

AM BROADCAST TRANSMITTER

DETC-S-4

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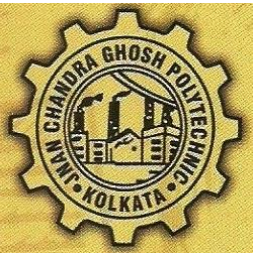
LECTURER

JNAN CHANDRA GHOSH

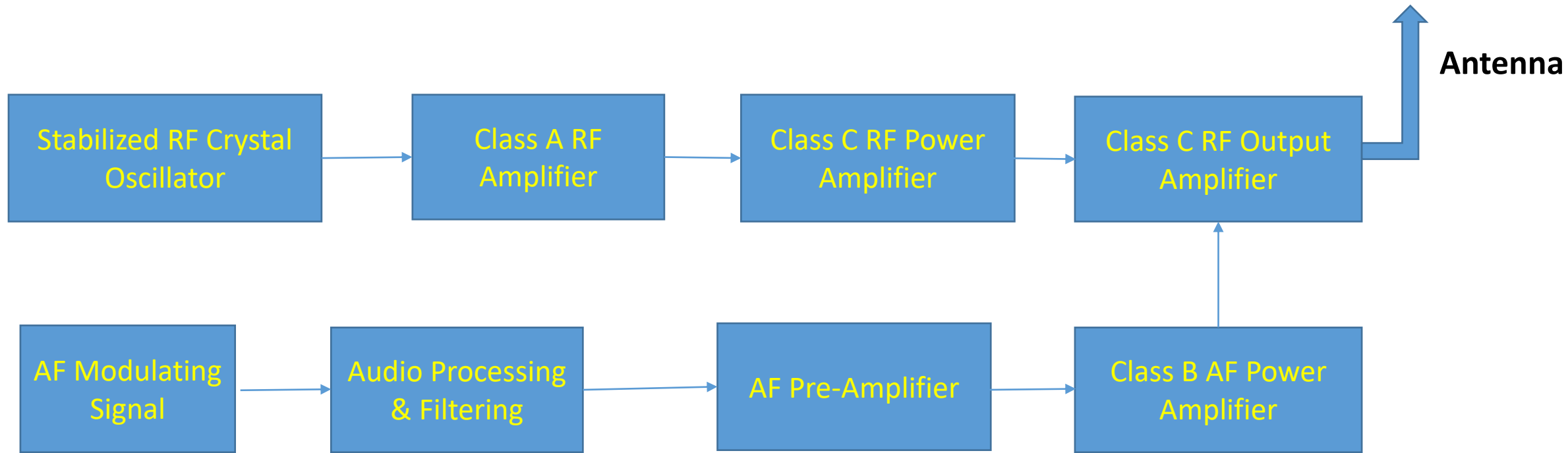
POLYTECHNIC

AM Broadcast Transmitter

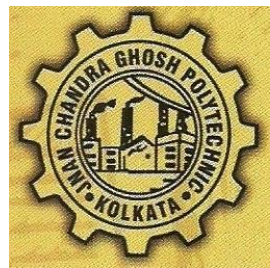
- Basic requirements :
 - Crystal Oscillator – Generates RF Oscillations(Primarily used in AM Transmitter)
 - Power Amplifier – Three Types- Class A , Class B , Class C
 - Two types of AM Transmitter
 - High Level Modulated Transmitter
 - Low Level Modulated Transmitter



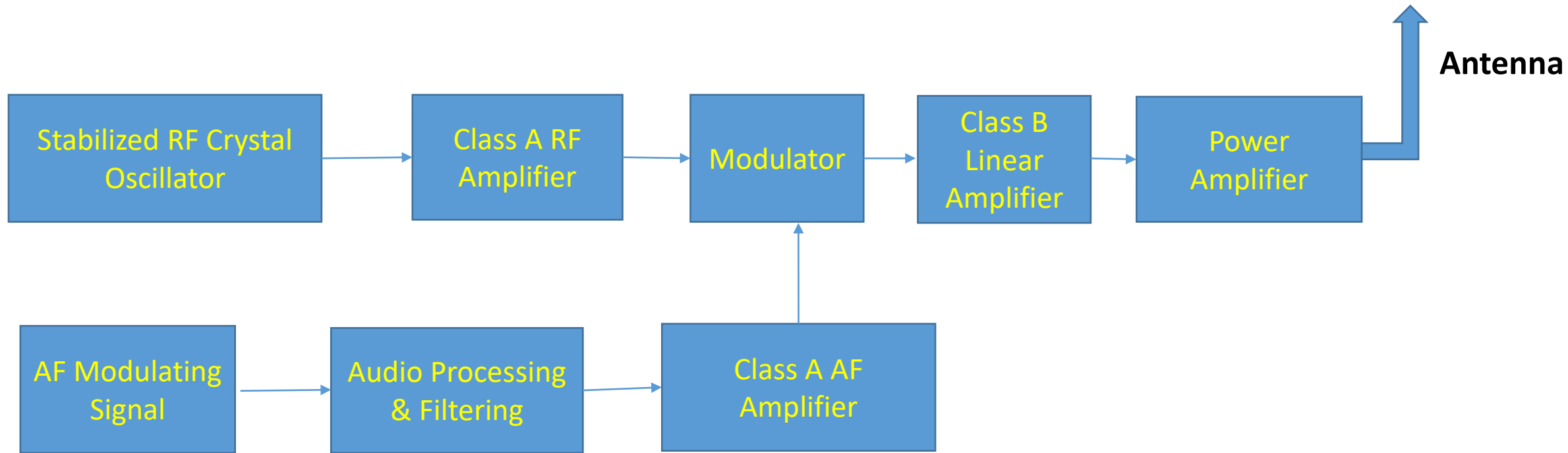
High Level Modulated Transmitter



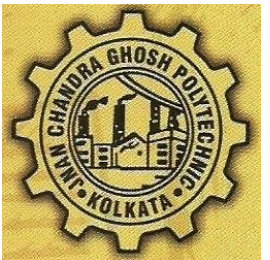
- In a AM Transmitter amplitude modulation can be generated at any point after the Radio Frequency source.
- If the output stage in a transmitter is collector modulated in a lower power transistor , the system is high level modulation which is used in TV broadcasting.



Low Level Modulated Transmitter



- For Low level Amplitude Modulation Class B Linear Amplifier is used.



Advantages & Disadvantages of AM Transmitter

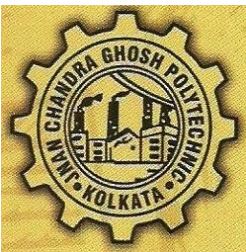
Advantages:

- AM Transmitters are less complex
- AM Receivers are simple , detection is easy
- AM waves can travel long distance
- AM transmitter is having low bandwidth

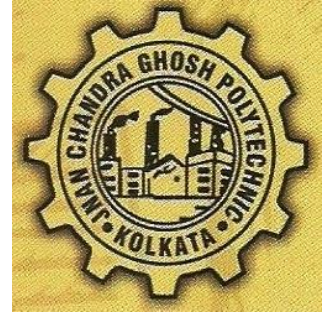
Disadvantages

- Power wastage takes place
- AM gets affected due to noise

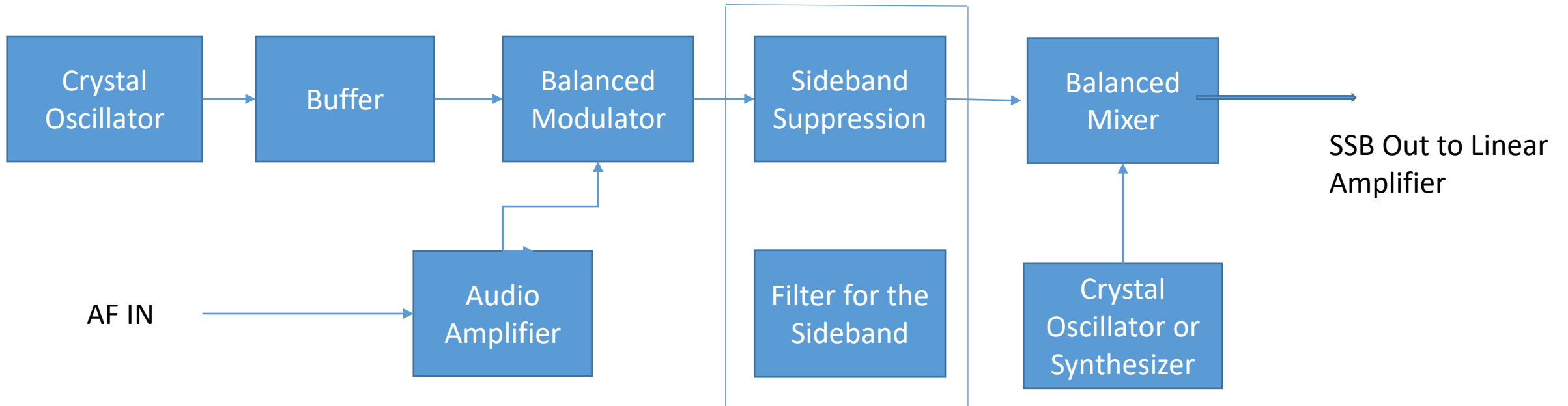
AM Transmission is used for Radio Broadcasting and picture transmission in TV



Generation of SSB(Single Side Band)

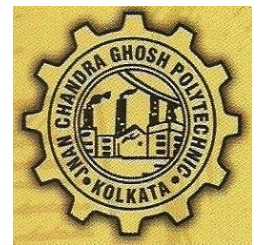
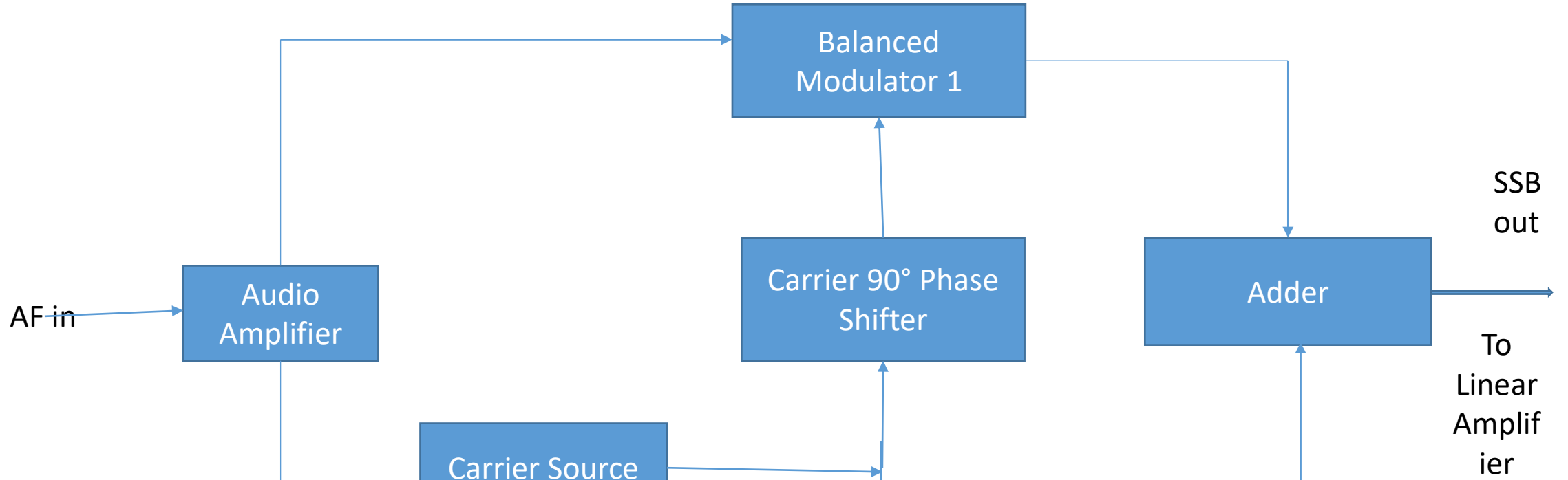


- Filter Method



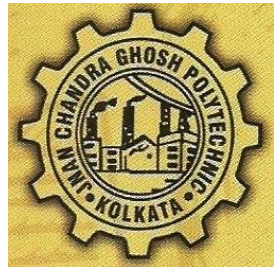
- Simplest method
- The output of balanced modulator contain two sidebands & some of the miscellaneous components which are taken care of by the tuning of outputs transformer secondary winding
- After Balanced Modulator the unwanted sideband is removed by a Filter
- Filter may be LC, Crystal or Ceramic or Mechanical depending on carrier frequency & other requirements
- So the Filter must have a flat pass band & extremely high attenuation outside the pass band

Phase Shift Method



Phase Shift Method

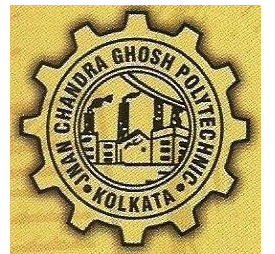
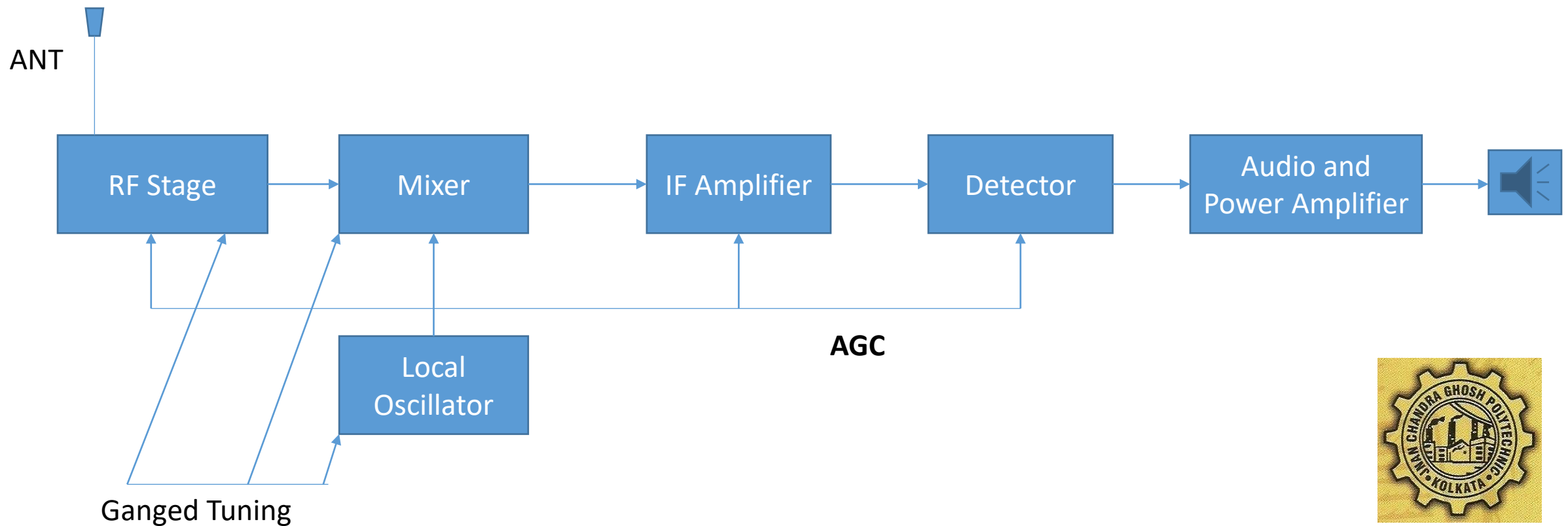
- Both modulators produce an output consisting only of sidebands
- Both USB lead the input carrier voltage by 90°
- One of the LSB lead the reference voltage by 90° & other lags it by 90°
- The two LSB 's are out of phase & when combined in adder giving SSB in which the LSB has been cancelled

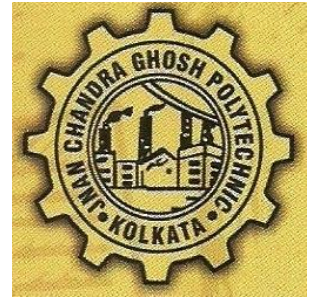


Heterodyning

The process of mixing two signals of different frequencies to produce a new frequency is called heterodyning.

Super Heterodyne Receiver -





Explanation:

RF Stage : Selects required signal
 Reject other signal
 Reduces effect of noise

Mixer : The signal voltage is combined with local oscillator voltage and is normally converted into a lower fixed frequency signal (IF Signal).

Local Oscillator : Local Oscillator Frequency Signal $f_o > f_s$ (signal frequency)

IF (Intermediate frequency) = $f_o - f_s$: This IF signal contains the same modulation as the original carrier. This IF signal is amplified and detected to reproduce original information.

A constant frequency different is maintained by the L.O. and the RF circuit normally through capacitance tuning in which all capacitors are ganged together.

IF amplifier provides most of the gain and sensitivity and bandwidth requirement of the receiver.

AGC – Automatic Gain Control : This will be explained later in details.

- **Detector** : Detector demodulates the signal and the original message signal is recovered
In AM diode detector (envelope detector) is used which will be explained later.

Advantage of Superheterodyning :

- No variation in bandwidth
- High Sensitivity and selectivity
- High Adjacent Channel Rejection

