Session 4

Application combining Sessions 1-3 in a live mix

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Application of Sessions 1-3

- Gain Structure - Using consistency to create measurable comparisons to make it easier to separate channels
- RTA readings and relating frequencies to ear sensitivity
- Using tone and volume control to create separation in a mix by using identified frequency gaps and creating a “flat response” mix
- Using compressors, gates, and tone control to change the attack of instruments, drums, and vocals to fit slower songs without changing overall volume

Gain Structure

- Gain is an important function of more than just where your fader runs as you incorporate a more complex environment including monitors, in ears, multitrack recording, or any number of other sends than the mains
- Sound boards vary in the voltage they label as 0 dB, 0 dB is a function of measurement of change in voltage in a logarithmic scale, 3db is a doubling or halving in voltage
- By running near the reference of 0 on most consoles, or -6 where 0 is peak on all channels you provide sufficient power for all auxiliary applications, if your faders are running too low on the mixer and are too sensitive make the appropriate adjustment on the master fader

Gain Structure

- By keeping the gain consistent from channel to channel you can make an accurate reading just by looking at your faders as to relative volume in your mix between singers, instruments, or any other input source
- Also if your gain is consistent it is easier to compare thresholds and ratios on compressors, gates, effects, and all other processing in the soundboard, it sets you up for being able to quantify your settings to be consistent with other audio techs at your facility

Relating frequency to real world applications

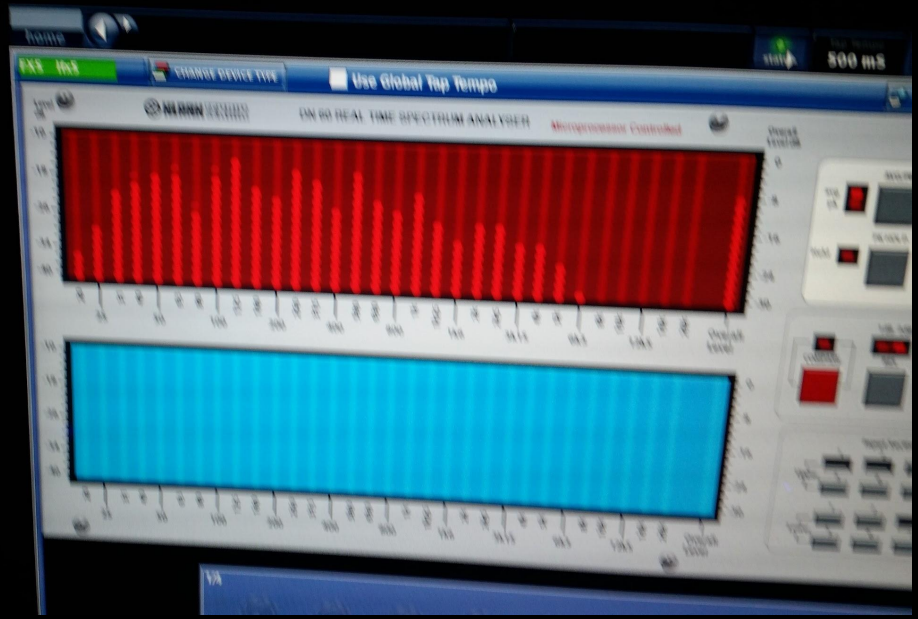
- The ear does not process all frequencies at the same volume
- Generally the lower the frequency the less sensitive the ear is
- The major exception is the 1.2k to 4k range, the ear is especially sensitive to these frequencies, which also correspond with the definition of consonants and higher definition of most instruments
- Sound systems tend to be most uniform in sound pressure level in the 1.2k to 4k range in the covered area, while higher frequencies tend to be louder the more centered you are on the speaker throw, and low frequencies tend to lobe around the speaker, below 400hz most speakers are very close to omni-directional (throws everywhere) and die off significantly with distance

Relating frequency to real world applications

- Because the ear is more sensitive to the higher frequencies, and people tend to experience discomfort earlier from high frequency, you need to adapt with adding more mids/low mids, especially in a larger room. There are some speaker technologies out that eliminate this need with the technology so that across the frequency range people get a much more uniform tone experience, but odds are you do not currently have one of those systems. If you are curious if you do please contact me and I can relay to you the design characteristics of your sound system if you provide me the proper information.

Relating frequency to real world applications

The right represents an Evangel service, Note that frequencies sub 500hz tend to be about 3 db louder than the definition range, and above the definition range slowly dies off.



Relating frequency to real world applications

- Evangel’s Sound System is EQd to be fairly flat response with the lows and low mids about 2.5 to 3 db louder than the highs if you are near the front. By running the low mids 5-6 db louder from the console through processing the middle of the room to the back has a flat response to the ear, where no individual frequency range is louder than the rest. Since the ear is not as sensitive to those frequencies the front of the room listeners do not notice the difference in tone as readily as a difference in the definition or high frequencies, it just sounds “warmer” for the 1/3rd front of listeners. Bass can sometimes be an issue from subs as low frequencies can be felt but dies off in the uncontrolled manner where the front is significantly louder. A balance has to be struck here

Relating frequency to real world applications

- When above 3.5k you will notice the volume dying off significantly. This is not because you can not hear the frequencies, though they do tend to be a bit quieter in the room. This is primarily because less channels hit these frequencies, so you do not get any stacking and the individual unique response from the instruments/cymbals that do stick out through the mix even at lower volume. Running these frequencies too high to get a true flat response even in the high end is extremely hard on younger listeners that have not lost sensitivity to those frequencies and people that have lost sensitivity do not notice they are missing anything since everyday life and even the instrument played in close proximity un-amplified would sound the same. Go for a sound that sounds natural to everyone.

Creating Separation in Instruments and Vocals through tone control

- You can utilize the fact that people tend to be more sensitive to higher frequencies to make a lead vocalist or lead instrument stick out or fall in the background. All but people that are nearly deaf will have full hearing up to 5Khz.
- In vocals this means boosting or lowering the 1.8k to 3khz range. You will often notice when you listen to pre-recorded music that a voice does not sound 100% natural but really shines out above everything else and if you listen closely you will notice it is due to the sharpness, this is acquired through boosting this frequency

Creating Separation in Instruments and Vocals through tone control

- Instruments that are particularly strong in the 1.6k to 2.5k range can interfere with singing intelligibility. Frequencies that are close enough together by the brain get processed together
- You can reduce the sharpness of an instrument in the 1.6-3khz range and boost it at a higher, or lower frequency to maintain its presence in the mix, tone is usually defined in a lower frequency range (sub 800hz) so it will not sound out of tune and if there is plenty going on in the reduced frequency range it will still fit well and sound natural in the mix, even though when on its own it sounds a bit off. My recommendation is do this during the songs, always start with it sounding as natural as possible as a starting point

Flat response mixing

- Pay attention to which instruments cover which frequency range in the sub 1khz range down to 160-235hz. Gaps in this range will make the mix sound incomplete and thin. By boosting certain instruments, such as rythm guitar in the 400-650 hz range, accoustic in the 650-900hz range, or keys can cover any range depending on the sound will make it sound more full. Pay attention to where large continuous gaps are on your RTA. The RTA will vary wildly depending on the song, and even where you are at in the same song, try to use an average and your ear. If needed work with your band to select a keyboard or pedal setting that is conducive to creating a full and complete sound.

Flat response mixing

- Not all songs are full range. If a full band is used expect a good flat response in the full range shown before, but if it is an acoustic set expect to only cover from 200-400hz up to 2.6khz. Know what ranges instruments cover and do your best to make a flat response in that range.
- During slow songs you may also choose to drop the bass so you do not have a 6db boost on the front of your seating, if they can still feel it it may be distracting when there is not as much going on

Utilizing compression and gates to change the feel of a mix with varying tempo songs

- During faster songs more dynamics are expected and help to create energy. By using higher thresholds on your compressors, lower attacks on compressors and gates and faster releases you let individual instruments vary more in volume. Overall the mix should be a fairly consistent volume but individual instruments and vocals stick out more with the variation
- During slow songs compressors can have the threshold reduced significantly as well as the ratio reduced on vocals. By doing this you average out the person's voice earlier, where before you took off peaks now you level out the entire singing volume. Generally a ratio of 1.6-2.4 is used for this. Look to have the compressor kicking in just before they sing at normal volume.

Utilizing compression and gates to change the feel of a mix with varying tempo songs

- Instrument compressors can generally be left untouched, usually a musician will play more even in the slower songs naturally solving the problem, if they do not though increase compression
- Gates on drums can have the threshold reduced and the attack increased. This will cause the drum to have less of the striking noise of the stick. You will still get the tone, especially from the kick and toms, but it will not have the same amount of punch through the mix. Slower songs require the vocals to be the star more than a full band. Compression with an extremely fast attack will further accomplish this if you can not get enough done with the gates, you can also use EQ controls to reduce the impact frequencies.

Personal preference and tips

- People tend to be more engaged with worship if they are able to hear the band over their neighbors that might be out of tune. I try to make slower songs sound quieter by removing a lot of the energy with the methods covered earlier while keeping the overall volume the same.
- Make the vocals stand out above all else. You can run the background vocals closer to the same volume as the lead if you cut the lead through more in the 2.2-3khz frequency range. It especially highlights harmonies as the mids of the voices blend together at a closer volume.
- Rhythm instruments should overtake leads, the lead guitar for example plays something unique and will stick out on a slower song by the merit of being different, but can detract from vocals. The rhythm will need to fill in the slack to make your mix sound full

Questions

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