loudspeaker

Working , characteristics

Moving coil

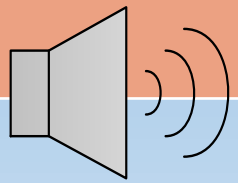
Woofer and tweeter

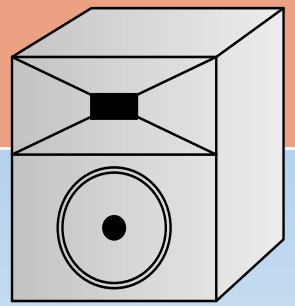
Cross over network , amplifiers

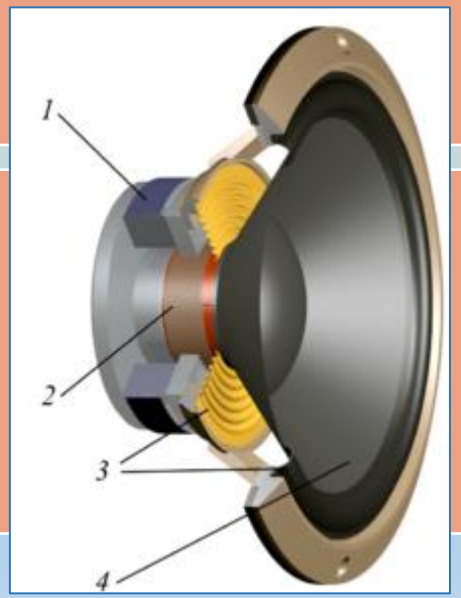
Loudspeaker is transducer which convert electrical signal of audio frequency of sound wave.

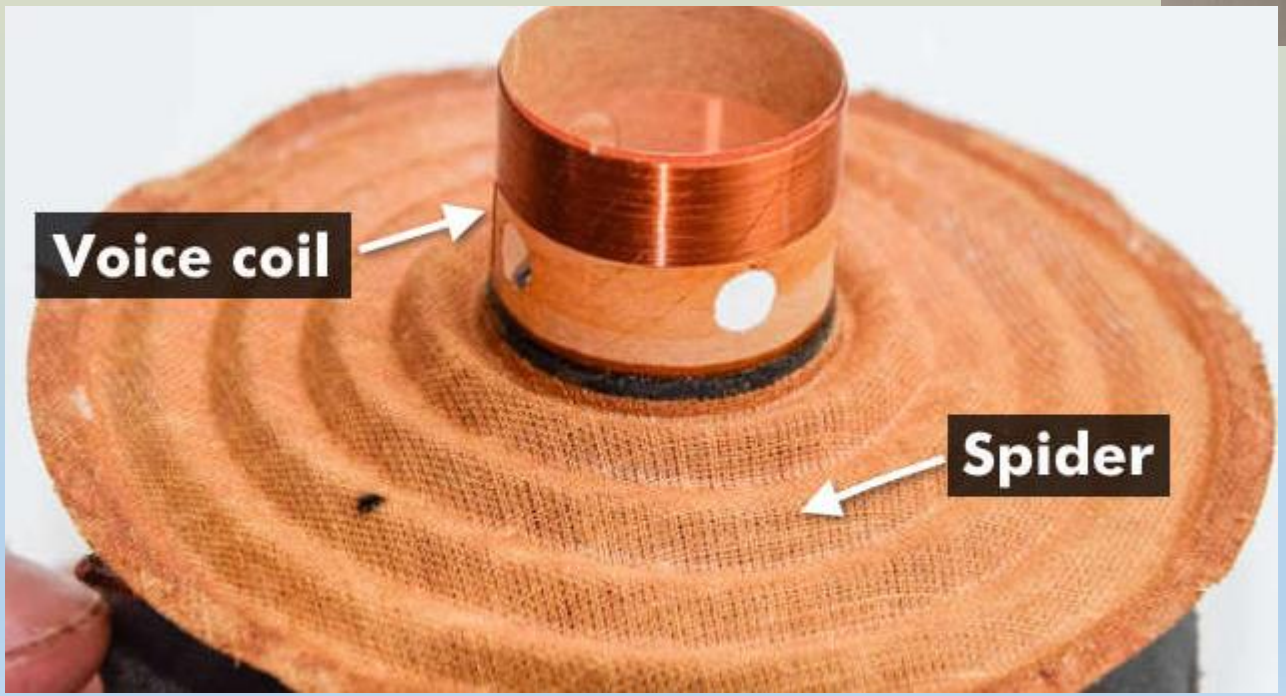
It is used in TV, Radio, computer ,laptop ,Mobil ,audio players

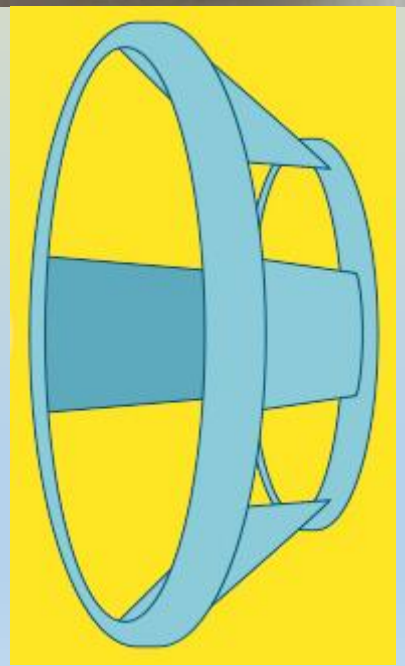
Types Cone type – Horn type








Voice coil
Spider



Diaphragm (cone): Moves in and out to push air and make sound

Dust cap (dome): Protects the voice coil from dust and dirt

Basket: The sturdy metal framework around which the speaker is built

Spider (suspension): A flexible, corrugated support that holds the voice coil in place, while allowing it to move freely.

Magnet: Typically made from ferrite

Voice coil: The coil that moves the diaphragm back and forth

Characteristics are –

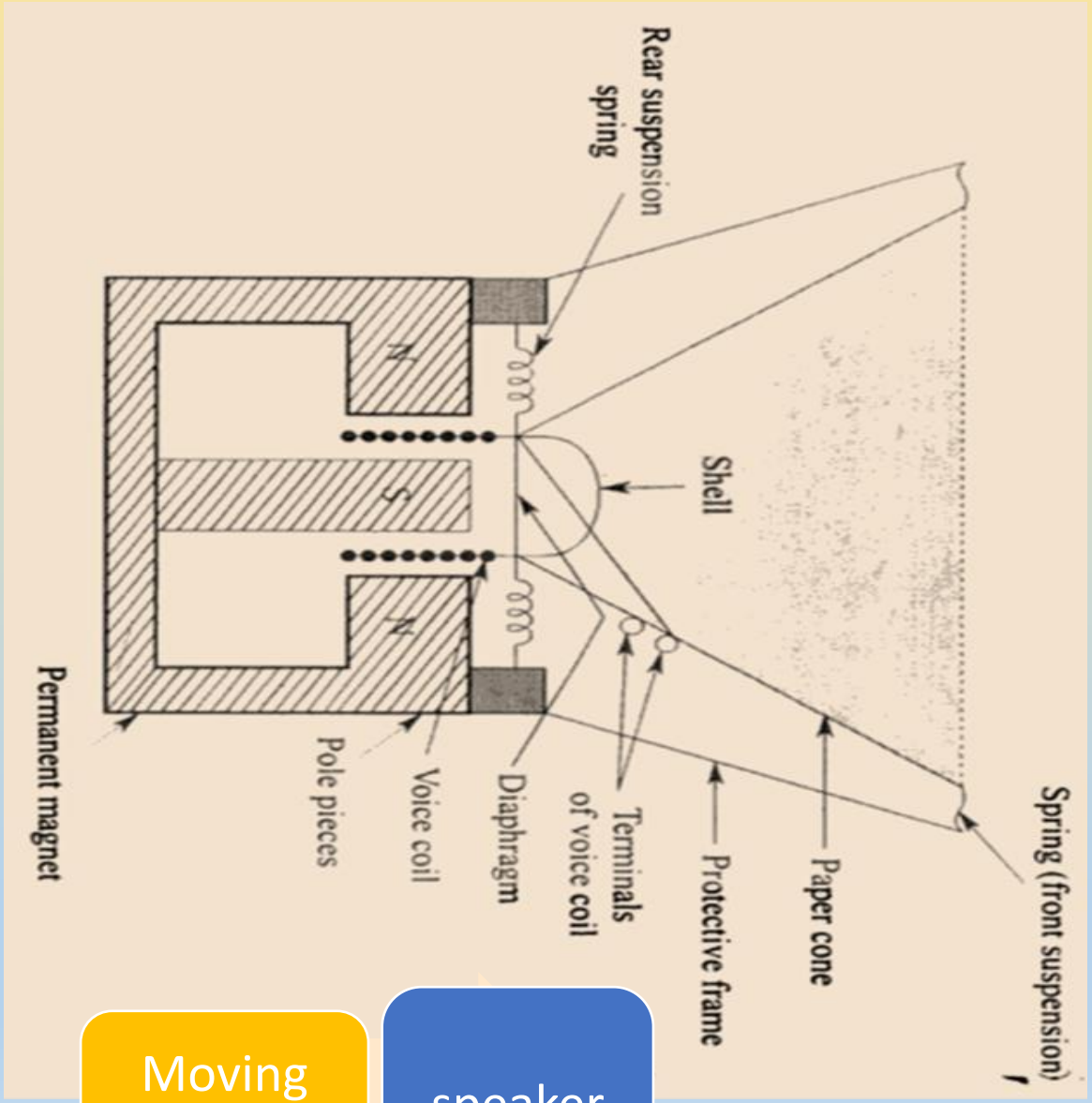
Efficiency – ratio of o/p sound power to i/p audio power. It describe the ability of the speaker to convert electrical signal into sound wave.

freq.res – it indicates loud speaker resp. for the audible freq,range of sound.16 Hz to 20KHZ.

Distortion –change in freq, amplitude, phase of o/p sound

Directivity – it is the ratio of actual sound intensity at a point, like -omnidirectional , tells us the response of sound intensity.

Impedance- represent in ohms , amplifier impedance necessary .



Moving coil type

speaker

Construction – consists of 1) voice coil.- single layer wire winding, wound on card board, Coil have two terminal ,where audio current is applied. coil is attached to cone type diaphragm

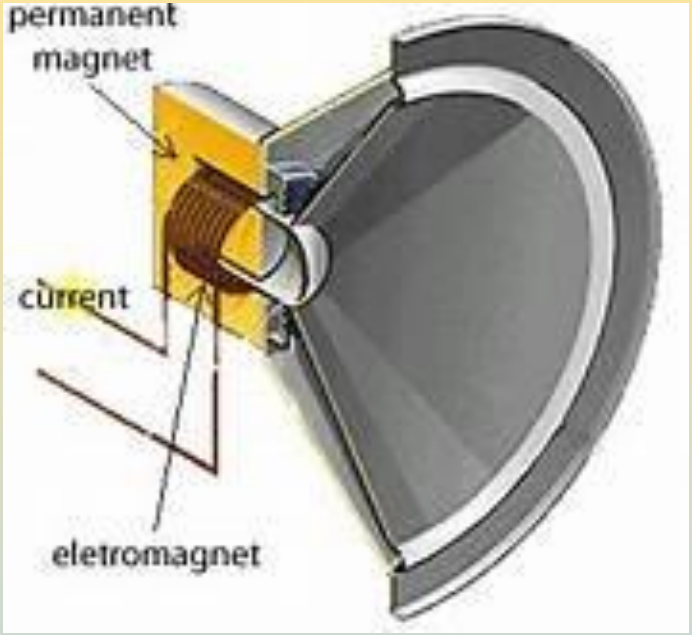
2) permanent magnet – pot type p.m used, it generate strong magnetic field to voice coil,

Diaphragm –cone type is used , made by paper material

Working- when audio current was applied to voicecoil,

there is interaction between magnetic field and current ,

as a result force work on coil, so coil vibrates , and diaphragm also vibrates and variations in air gap between magnet and coil takes and resulting as a output sound wave.



Characteristic's are

Efficiency – low 5%

signal to noise ratio –30db

freq.res–poor 60-5000Hz

distortion – more than 5%

Imp- 2 to 32Ω

Power handling – 25mw

Application- Hi-Fi unit. PA System

Advantages

1. Higher power can be obtained
2. Frequency response is better (40 Hz to 5000 Hz)

Disadvantages

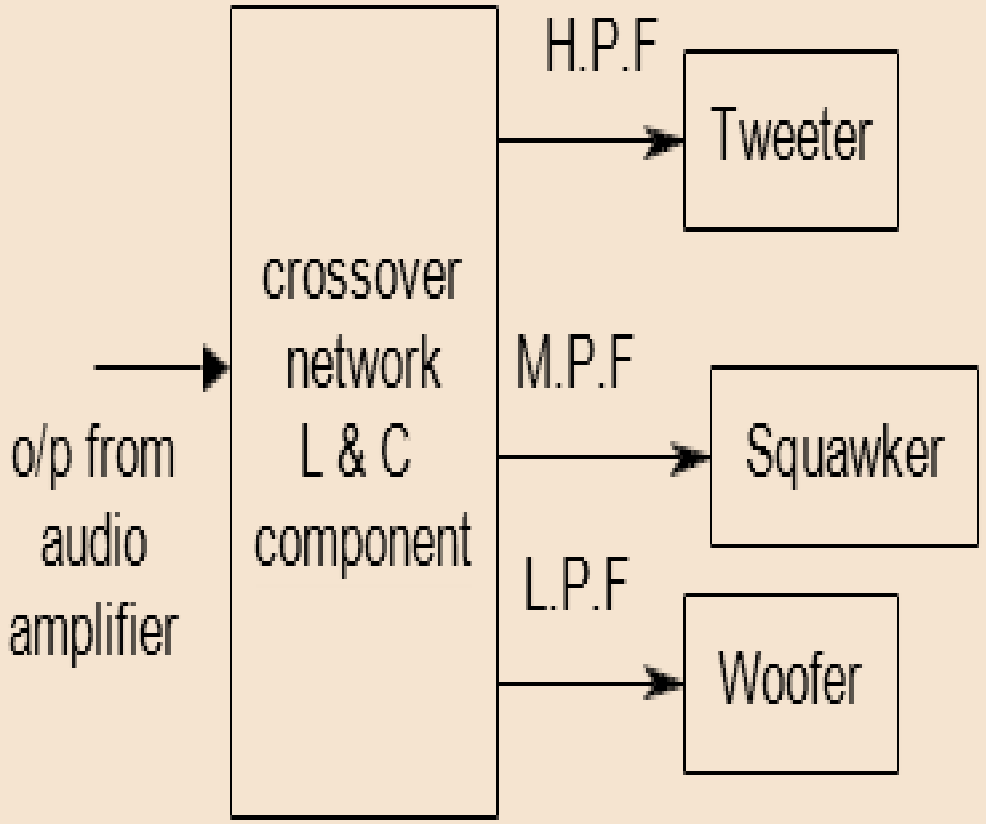
1. Power supply needed for field coil
2. Heavier weight for the same amount of magnetic field
3. Costlier

Woofer – It is lager cone diameter type , heavy, low frequency speaker. it is used in car , computer , home system to play low frequency sound (10 to 500Hz), as bass..

Squawker/ medium – it is medium cone diameter type speaker , use in home system , having frequency range 500 Hz to 5000Hz.

Tweeter - It is small , cone diameter type , high frequency speaker, it is used in car , computer , home system to play High frequency sound (5000 to 20,00Hz),

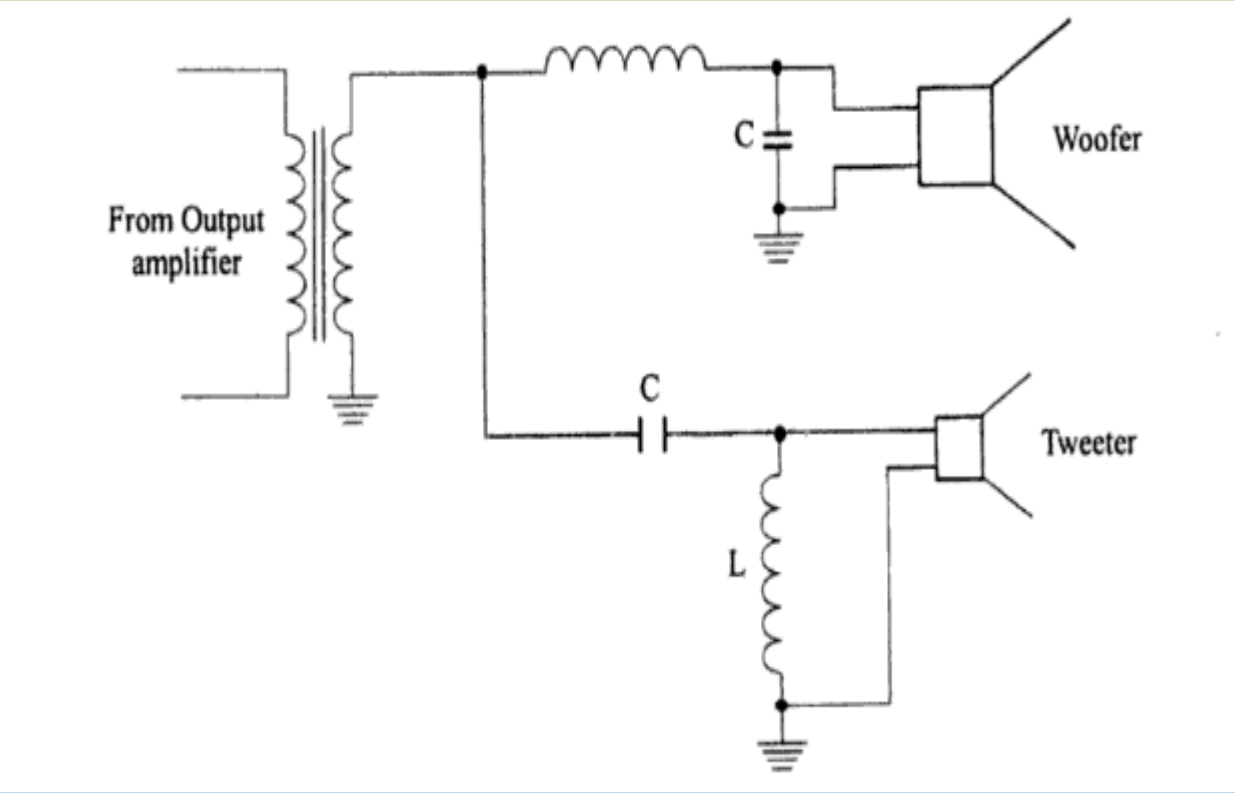
Cross over network

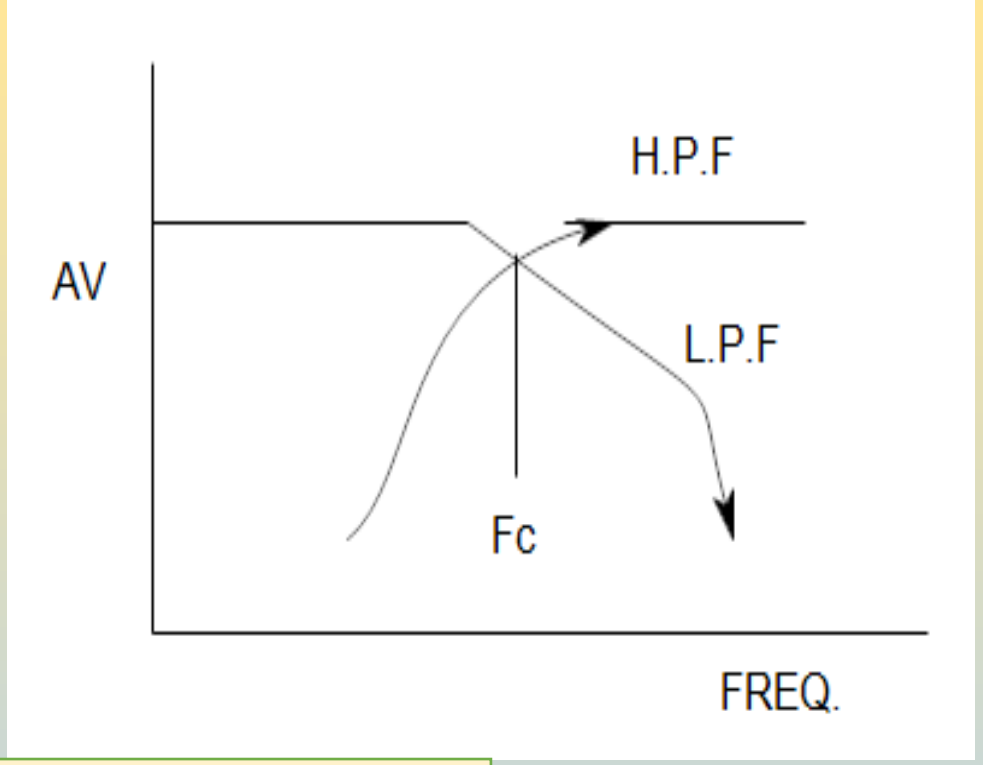


Cross n/w used in multiway Speaker system

1.It divides incoming sound Signal freq. into separate Freq. band

Two way Cross over n/w





$L = \sqrt{2}R/2\Pi FC$

$C = 1/2\sqrt{2}\Pi FCR$

Amplifier

- Function – is to amplify the audio frequency signal to 20 to 20KHz , to reproduces the sound in Hi-Fi system , like TV,Mobil
- Mono Amplifier-
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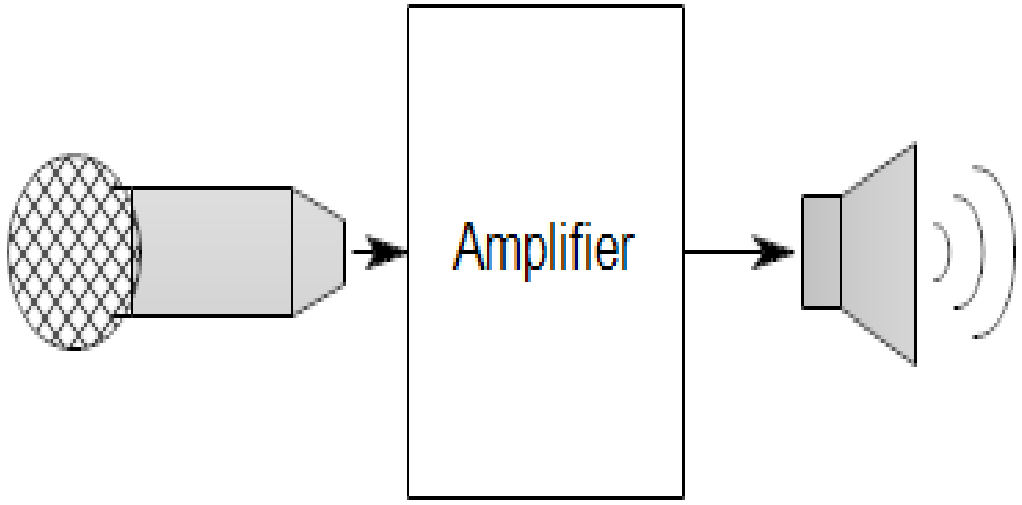
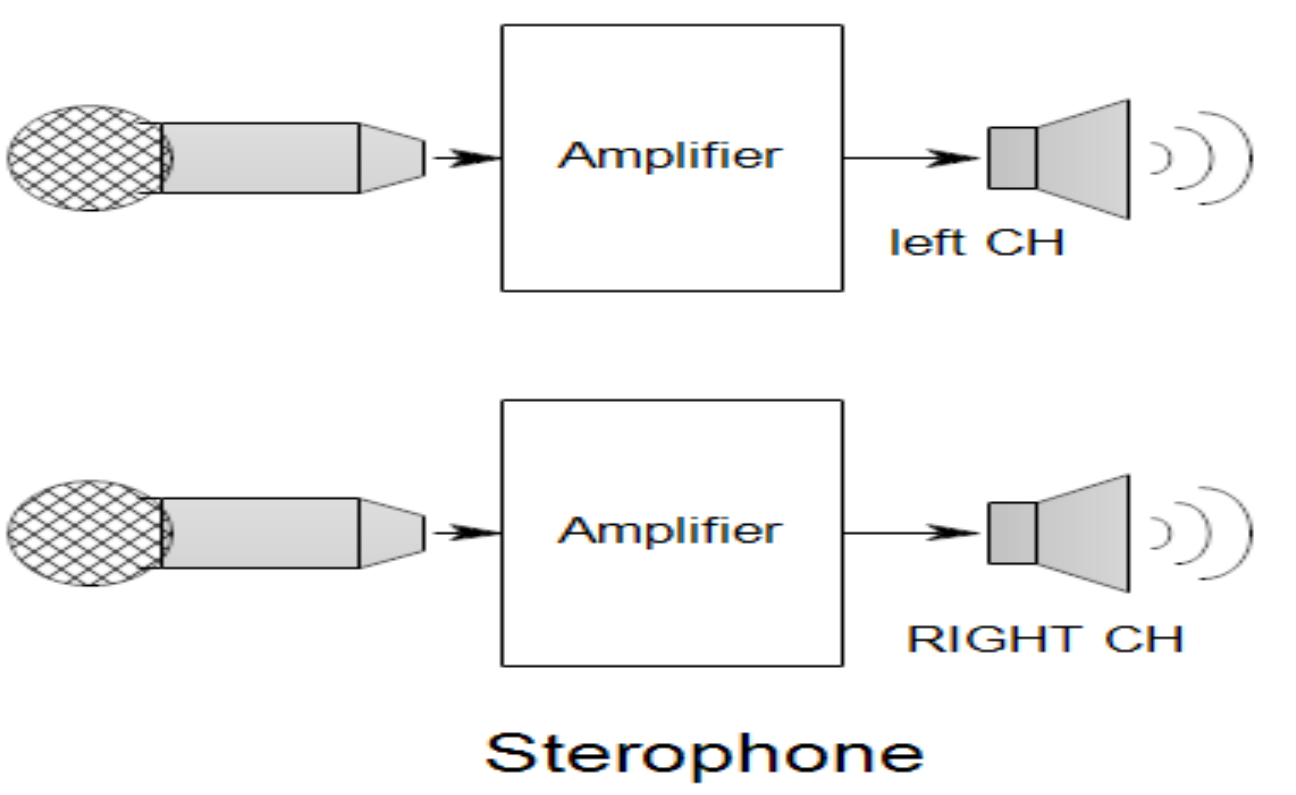


Monophony system

- Stero amplifier-



	Mono	stereo
Stands for	Monaural or monophonic sound	Stereophonic sound
Channels	1	2
Usage	Public address system, radio talk shows, hearing aid, telephone and mobile communication, some AM radio stations	Movies, Television, Music players, FM radio stations
Key feature	Audio signals are routed through a single channel	Audio signals are routed through 2 or more channels to simulate depth/direction perception, like in the real world
Recording	Easy to record, requires only basic equipment	Requires technical knowledge and skill to record, apart from equipment. It's important to know the relative position of the objects and events.

Review and questions….

- Compare between Microphone and speaker .