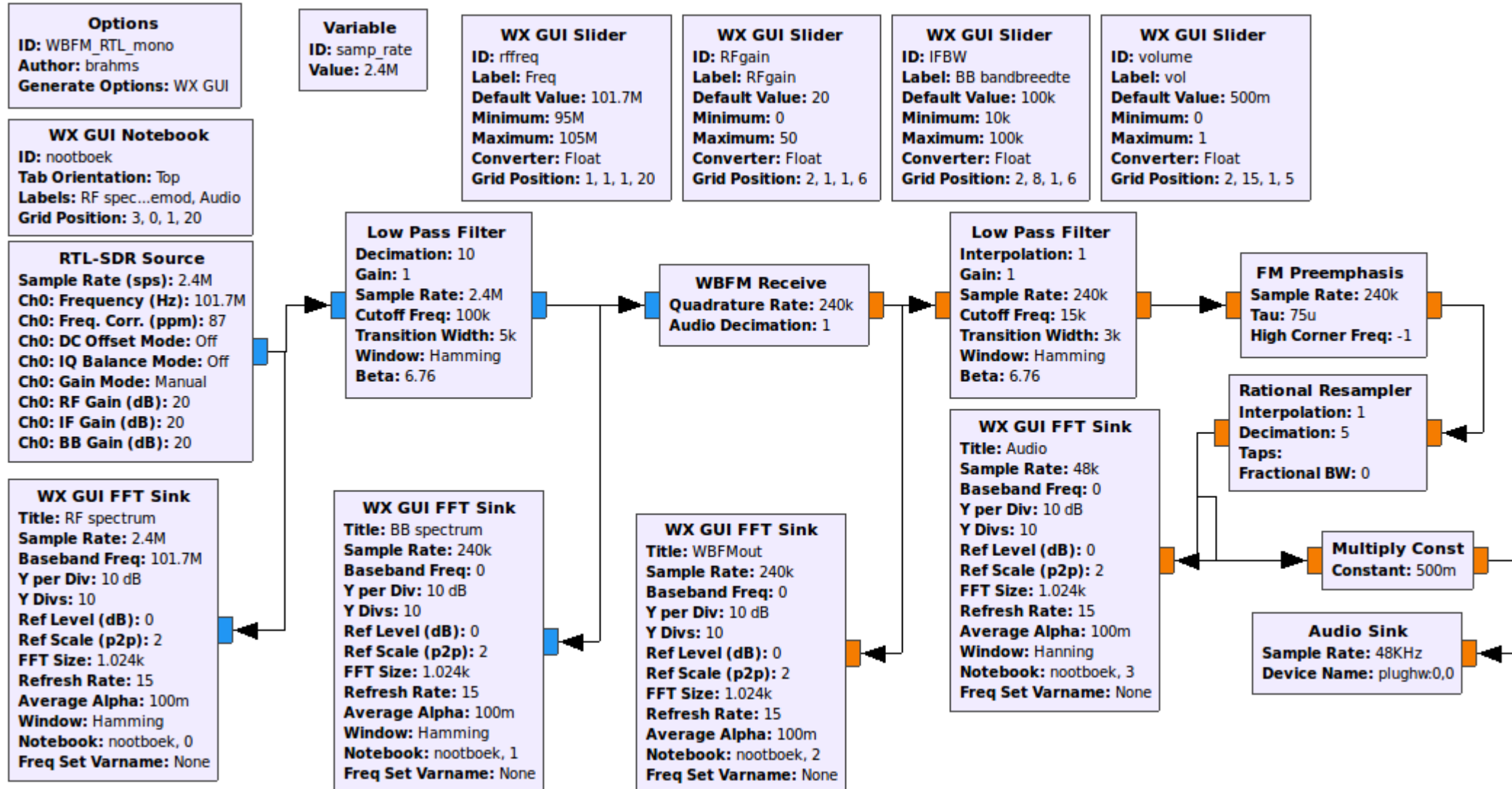
Option buttons

WX GUI Slider ID: rffreq Label: RF freq Default Value: 121.2M Minimum: 118M Maximum: 128M Converter: Float Grid Position: 1, 1, 1, 30	WX GUI Chooser ID: rfgain Label: rfgain Default Value: 0 Choices: 0, 10 Labels: 0, 1 Type: Radio Buttons Grid Position: 2, 1, 1, 4	WX GUI Slider ID: ifgain Label: IF gain Default Value: 33 Minimum: 0 Maximum: 47 Converter: Float Grid Position: 2, 9, 1, 8	WX GUI Slider ID: bbgain Label: BB gain Default Value: 45 Minimum: 0 Maximum: 62 Converter: Float Grid Position: 2, 17, 1, 8	WX GUI Slider ID: volume Label: Vol Default Value: 200m Minimum: 0 Maximum: 1 Converter: Float Grid Position: 2, 25, 1, 8
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GNUradio





Airband AM
ontvanger

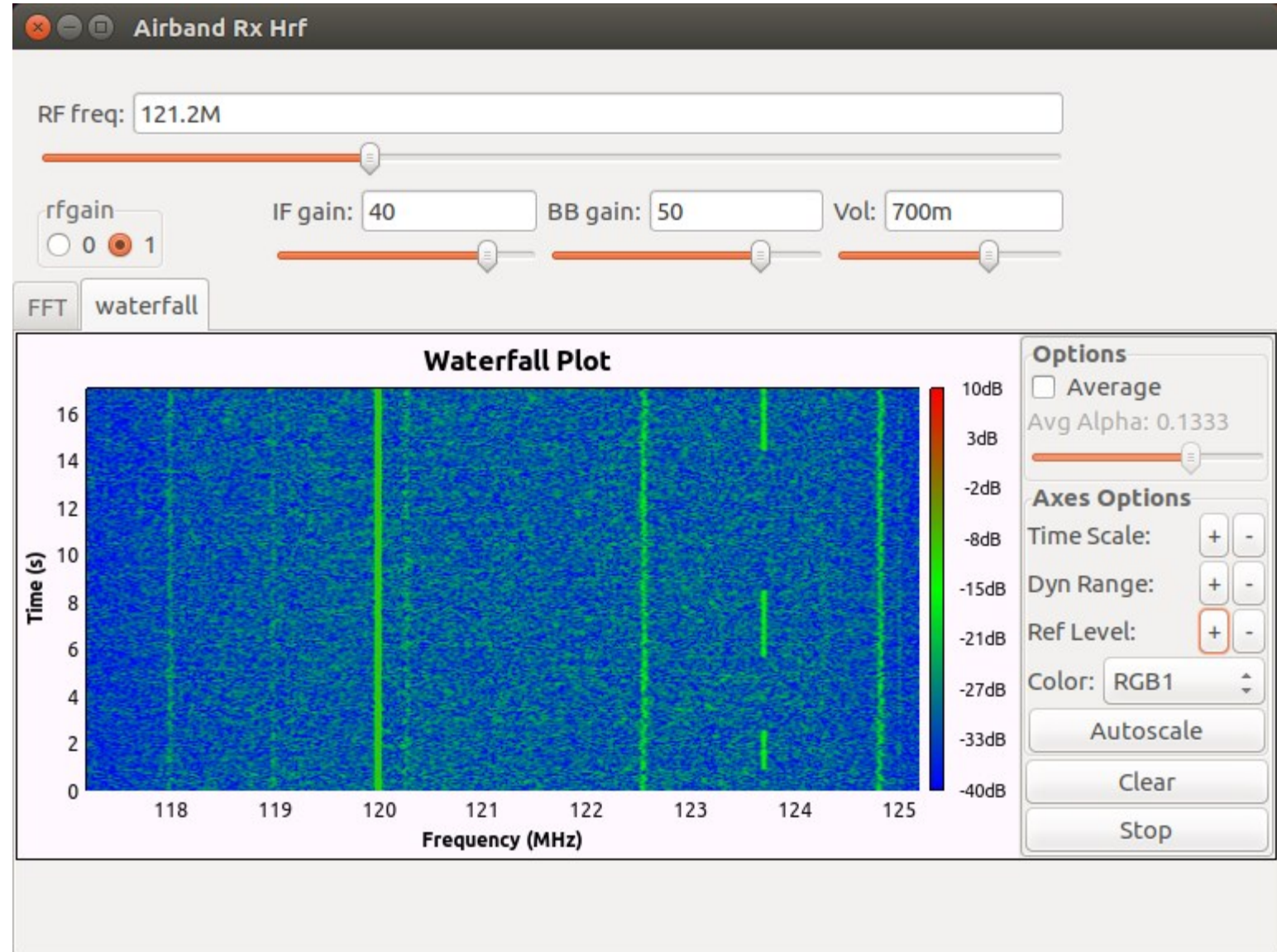
Instrumentatie en
user interface:
spectrum display





Airband AM
ontvanger

Instrumentatie en
user interface:
waterfall display





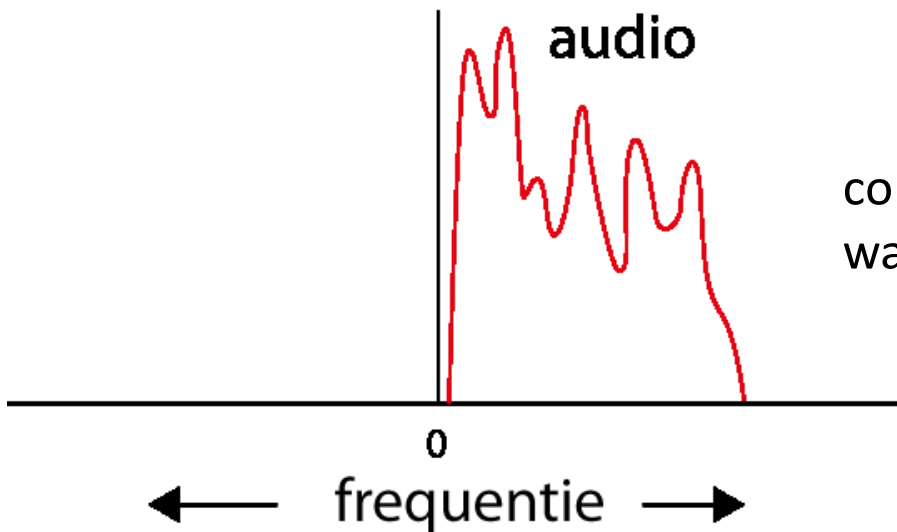


GNUradio

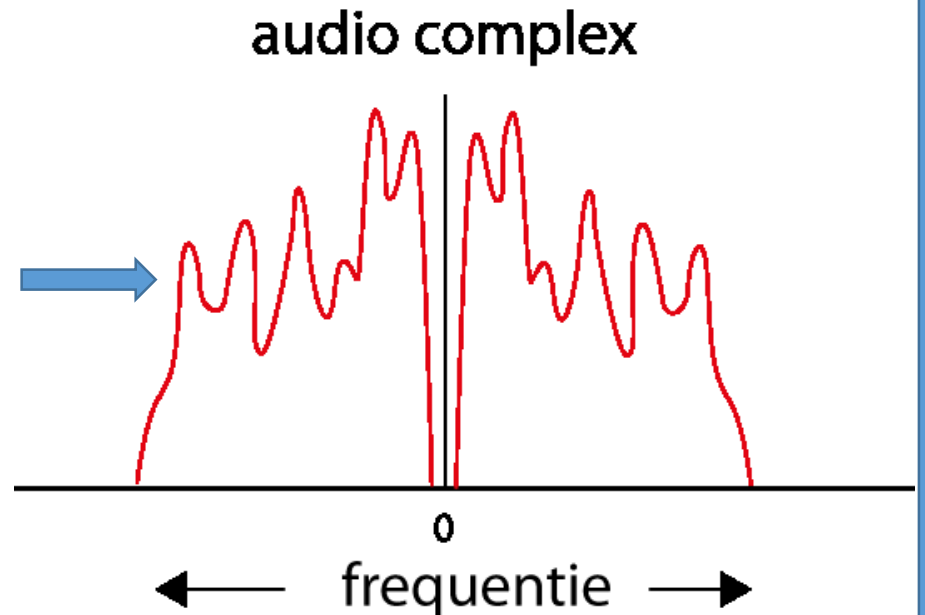
SSB transmitter

- Audio (file): complex

reële amplitude waarden



complexe amplitude
waarden toevoegen

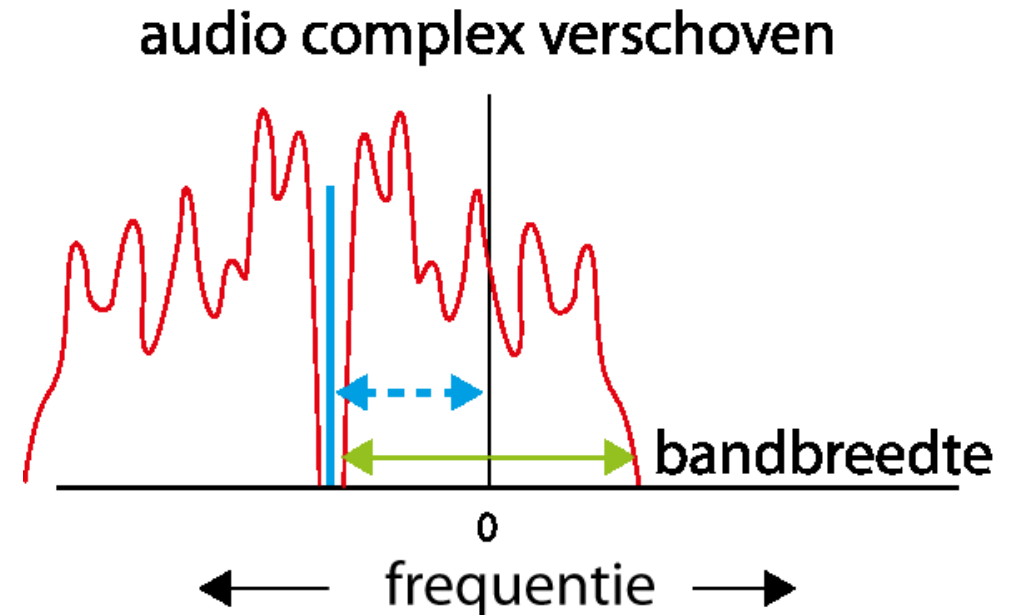
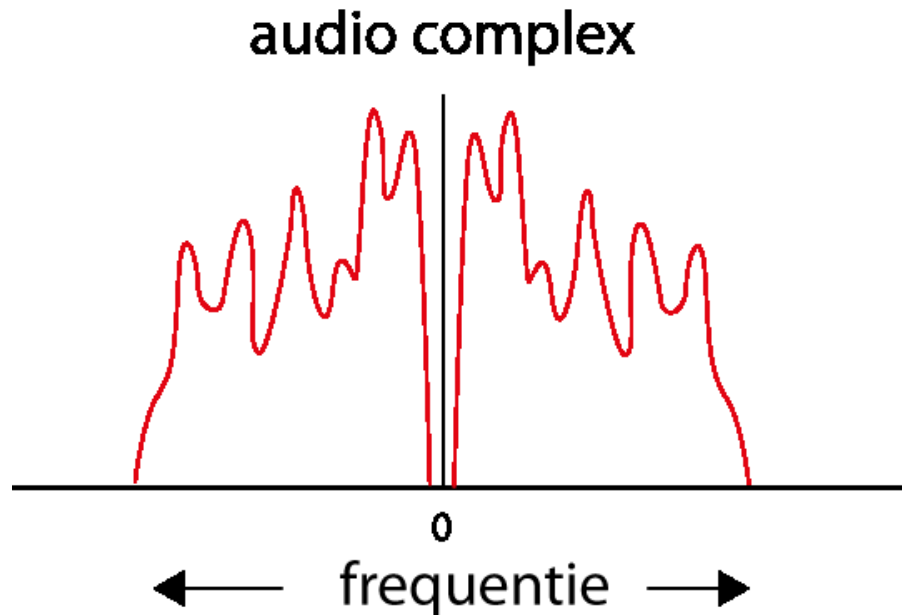




GNUradio

SSB transmitter

- Audio (file): complex, shift audiospectrum

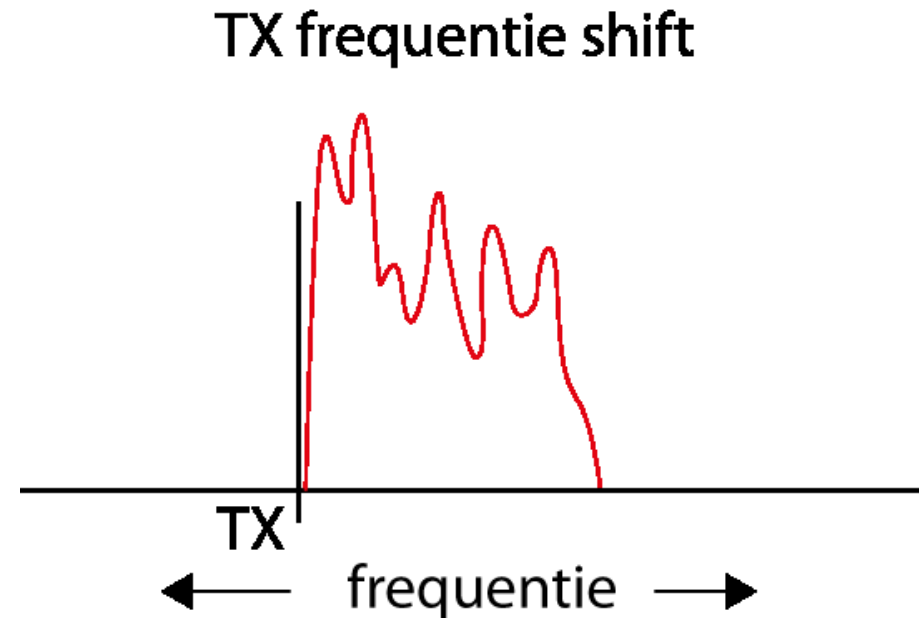
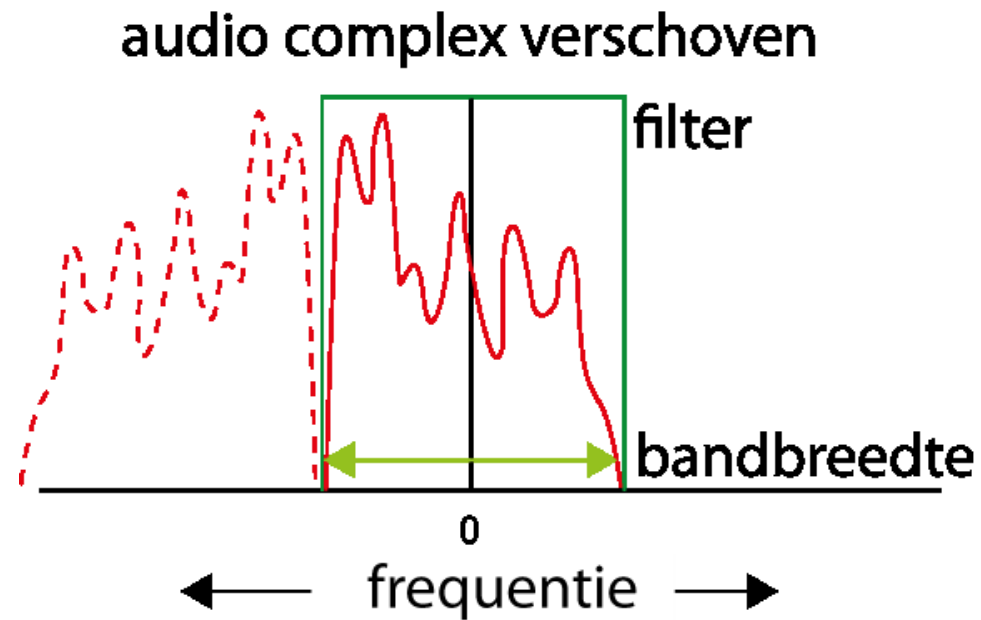




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SSB transmitter

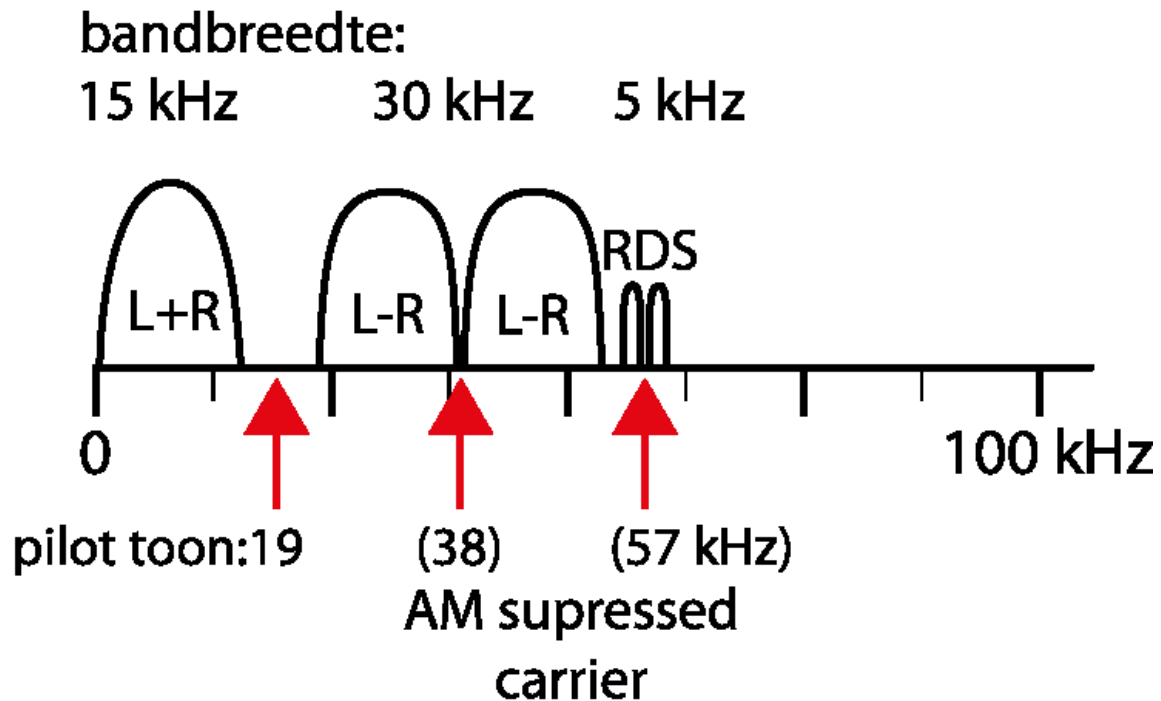
- Filter sideband, verschuif naar TX-frequentie





FM-omroepband ontvanger met stereodecoder

Spectrum na FM demodulatie:



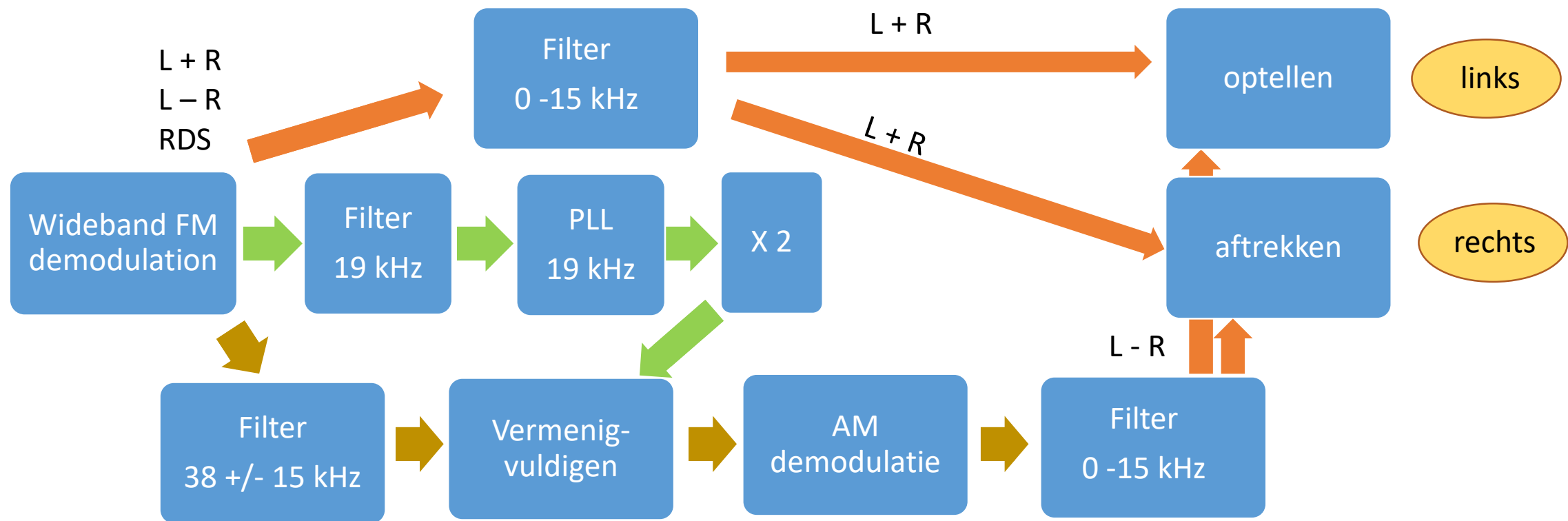


FM-omroepband ontvanger met stereodecoder

Stappen:

- FM-demodulatie, L+R signal in band 0 – 15 kHz
- extractie van 19 kHz 'pilot'-toon met PLL
- verdubbelen naar 38 kHz als carrier voor AM-demodulatie van L-R
- filteren van L-R band (23 – 53 kHz)
- AM demodulatie
- optellen en aftrekken van (L+R) en (L-R)

FM-omroepband ontvanger met stereodecoder





GNUradio

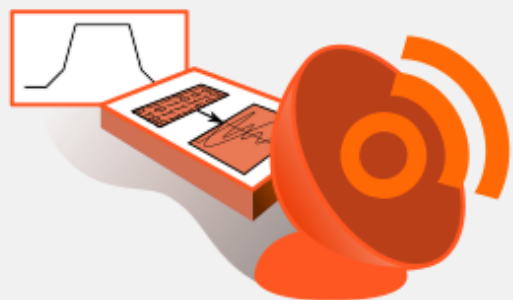
GNUradio studiemateriaal:

- files.ettus.com/tutorials/labs/Lab_1-5.pdf
- gnuradio.org/redmine/projects/gnuradio/wiki/
- gnuradio.org/redmine/projects/gnuradio/wiki/GNURadioLiveDVD
- www.trondeau.com/
- www.ece.uvic.ca/~elec350/grc_doc/index.html#
- <https://www.youtube.com/watch?v=og8RhGTFhfU>
- www.rtl-sdr.com/about-rtl-sdr/
- <https://greatscottgadgets.com/hackrf/>

en nog veel meer.....

[GNURadio.org](https://gnuradio.org)

Learn About GNU Radio



From Design to Deployment

With GNU Radio you can simulate, prototype, and deploy, all from the same workflow.

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Active Community

Leverage a wide selection of existing modules, made available by our community of active developers.

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Free Software

GNU Radio is Free Software. That means you have the liberty to use and modify it as you wish

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