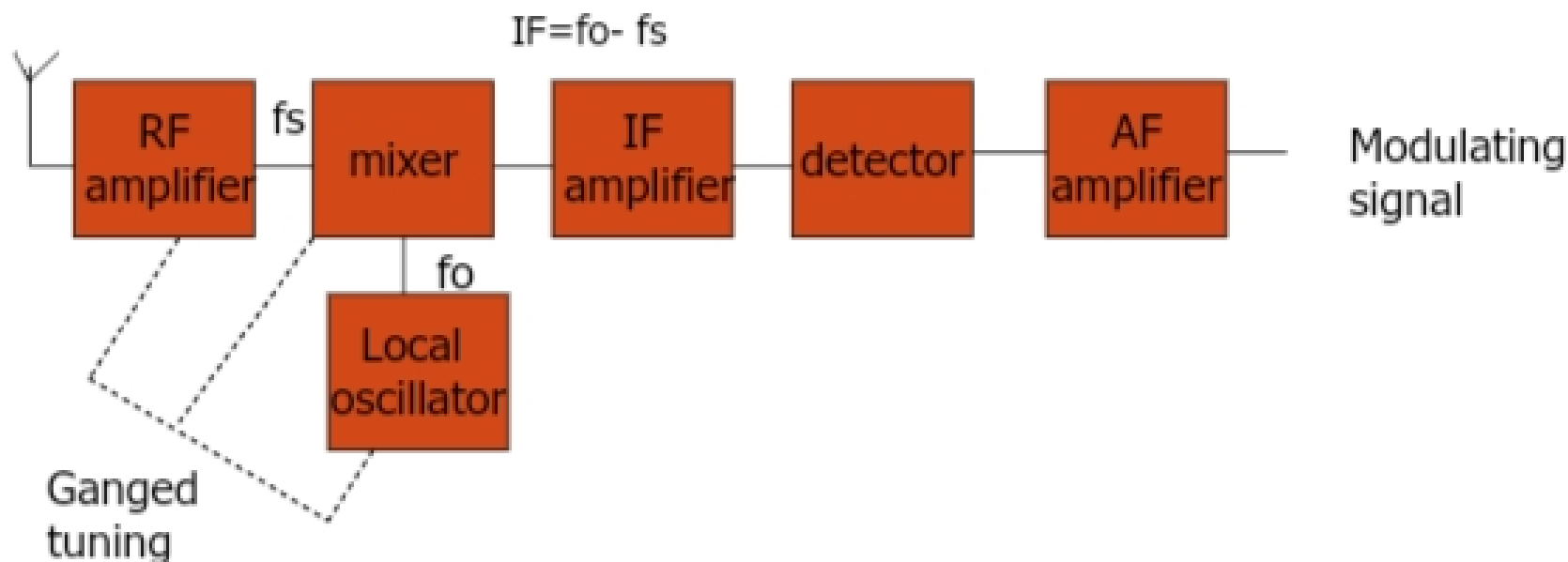


SUPER HETRODYNE RECEIVER

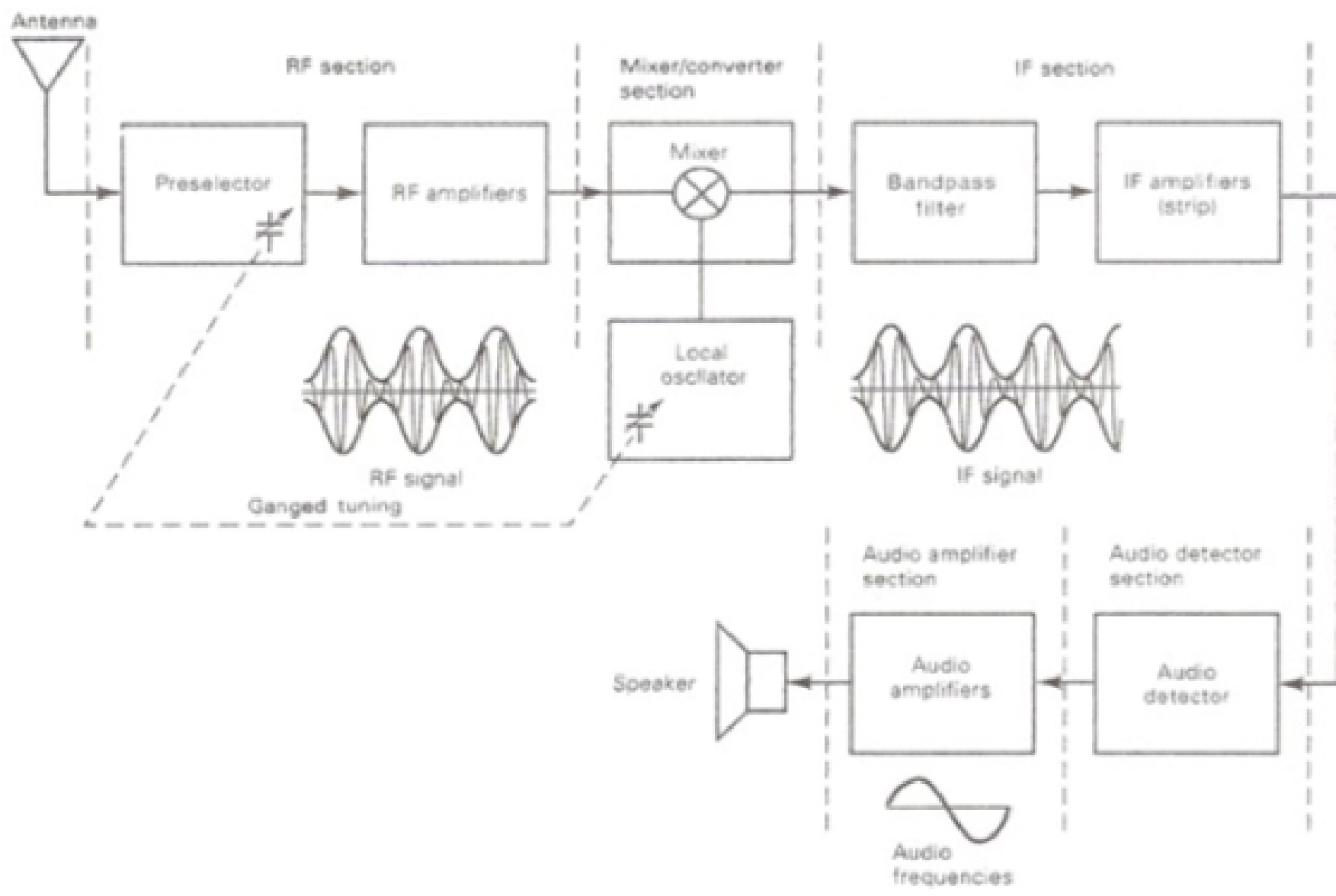
The shortcomings of the TRF receiver are overcome by the super heterodyne receiver.



- *Heterodyne* – to mix two frequencies together in a nonlinear device or to transmit one frequency to another using nonlinear mixing.
- Also known as *frequency conversion* , high frequency down converted to low frequency.(IF)
- A super heterodyne receiver converts all incoming radio frequency (RF) signals to a lower frequency known as an intermediate frequency (IF).

DRAWBACKS OVERCOMED

- Stability – as high frequency is down converted to IF the reactance of stray capacitances will not decrease as it was at higher frequencies resulting in increased feedback.
- No variation in BW- as IF range is 438 to 465 KHz (in case of AM receivers) mostly 455KHz ,appropriate for Q limit (120).
- Better selectivity- as no adjacent channels are picked due to variation in BW.



- **RF section**

- Consists of a pre-selector and an amplifier
- Pre-selector is a broad-tuned bandpass filter with an adjustable center frequency used to reject unwanted radio frequency and to reduce the noise bandwidth.
- RF amplifier determines the sensitivity of the receiver and a predominant factor in determining the noise figure for the receiver.

- **Mixer/converter section**

- Consists of a radio-frequency oscillator and a mixer.
- Choice of oscillator depends on the stability and accuracy desired.
- Mixer is a nonlinear device to convert radio frequency to intermediate frequencies (i.e. heterodyning process).
- The shape of the envelope, the bandwidth and the original information contained in the envelope remains unchanged although the carrier and sideband frequencies are translated from RF to IF.

- **IF section**

- Consists of a series of IF amplifiers and bandpass filters to achieve most of the receiver gain and selectivity.
- The IF is always lower than the RF because it is easier and less expensive to construct high-gain, stable amplifiers for low frequency signals.
- IF amplifiers are also less likely to oscillate than their RF counterparts.

- **Detector section**

- To convert the IF signals back to the original source information (demodulation).
- Can be as simple as a single diode or as complex as a PLL or balanced demodulator.

- **Audio amplifier section**

- Comprises several cascaded audio amplifiers and one or more speakers

- **AGC (Automatic Gain Control)**

- Adjust the IF amplifier gain according to signal level(to the average amplitude signal almost constant).
- AGC is a system by means of which the overall gain of radio receiver is varied automatically with the variations in the strength of received signals, to maintain the output constant.