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### Advantages and Disadvantages of Super Heterodyne Receiver

This page covers **Advantages and Disadvantages of Super Heterodyne Receiver**. It mentions super heterodyne receiver advantages or benefits and super heterodyne receiver disadvantages or drawbacks.

### What is Heterodyne and Super Heterodyne?

#### Introduction:

- Heterodyne receiver uses single RF mixer for conversion of modulated RF signal to baseband I/Q signals.
- Super heterodyne receiver uses dual RF mixers for conversion of modulated RF signal to baseband I/Q signals.

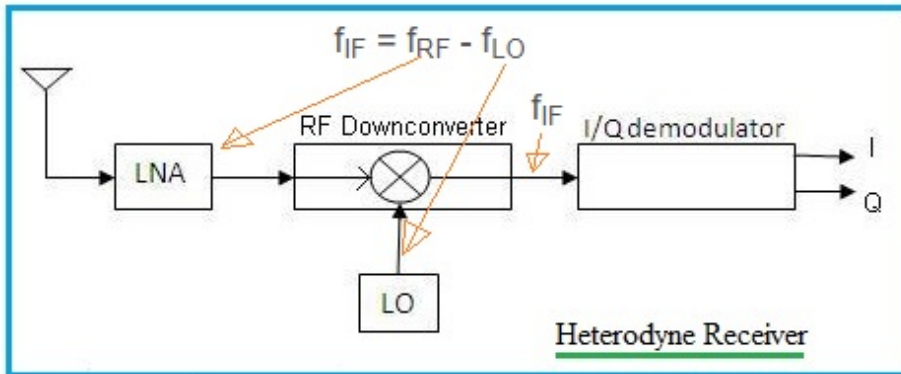
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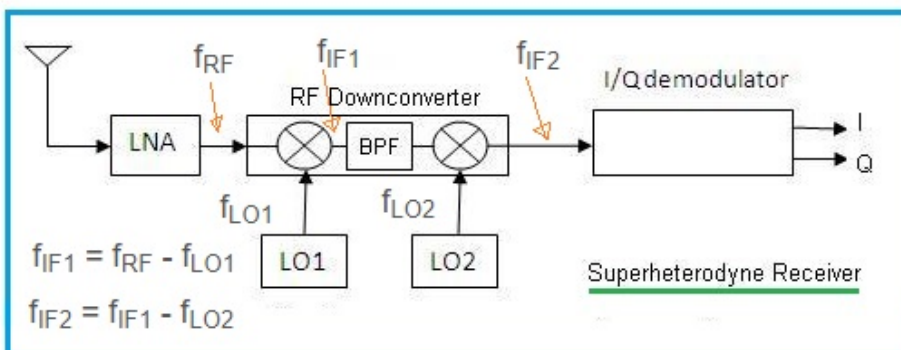
Heterodyne and super heterodyne receiver types use different LO (Local Oscillator) frequency than received signal frequency.



The figure-1 depicts Heterodyne receiver architecture. Here

$$f_{IF} = f_{RF} - f_{LO}$$

Refer [RF Mixer basics>>](#) and [RF Mixer tutorial](#) to understand up conversion and down conversion.



The figure-2 depicts Super Heterodyne receiver architecture.

Here Here  $f_{IF1} = f_{RF} - f_{LO1}$  ...equation-1 at stage-I

Here  $f_{IF2} = f_{IF1} - f_{LO2}$  ...equation-2 at stage-II

The modulated  $f_{IF2}$  is processed to achieve baseband I/Q signals at zero frequency.

Refer [Homodyne Vs Heterodyne Receiver>>](#).

## Benefits or advantages of Heterodyne and Super Heterodyne Receiver

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### Following are the benefits or **advantages of Heterodyne and Super Heterodyne Receiver:**

- ➔As it converts high frequency to low frequency, all processing takes place at lower frequencies. The devices are cheaper at such lower frequencies compare to higher frequencies.
- ➔It is easy to filter IF signal compare to RF signal.
- ➔It offers better sensitivity compare to homodyne receiver architecture.
- ➔Heterodyne uses single conversion and super heterodyne uses double conversion. The super heterodyne receiver prevents image noise foldover due to use of two IF frequencies before conversion to baseband.

## Drawbacks or disadvantages of Heterodyne and Super Heterodyne Receiver

### Following are the **disadvantages of Heterodyne and Super Heterodyne Receiver:**

- ➔It requires additional LOs (Local Oscillators) and RF Mixers to convert signal from RF to IF before conversion to baseband. This increases cost of overall receiver.
- ➔Moreover filters are also needed to remove any LO leakage as well as undesired frequency components to prevent image frequencies. This also increases cost as well as complexity of the receiver.

Also refer advantages and disadvantages of [Homodyne receiver >>](#).

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