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Experiment 2.

Aim: To study DSB SC modulation and demodulation

Amplitude Required: ST 2201 and 2202 with power supply cord., CRO with Connecting probes, Connecting cords.

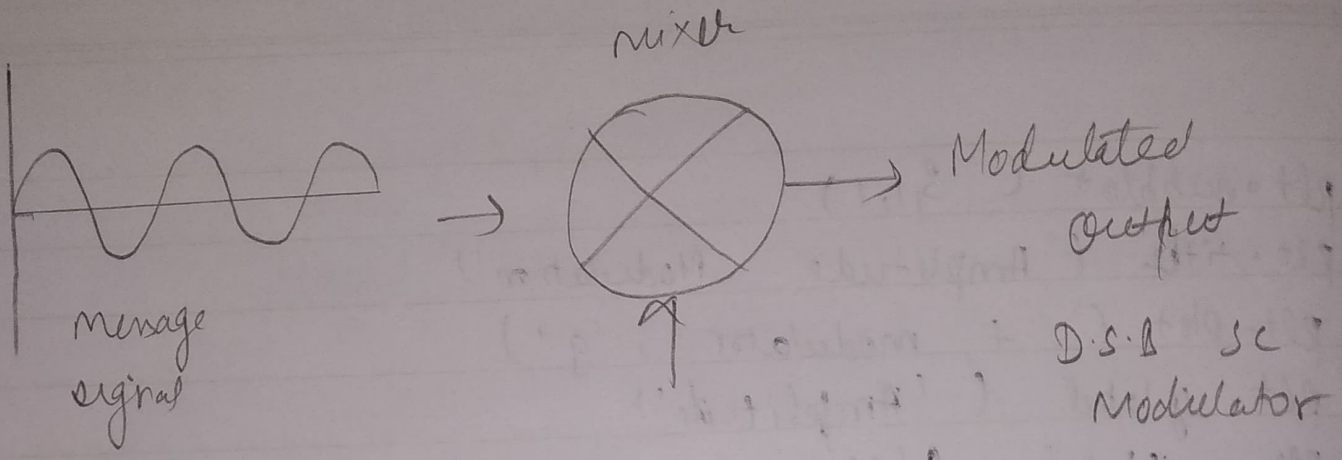
Theory: DSBSC in transmission in which frequencies produced by amplitude modulation are symmetrically spaced about and below the carrier frequency and the carrier frequency level is reduced to the lowest practical level, ideally being completely suppressed.

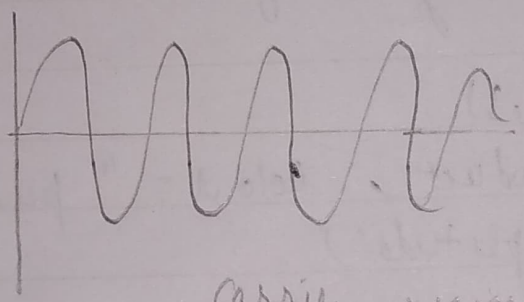
DSB SC is basically an amplitude modulation wave without the carrier therefore reducing power waste giving it a 100% efficiency. this is an increase compared the normal Am transmission which has a max frequency 33%.

Generation of DSB SC Ami

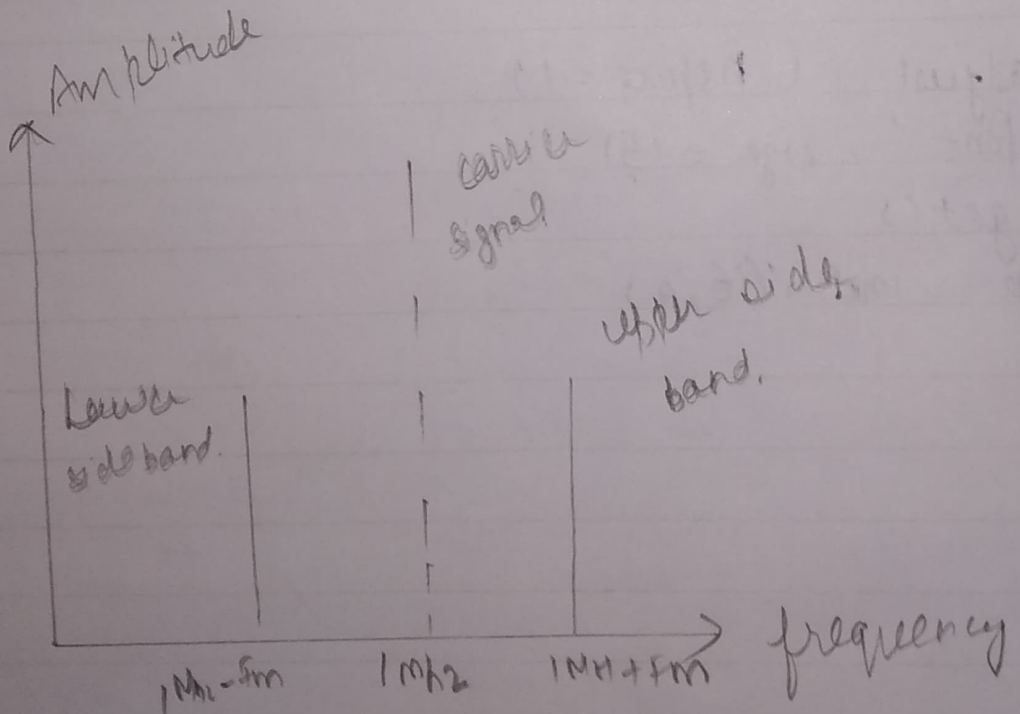
DSB SC is generated by a mixer. This consist of a menage signal multiplied by a carrier

Teacher's Signature.....





carrier signal



Frequency spectrum of DSB - SC

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Signal. The mathematical representation of the process is where the product of sum trignometric identity is used.

$V_m \cos \omega_m t \times V_c \cos \omega_c t = \frac{V_m V_c}{2} [\omega_m + \omega_c) t + \cos(\omega_m +$

Procedure:

1. Connect CRO to the audio frequency section.
2. Switch on both CRO and kit.
3. Select the message and carrier signal.
4. Now spress the carrier.
5. Now trace modulated signal.
6. Trace the received message signal after SC mod.

Result: Double sideband suppressed carrier (DSB-SC) signal was modulated and demodulated and output obtained CRO.

Precautions: 1. Connection should be right.
2. Switch off CRO when not in use.

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Viva Question:

Q1 Define DSB SC?

After modulation, the process of transmitting the sidebands (USB, LSB) alone and suppressing the carrier is called as Double side band suppressed carrier.

Q What are disadvantages of DSB Fc?

Power wastage takes place in DSBFC as it is bandwidth inefficient system.

Q. Define coherent detection?

During demodulation carrier is exactly coherent or synchronized in both the frequency and phase with the original carrier wave used to generate the DSB SC wave. This method is called as coherent detection or Synchronized detection.

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Python code

```
Import numpy as np.
import matplotlib.pyplot as plt
from math import pi

Ac = float (input('Enter Carrier amplitude'))
fc = float (input ('Enter Carrier frequency'))
Am = float (input ('Enter message amplitude'))
fm = float (input ('Enter message frequency'))

modulation_index = float (input ('Enter mod Index'))

fs = 5000
t = np.arrange (0,1,1/fs)

Carrier = Ac * cos (2* np.pi * fc * t)
modulator = Am * np cos (2* np.pi * fm * t)
Product = Ac * (modulation_index * np.cos ( 2* np.pi *
                * np cos (2* np.pi * fc *t)

plt.subplot (3,1,1)
plt.title ('Amplitude Modulation')
plt.plot (t, modulator,'g')
plt.ylabel ('Amplitude')
plt.xlabel ('Message Signal')
```

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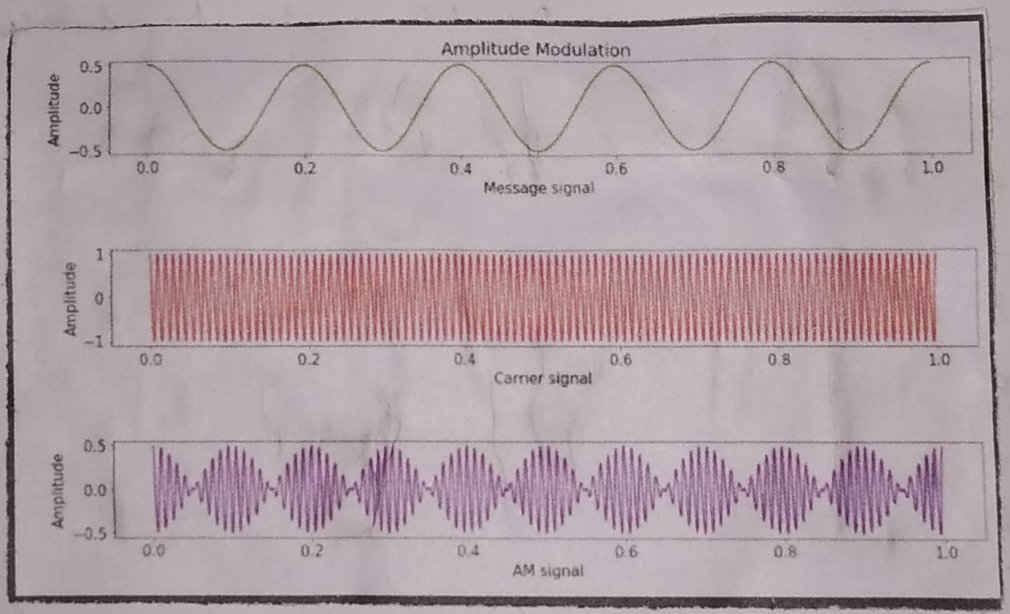
Amplitude Modulation
Amplitude
0.5
0.0
−0.5
0.0
0.2
0.4
0.6
0.8
1.0
Message signal
Amplitude
1
0
−1
0.0
0.2
0.4
0.6
0.8
1.0
Carrier signal
Amplitude
0.5
0.0
−0.5
0.0
0.2
0.4
0.6
0.8
1.0
AM signal

```
plt.subplot(3,1,2)
plt.plot(t, carrier, 'r')
plt.xlabel('Amplitude')
plt.xlabel('Carrier signal')

plt.subplot(3,1,3)
plt.plot(t.carrier,'r')
plt.ylabel('Amplitude')
plt.xlabel('AM Signal')

plt.subplots_adjust(hspace=1)
plt.rc('font', size=15)
fig = plt.gcf()
fig.set_size_inches(16,9)
```