IMPLEMENTATION OF AMPLITUDE SHIFT KEYING

By SPARSH ARYA(17BEC0656)
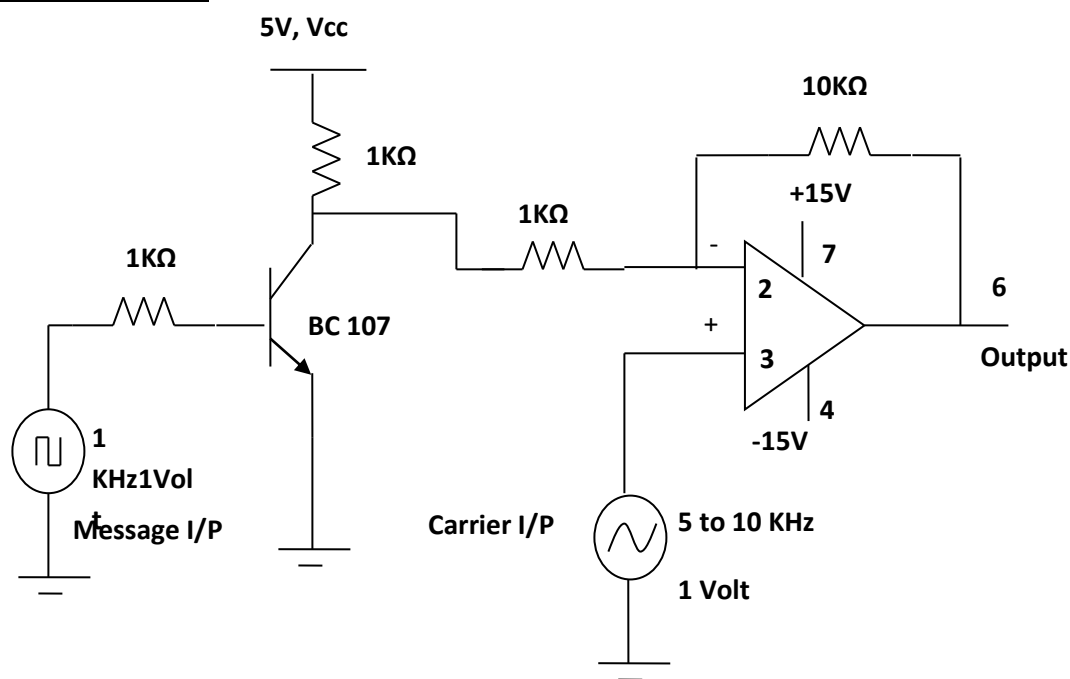
Aim:

To construct and study Amplitude Shift Keying Modulation circuit and to absorve the waveforms
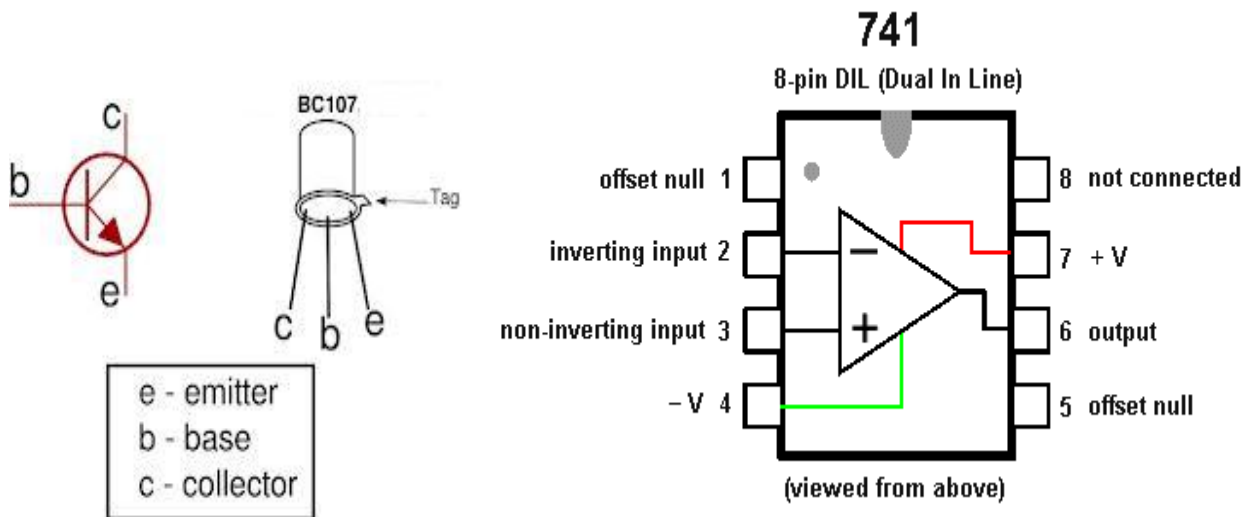
Components Required:

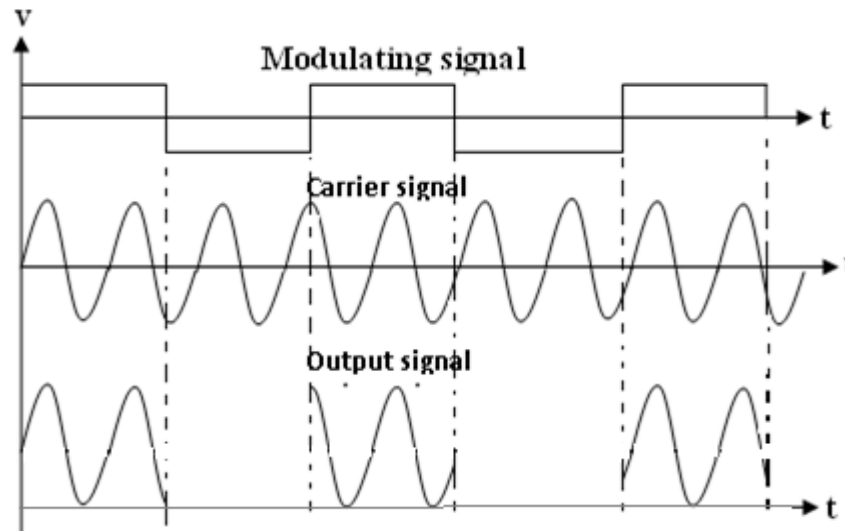|	
IC 741	1
Transistor BC 107	1
Resistors	1KΩ - 3 10KΩ - 1
DC Power Supply	1
Digital Storage Oscilloscope (DSO)	1
Bread Board & Connecting Wires Set	1
Function / Waveform Generator	1

Circuit Diagram:

Pin Configuration for Transistor BC 107 & IC 714:

741
8-pin DIL (Dual In Line)

offset null 1 — 8 not connected

inverting input 2 — 7 + V

non-inverting input 3 — 6 output

− V 4 — 5 offset null

(viewed from above)

e - emitter
b - base
c - collector

Procedure:

1. Connect the circuit as shown in the circuit diagram.
2. Adjust the input message amplitude and frequency to 1V& 1 KHz respectively.
3. Observe the output in DSO at pin 6 of the Op-amp.
4. Tabulate the readings and write the observations.

Model graph:

Theory:

Amplitude shift keying (ASK) is the simplest digital modulation technique. In this modulation method there is only one carrier which is switched ON/OFF depending upon the input binary sequence to transmit symbol 0 and 1. The binary ASK system was one of the earliest form of digital modulation used in wireless telegraphy. In an binary ASK system binary symbol 1 is represented by transmitting a sinusoidal carrier wave of fixed amplitude Ac and fixed frequency fc for the bit duration Tb where as binary symbol 0 is represented by switching of the carrier for Tb seconds. This signal can be generated simply by turning the carrier of a sinusoidal oscillator ON and OFF for the prescribed periods indicated by the modulating pulse train. For this reason the scheme is also known as on-off shift testing. The ASK signal can be generated by applying the incoming binary data and the sinusoidal carrier to the two inputs of a product modulator. The resulting output is the ASK wave.

PreLab Questions:

1. What is op-amp?
2. What is on-off keying?

Tabular Column:

Signals	Amplitude (volts)	Frequency (Hz) or Time Period (s)
Modulating Input signal	2.00V	500 Hz,2ms
Carrier Signal	4.00V	4 KHz,0.25ms
Modulated ASK output signal	28.00V	500 Hz,2ms

Inference: The ASK modulator circuits were set up and the observation was noted down and output waveform were observed.

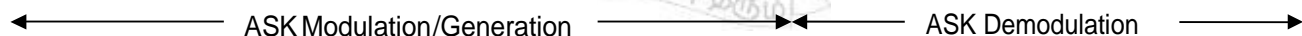# IMPLEMENTATION OF AMPLITUDE SHIFT KEYING (ASK) DEMODULATION

Aim:

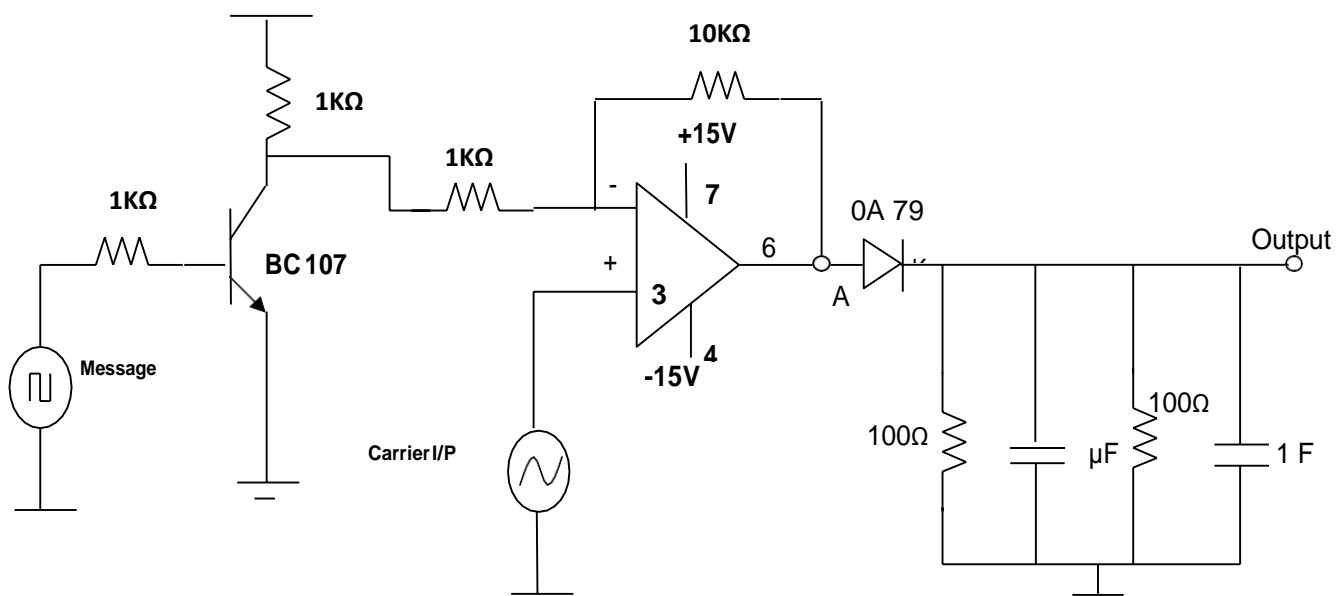To implement generation and demodulation circuit for Amplitude Shift
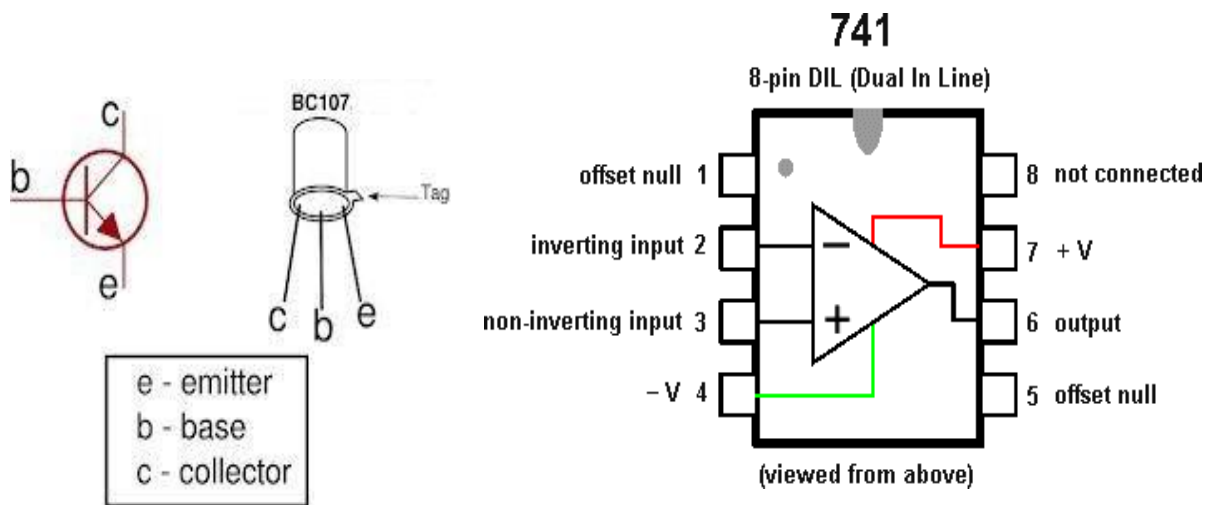
Keyed (ASK) signal

Components Required:

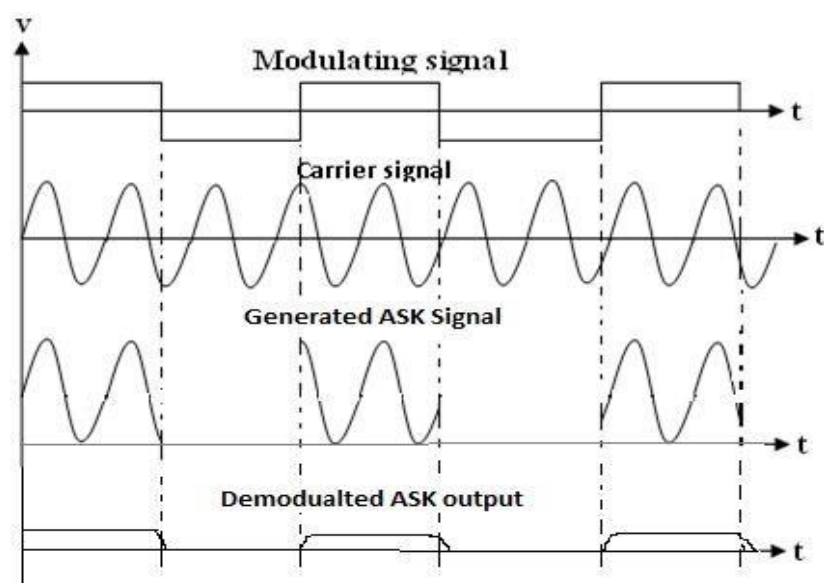|	
IC 741	1
Transistor BC 107	1
Diode	0A 79 - 1
Resistors	1K - 3 10KΩ - 1 100Ω - 2
Capacitors	1µ - 2
DC Power Supply	1
Digital Storage Oscilloscope (DSO)	1
Bread Board & Connecting Wires Set	1
Function / Waveform Generator	1

Circuit Diagram:

◄──────── ASK Modulation/Generation ────────►◄──── ASK Demodulation ────►

Pin Configuration for Transistor BC 107 & IC 714:

741

8-pin DIL (Dual In Line)

offset null 1   8 not connected

inverting input 2   7 + V

non-inverting input 3   6 output

– V 4   5 offset null

(viewed from above)

c

b

e

BC107

Tag

c b e

e - emitter
b - base
c - collector

Procedure:

1. Connect ASK Modulation/Generation part of the circuit as shown in the circuit diagram.
2. Adjust the input message signal as **400Hz & 2V$_{p-p}$,** and Carrier signal **as 4Vp-p & 7 KHz** respectively.
3. Observe the output in DSO at pin 6 of the Op-amp and check the generation of ASK.
4. Complete the connections of the Demodulation part as shown in the diagram and observe the output in DSO.
5. Tabulate the readings and write the observations.

Model graph:

Modulating signal

Carrier signal

Generated ASK Signal

Demodualted ASK output

THEORY:- Amplitude shift keying (ASK) is the simplest digital modulation technique. In this modulation method there is only one carrier which is switched ON/OFF depending upon the input binary sequence to transmit symbol 0 and 1. The binary ASK system was one of the earliest form of digital modulation used in wireless telegraphy. In an binary ASK system binary symbol 1 is represented by transmitting a sinusoidal carrier wave of fixed amplitude Ac and fixed frequency fc for the bit duration Tb where as binary symbol 0 is represented by switching of the carrier for Tb seconds. This signal can be generated simply by turning the carrier of a sinusoidal oscillator ON and OFF for the prescribed periods indicated by the modulating pulse train. For this reason the scheme is also known as on-off shift testing. The ASK signal can be generated by applying the incoming binary data and the sinusoidal carrier to the two inputs of a product modulator. The resulting output is the ASK wave.

1. What is op-amp?
2. What is on-off keying?
3. What are the design considerations for a Low Pass Filter?

Tabular Column:

Signals	Amplitude (volts)	Frequency (Hz) or Time Period (s)
Modulating Input signal	5Vp-p	10ms
Carrier Signal	5Vp-p	1us
Modulated ASK output signal	23.4 Vp-p	Ton=5.6 ms Toff=4.4 ms
Demodulated ASK output signal	5Vp-p	10ms

Inference: The ASK demodulator circuits were set up and the observation was noted down and output waveform were observed.

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