



SOUND DESIGN & MIXING

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INTRODUCTION

Thank you for attending our Sound Design and Mixing course. We hope you'll have a fun, useful and engaging time. This handbook contains useful reminders of the areas covered during the course and a glossary, in case you come across any unfamiliar terms.

It has been said by filmmakers who appreciate sound's potential as a storytelling tool that it is accountable for at least 50% of the movie experience. However, sound often goes unnoticed and pushed to one side in favour of the visual element of film narrative. This is understandable, after all, we can't see sound, but it is precisely the ability to go largely unnoticed by audiences which makes it such a powerful creative tool for filmmakers.

Throughout a range of creative disciplines including film, theatre, video games, VR & AR, sound is, arguably, the glue that holds together the experience and the narrative for an audience. It falls to us as Sound Designers to lead the audience through the story or experience, to get them to believe, invest and to ultimately, feel.



Part 1

Sound design
fundamentals



Understanding your craft

The term 'Sound Designer' is an often controversial and misunderstood title in some parts of the film industry. Much like when the term 'Production Designer' was introduced in the 1930s, there has been some hostility to the title who feel it is an overly dressed term for the role of Supervising Sound Editor, or Re-recording Mixer. However, this really misses the point of what a Sound Designer's role actually is.

WHAT DOES A SOUND DESIGNER DO?

A Sound Designer, in its original sense of the title, is responsible for fulfilling the Director's vision for any given piece of work by overseeing all aspects of the soundtrack including dialogue, Foley, Atmos effects, music editorial and mixing. This includes overseeing everything the audience hears from an aesthetic point of view as well as a technical one. A Sound Designer could be considered an aural equivalent of a Director of Photography in this sense.

Increasingly, the term Sound Designer is used to describe someone who creates new sounds from scratch, or unique creature sounds or sci-fi effects etc. While this is often part of the job, it is not the whole story, as good sound design is not all about recording technology and plugins etc., but understanding what the film needs from a sonic perspective in order to connect emotionally with an audience. Sometimes, designing sound means taking sound out, rather than putting new ones in.

COLLABORATION

Like many creative industries, filmmaking is a collaborative process where good communication, planning and an awareness of what everyone else is doing goes a long way to the success of a project.

Because the audio post production process usually comes right at the end of a project, and therefore any delays in the process are likely to cut into any time allocated for post sound, it is extremely important for the post sound team to communicate with the other departments who are feeding them the materials they need.

In particular, keeping open communication lines with Video Editors will save a lot of frustration and potential for confusion further down the line. It is also important that 'Picture Lock' is agreed before too much audio post work is carried out. While changes to the picture edit are sometimes inevitable, conforming lots of tracks of audio to a new visual edit can be very time consuming, expensive and laborious.

WHO DOES WHAT?

The audio post production process has many stages to go through before a project arrives at the final mix and is ready for an audience to see it. On larger film and high-end television drama productions, these various stages are often handled by separate people or teams of people each working in their own specific area. On smaller productions, it is common for one person to assume many, if not all the roles at various stages of the process. Here are a few of the main roles in the audio post production process on a feature length drama:

Supervising Sound Editor/ Sound Designer

This person oversees all aspects of the audio post production process and usually supervises the audio post team. As well as being responsible for delivering the project on time and on budget and maintaining standards across the audio post process, the Supervising Sound Editor also works with the Director in order to meet the needs of the project from an aesthetic point of view.

Dialogue Editor

Dialogue Editors edit audio captured from the production. The Dialogue Editor(s) main responsibility is to make sure the production dialogue is clear, free from unwanted noise, seamless between edits, fully in sync with the visual and the most appropriate take for the performance.

The Dialogue Editor will work with an OMF or AAF files supplied by the Picture Editor. These files contain all the production dialogue used in the edited sequence.

In addition to this, the Dialogue Editor will usually take the unedited audio footage from the Production Mixer in order to access additional microphone tracks, alternate lines, words or parts of words which can be swapped out during the editing process. The Dialogue Editor also keeps a record of any lines of dialogue needing ADR treatment or re-recording.





ADR (Automated/Additional Dialogue Replacement) Mixer

The ADR Mixer is responsible for recording additional or replacement lines of dialogue in post production. Often, not all dialogue recorded during the production phase is usable due to logistical and technical issues on set. This is common on large budget special effect movies which often have very noisy locations and production processes.

When ADR is required, actors are brought back into a studio once the film has been edited (usually) so lines of dialogue can be recorded synchronously with the picture in a quiet and controlled environment. ADR is also used to add additional dialogue not captured as part of the production. This could be due to changes to the edit of the project where new lines of dialogue are required to fix plot holes or replace cut scenes. This type of ADR does not require lip-sync as the lines are new, but still need to fit for time and sit naturally alongside dialogue captured from the shoot.

Sound Effects Editor

Sound Effects Editors are responsible for editing in additional sound effects to a project. Background (BG) Editors are responsible for adding ambiances and environments on bigger projects, whereas, Sound Effects Editors handle everything from passing car sounds to explosions and creature effects. Sound Effects Editors also spend a lot of time recording sounds either in a studio or out in the field and are always adding to their own personal sound effects libraries.

Foley Artist/Mixer

Foley sound relates to the sound characters make on screen. The focus of capturing sound during production is usually on capturing the most natural sounding and cleanest dialogue. Because of this and the dialogue editing

process, many sounds which are created when a character moves onscreen are lost or not as clear as they could be. The Foley process uses creative audio recording techniques to add and replace these sounds to the movements of onscreen characters recorded in-sync to the image.

Most common Foley sounds are footsteps, cloth movements and handling of props. But capturing Foley can also require some very creative applications of sound in order to create the movements and actions of more unusual characters such as dinosaurs, robots and monsters etc. Foley is named after Jack Foley who invented the technique of recording sound effects to picture in the late 1920s just as the industry left behind the 'silent era' in favour of the 'talkies'.

Re-Recording Mixer/Dubbing Mixer

The Re-Recording Mixer takes all the sounds created by the rest of the audio post production team, as well as any music or score from the Composer, Music Editor or Supervisor, and mixes everything together in a way that keeps the audience's interest in the story and best serves the film.

The Re-Recording Mixer (or their assistant) will be responsible for delivering the final mix to the correct specifications required either for broadcast or theatrical release. Often, more than one mix is required as there are multiple playback formats currently available in different delivery systems like stereo, 5,1, 7.1, Dolby ATMOS®, DM&E mixes or stem tracks will also usually be part of the deliverable formats required at this stage by Producers.

Part 2

Preparation



Planning your approach

USING REFERENCES

Your ears are the best tools you have. But these need some degree of calibrating so you can trust what you are hearing. Use references, e.g. reference tone to set up your workspace, and references of film and TV clips which could be useful from an aesthetic or mix perspective. Once your audio references are set, don't adjust the volume – and if you have to, always re-calibrate.

IN FILM, SOUND AND IMAGE ARE NOT JOINED

We live in a world where birds tweet and cars zoom past us with sounds locked to each object by an unbreakable invisible bond. But in the world of film it doesn't have to be this way. In fact, things get much more interesting when they are not.

Due to the nature of the filmmaking process, most of the sound we hear in drama and even documentaries are replaced during post production. Audiences are often distracted by the visual information, so this construct often goes by unnoticed. This allows sound designers and filmmakers to play with and subvert the kind of sound/image relationships we might be used to in the real world, in order to create new meaning or connect emotionally to their audiences.

This is particularly useful when wanting to change perspective to a single character view point, or to get inside their head. For example we may experience what the character 'hears' internally, but we see what the camera 'sees' and the two perspectives may not be the same.

THE ANATOMY OF A SOUNDTRACK

It is important to think about the separate elements which go into making your mix. This will help you manage your workflow and organise your sessions more effectively, especially on larger projects. Most film soundtracks can be divided into three distinct categories; dialogue, music and effects, or DM&E. These can be further broken down into the following sub categories or 'food groups':

DIALOGUE

Production audio, ADR and voiceover.

MUSIC

Stock or production music, commercial music (needle drops), composition or score. You should also consider if the music is diegetic or non-diegetic.

EFFECTS

Foley, hard effects, backgrounds/Atmos, non-diegetic effects.

When delivering a final mix of a project, it is common to also deliver separate audio elements of the dialogue, music and effect tracks only. These are called stems, or DM&E tracks and are useful for creating trailers, show reels or foreign language dubs at a later date.



Part 3

Mixing



Bringing it all together

Mixing is the process where all the elements of your soundtrack blend together to form a consistent, engaging soundtrack to the visual images. This is a highly creative as well as technical endeavour, which requires attention to detail and the ability to 'zoom' out to experience the film or TV programme as a member of the intended audience might.

The process of mixing requires making many aesthetic and technical decisions throughout the course of a project. It is the choices at the mix stage which determine what the audience hears in the final project.

For example, if there is music in a project, how much of this do we hear in relation to the dialogue and sound effects? Is it important for the audience to hear Foley footsteps during an action scene, or are they competing or masked by other sound effects or elements? Is the dialogue clear, level and natural sounding throughout, or is it constantly competing with the music?

Where should the sound come from? Are the sounds I am hearing matching the perspective the audience has of the image on-screen? Can I change the audience's perspective by only allowing them to hear certain elements in the mix and if so, what does this do to the story?

In the case of multi-channel audio formats such as 5.1 or 7.1 playback systems, this question relates to where in the room do I want my sound to appear from. Do I want the helicopters to fly over the audience front to back or spin the dialogue around the audience in order to give a sense of disorientation?

All of these questions and many more are answered during the mix which often requires a bit of experimentation and trial and error. However, there are a few principles to consider:

MIX AS YOU GO

On smaller projects where there isn't an additional Re-Recording Mixer who oversees the final mix stage, it is a good idea if you can mix as you tracklay or set relative levels as you edit your project. This gives you a good sense of what your project will sound like as you create it and save a lot of time at the end of the project going back to mix. This could give you a ready made Pre-Mix which reduces the time needed in the Final Mix. If there is a Re-Recording Mixer handling the mix at the end stage, check with them to see what they would like to receive, if they will be mixing and whether suggested volumes are welcome or not, as they might prefer to start from scratch.

DIALOGUE IS KING!

Often, it is through dialogue that the story or message in a project is conveyed to an audience. Even if this is not the case, audiences get very annoyed and frustrated when they can't hear or understand the dialogue properly. Audience perception that dialogue is poor or unintelligible is one of the biggest complaints received by broadcasters around the world.

Recently, aesthetic decisions to mask dialogue by filmmakers have also been controversial and caused frustration among cinema audiences on the big screen. So, the mantra, 'Dialogue is King!' is well worth remembering when it comes to mixing. For this reason, dialogue should be considered first when it comes to mixing.

Once the dialogue is consistent and clear, the mixer can then look to other elements of the soundtrack to mix around the dialogue as a reference. Think in terms of, should this be louder or quieter than the dialogue in any given scene? What kind of perspective should the rest of the sound in the scene have if the dialogue is placed in a particular perspective?

THE TOOLS

There are really only a few tools to use when mixing; volume, pan, EQ, compression and reverb. There are other effects of course, but when it comes to placing sounds within a 2-D space, these are your main ones to master:

Volume

As well as giving a sense of perspective to sounds, the closer you are to a sound source the louder that sound needs to be. Volume can also apply a hierarchy and structure to your sounds. We tend to think of the sounds we hear loudest as the most important. This mimics the ability for humans to focus in on specific sounds and to filter out less important ones and is a very powerful tool when mixing.





PAN

In stereo mixing, a mono sound can be panned across the stereo field (between left and right speakers) – this gives a sense of place across a two-dimensional space. Used in conjunction with volume, sound can be placed either up close or in the distance and to the left or right or anywhere in-between in the stereo field. In multichannel mixing, panning can be used to move sounds around the audience or even above them to achieve a more immersive mix.

EQ (Equalisation)

EQ-ing allows us to ‘shape’ the tonal quality of a given sound and perhaps change or enhance its meaning to the audience all together. A common example of this is an extreme use of EQ to remove low frequencies from dialogue to achieve a telephone or radio effect. But EQ is most often used in more subtle ways to allow other room for other sounds to be heard, as well as cutting or boosting certain frequencies to achieve greater clarity in the soundtrack.

Compression

Is a way to smooth and control the volume of a sound source and reduce its dynamic range. This comes in very useful for achieving consistent and level dialogue, as small changes in volume can impact clarity in a busy mix. Compression can also add punch or impact to sounds and can be used to make things appear louder than they actually are.

Reverb

Can be used for very creative effects or, more often than not, in more subtle ways. In conjunction with panning and volume, reverb can create a sense of space or distance for sound effects and dialogue to exist in. Most rooms have their own unique reverb. That is, the unique way in which sound reflects off surfaces and colours the sound. Creatively, reverb can be best used to evoke memories or to suggest an altered state in a character.

The final, most important tool are your own ears. Look after them – by not exposing them to loud sounds for sustained periods. Train them – by listening to the world around you and focusing on specific details. Trust them – when it comes to mixing, once you have mastered a few practical and technical principles, then, in the words of pioneering record producer Joe Meek, ‘if it sounds right, it is right.’



Sound Design for Low & No Budget Films,
Patrick Winters

Audio/Vision, Michel Chion

Dialogue Editing for Motion Picture Sound,
John Purcell

The Foley Grail, Vanessa Theme Ament

The Sound Effects Bible, Ric Viers

Sound Design for Science Fiction,
William Whittington

*Sound Design: The Expressive Power
of Music, Voice and Sound Effects*,
David Sonnenschein

WEB RESOURCES

Learning space dedicated to the art of
Film Sound Design:
filmsound.org

Profiles the greatest and upcoming
sound minds from around the world and
highlights their contributions:
soundworkscollection.com

Avid Pro Tools:
avid.com/pro-tools

Adobe Audition:
adobe.com/uk/products/audition.html

5.1

A playback system where speakers are set up in a certain way to play sound out of left, right and centre channels with two speakers positioned left and right behind the audience. These speakers are what the '5' refers to. The .1 relates to an additional channel which only handles low frequency sounds.

7.1

A playback system with a similar configuration to 5.1 – with two additional speakers positioned at the left and right sides of the audience to augment the front and rear speakers.

ADR

(Automated or Additional Dialogue Replacement) ADR is the process of re-recording production dialogue because of technical or performance issues. ADR can also include recording additional lines of dialogue to bridge gaps in the story.

Atmos/Ambiance

Sound effects which describe the environment of the on-screen world. These are also known as backgrounds or BGs.

Bandwidth

The range of frequencies on either side of the centre frequency.

Bit-depth (Word Length)

A 16-bit word contains more information and more dynamic range than a 10-bit word. A 24-bit word which is the industry standard format for audio production contains even more information.

Bus

A bus is an assigned path to route one or more audio signals to a particular destination, such as sub-groups, auxiliary channels and mixes.

Compression

An audio processing device in either hardware or software form. Compressors 'smooth' out the audio signal by boosting quieter parts of the signal reducing louder parts by a certain defined level.

Compression Ratio

This is the ratio of input to output after the compressor has activated. A ratio of 4:1 (four to one) represents a medium amount of compression and means that when the incoming level (above the set threshold) rises by 8dB, the outgoing level will only rise by 2dB.

Condenser Microphone (capacitor microphone)

Common type of microphone for recording voice. Unlike dynamic microphones, condenser mics need phantom power (48v) or battery power to operate.

Crossfade

Fading in (raising the volume) of one sound while fading out (lowering the volume) of another over time. Where the two fades 'cross' is at equal level of loudness for both sounds.

DAW (Digital Audio Workstation)

Any computer based system designed to record, edit and playback digital audio.

dB or Decibel: (1/10 of a Bel)

A logarithmic measurement of signal strength used to compare the ratio of two quantities in terms of how loud a sound is.

DM&E/DME

The separate dialogue, music and sound effects track of a project.

Dynamic Microphones

Do not require phantom power (48v), but uses magnetic variations to create a signal. These microphones tend to be less sensitive than Condenser Microphones, but are more robust.

Equalisation (EQ)

The process of adding or gain levels or changing the volume of specific frequencies in order to shape the character of the sound.

Foley

Creating and recording character related sound effects in a studio usually in synchronisation with the visual image.

Frequency

The number of cycles per second in an audio wave. Often measured in Hertz (Hz) or kHz. The frequency range of human hearing is 20Hz – 20kHz.

High-pass Filter

This is an EQ effect which allows all high frequencies beyond a defined point to pass. Frequencies below the defined setting will not pass through and will not be heard.

Low-pass Filter

The opposite of a high-pass filter, where only low frequencies are able to pass through and be made audible.

Mixing

The process of blending sounds, music and voices together into a final piece of audio.

Phantom Power (48v)

An external power source to power condenser mics and other audio equipment. The power source is provided by the equipment the microphones are connected to and is sent down the XLR cable to the equipment needing power.

Pan

A control that shifts the signal between the left and right speakers, or to other speakers in a surround system.

Pitch

The difference between high and low frequencies. Also referred to as tone.

Reverb

A time-based effect that adds multiple reflections of an original sound wave.

Sample Rate

The number of samples taken from an analogue signal in the process of converting the sound into a digital format. The higher the sample rate, the higher the quality and the bigger the digital file. Common sample rates are: 44.1kHz, 48kHz, 96kHz and 192kHz.

Sends

A send is a pathway on in either analogue hardware devices, digital recorders or DAW software that enables an original signal to be split and rerouted to a separate output.

Timecode

The electronic labelling system used to name each frame in a given sequence. Each frame is given a unique number based on where it falls in the sequence relating to hours, minutes, seconds and frames. An example of the is 02:58:16:12 – this provides the footage at this point in the sequence a label of two hours, fifty-eight minutes, sixteen seconds and twelve frames.

Tracklay

The process of editing sound effects into a DAW working to picture.

