



Guidance Notes - How to Improve Your Live Sound

First of all, let's make some assumptions:- You are reading this because you play live gigs but you can't get the sound that you want. You are not a megastar, so you don't have your own sound engineer on standby to solve any problem that might come along. Well-paying gigs are for the lucky few, not the great majority, so what makes the difference? How can you improve your sound to make people notice and get those well-paid gigs? Well, success nearly always comes down to looking and sounding good. I can't make you look any better, but I can help with your sound problems! So let's look at the Live Sound problems for each performer and also from the audience perspective:-

Band Essentials

Think of each player as occupying their own sonic space. Each band member hears themselves in a particular way – the “sound” that they hear is in their head (illustrated perfectly by talent shows such as the “X Factor”). Assuming that you have talent, the difficult part is in getting what you hear to your audience in such a way that they hear it and most of all, enjoy it. If each band member can achieve this at optimal volume such that they can hear themselves and each other, it's very likely that it will sound good to the audience as well. My job is to help you to achieve this.

A band is a team effort – the most successful bands know this. If individual sound levels are not controlled, it can ruin the sound of the whole band. In fact, each band member is probably the person least able to judge how loud they really are. The reason for this is down to Psycho-Acoustics and the way that we hear ourselves. This is why bigger bands have a mixing desk out front where the audience is. You don't have to have one, but it helps a lot if you can afford it - or find someone sufficiently knowledgeable, with a good “ear” and willing to do the job for little or nothing. How loud the band seems to sound on stage depends on how long and how loud you have been playing. You will need more volume in venues full (if only) of people than you will in an empty room. Soft squishy things – carpets, upholstery, curtains and particularly people - absorb sound and high frequencies more than shiny walls and floors in a box-shaped empty room.

Vocals

First I'll state the obvious – the vocalist must be heard – what's the point of a great lyric if your audience can't hear it? If you have to strain your voice to make yourself heard, you probably won't last the night and if you do, you will have damaged your voice and shortened your singing career (Rod Stewart and Elkie Brooks excepted). But let's assume that you know that you need to exercise and warm up your vocal chords before hitting the stage. If you're shy about this, you are going to have trouble when you get to the first Pub Gig! Your voice and your microphone are your instrument. Just like any other instrument it has amazing potential but also some limitations that you need to know about..... The louder you hear your voice (at high Sound Pressure Levels), the flatter the pitch of it will sound (Psycho-Acoustics and Physics again)! Feedback can be a big problem for some bands. Fundamentals for limiting the chances of feedback are:- Use a well-designed Microphone – the Sure SM58 is popular for a very good reason – it has excellent anti-feedback properties. Don't cover the back of the Microphone Ball with your hand – it may look cool but it reduces the directionality – a feature that is needed to help cut feedback. Keep vocal effects to a minimum

– they are great for the studio, but not for live sound – a little reverb is all you really need. You may find a noise gate useful because under certain conditions it can prevent feedback. Compressors will aggravate feedback problems unless they are set up very carefully – an experienced vocalist won't need one anyway. A graphic equaliser can be used to tune out certain resonances and “hot” frequencies that might promote feedback. “Boominess” can be reduced by cutting frequencies below 100Hz for the vocal channels only (some microphones and most mixers have switch to cut lower frequencies). Don't stand in front of the PA speakers. Set your PA speakers such that they face directly forwards for a good stereo “image” or angled slightly inwards and downwards for best audience coverage. If you use a stage monitor, position it such that the body of the microphone is in line with the centre of the speaker cone. A couple of angled monitors at the front of the stage facing the band are an extremely worthwhile improvement for the whole band because being able to hear the vocals will remind them where you are in the song and help you all to relax and look at the audience. Then you'll be able to see why you play.

Guitar

Ever wonder why the other band members keep telling you you're too loud? Higher frequencies are more directional than low bass frequencies, so if another band member is directly in line with the centre of your speaker driver (known as on-axis), the volume will be much louder than to the side - say more than roughly 30 degrees off-axis. The centre of the speaker cone is where the higher frequencies originate – try putting a small disc about the size of a CD in centre-front of a 12” driver and see how much the on-axis volume changes – if you listen carefully, you'll notice that the tone has changed also. Careful placing of your Amp/Speakers will not only be kinder to other band members (in terms of reducing hearing damage), but will improve what you and your audience hear. It's tempting to wind the amp volume controls to the limit (10 or even 11) but the best tones are usually found lower down the dial. It's important to understand the difference between Gain and Volume. Gain is all about sensitivity. Volume is about Loudness. It's Gain that affects articulation, sustain and drive or distortion. The tonal balance that you hear will depend on the volume and where you are in relation to the speaker. Too much bass will soak up the power of your amp and make it difficult for the other instruments to be heard because you are invading their sonic space.

Keyboard

Nowhere does this potentially happen more than with Keyboards because they can produce virtually any instrument sound from the deepest bass to the brightest cymbal. A great keyboard player wants to be heard (same as the other band members) but if the keyboard levels are not controlled, it can ruin the sound of the whole band. Of course, if the Keyboard is the main instrument in your band, the situation is rather different and you probably won't need any other band members! Keyboard amplifiers are full-range – just like PA Systems. The difference is that you won't find many keyboard amps with more than 100W output. Unless you are doing very small gigs, a keyboard amp should only be used to provide a local monitor for what you are playing. The bulk of your volume will be via the PA system – preferably in stereo. Your keyboard is capable of producing the sound of virtually every instrument likely to be used in a band. If all these instruments appear to be coming from a single point on stage it can be less interesting for the audience. Keyboards are voiced in such a way that the perceived position of a particular sound in the stereo “image” varies with the individual “voice”. A simple Piano sound may spread the notes evenly across the image, lower notes to the left, higher notes to the right. Horns, Strings, etc. will be placed at specific

point just as though they were individual players arranged on the stage. Bass will usually be placed at the centre of the stereo image because the lower frequencies are not directional and they consume a large part of the keyboard amplifier's power. Placing Bass centrally in the stereo image ensures that both channels of a stereo amplifier and both left and right speaker systems share the power and provide better acoustic volume. Sub-Woofers are not directional at all, which is why sometimes only a single powered speaker unit is used.

Bass

Here are some fundamentals that make the experience better for the player, the band and the audience. Don't dial in too much low frequency gain on your amplifier – frequencies below about 80Hz don't really improve your sound but they soak up your amp's power like an Arab uses oil. Stage definition of bass is inversely proportional to speaker driver size. The acoustic volume (i.e. what you *Hear*) at very low frequencies from 15" and 18" speaker drivers is quite low if you stand close to them (even though the acoustic *Pressure* is high enough to make your trouser legs flap), but out in the audience and the car park, the volume will be high. 10" speaker drivers are a very good choice for bass because they sound good close up. To get more volume to the audience and the car park, you simply need more of them. Larger speaker drivers tend to cause odd resonances and phase cancellation of certain notes that can be quite distracting as you move around the stage. The equalisation settings that you use on your amplifier will be different if you practice at a low volume. At very high volumes, much less low-frequency boost will be needed. Some amplifiers have equalisation controls with a very wide range of settings in terms of frequency and gain. It's best to avoid dialing-in very large amounts of boost or cut.

Drums

A couple of well-placed overhead microphones and one in front of the Kickdrum is all you need – really! To appreciate this, it's a good idea to get someone to play your kit during a soundcheck while you stand where your audience will be. Of course, you can have more microphones and pads, but then you'll need a PA with more mixer channels and it will take longer to setup – and you'll have to get to the gig much earlier! A big drum kit played vigorously is capable of producing an acoustic volume equivalent to several hundred Watts, so unless the venue is very big, the audience will hear most of what is played. The microphones are used to improve the kick-drum sound and add a bit more volume and definition to the cymbals. The gain settings for the microphones should not be set too high otherwise feedback will be a problem. The drummer's vocal microphone should be placed such that it does not pick up any other sounds.

PA System

As a minimum, a 12 channel mixer amp of at least 300W per channel, with a built-in graphic equaliser, 15" horn-loaded speaker cabinets with extendable tripod supports to lift them above the audience head-height and one powered and one slave 12" horn-loaded angled floor monitors. A single powered sub-woofer can be used to increase the lower frequencies if required – particularly for a keyboard or to "beef-up" a kick-drum. Depending on the number of vocals, the number of microphones required would be one per vocalist, one for the kick-drum, two for overhead drums (captures all upward facing drums and cymbals) and perhaps one for the guitar amplifier. Bass and keyboard can be connected directly to the PA mixer if required. For a five piece band (Lead Vocalist, Guitar, Keyboard, Bass and Drums) a

maximum of 12 channels would be required for the PA Mixer. This assumes a microphone each for vocals, three for drums and one for the guitar amp. The keyboard will require two single channels or one stereo channel. Too much gear does not significantly improve the sound for a typical small group venue. Remember that it all has to be carried and set up each time you play. Often there won't be a stage as such, so some extra space can be gained by standing the PA speakers on the floor to the front of the area allocated to the band. A word about Amp/Speaker ratings, generally you should choose an amplifier with a higher rating than your speakers by about 50% so you would need a 300W amp for 200W speakers. This reduces the possibility of distortion which can kill speakers. Do not, under any circumstances, run your system continuously if it sounds distorted. If you need more volume and therefore power, remember that with amplifiers, you have to increase the output power by a factor of 10 to double the volume. This is why 2kW PA amplifiers are now commonplace. If the amplifier power increases, then the speaker power handling must also be increased proportionally. Finally, more volume can be achieved by adding more speakers. Doubling the number of speakers of a given size will double the acoustic volume. Don't hesitate to contact Sonic Fix if you would like more information.



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