Basic Live Audio Cheat Sheet

by danthedrumguy via cheatography.com/22271/cs/4524/

Setup

Before you begin, make sure the snake is properly connected to the mixer, the mixer is connected to the amplifier rack correctly, the power supply for the amplifiers is plugged in but powered down, and the speakers are plugged into the amplifier rack.
Turning the Sound System On:
1. Make sure all mics and instruments are plugged in to the snake and any powered instruments (keyboard, electric acoustic guitar, etc.) are turned on.
2. Turn on Mixer/Soundboard and make sure the gain knobs are all down, the channels are muted, and the main volume faders are pulled completely down.
3. Turn on the amplifiers with gain knobs turned completely down, increase gain knobs to no more than roughly 50%.
4. Set gain structure for each channel, un-mute the channels one at a time and slowly increase the fader volume. Set a rough EQ for each channel as you do this. If need be, have the musician play solo so you can hear clearly.
5. While the band is playing at full volume, go to the amp rack and make sure there is no clipping happening in the system. If none, slowly increase amp gain until either clipping occurs or you reach roughly 75% gain. If clipping occurs before this point, decrease gain by 10-20% as excessive clipping can damage the speakers.
6. Once all channels (instruments/mics) have been un-muted, EQ'd and sound decent solo, have the band play a song. If you hear anything you want to change, do so and then move around the room listening to the sound from different perspectives (remember, what sounds decent in one place can sound not so great in another). Continue to adjust levels, panning, EQ until you have the sound you desire.

Mixing Tips and Techniques

To make an instrument sound "better":
Do not boost the frequencies you want to hear, simply remove the ones you don't want to hear.
To make an instrument sound "different":
A tactful frequency boost can help achieve this.
Think about what frequencies each instrument produces. For example, a piano can produce low frequencies like a bass guitar, however, slightly cutting the lows from a piano can give the bass guitar more "space" so it doesn't have to fight the piano for those frequencies.
If you get to a place where you are happy with the mix, step out of the room for a for a few minutes to let your ears rest. When you return, walk around the room and listen for anything you didn't hear from the board. For example, the frequencies from the bass guitar can be quite a bit more noticeable from a few spots than others. Work to eliminate these "hot spots".

Kick:
Bottom at 80 - 100 Hz; Hollowness at 400 Hz; Smack at 3-5 kHz.

Snare:
Fatness at 120 - 240 Hz; Crispness at 5 kHz.

Toms:
Fullness at 240 - 500 Hz; Attack at 5 - 7 kHz.

Bass Guitar:
Bottom at 50-80 Hz; Attack at 700 Hz; Snap at 2.5 kHz.

Acoustic Guitar:
Body at 240 Hz; Presence at 2 - 5 kHz.

Piano:
Presence at 3 - 5 kHz.

Vocals:
Boominess at 240 - 260 Hz; Presence and Sibilance at 5 kHz; Air at 10 - 15 kHz.

Frequency Reference

16 Hz - 60Hz

Encompasses sounds which are often felt more than heard. These frequencies give the music a sense of power even if they occur infrequently.

60 Hz - 225Hz

Contains the frequencies of the rhythm section so EQ'ing this range can change the musical balance, making it fat or thin. Too much boost in this range can make the music sound boomy.

250 Hz - 2 kHz

Can introduce a telephone or "old time radio" like quality to the music if boosted. Boosting the 250 Hz range can give the sound a muddy quality. Boosting the 500 Hz to 1 kHz octave makes the instruments sound horn like, while boosting the 1 KHz to 2kHz octave makes them sound tinny. Excess output in this range can cause listening fatigue.

2 kHz - 4kHz

Too much boost in this range, especially at 3kHz, can also cause listening fatigue. Dipping the 3kHz range on instrument backgrounds and slightly peaking 3kHz on vocals can make the vocals audible without having to decrease the instrumental level in mixes where the voice would otherwise seem buried.

4 kHz - 6kHz

Responsible for the clarity and definition of voices and instruments. Boosting this range can make the music seem closer to the listener. Reducing the 5kHz content of a mix makes the sound more distant and transparent.

6 kHz - 10 kHz

High frequency which cymbals often produce. The higher end of the vocal spectrum is here too.

10 kHz - 16kHz

Controls the brilliance and clarity of sounds. Gives "air" to the mix.

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Terminology

Equalizer (EQ) - A device that boosts or cuts selected bands of frequencies in the signal path.
EQ Sweep - The act of boosting a frequency and then changing the frequency being boosted until a specific (usually unpleasant) frequency is found. Once found, that frequency can be isolated and then removed.
Feedback - The “howling” or “ringing” sound caused by bringing a microphone too close to a loudspeaker driven from its own amplified signal.
Frequency - The number of times an event repeats itself in a given period of time. Generally the time period for audio frequencies is one second, and frequency is measured in cycles/wavelengths per second, abbreviated as Hz. One Hz is one cycle per second. One kHz (kilohertz) is 1000 cycles per second.
Gain - The variation in level of a signal. Proper gain structure within a sound system allows for maximum dynamic range and the minimum level of noise a system is capable of generating.
Headroom - The available signal range above the nominal level before distortion occurs. Headroom may be thought of as a safety margin that allows room for all those dynamic peaks that give impact to music.
Peak - The high point in signal level. Where clipping or distortion begins.
Phantom Power - The +48V power supply available at the channel mic inputs, for condenser mics and active direct boxes.
Reverberation ("Reverb") - The sound remaining in a room after the source of sound is stopped. It's what you hear in a large room immediately after you've clapped your hands.
Tinnitus - The ringing in the ears that often results from prolonged exposure to very loud sound levels.
Unity Gain ("Unity") - When a gain-providing circuit is set for zero boost. Settings at unity gain typically ensure balanced signal levels and help protect against feedback.

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