Experiment No. 2 Date:

Aim: To study the generation and detection of Amplitude Modulated (AM) signal.

Objectives:

1. To configure a MC1496 based AM transmitter at system level for AM signal generation.

2. To determine the Modulation Index based on observation of the generated AM signal.

3. To configure a Super-heterodyne AM receiver at system level.

Resources/Specifications:

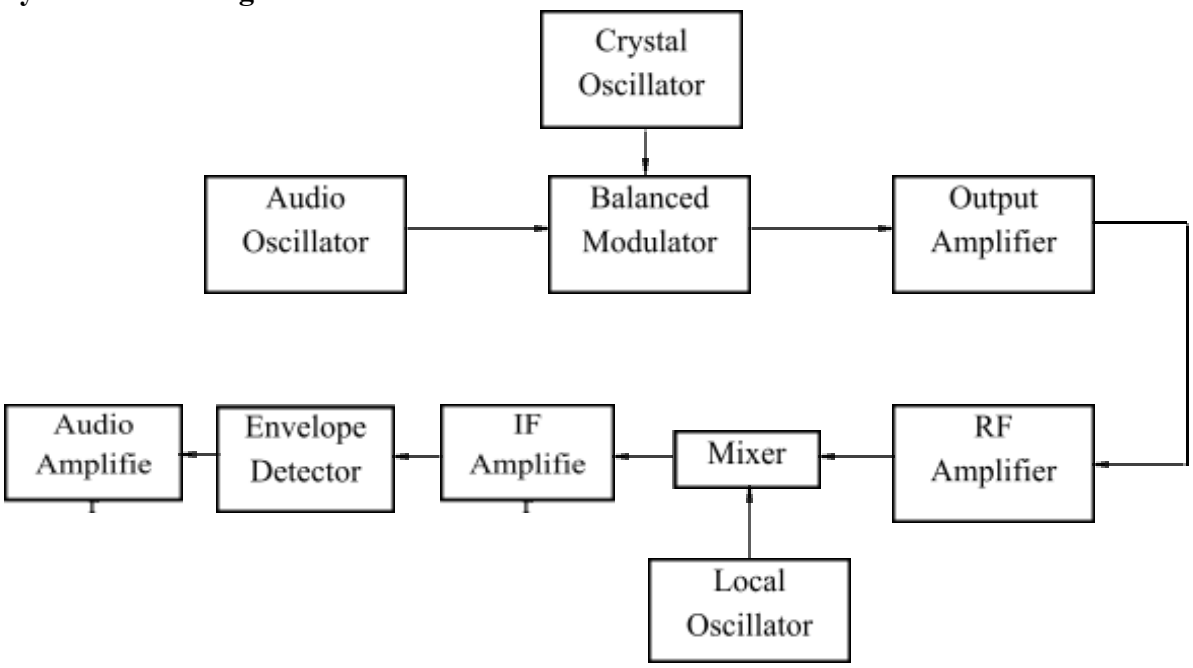
1. AM transmitter trainer board.

2. AM receiver trainer board.

3. Jumper cords – As per requirement.

4. Digital Storage Oscilloscope: 70 MHz, 1GSa/s.

System Level Diagram:



System Description:

Transmitter

Audio Oscillator: Generates Audio Frequency (AF) single tone sinusoid as modulation signal.

Crystal Oscillator: Generates Radio Frequency (RF) carrier sinusoid as carrier signal.

Balanced Modulator: MC1496 IC configured for AM generation.

Output Amplifier: Amplifies the AM signal generated by Balanced Modulator for transmission.

Receiver

RF Amplifier: Detects the received AM signal by tuning to the transmitted carrier frequency.

Mixer: Multiplies the tuned and amplified AM signal with the local oscillator signal to down convert the AM spectrum to Intermediate Frequency (IF) for stable amplification.

IF Amplifier (two-stage): Provides flat gain response for stable amplification.

Envelope Detector: Extracts the AM envelope to demodulate the message signal.

Audio Amplifier: Amplifies the demodulated signal in the AF range.

Parameter Settings:

Modulating Signal: Sinusoid with $V_m =$ _____ , $f_m =$ _____ .

Carrier Signal: Sinusoid with $f_c =$ _____ .

Observations:

Modulated Signal: $V_{max} =$ _____, $V_{min} =$ _____.

Demodulated Signal (Post detection): $V_m =$ _____ , $f_m =$ _____ .

Demodulated Signal (Post amplification): $V_m =$ _____ , $f_m =$ _____ .

Calculations:

Modulation Index: $m_a = \frac{V_{max} - V_{min}}{V_{max} + V_{min}} =$

Plot:

1. Observed AM waveform v/s time.

Note: Plot should be clear and the figure caption, axis labels with units and legends must be specified.

Conclusion:

Signature of the Instructor