Communication and Radar Laboratory
Lab. Course EL-392

Experiment # 02 (AM & Demodulation)

Object:- (a) Draw the modulation characteristics **(m vs A)** of the AM section of the kit supplied (AQUILA AM Demonstrator Model AET – 14)
(b) Use demodulator section of the kit to recover the message signal.

About the AM kit : AQUILA AM DEMONSTRATOR AET – 14 (CRT-3)

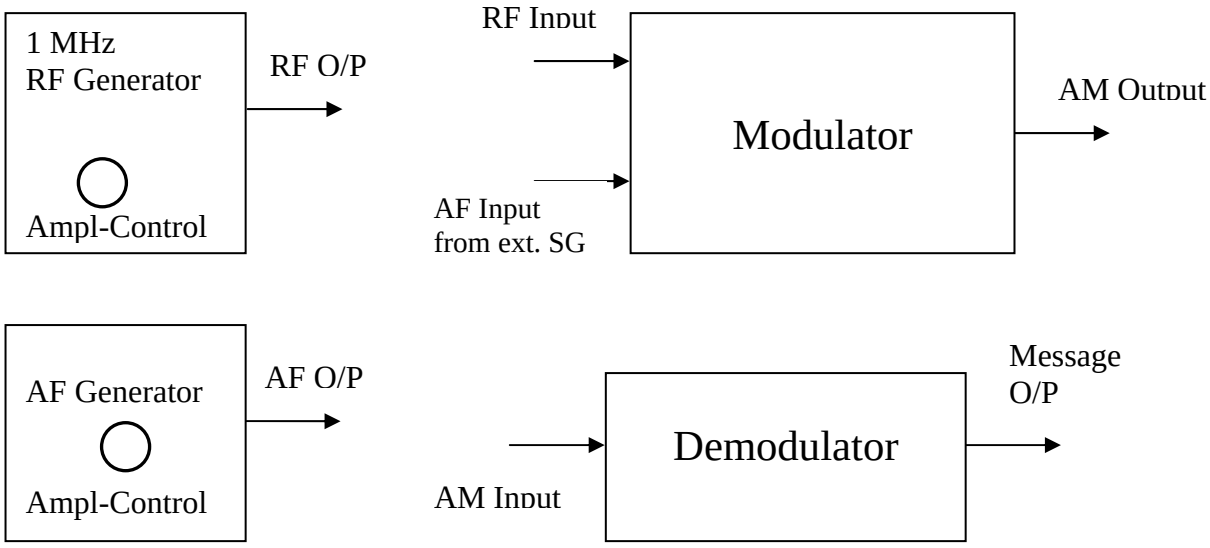


Fig 1:- Kit Layout Diagram

The AQUILA AM DEMONSTRATOR kit model AET – 14, consists of the following:-
(i) A built-in carrier-wave generator (sine-wave) of fixed frequency 1 MHz and adjustable amplitude.
(ii) A built-in message generator (sine-wave) of fixed frequency and adjustable amplitude.
(iii) A modulator and a demodulator as shown in the above figure.

Procedure:-
1. Switch ON the kit and view its RF O/P on the CRO, adjust its amplitude to maximum and use it as a carrier C(t), connect it to the RF Input terminal of the modulator.
2. Without connecting any signal to the AF-Input terminal of the modulator, observe the output of the modulator; the same un-modulated carrier will appear here.
3. Now, obtain a sine-wave output from an external signal generator, view it on CRO, adjust it frequency around 1 KHz & amplitude around 2 Volts p-p and use it as a message signal m(t).
4. Connect the above adjusted signal m(t) to the AF Input of the modulator, viewing it on one channel & the modulator's O/P (AM O/P) on another channel of the CRO, makr proper adjustments on CRO. ➔ message signal m(t) & AM signal will appear on the CRO screen.
5. Change the amplitude of m(t) ➔ modulation index of AM signal will change.

6. Take different values of the amplitudes of m(t) & measure the modulation index corresponding to each value of the amplitude, and tabulate the observations as shown in the observation table.

Observations:-

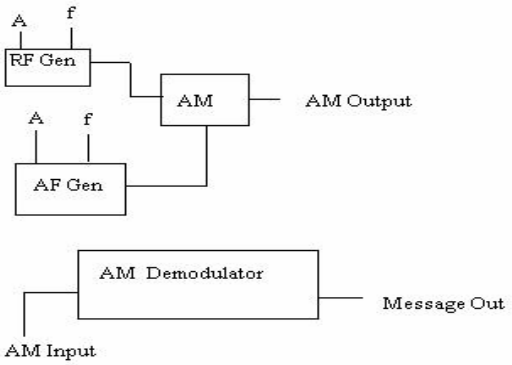
Carrier Signal (RF signal): A_c = ------ mV_{p-p} (adjusted)

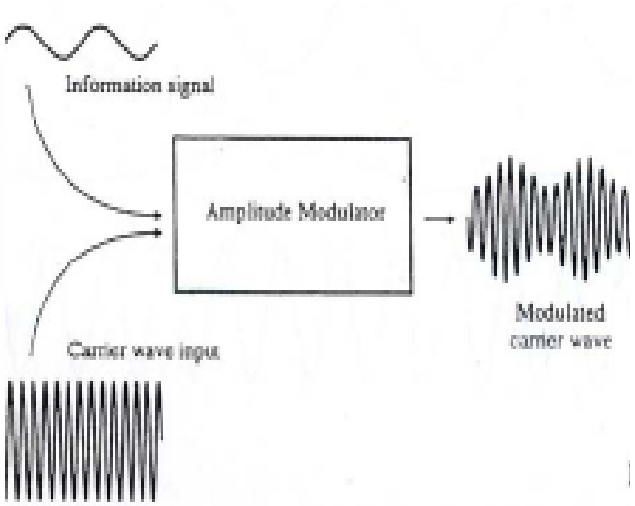
f_c = 1.0 MHz (fixed)

Modulating Signal (AF signal): f_m = ------ Hz

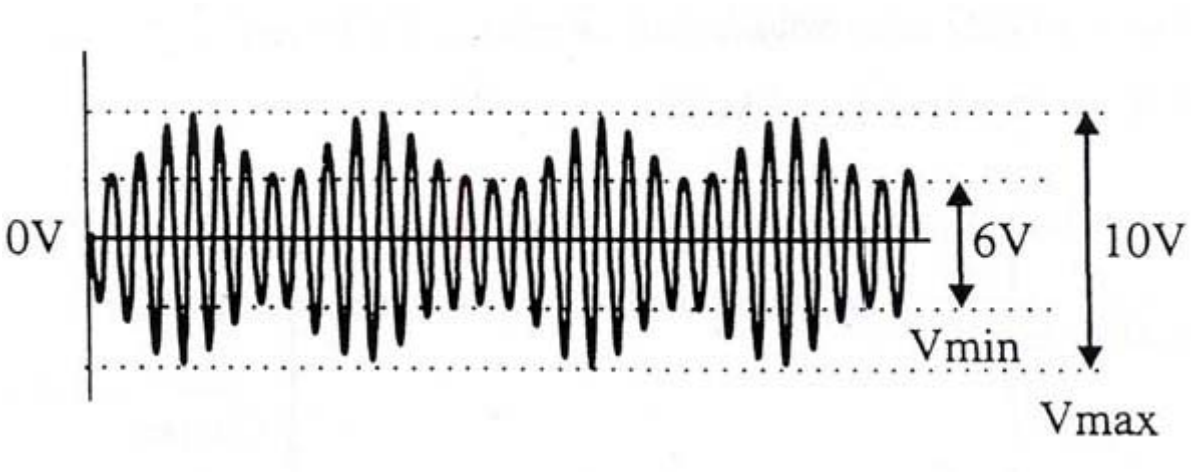
S. No.	Am ($volts_{p-p}$)	Meas. of max (A) & min (B) of AM signal		Modulation Index, m (%)
		A	B	
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

Experimental Setup:-





Measurement of modulation index of AM wave:-



The modulation index, m = [$(V_{max} - V_{min}) / (V_{max} + V_{min})$] **x 100 %**

Sample Calculation:-

The modulation index, m = [**(A - B) / (A + B)**] **x 100 %**

For Recovered Message Signal (at demodulator's o/p), Amplitude = volts p-p
Frequency = Hz

A curve between **m** versus $\mathbf{A_m}$ gives the modulation characteristics of the AM.

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