Sound

- In the theatre there is no natural background noise, as in films and television.
- Any sounds or music needed to evoke atmosphere must be consciously chosen and made during the show.
- Some noises, such as a crack of thunder, may be an important part of the script.
- In a musical show, singers and musicians must be heard clearly as they sing or play. The_Sound_Designer.

Producing Different Sounds

- Sounds are called ‘live’ if they are made during the performance, like someone singing.
  - microphones are placed in the theatre to pick up live sounds.
- Pre-recorded sounds are made on a tape and played back at the right moment.
  - You can buy sound effects cassettes, records, and CD’s with noises such as pouring rain, or a car on gravel.

Producing Different Sounds, (cont)

- Music played on record, cassette, or compact disc may be relayed into the auditorium.
- A sound designer must have initiative. They may need to go somewhere unusual to record a particular effect live; sometimes they dub several sounds together to make an unusual effect; or ‘cheat’ by imitating a sound.

Broadcasting Sounds

- Whether a sound is pre-recorded or live it must be amplified and broadcast so that all the audience can hear it. This is how it is usually done.
- Pre-recorded sounds are recorded onto a tape or CD in the sequence in which they will be needed.
- A theatre usually has a turntable, cassette player, and CD player. They produce sounds or music to be recorded onto the main tape. Sometimes effects are broadcast direct from them.

Broadcasting Sounds (cont)

- All of the sound sources are plugged into a machine called a mixer. This controls which sound is heard and how loud it is. it can fade sounds in and out, too.
- The mixer is plugged into an amplifier, which makes noises louder.
- The sound from the amplifier is broadcast through speakers. For balance, there is usually a speaker on each side of the stage. Small portable speakers are used if a sound has to come from a particular direction.

Sound Designer's Responsibilities

- Works with director in understanding the concept of the show
- Designs specific sound segments or effects
- Appointed by the director
- Works with sound crew to see that design is executed properly
- Attends meetings with director prior to finalization of design.
- Attends technical rehearsal, and other rehearsals as needed.

Sound Director and Sound Crew

- The sound designer discusses all the effects needed in the play with the director.
- The crew is then instructed to prepare them and make the sound tape if necessary.
- During the show they sit in the technical box with the light crew and operate the sound equipment.
- The sound crew uses a sound cue sheet prepared by the sound designer to inform them when and how to create each necessary sound during the production.

Sound Crew Responsibilities

- Works with the light crew and the stage manager to understand where sound cues are to be played. The crew may be asked to tape music and/or sound effects.
- Attend rehearsals as needed including technical and dress rehearsals, as well as all performances.
- Appointed by the director, technical director, or production assistant.

The microphone (mic) is found in everything from telephones to computers to recording studios, microphones are part of our daily life.

Don't make the mistake that many amateurs make and use whatever mic is at hand (e.g. using a vocal mic for a bass drum). Also, don't make the mistake of assuming that using a microphone is easy. Microphone technique is a learned skill - plugging it in and pointing it isn't always enough.

The microphone is perhaps the most critical part of the audio chain (assuming that all other components are at least acceptable quality). A good quality microphone will provide you with the basis for excellent audio, whereas a poor quality microphone will mean poor quality audio - no matter how good the rest of the system is.

How Do Microphones Work?

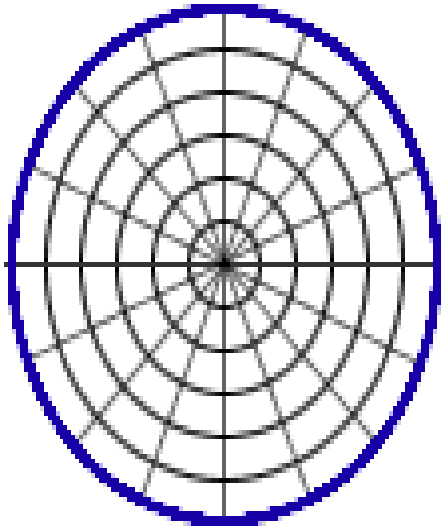
- Microphones are a type of *transducer* - a device which converts energy from one form to another. Microphones convert sound waves into electrical energy (the audio signal).
- Different types of microphone have different ways of converting energy but they all share one thing in common: The *diaphragm*. This is a thin piece of material (such as paper, plastic or aluminium) which vibrates when it is struck by sound waves. In a one below, the dia of the microphone

Directional Properties

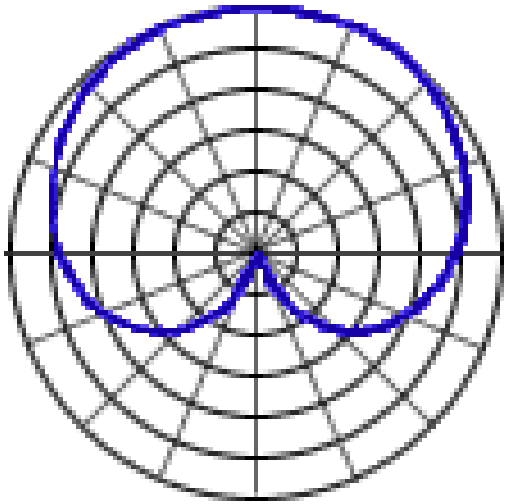
- Every microphone has a property known as *directionality*. This describes the microphone's sensitivity to sound from various directions. Some microphones pick up sound equally from all directions, others pick up sound only from one direction or a particular combination of directions. The types of directionality are divided into three main categories:
  - **Omnidirectional**
    Picks up sound evenly from all directions (omni means "all" or "every").
  - **Unidirectional**
    Picks up sound predominantly from one direction. This includes cardioid and hypercardioid microphones

Omnidirectional

- **Uses:** Capturing ambient noise; Situations where sound is coming from many directions; Situations where the mic position must remain fixed while the sound source is moving.
- Although omnidirectional mics are very useful in the right situation, picking up sound from every direction is not usually what you need. Omni sound is very general and unfocused - if you are trying to capture sound from a particular subject or area it is likely to be overwhelmed by other noise.

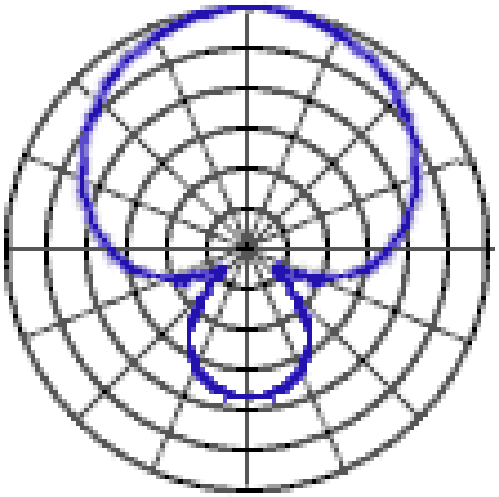


Cardioid a unidirectional mic



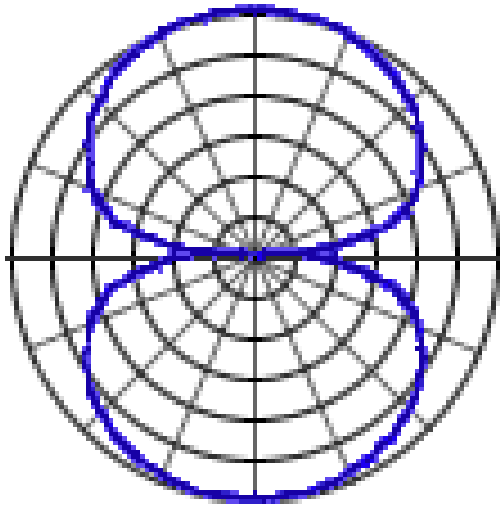
- **Cardioid means "heart-shaped", which is the type of pick-up pattern these mics use. Sound is picked up mostly from the front, but to a lesser extent the sides as well.**
- **Uses: Emphasizing sound from the direction the mic is pointed whilst leaving some latitude for mic movement and ambient noise.**
- **The cardioid is a very versatile microphone, ideal for general use. Handheld mics are usually cardioid.**
- **There are many variations of the cardioid pattern**

Hypercardioid a unidirectional mic



- **This is exaggerated version of the cardioid pattern. It is very directional and eliminates most sound from the sides and rear. Due to the long thin design of hypercardioids, they are often referred to as shotgun microphones.**
  Uses: Isolating the sound from a subject or direction when there is a lot of ambient noise; Picking up sound from a subject at a distance.
- **By removing all the ambient noise, unidirectional sound can sometimes be a little unnatural.**
- **You need to be careful to keep the sound consistent. If the mic doesn't stay pointed at the subject you will lose the audio.**
- **Shotguns can have an area of increased sensitivity directly to the rear.**

Bidirectional



- **Uses a figure-of-eight pattern and picks up sound equally from two opposite directions. Uses: As you can imagine, there aren't a lot of situations which require this polar pattern. One possibility would be an interview with two people facing each other (with the mic between them).**

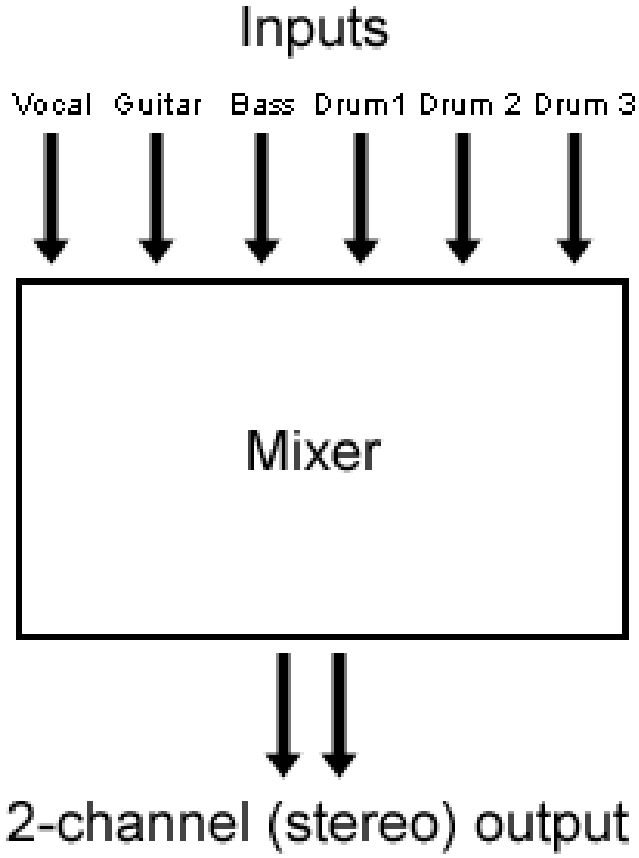
Wireless microphone

Hypercardioid microphone

cardioid microphones

Sound Mixers: Overview

- A *sound mixer* is a device which takes two or more audio signals, mixes them together and provides one or more output signals. The diagram on the right shows a simple mixer with six inputs and two outputs.



Sound Mixers: Overview

- As well as combining signals, mixers allow you to adjust levels, enhance sound with equalization and effects, create monitor feeds, record various mixes, etc.
- Mixers come in a wide variety of sizes and designs, from small portable units to massive studio consoles.
- Sound mixers can look very intimidating to the newbie because they have so many buttons and other controls. However, once you understand how they work you realize that many of these controls are duplicated and it's not as difficult as it first seems.

Channels

- Mixers are frequently described by the number of channels they have. For example, a "12-channel mixer" has 12 input channels, i.e. you can plug in 12 separate input sources. You might also see a specification such as "24x4x2" which means 24 input channels, 4 subgroup channels and two output channels.
- More channels means more flexibility, so more channels is generally better.

Sound Mixers: Channel Faders

- Each channel has it's own fader (slider) to adjust the volume of the channel's signal before it is sent to the next stage.
- A slider is a simple control which varies the amount of resistance and therefore the signal level. If you are able to look into the inside of your console you will see exactly how simple a fader is.
- As a rule it is desirable to run the fader around the 0dB mark for optimum sound quality, although this will obviously vary a lot.
- Remember that there are two ways to adjust a channel's level: The input gain and the output fader. Make sure the input gain provides a strong signal level to the channel without clipping and leave it at that level — use the fader for ongoing adjustments.

Input Channels

On most sound mixers, input channels take up most of the space. All those rows of knobs are channels. Exactly what controls each channel has depends on the mixer but most mixers share common features.

- Sound Designers have many opportunities for work. From concerts, to television studios, to sporting events to theatres and film. Every entertainment venue requires sound enhancement.
- The job is requires technical proficiency and understanding of the principles of sound and the operation of amplification and mixing equipment, but will be an incredibly rewarding career for someone who is interested in this technology.