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Basic Audio Mixing Techniques

Class Description:

This course is designed to assist in developing basic audio mixing techniques. It is based on the assumption that tracks have been recorded and edited. It will cover panning techniques to create a wide stereo sound. Channel inserts and auxiliary sends are used to incorporate effects into a mix. Their routing and typical usage will be covered. We will also explore common dynamic, frequency and time based effects. The master stereo bus/final output section will be briefly discussed as well.

Learning Objectives:

1. Understand a stereo mix, proper panning techniques and setting up your monitors.
2. Demonstrate various audio effects with channel inserts and auxiliary sends.
3. Explore the differences between the three typical types of audio effects (Dynamic, Frequency & Time Based)
4. Functions of the master stereo bus/final output.

Stereo Mix, Panning and Monitor Placement

Unless you are mixing in surround, all mixes are in a 2-channel (Left/Right) format. Each channel in your DAW or on a mixing console will have a pan pot (potentiometer). The pan pot can be adjusted to send the signal on that channel fully left, right or anywhere in your stereo spectrum. Proper panning allows for instruments to have a sense of separation and create a fuller, wider sounding stereo mix. Low frequency sounds (bass guitar, kick drum) don't typically get panned due to the omni-directionality of low frequencies. If a pair of drum overheads was utilized during tracking, they should be panned to either side of the stereo spectrum accordingly.

Alignment of monitors is crucial to achieve the proper stereo perception.
Below are a few tips to help create a mixing "sweet spot" with your monitors to create stereo perception.

- Move monitors and your desk to the shortest wall in your room. (if possible)
- Center them along that wall. Pull them away from the wall by at least 12 inches. This helps avoid false bass response. Mixes will sound bass heavy but not translate to other systems if monitors are close to a wall.
- Then make sure the distance between your monitors on the desk is the same distance from each monitor to your head. (Equilateral triangle) See Figure 2.
- Turn the monitors in slightly to face you and adjust their level so the top tweeter is at about your ear height when sitting.

If you can't move your monitoring position to the shortest wall, please ensure you attempt to follow the other recommendations. After you have the monitors set up. Listen to some music you are very familiar with and see how it translates to your space.

Inserts and Auxiliary Sends

The two standard ways to add effects to a signal are channel inserts and auxiliary sends.

- Insert: typically used with a dynamic or frequency based effect and is intended to change a signal completely. Inserts can be done on a physical console channel or within a DAW. Inserts can be placed on a channel pre-fader or post-fader.
- Auxiliary send: used to enhance the original signal. They send a copy of the original signal to another channel for processing. The copy and original can then be blended to achieve the desired sound.

Types of Effects

Any current music you have listened to has some sort of effects added. Effects can be incorporated into the recording process. When new to digital recording, it is advised to add effects after tracking. This will preserve your original tracks. If you

add effects during tracking, they CAN'T be removed later. Effects can be analog outboard equipment that you physically send signal to for processing then back to the console. We will focus on DAW effects, which digitally emulate effects being sent to analog gear.

Dynamic Effects: Adjust the amplitude of the signal or what is commonly referred to as the volume of the sound. An insert is typically used for dynamic effects.

- Compressing/Limiting: All signal values above a certain adjustable threshold are reduced in gain relative to lower-level signals. This creates a more even signal level, reducing the level of the loudest parts. Two important characteristics are:
    - Threshold: The level at which compression/limiting begins
    - Ratio: The amount of compression applied to the signal after it passes the threshold. For example a ratio of 3:1 would mean for every 3 dB over the threshold, only 1dB will be allowed to pass. And an extreme ∞:1 ratio will completely stop any signal from exceeding the threshold. This is often referred to as a limiter.

  Please see Figure 3 for a visual representation of compressing an audio signal.

- Expansion/Gates: Increase the dynamic range of a signal. High level signals maintain the same (or nearly the same) levels, low level signals are reduced (attenuated) or eliminated. Expansion is the opposite of compression.
    - Threshold: The level at which signal stops being expanded.
    - Ratio: The amount the signal is expanded before it reaches the threshold. For example, if the ratio is 2:1 and the signal drops 3dB below the threshold, the signal level will be reduced to 6dB below the threshold. And an extreme ∞:1 ratio will eliminate the signal until it passes the specified threshold. This is referred to as a noise gate. Gates are often implemented to stop cymbal bleed in the tom mics.

Frequency Effects: Pitch is the common reference for frequency effects. Humans can hear between 20Hz and 20,000Hz (20 kHz).

- Equalizers: allow certain frequencies to "pass through" to the output while stopping or attenuating other frequencies. EQ effects typically include highpass, lowpass, and band-pass filters. When the audio signal passes through an EQ filter, the frequencies that pass through can be raised or lowered in volume. Often referred to as boosting and cutting frequencies. You can create many changes to the sound of your mix by boosting and cutting various frequencies.Subtractive EQ is often more useful than boosting signals. An insert is typically used for frequency based effects. To assist in equalizing your mix, *figure 1* shows a visual representation of the human hearing range and where different instruments live within that range.

Time Based Effects: most common include reverb, delay and chorus. Auxiliary sends are typically used for blending of the the original signal and the effected signal.

- Reverb: The resulting sound when you clap in a large room is reverb (reverberation). Reverb effects typically emulate the sound of a specific "room" like a large concert hall. These can be used to create a sense of space and more natural sounding mix.

- Delay/Echo: Creates the sound of a repeating decaying echo. The delay time can be as short as a few milliseconds or as long as several seconds. A delay effect can include a single echo or multiple echoes, usually reducing quickly in relative level. A stereo delay can be implemented to create a wider stereo spectrum.

- Chorus: The chorus effect is designed to make a signal sound like it was produced by multiple similar sources. For example, if you add the chorus effect to a solo singer's voice, the results sounds like.... a chorus.

Master Stereo Bus Fader/Final Output

All audio must eventually be routed to the Master Stereo Bus Fader/Final Output channel. A final EQ and occasionally compression are inserted to round out the sound. Monitoring the master fader will help you observe how "hot" the final mix signal output is. Most of us are mixing in a non-treated environment. So bounce mixes down and listen on different systems to see how they translate and make adjustments to your mix accordingly.

Final Thoughts

The above information is to be used as a starting point. Rules are occasionally meant to be broken! Many people directly insert time based effects on DAW channels. Experiment and discover new sounds and techniques. The golden rule is: If it sounds good, It is good!

Figure 1

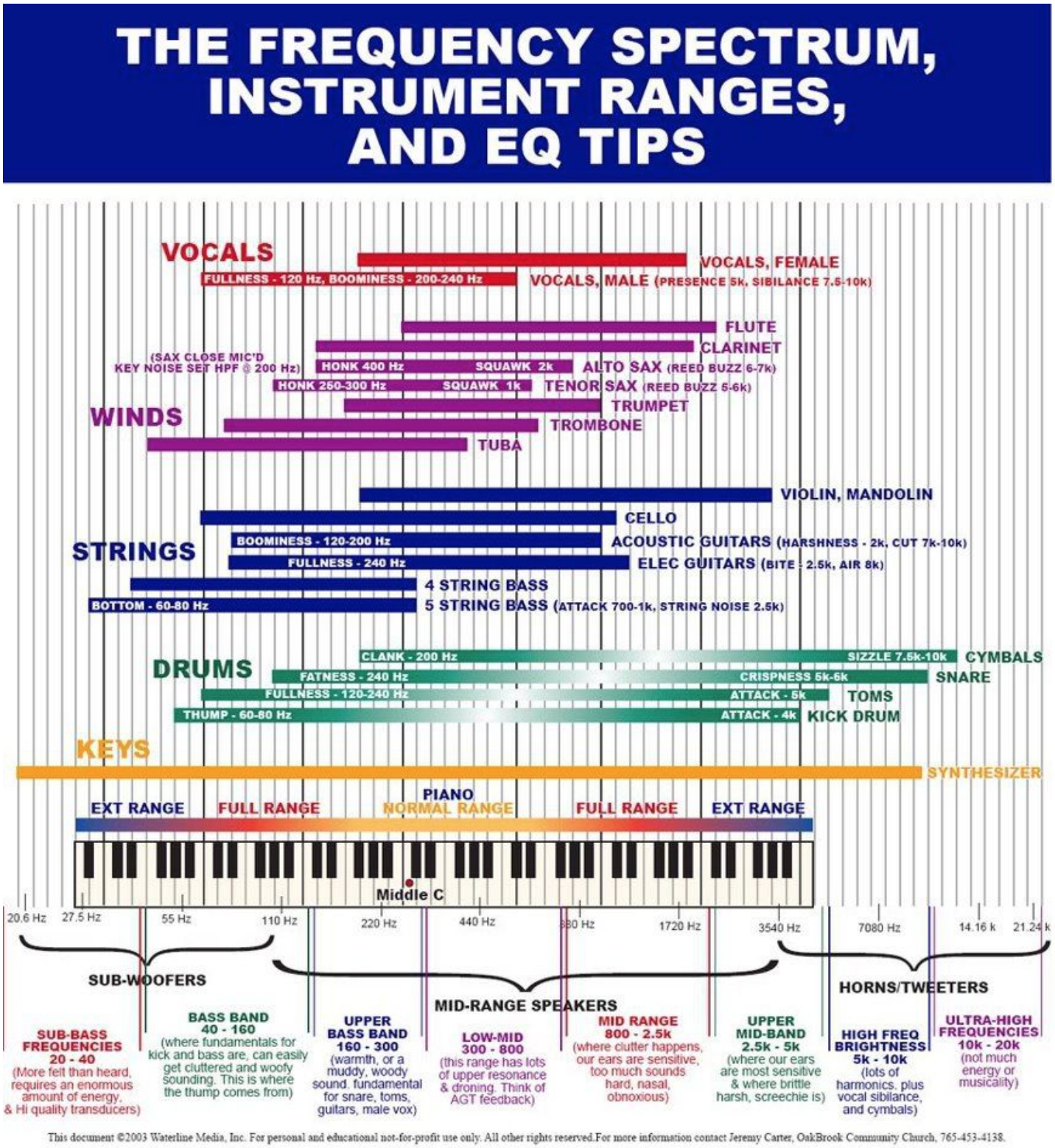

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Figure 2

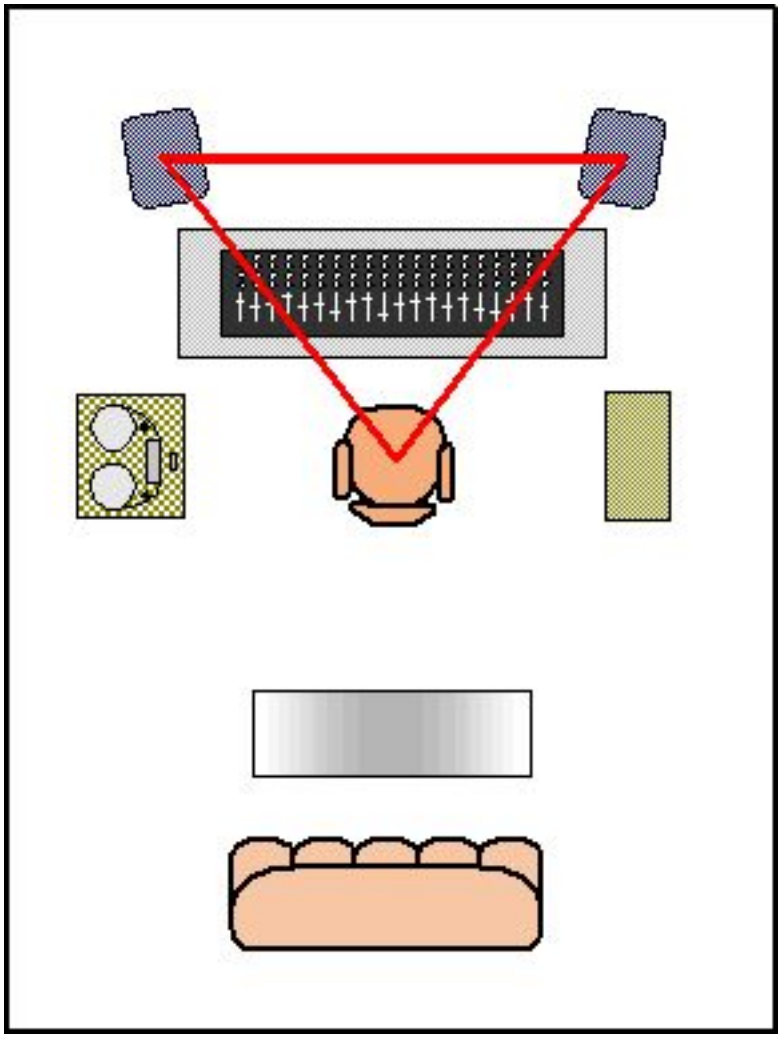
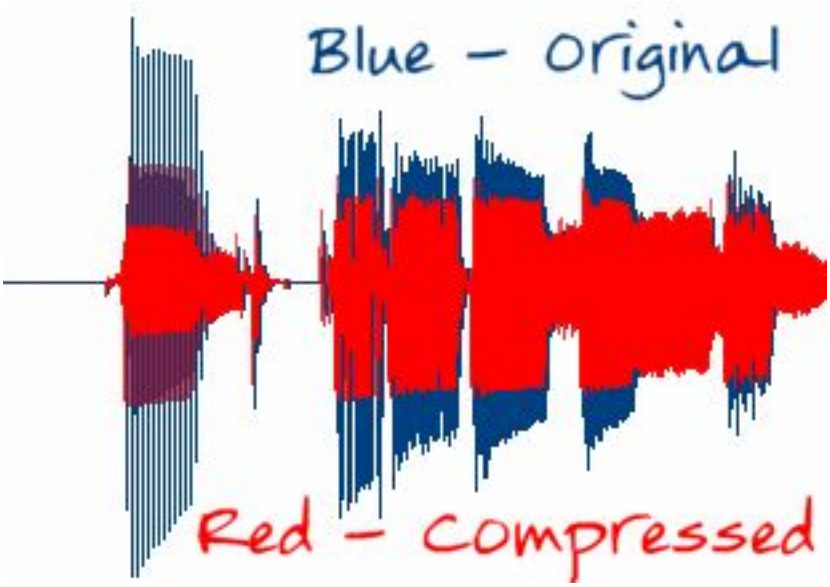


Figure 3: example of how compression reduces an audio signal.



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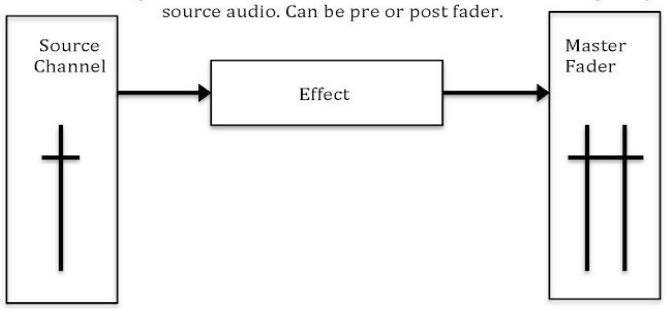
Below is a visual representation of how a channel insert is used to completely change the original source audio. Can be pre or post fader.



Below is a visual representation of how an auxiliary send is used to blend an effect with the original source audio.