

Music Technology Experience: Live and Studio

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The following is an overview of my experience and condensed knowledge of live and recorded sound. My music technology and performance experience grew simultaneously throughout my life with long term employment and personal endeavors. The venues range from a living room to bars packed with people, from the stage and sound system on Allen Street during Arts Festival to venues such as the State Theater, and the innumerable churches across the country to the long-term weekly responsibilities at Albright-Bethune UMC where I reside as Director of Music. This is not to say that at every location I was solely responsible for sound or stage, though at times I certainly am, but teamwork with coworkers or on-site union staff was common and often an excellent source of the knowledge I gained along the way. Likewise with recording, I have been the guy in the chair engineering, capturing in real time, as well as simply in the room to witness or in a studio in Nashville for multiple sessions record my music with session musicians and an engineer. Specific musical moments are plentiful, these descriptions seek to offer a glimpse at my capabilities.

Sound Engineering in Live Music Settings:

Small sound system and venue: private space or parties, book stores, bars, restaurants, churches, outdoor spaces.

- Solo entertainment performances, private events, and open music community events, worship services.
- Including hosting/performing, all set up and strike, mixing to the venue and balance of voice/microphone to instrument or multiple instruments.
- Usually one or two speakers, occasionally a performer monitor.
- Any available or appropriate system effects.

Medium sound systems and venue: Churches, theaters, bar, outdoor. Multiple performers, bands, or large unified ensembles with support instruments or soloists (choirs or theatre groups).

- All set up and strike, detail-oriented assignment and stage alignment of XLR/Instrument/Speaker cables for multiple house speakers and performance monitors, all microphones, multiple instruments to a multi-channel mixing console.
- 4-64 channel consoles and applicable software on console or controlled via remote iPad/tablet (Allen and Heath, PreSonus, Mackie, Yamaha, Behringer, ect.)
- Mixing and balancing of the group to the venue space with, often times more necessary, mixer enabled effects or rack unit processing (compression, reverb, and frequency equalization EQ, ect.).

- Identification and resolution of feedback or electronic ground loop issues caused by musician equipment, sound system settings pertaining to the venue space, or performer/microphone physical location in conjunction with speakers and monitors. Using EQ or other means to remove or cancel the issue.
- Management and placement of large quantities of electronic gear, settings and volumes. General chain of technology flow: Performers/instruments- electronic effects pedals and DI Box- amplifiers/cabinets- processing equipment- mixing boards or iPad software- monitors and house speakers- ears- adjust.
- Likely to need multiple microphones and specific types of microphones for a drum set and other acoustic instruments. Furthermore, manage the live acoustic sound in the space produced from drums and non-traditionally amplified instruments to balance with the amplified instruments. A snare drum in the midst of a heavy-handed player is a catastrophe in the making.
- Blending and balance of sound from multiple horn/brass/woodwind players in a section or individually amplified via microphone, or not amplified, with the rhythm section, vocalists, ensemble at large.
- Required knowledge of dynamic and condenser microphones of various types and qualities, as well, when and where to use them. Proper placement and spacing from the source of sound each instrument possesses. A horn player microphone will not generally be appropriate to use for a kick drum microphone. Some microphones have multiple functions some are very specific for quality and timbre of a particular instrument or frequency range that is to be captured and amplified

Large sound systems and venues: Similar to medium systems in all aspects.

- The number of speakers, monitors, microphones, and directly lined instruments/amplifiers increases.
- Most commonly to include subwoofer speakers for enhanced low frequency control
- Most commonly to include use of multiple wireless microphone systems. Individually provided by the performer or built in to the venues rack units and pre set to certain channels on the console.
- Most commonly to include more sound engineering rack mounted equipment (power amplifiers, compressors, equalizers, reverb, delay). Used in the signal chain (pre or post) to match, enhance, or ring out problematic frequencies within the venue.
- The live venue sound will either be wet or dry with natural reverb and also be composed of a certain timbre and color based on architectural design. Either intentionally or non-intentionally implemented dampening (panels are usually

intentional – curtains and attendee bodies are not intentional) will affect the experience and the experience can drastically shift in the space based on the size of the ensemble and the size of the crowd. One seat in the room or hall will be flooded with certain frequencies while another may have trouble hearing the diction from choir if the choir is not diligent in its pronunciation.

- Will require one of the following: Either a snake (large quantity of various cables bound together) to travel a long distance from a central point on a stage to the mixing console. Or in the case of a permanent venue, installed access panels around the stage labeled and connected in sequence for consistent and easy set up. In either case all instruments requiring cable or microphone will plug in to these areas to then be connected to the mixing console.

Recording, Mixing, and Mastering of Live Performances and Studio Sessions:

Small Performance Live or Studio Music:

- Requires a minimum of a cell phone properly placed. The upgrade to this, used for ease and speed, is a single condenser microphone designed for phone or tablet in correlation with an app or recording program such as Garage Band. Best for quick sharing to family or social media or for personal use to reflect on and analyze a performance.
- The higher quality recording for permanent public sharing or audition submissions will require one to four microphones, applicable cables, a Digital Audio Interface (device that processes the captured sound and translates it to the computer), a computer or laptop equipped with a Digital Audio Workstation “DAW” (program to view, mix, edit, master, and listen to the captured tracks, such as Logic, ProTools or any free software if budget is an issue). This method commonly requires an engineer to control the interface and the DAW so the performers can focus on the music, however it is possible to do both.
- Post production of the captured tracks using the DAW to balance the tracks and then export the final mix (song) to a sharable media file (mp3, wav., m4a., etc.). The mixing stage of the final product can be done swiftly or with higher attention to detail. The project at hand would dictate the necessity. A proper recording is the key to a successful mix.

Larger Ensembles Live:

- The process here is to first control and balance the live sound via the skills and technology described above in the medium and large venue performances. Many of the higher quality mixing consoles also double as the interface required to communicate to the DAW. Each channel on the live board is to directly correspond to the chosen channel on the DAW. Once the live sound is balanced then each level can be set within the DAW to, most likely, capture a high caliber and mixable recording. However, each microphone

used will have some amount of sound bleeding from other instruments. Only directly captured, electronic instruments are immune to this aspect of live recording.

- Often, two directional condenser microphones will be used to capture the ensemble as a whole from a sweet spot in the venue. This crossed, left/right, two track recording can then be used to balance and enhance the final product in conjunction with the individually captured instruments. These microphones are paramount for choirs and sections of instruments that are not necessarily mic'd for the sake of the live sound.
- The two-condenser microphone set up is also the simplest and easiest way to guarantee the best recordings of any ensemble, of any size, that has no need for live sound enhancement.

Studio Recording, all types:

- The concept and process of studio recording is accomplished in two ways depending on time and location. One, record all players at the same time using heavily soundproofed and isolated rooms to capture the cleanest and driest track for each instrument. Two, record each instrument individually using a metronome and playback settings to build the ensemble recording one track at a time. In either case the goal is to have all tracks recorded and then mix and balance using the DAW after the fact.
- The microphones used for studio recording are paramount to the recording. These microphones are often thousands of dollars compared to the handful of hundred-dollar microphones used in live sound. The diaphragms which catch the wave/frequency/music produced by the instrument or singer are much more sensitive and designed for a precision that offers a quantifiable difference in quality of the final product.
- Techniques of recording different instruments can be experimental based on the project or desires of the performer. However tried and true approaches exist for all instruments.
- An acoustic grand piano, similarly to the needs of a drum set, prefers to utilize two or more microphones. This can be affected drastically depending on the performer's choice to have the lid closed, half, or full stick. Each piano has a color and tone to its natural sound, so it is important to pay tribute to its beauty by properly capturing that sound. The plate of each piano has holes and spaces where the sound enjoys to vibrate through and bounce off the lid, then directionally find its way to the ears of the audience. To emulate this in the post production of the piano tracks an engineer can place microphone in many combinations inside the plate or outside the lid to best capture the low frequencies separate from the mid and high frequencies.
- Mastering can be done with the click of a button using higher end DAW programs and is suffice for 90% of projects. The final product of a polished song for various levels of media listener consumption is at the behest of the performer. The highest quality mastering meant for mass production and radio/pop-culture release will be done by a Mastering Engineer using skills and techniques developed through in-depth training paired with technology that only the best recording studios truly wish to invest in. The limitations of proper Mastering and why most large projects are given to a studio to "master" are two-fold. Firstly, the hardware/physical technology required to process individual tracks are plentiful and expensive. And secondly, the guy who specifically studied these techniques can do it better.