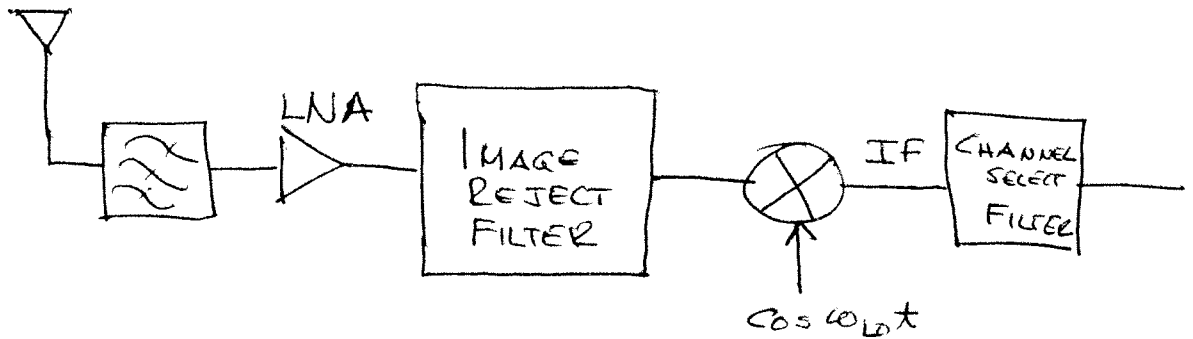


HETERODYNE AND IMAGE-REJECT RECEIVER



SIMPLE HETERODYNE RECEIVER

+ THE IF FILTER SUPPRESSES OUT-OF-CHANNEL INTERFERERS, THUS PERFORMING CHANNEL SELECTION!

- A KEY ISSUE IN HETERODYNING IS THE TRADEOFF BETWEEN IMAGE REJECTION AND ADJACENT CHANNEL SUPPRESSION!

- IR FILTER IS AN OFF-CHIP FILTER THAT MUST MATCH 50Ω

• FOR GIVEN FILTER QUALITY FACTORS (Q_s) AND LOSSES, IF THE IF IS HIGH:

IMAGE IS GREATLY ATTENUATED WHEREAS NEARBY INTERFERERS REMAIN ~~AT~~ LARGE

IF THE IF IS LOW:

IMAGE CORRUPTS THE DOWNCONVERTED SIGNAL

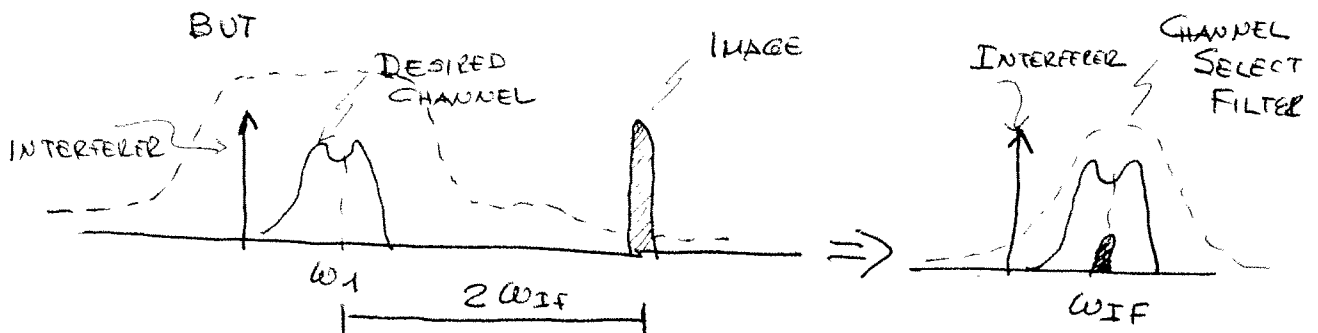
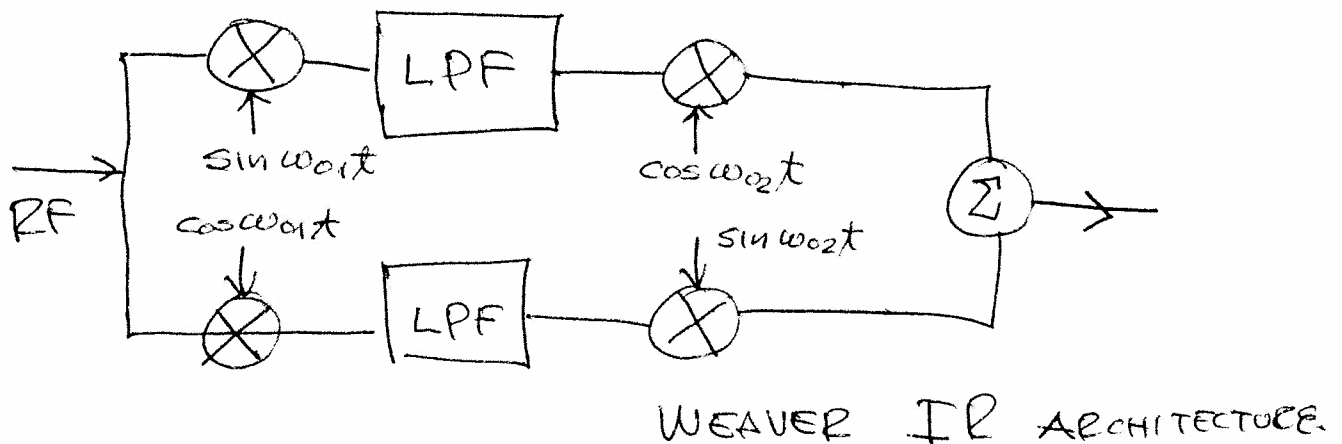
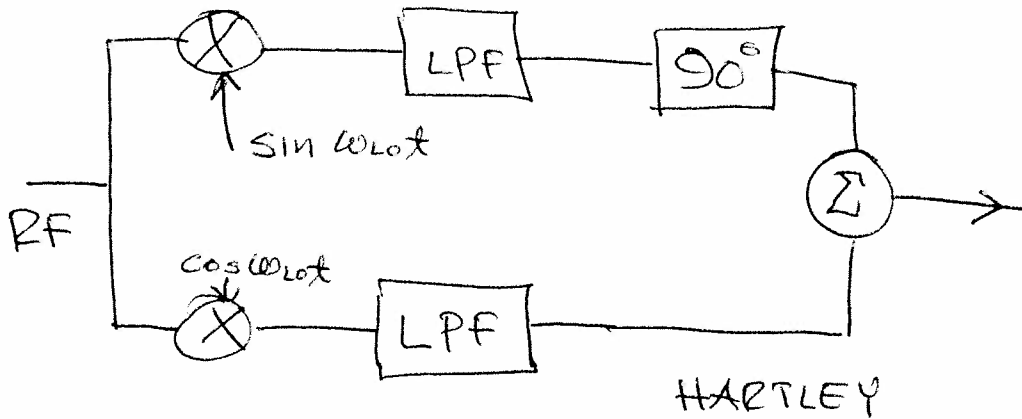


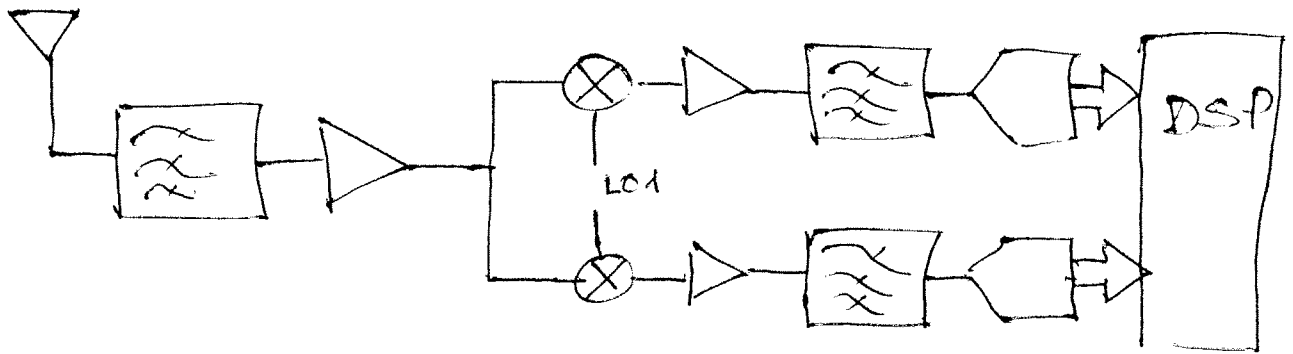
IMAGE-REJECT ARCHITECTURES

THEY ALLOW TO SPLIT THE DESIRED SIGNAL WITH THE SAME POLARITY AND THE IMAGE WITH OPPOSITE POLARITIES. THUS THE SUM OF THESE TWO SIGNAL IS FREE FROM THE IMAGE.

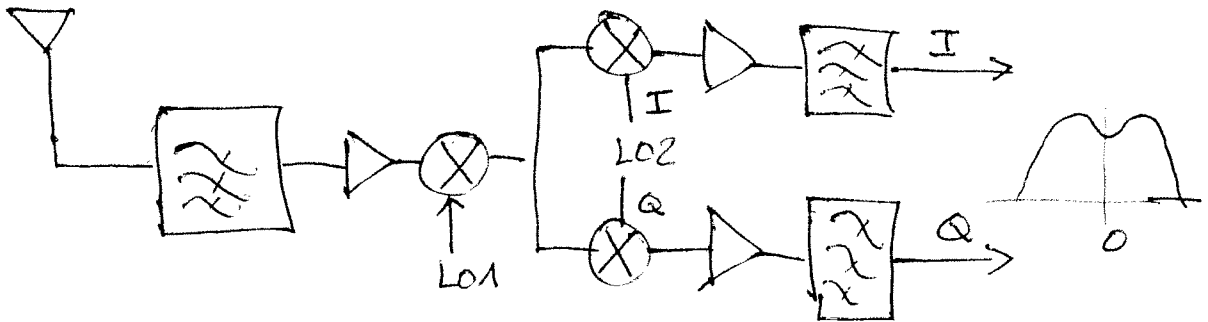


- GAIN AND PHASE MISMATCH PROBLEMS.

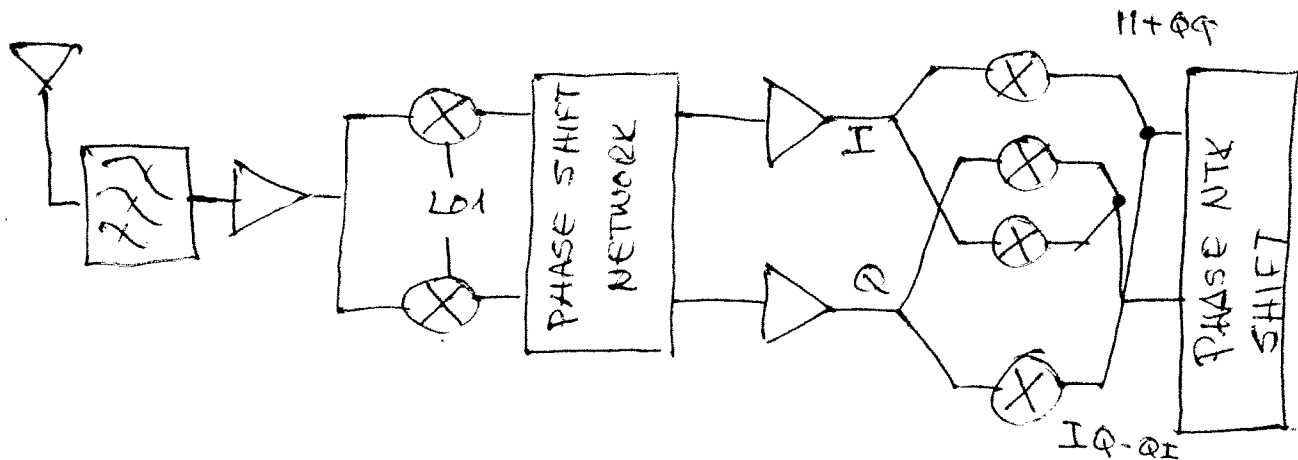
NOTES ON ARCHITECTURES OF RECEIVERS



LOW-IF SINGLE CONVERSION



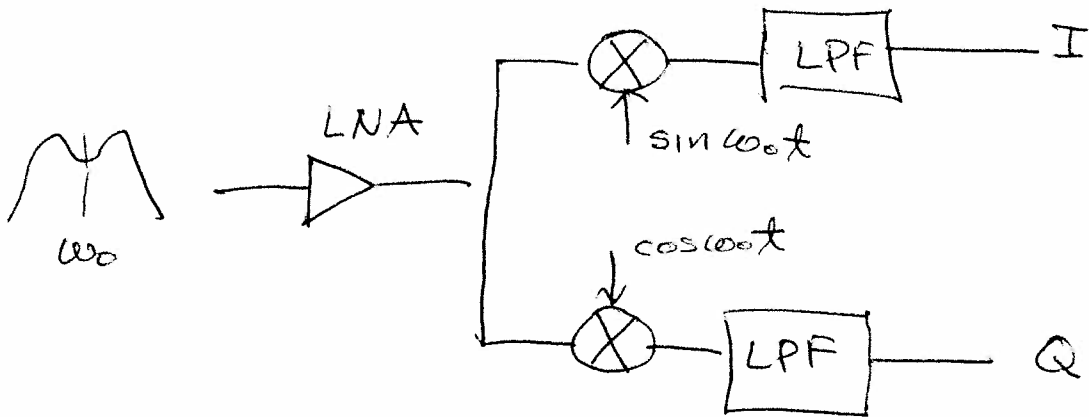
INDIRECT CONVERSION TO ZERO IF
(DIRECT CONVERSION DROPS FIRST MIXER)



DUAL CONVERSION WITH LOW SECOND IF AND ON-CHIP IMAGE REJECTION

ZERO IF TOPOLOGY

- + DESIRED CHANNEL IS SELECTED BY A LP ACTIVE FILTER
- TROUBLE WITH BASEBAND FLICKER NOISE AND DC OFFSETS
- THE OFFSETS IN AN IC RECEIVER MIGHT BE TWO ORDERS OF MAGNITUDE HIGHER THAN THE SIGNAL.
- + NO IR FILTER IS NEEDED.
- + FSK MODULATION IS TOLERANT TO DC OFFSETS, WHICH MIGHT BE REMOVED BY A CAPACITOR COUPLING



- I AND Q ARE NEEDED BECAUSE THE TWO SIDEBANDS OF THE RF SPECTRUM, IN A TYPICAL PHASE AND FREQUENCY MODULATED SIGNALS ~~FREQUENCY~~ CONTAIN DIFFERENT INFORMATION

