AM Receiver

Definition: it's an electronic system that receives the amplitude modulated signal and recovers the message signal.

functions of Receiver

→ process of De-modulation of incoming modulated signal.

→ Carrier frequency tuning → to select the desired signal.

→ filtering → to seperate the desired signal from others.

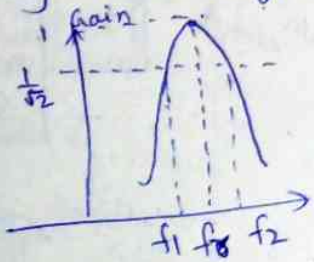
→ Amplification → to compensate the loss of signal during transmission through long distance.

performance characteristics of Receiver -

→ selectivity - to measure the ability of the receiver to select a signal of a desired frequency and rejecting all others.

$$BW = \frac{f_r}{Q}$$

f_r = resonant freq
Q = quality factor
BW = Band width.



→ Sensitivity - the ability to detect the weakest possible signal.

Gain ∝ Sensitivity.

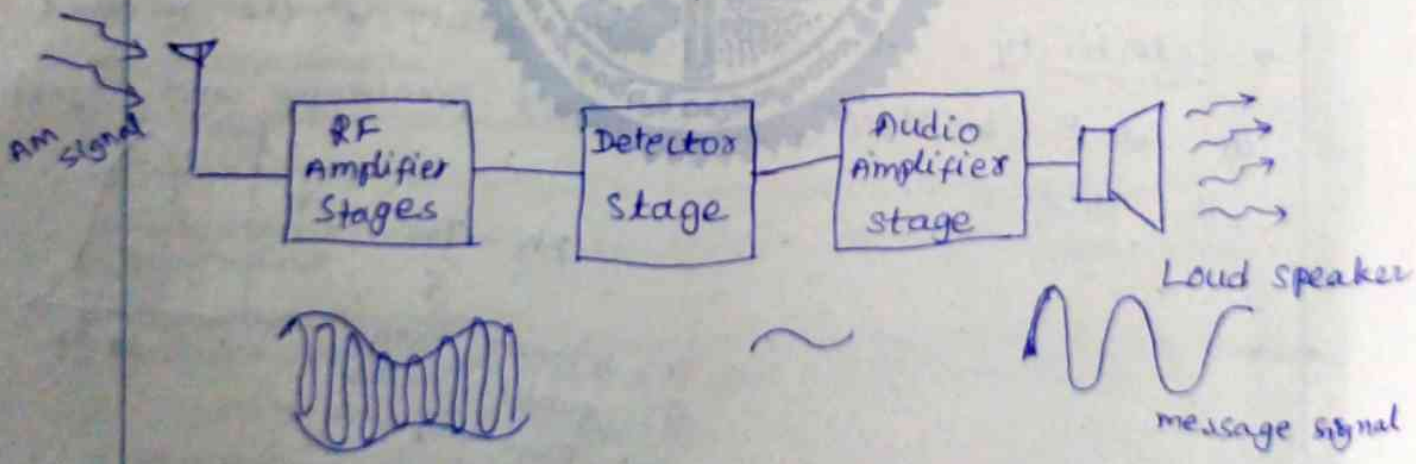
→ fidelity - the ability of the receiver to reproduce all the range of modulating frequencies at the o/p side

Types of Receivers

Coherent Receivers	Non-coherent Receivers
→ Synchronous Receivers	→ Asynchronous receivers
→ The frequency generated at the receiver is synchronized to the carrier frequency in the transmitter.	→ The freq generated in the receiver is completely independent from the transmitter carrier freq

AM Receiver -

It consists of two or three stages of RF amplifiers detectors & audio amplifier.



RF Amplifier stage -

It consists of two or three stages of tuned RF Amplifiers (all tuned together) to select and amplify the desired signal.

→ Simultaneously reject all other frequencies.

Detector stage - The suitable amplified signal is demodulated by the detector circuit.

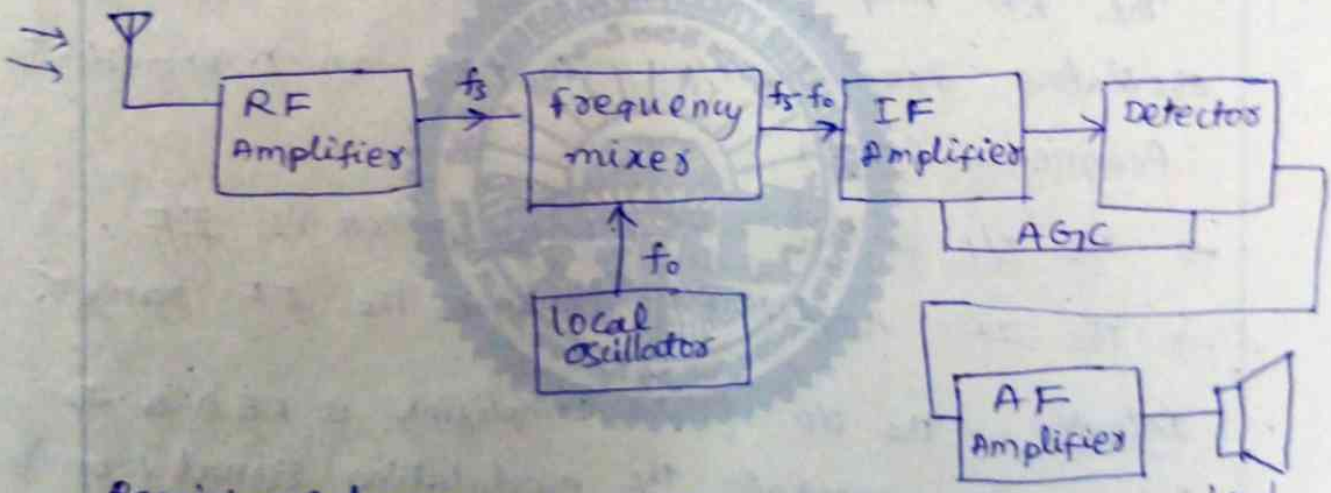
Amplifier stage - the detected signal is amplified to an adequate power level using audio-amplifier.

Given to the loud speaker for reproducing it.

Super Hetrodyne Receiver -

means super sonic hetrodyne receiver.

Hetrodyne means "mixing".



Receiving Antenna receives the transmitted o/p as an input which is having low gain.

It's given as I/p to the RF Amplifier.

RF Amplifier - It means Radio frequency Amplifier.

the o/p of antenna is tuned and amplified by this RF Amplifier.

The o/p of RF Amplifier is given as i/p to the frequency mixer.

the frequency of RF Amplifier o/p is denoted by 'f_s'.

Frequency mixer -

- it has two frequency signals as i/p's.
  ① RF Amplifier's o/p
  ② local oscillator's frequency.
- the local oscillator produces an independent frequency
- the output of the frequency mixer is
  $f_s + f_o$ ⇒ sum component
  $f_s - f_o$ ⇒ difference component.

IF Amplifier -

The RF Amplifier o/p is mixed with the local oscillators frequency o/p to form an Intermediate frequency. (IF)

→ The o/p of the frequency mixer is IF.

→ The IF Amplifier amplifies the IF ranges.

Detector - The o/p of IF amplifier is FED to the detector to seperate the modulating signal from the carrier signals.

The o/p of the detector is an Audio frequency.

→ The Gain of the Audio frequency is controlled by the Automatic Gain controller (AGC).

AF Amplifier -

The AF signal obtained at the detector o/p is of low gain, hence an AF Amplifier is used to amplify the AF signal for providing amplification.

Loud speaker - o/p is connected to a speaker.