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Developing Good Mixing Habits

by Tim Crich

Writing on mixing is a difficult task. Try explaining to someone, without actually being there, how to paint a picture, how to play the blues, or how to remove a spleen. These basic few points just scratch the surface of good mixing habits. Bottom line, the best mixes come from well-written, well-arranged, well-played and well-recorded songs.

Getting Started

Paint a mental picture of how you want the mix to sound, then start with a fresh, relaxed attitude. Check your session notes and ideas that seemed to work while tracking and overdubbing. Maybe listen to some of the earlier rough mixes. Sometimes a 10-minute mix at the end of a session can sound better than a 12-hour marathon mix. Rough mixes may be heavier, lighter, drier, more groove. Determine which elements of a favourite rough mix best captures the feeling and aim the boat that way.

Set up, label, and double check the signal flow of all your needed reverbs, delays, or harmonizers before you start. Set all compressors, limiters and gates to unity gain. If applicable, go through all tracks and erase any unwanted noises such as coughs, instrument sounds, etc. Activating the playback machine's loop mode allows the uniform repetition of the song to help get into a flow for the mix. Like the musicians who played the song, the mixer can get into a "creative groove" as well.

Levels

Run the console at its optimum operating level. Pushing fader levels all the way up adds unnecessary noise. Keep all the gain trims as low as possible, and the master buss level at zero for clearer, more transparent mixes – crucial on budget consoles when distortion increases as gains are boosted. Plus, with the master fader always set at zero, you know if it has been moved or not, and lets you know where to return after every fade.

Turn down not up. Before changing a track's level, see if you can turn something else down to make the track jump out a bit more. Continually raising certain tracks because they are getting lost means there may be an equalization problem. Check to see if frequencies are overlapping, or if any frequencies could be pulled rather than added.

Try this: Set the volume at a reasonable level. Plug your ears with your fingers, close your eyes and listen to the track. This seems to give a different perspective of levels, and is a good method of checking the vocal and snare drum levels. But sometimes you just lose the groove in the levels. Pulling all the faders down and re-setting levels doesn't take long and may help you regain perspective as you bring each instrument back into the mix. Once you have your levels set where you like them, leave them.

Mix at lower volume levels. Lower volume protects your valuable hearing and the sounds tend to be more accurate. Plus the loud levels might wake up the producer.

The Groove

The groove is the defining entity of the song, the central core of what keeps it going. Create movement throughout the mix by slightly changing panning, effects, processing and track levels. Enhance the groove and preserve the emotion by bringing the best things forward in the mix. Identify one or two fundamental elements and accentuate them.

Create layers by bringing in one instrument at a time. Give the listener a little at a time as the song progresses, rather than everything at once. Make the song more like a staircase, building as it progresses. And what if a part just doesn't fit? Don't try to make it fit. Cut it and be done. Each element must be solid, not wishy-washy. For example, if you have three guitars playing roughly the same thing, either clean them up or use only one of the tracks as a main one. In the long run, each remaining instrument will have more impact. Of course, don't eliminate parts unless you are authorized.

As Time Goes By

Take a silence break every few hours. Ears need time to relax and rejuvenate every few hours. Your ears are organs, not muscles – overuse does not make them stronger. If that were the case, I would have a liver of steel.

As with the recording process, don't go solo too often. It's great to have the solo button to get a basic sense of an instrument, or to zero in on a problem, but get in the habit of changing equalization with the rest of the tracks in the monitor mix. When you can't hear the other tracks, you can't effectively equalize a track to fit in, yet stand out. Don't spend too long on any single instrument. Get a basic sound, then move on, tweaking each instrument as you mix.

Occasionally, listen to the mix through headphones to catch any buzzes, clicks, pops, hums, etc. Tiny flaws sometimes not evident in the monitors can come through loud and clear in the headphones. At low levels, headphones may help give you a true feeling of the placement of all instruments. Many listeners enjoy their music through headphones.

Long hours benefit no one. Spending 20 hours on a mix will not make it twice as good as spending 10 hours on a mix. At some point, the best has been done, and continuing on is fruitless.

Finally, and most important, when deciding which instrument takes precedence in the mix, make the guy who signs your cheque sound best!

This article is excerpted with permission from Tim Crich's book Recording Tips For Engineers. *He also wrote the bestseller* Assistant Engineers Handbook. *He has over 20 years of experience in the recording studio and has worked on records by the Rolling Stones, Bob Dylan, John Lennon, KISS, Billy Joel, Bryan Adams, Cher, Bon Jovi and many more.*

Recording Q & A

By Mike Turner

The cost of recording an album has dropped in many ways (DAWs, home recording). How do you feel this has affected the quality of albums?

I think the easiest thing would be to bemoan the vast sea of mediocrity that affordable home recording has foisted upon the world while telling stories of 'In my day...' and how everything was better when it was difficult to do. While it's true that there is some truly awful crap out there (spend a bit of time on MySpace and tell me I'm wrong) I truly think that it's more of a benefit to 'music' that anyone can do what they want with the medium. This is how discoveries are made. Just because the manual says it's wrong doesn't mean it's not useful. We all love huge, distorted guitars (or is that just me?). Distortion on a guitar is a result of accidents early in the history of guitar. It was either an amp that was dropped off a loading dock before the recording session of Ike Turner's 'Rocket 88' or a torn speaker in Link Wrays' amp while recording 'Rumble.' One thing is sure, it was an ACCIDENT! The good thing is that someone said, "Hey, that's cool! Do that again!" So, with a little luck, there is someone doing something wrong but really cool right now. As for the question of music being worse now than in times past, let's face it, crappy music has always been around. It only seems like things were better in the past because the crap gets forgotten, and only the cream remains.

Because anyone can (and often does) make records, we have vastly more content to wade through to find the good stuff. Of course, good technique will help you get heard. If what you have recorded is sonically compromised, people won't get past those issues to hear what value your music has to offer.

I think that when the cost of making a record was prohibitive, it made sure that only the most driven, best prepared, and technically skilled musicians would make records. Since one can now make a record at home for the price of a couple of microphones and a good computer, people that are less committed to the quality of the end result feel that, because less money is at stake, what they're doing is 'good enough.' It isn't.

Regardless of the cost of the recording or what gear you buy for the job, the important thing is that what you have done will be a permanent representation of your art, a record. If you compromise along the way, be it during writing, recording, mixing, or mastering, you shouldn't be making records. This is also indicative of the 'celebrity' mindset that exists far too much today. Many people make records in order to become 'famous' and that is their dream. So, while they're dreaming about being famous they think that 'their public' will see through those silly little oversights like being in time and in tune and see the 'star' that they are. Then they'll get 'discovered' and someone else will do all of that troublesome 'work' like finding great songs and making them sound like the gifted musician that they would be if they just got around to learning about that whole music thing.

What equipment is essential to create a professional-sounding recording?

The piece of equipment you need is a pair of ears. We all have them and it's a matter of working on them. When you get your first recording medium, you tend to think it's pretty damn good. You're most likely right, it's better than what you've known until now (nothing) and that's pretty good. Then you start to hear its shortcomings (because you're listening very closely!) and you upgrade to the next step and it's good again. Then your ears catch up and before too long you're listening to high definition audio at 48 bit 96 KHz and wondering if there's anything that doesn't have the limitations you're starting to hear.

Now that you've got your ears on, you start at the beginning and work from there with the same attention to detail. Is the music good? Are the sources good? If you can't stand in front of the source and think, "Wow, that sounds killer!" then no piece of gear or plug-in is going to drag that 'wow' out of your listener. Which brings up the issue of venue. We all sound good singing in the shower. Drums? Not so much. The only thing that needs to be recorded in a specific environment is the drums.

Drums are always the biggest problem in terms of location. You need a venue that gives you the freedom to record 'ambience' (room sound) without having that 'ambience' overwhelming the track. Go to a commercial studio that has a good drum room and a good selection of microphones. Do the smart thing and work with a good engineer. You can then record in other venues that are more cost-effective.

If there is one thing that you will never regret buying, it's a 58. Love it or not (you can't hate it!) the venerable Shure SM 58 handheld dynamic microphone is an enduring standard in the industry. While recording guitars for the Fair Ground record at my studio, I got pretty fancy. I had a large diaphragm tube condenser (Rode NTK) on the cabinet, I had a 421 on it, I had a 609 (both Sennheiser) on it, and finally I had a 58 straight down the cone almost as an afterthought. There was much fussing with phase coherence and cancellation and careful choice of preamps and EQs (Focusrite ISA 430, API 512c into a Blue Stripe 1176 were staples). I chose to track each mic separately so that when we combined guitars at mix time we'd have options. We ended up using the tracks done with the 58 in the majority of the songs.

You can do good work with a 58 on almost any sound source, so if you're looking for your first mic, go nuts! Of course, you will need a preamp. This gets a little bit more tricky. Put simply, spend as much as you can on as few bells and whistles as you can. Get an all-in-one box or channel strip. Be prepared to throw down some significant coin. I think if you had $500 to spend, you'd be better to get a single mic pre, no EQ, no compression, nothing. This way, all of your money is going towards the quality of the pre, not in providing the other features. All of these features are decently emulated with software, but if you compromise your fidelity with a cheaper preamp you can't restore it later. Finally, get a good interface. Yes, you can get sound into your computer through the stock soundcard but, trust me, not well enough to make you sound good. Next time … *Being Prepared for the Studio and What Follows.*

Mike Turner is the former guitarist of Our Lady Peace. He partnered with Mari Dew, Caryn Hanlon, and Trevor Kustiak to launch The Pocket Entertainment and The Pocket Studios. For more information, contact www.thepocketstudios.com

Are You Really Ready To Record?

by Mike Turner

Warning! This is a dangerous question! You may not be ready for the explosive reaction that this may unleash! The level of frustration that this can cause may lead to much ranting and gnashing of teeth! Unprepared bands are a problem for the engineer on a session, and, unfortunately, most of those people have grown accustomed to unprofessional musicians. For the producer, part of the job is to make sure that preparations have been done for the studio – so if the band isn't ready it's at least partially the producer's fault. Of course, if an artist doesn't have a producer per se, someone in the band will have to take the reins and direct the session, usually without having done the needed pre-production.

Ideally, when a band plans to go into the studio several things need to be in order before you get there. The song is the most important thing. If it's not great, why are you recording it? If you believe it's as great as it can ever be (we all start somewhere) then you need to make certain that the arrangement is doing what it should be.

The normal flaw is that, as musicians, we tend to think that things are as much fun to hear as they are to play. Not true. Each part of a song needs to be represented enough that it serves its purpose and doesn't overstay its welcome. You know that great four-bar riff in the intro of the song that you play four times through? Most likely it only needed to be heard twice, maybe only once if you're going to play it again after a chorus as a re-intro (refrain, motif, or whatever you choose to call it). If you manage to dress up the riff in different settings, i.e., acoustic vs. electric, or by the use of dynamics or effects, then you might be able to repeat it more – but just bashing away on a riff for extended periods doesn't do anyone any favours. If you love the riff more than anything and want to play it longer, feel free to do that live, just don't beat the hell out of people with it on a CD.

Okay, now your song is the best one you've ever done and the arrangement is tight and concise. Well done! Now, does the drummer know his/her parts? I mean really know them? You (looks like you're going to be the producer after all!) should be able to ask: "What are you playing in the second half of the second verse where it goes to the pre-chorus?" and your drummer should be able to pick it up from that point and tell you, even verbally (Boom KA BuBoom Boom KAK KACK-A), EXACTLY what he/she intends to play. As a matter of fact, everyone in the band should be able to give the same answer – not just for their own parts but, at the very least, the drums as well. This way there's no confusion when you're in the studio. I can't tell you the number of times I've heard arguments about how part of a song is supposed to go once the band is in the studio: "Why are you changing chords on the 'and' of four? It's supposed to be on the downbeat!" "NO WAY! I always play it like this... " If you knew each others' parts, this discussion would have taken place at the rehearsal stage where nobody feels like an idiot in front of the engineer at the studio. This is one of the things that marks somebody as a pro: knowing to listen first, hearing what needs to be played, and playing it well.

So, now you have a great tune with a tidy arrangement. Everybody knows what to play and those parts all agree. Next, make sure all of your gear is in perfect condition. Do you want a permanent record of how you were substandard? This means new strings and setups for the guitarists, new skins and a well-tuned kit for the drummer, and the singers should not show up hung over from being out at a loud bar yelling and smoking all night. If you don't have top-notch gear, you should look into renting some for the recording – most studios either have some or can help you with a recommendation on where you can get it.

Your checklist is almost complete. You now have a great tune, a great arrangement, great individual parts that work great together being played on great gear in the studio. Doesn't that sound great? Here's where the final hurdle is. When you get into the studio there's a different experience of the music you make. It might not sound as exciting as you'd thought. This is where a little flexibility is in order. You remember those parts that everyone memorized and the arrangement that you laboured over so diligently? They might need a little tweaking in the studio. This isn't a

contradiction of what I've said already. If you know the song as well as you should, changes are easier to accommodate BECAUSE you know the song so well. Know your parts going in, but don't get so attached to them that you can't hear the opportunity for something better. Sometimes the smallest change puts excitement into a track that was lacking once you got to the studio. The chance to get the best performances will only be increased by the atmosphere of achievement you will get by not having the session grind to a halt because you weren't prepared. Trust me, it's hard to be creative when you're dealing with someone who hasn't done their homework and is feeling too much pressure executing their parts in a song that they don't quite know.

Mike Turner is the co-founder and former guitarist of Our Lady Peace, as well as a three-time Juno Award winner and a four-time MuchMusic Video Award winner. He quickly established himself as a premier source for live recordings using a streamlined mobile live recording rig of his own design. Mike soon had the itch to build a "real" recording studio, and he partnered with kindred music industry veterans Mari Dew, Caryn Hanlon, and Trevor Kustiak to launch The Pocket Entertainment and The Pocket Studios. Please contact www.thepocketstudios.com for more information.

MP3 And Beyond

by Mike Turner

The reality of the MP3 revolution is ongoing. What is the impact of MP3 on the recording of music?

When first introduced, MP3 compression was the only way of transmitting music files of any size due to restrictions on bandwidth. For this reason, people tolerated the inherently inferior audio quality. There was also the issue of expensive storage space that was also addressed by MP3 compression. Once again, because memory was expensive, people tolerated the bad audio because good audio was just too memory-intensive. Both of these factors are becoming less and less of an issue. With high-speed Internet access becoming the norm and hard drive memory going under the dollar per Gigabyte threshold, there is less need to tolerate bad sound.

My theory is that MP3s on the Internet are the equivalent of radio in the past. Radio was revolutionary based purely on the fact that it was without precedent. Music on the Internet is following a similar course based on the precedent of radio. Initially music was all over AM radio and people went crazy for it, millions of little transistor radios were sold and the Top 40 market was born. As AM became ubiquitous and the number of people listening represented a sufficiently large amount of the population, the small percentage within that number who were unsatisfied with the fidelity were a big enough market to merit a new format. And so FM radio became the domain of the discerning music listener. As times changed and tastes evolved, it was no longer sufficient to just be accessible like AM radio was, the fidelity provided by FM became more affordable and instead of tiny transistor radios that only received mono AM radio through a single speaker, people began to buy home receivers that were stereo and had multi-component speakers capable of good quality sound. At every stage there were a group of people that wanted better sound and they are still around today. Go to your local stereo store and tell me that fidelity is irrelevant. Once the innovations become the norm and their prices become affordable, more than just the early adopters will choose to upgrade. Currently we are in the early stages of the MP3 revolution but I think it's inevitable that people will begin to require more from the fidelity of MP3s and that an affordable, superior sounding alternative will supplant them.

As for the question of a singles-based market, I think it's always been that way to a degree. It takes an introductory song to get the listeners interest – then and only then will they check out the catalogue of an artist. Unfortunately, there seemed to be a movement once the album became the standard to fill space with sub-par material for the sake of track count. If you wanted to get the song you liked from an artist, you had to buy the entire album regardless of the quality of the other tracks. With the amount a consumer buys from an artist becoming discretionary, people will only buy the entire album if it's all good. There is the interesting idea that, as an artist, you will have the option of making your material available as each song is created, not every 12-18 months in an album (ie: collection of songs) format. If you are creating something to be presented as an album, you have that option but aren't bound to it.

What will happen to the industry over the next few years? If I knew that I'd be sleeping better at night! The only thing for certain is that it'll be utterly different than it is now. Most likely it will be very much smaller and the gross revenues will be commensurately smaller as well. So if you want to be a rock star with a mansion and lavish lifestyle, you'd better have two mansions and a downright opulent lifestyle to start with.

I think that the record companies will still be around but they will get out of the distribution business entirely. It's always been their specialty to know how to market artists. I think it'll also become more artist-driven in terms of the public no longer being content to buy whatever is being marketed. I hope in the future it will be quality first, then marketing. I believe this will be the most relevant aspect of the future industry. Not to sell something to a consumer by hook or crook, but to become a trusted source of specific types of music. Let's face it, with the advent of affordable recording technologies EVERYONE has a band and wants you to hear their music. The difficulty is filtering through all of that content to get to what you're interested in. This is what the labels are specialists in. There are still versions of aspects of the traditional industry, for example websites like www.pitchforkmedia.com are replacing print media but the importance of getting noticed by them is no different and no less difficult. Record labels are in the business of relationships. There are publicists whose lives are dedicated to knowing what outlet is appropriate for which artist and have the relationship with all of them. Do you, the artist, know someone at pitchfork? *Rolling Stone*? *The Oprah Winfrey Show*? How are you going to get the benefit of the exposure that these outlets offer to the right artists?

Some future version of the label will have continued to maintain the relationships with these outlets and that will be the value they bring to the table. This is just one aspect of what a label does now and the best thing is that they are a one stop shop for these and other services. I guess you could try and outsource all of these things … wait a minute, that's the next column!

Mike Turner is the co-founder and former guitarist of Our Lady Peace, as well as a three-time Juno Award winner and a four-time Much Music Video Award winner. He quickly established himself as a premier source for live recordings using a streamlined mobile live recording rig of his own design. Mike soon had the itch to build a "real" recording studio, and he partnered with kindred music industry veterans Mari Dew, Caryn Hanlon, and Trevor Kustiak to launch The Pocket Entertainment and The Pocket Studios. Please contact www.thepocketstudios.com for more information.

Laying Down Electric Guitars

by Chris Tedesco

When it comes to recording electric guitars, there are really no rules. However, in my experience, there are a few misconceptions about the art of capturing a good sound. You absolutely must begin with a good sounding source and this applies to miking anything. Once you've achieved getting the sound you want out of the rig, then you can start throwing up mics and trying different techniques. Most engineers have their own systems built through experimentation and experience but generally speaking, anything goes.

Speaking with Steve Chahley, Chief Engineer at DNA Recording Facility, some good points were brought up. Agreeing that every situation is different, "more times than not, the guitarist's live setup and sound doesn't apply when they get into the studio," says Chahley. "In a live setup, gain, volume, and EQ settings are dialed in with a very different purpose in mind and that purpose is to make sure the guitar can be heard during the performance, which sometimes sacrifices the tone." In addition, overdrive pedals and such could be used live to get a bit of boost during certain parts of the song but in the studio, it is sometimes better to drive the amp naturally from its native controls, especially if it's vintage.

The MOST important thing to do, and if this is the only piece of advice that you take from this article then I've done my job, is to make sure that the guitars that you're tracking have been set up and tuned correctly. There is nothing worse than discovering that the guitars and bass are slapping each other as a result of poorly set up intonation and tuning when you've already tracked 12 songs this way! Sometimes it's obvious right from the start but sometimes it's not. The situation becomes worse and worse as you move along, especially when you're layering guitars.

Once you've set up and tuned, you can now start listening to the amp. Get the sound that you're after by adjusting the amp while being in front of the cab, not behind it. It's common sense that the mic(s) are placed where the sound comes out of, so put yourself in the place where the mic would generally be positioned and listen. Be careful not to blow your eardrums out! Start at a lower volume then gradually increase it.

You're now ready to toss up a mic or two. Now this is the debatable part of the

piece! "There is no right or wrong way of miking a guitar amp although there are a few things to watch out for," says Chahley. Speakers in general produce a Sound Pressure Level (SPL) that you need to take into consideration when miking. This refers to the pressure caused by speakers moving air. You can distort the microphone easily by having the amp too loud, or by having the mic too close. If you're using a condenser or especially a ribbon mic, you can actually destroy the diaphragm or ribbon at loud volumes. Placing the microphone perpendicular to the speaker is probably the first thing to try. The speaker's face is made up of the cap, which is the smaller protruding circle in the center, and the cone, which is the larger circle surrounding it. Pointing the mic's diaphragm at the point where the cap meets the cone should give you the "best of both worlds" sound. The more you move the mic towards the center of the speaker, the more hi and mid frequencies will appear and oppositely, the more you move towards the outer ring, the more low end frequencies will appear. If you're using a two-mic set-up, then the second mic could be placed at a 45-degree angle and pointed more towards the cone, giving you some extra low end. At mix time, these two tracks can be blended together to give you one sound. This is an example of a simple close mic guitar cabinet setup. There are endless ways to place microphones in different configurations to achieve a good sound. Setting a mic back a few feet from the cabinet as opposed to a few inches will give you another colour at mix time.

If you're using a combo amp with an open back, you have a few more options because you now have sound coming from the front of the amp, as well as the back. Applying the same technique as above to the front, try adding a mic to the rear to capture some lows and low mids. Just remember, you need to flip the phase of the back mic because when the speaker moves forward (pushes), then the front mic diaphragm moves inward and the rear mic diaphragm moves outward. Without getting too technical, if you don't flip the phase, it will sound like crap!

Getting a good guitar sound depends on more than just mic technique. We have to take into consideration things like the actual mics you're using, the preamps, the compressors, the multi-track and even the cables. You don't necessarily need a Neve pre to get a good guitar sound, but it definitely helps. The key is experimenting! Be creative with the setup, keep mixing in mind, and tune the damn guitars!

DNA Studios is owned and run by Chris and Dave Tedesco and hosts Steve Chahley as Chief Engineer.

The Bottom End

by Inaam Haq

The bass line in a track is one of the things that make a listener move and groove with the music. The way it swings with the kick and holds down the bottom end, both rhythmically and harmonically, forms the foundation that the track is built on. As such, the recording of bass is not a simple afterthought. While it may seem very simple to just plug in the bass direct and go, there are several considerations to keep in mind.

First off, a great bass recording starts with a great player, a fine instrument, and the right part. There are ways to enhance the sound and fix certain issues, but starting out with these elements is the best way to ensure that you get good results.

Use of a direct injection (DI) box is often the first choice for many engineers and bassists, but beware, not all DIs are created equally. One high-quality DI is the Avalon U5, which has a very solid, clean, and transparent sound. Many high-end outboard tube preamps also have instrument inputs that allow guitars and basses to be plugged directly in. Tube preamps can help to warm up, or add a bit of grit to, what might otherwise be a clean, yet sterile, recorded signal.

For many players, the crunch and growl that comes from their favourite bass amp is an essential component of their sound, so you will need to record the amp to get the dirt that you wouldn't be able to get from the direct signal alone. A large-diaphragm dynamic mic such as the Sennheiser 421 is a good choice of mic for this application. It can better handle the high sound levels being created by that fridge-sized, earth-shaking 8 x 10 bass cabinet than a condenser mic, and will be able to capture more bass than, say, a Shure SM 57.

A special case in recording is the upright acoustic bass. This monster instrument can create a lot of beautiful low end, but is vulnerable to leakage from nearby instruments. A common way to mic the acoustic bass is to place a large-diaphragm condenser down near the bridge or the "f" hole. A small-diaphragm condenser can also be placed near the neck to pick up the fine details like finger noise and string snap, (as well as the occasional grunt or heavy breathing from your bass player!). An option to consider when leakage is a factor is to wrap a small-diaphragm condenser in foam or bubble wrap and gently place it where the bridge meets the body, facing up. That allows you to get the mic nice and close. A lot of upright basses also have a pickup, which can be blended with the mic(s) to help you get a clearer signal from the instrument with a minimum of bleed. Many bassists are reluctant to even use the DI when recording because the pickup doesn't capture the same resonance and warmth that can be heard acoustically. A little reassurance that you will only be using the DI to augment the miked signal can help your player feel more comfortable.

By recording both the direct signal and the mic signals of the bass or bass amp, you can give yourself great flexibility when it comes time to mix. By sending the direct sound to an amp and then re-recording it (a process known as re-amping), you can re-create or change the bass amp tone. The direct sound can also be processed with amp simulators or effects, radically altering the sound of the original instrument.

Anytime that you are running multiple signals of the same sound in parallel, such as the DI sound and the amp sound, it's essential to check for phase. Because the signals aren't taking exactly the same path, they get slightly misaligned. The peaks and valleys of the sound wave that should be lined up become opposite to each other, and cancel each other out. In this situation, the signals are out of phase, and the bass may sound hollow, or all the bottom end might suddenly disappear when the DI and amp signals are combined. By inverting the phase of one of the signals, you can restore the sound. Most consoles and preamps have a phase switch to flip the phase. Often this switch is simply marked as a "0" with a slash through it. If there's no phase switch handy, any professional DAW software worth its salt should have an "invert" function to do the same thing. Little Labs also makes a very effective unit called the IBP Analog Phase Alignment Tool, which allows you to sweep the phase to make sure that your signals are totally in phase.

There are many other aspects to consider with regards to the bass such as EQ and compression. These choices will depend a lot on the track and the style of material. In general, when recording, it's a good idea to be conservative and not commit yourself to anything that might limit your flexibility further down the line. In mixdown, you want to allow the kick and bass to coexist by giving each one its own frequency space. Just remember that the tools you use and the decisions you make should be chosen, like colours, to complement the part because, ultimately, the bass is serving the song.

Inaam Haq is the senior engineer at Cherry Beach Sound, where he has been for 10 years. Inaam has worked with Rush, Headstones, and Not by Choice. www.cherrybeachsound.com.

There's No DNA In This "Bleed"

The Hell Of Isolation/Separation

by Chris Tedesco

The very purpose of having multiple track recordings is, essentially, to have control of the sound of each individual track. However, with poor isolation/separation, there can potentially be a problem when recording live off the floor, which, in our experience, is becoming more and more popular, especially among indie bands.

Picture a room full of instruments, including drums, bass and guitar amps, and percussion, for example. Now, throw in 30 live mics in that same room, and you will have an issue with isolation/separation. There is a small misconception about the two. **Isolation** is when you place instruments in different rooms so that each microphone is picking up only the sound coming from that particular instrument and its ambiance, assuming that these rooms have a significant amount of sound proofing. **Separation** is when the instruments are all in the same room and are sectioned off to achieve the least amount of "bleed" into the other instruments' mics. Unless you have a studio with five or more booths and a band that's cool with being in different rooms, total isolation may be difficult to achieve.

Even though isolation will allow for the most control over each individual track, some groups need to play together as a band in order to get a good performance. In this instance, you need to have good separation of each instrument or you'll have a nightmare at mix time. For example, when you are turning up the guitar track, you may find that you are also turning up the snare drum because it bled into the guitar amp mics. If you add compression to the guitar track later on, the kick or snare might be loud enough to trigger the compressor or reverb unit, making it difficult to control – like using a PC.

The best way to achieve separation is to use "baffles," or "gobos." Basically, gobos are moveable walls on wheels or pads that can be positioned around the sound source to "separate" it from the rest. It's like building a temporary wall in your live room. They are made up of an absorptive side (a few layers of dampening material such as insulation covered with a rated fabric), and a reflective side (a more dense layer of material such as MDF wood, or particle board), or a combination of either side.

The gobos don't stop the sound completely, but they dramatically reduce it. Imagine sitting in front of a speaker at mid volume. By placing your hand between the speaker and yourself (palm facing the speaker) you could block the direct sound. Although you can still hear the sound, it has to move around your hand (gobo) to get to your ears – this is what makes it indirect.

To properly execute "good separation" you need to use some common sense. Have a game plan in mind when placing your instruments around the room. To state the obvious, don't point the guitar cab at the kick drum or the bass amp. Set up the gobos strategically according to priority, depending on how many are available to you. Cover the drumkit first, and point the amps away from each other and from the kit. If you have to, use one gobo as the wall between two instruments, rather than sectioning off the bass cab while leaving the guitar cab blaring into the openness. Another thing to consider would be drum overhead mics. I suggest keeping them a little tighter to the kit than usual, or they may become unusable. If you're having troubles with the kick drum, try covering it completely – mic and everything – with a moving blanket or a sleeping bag. You get a tighter sound, but you eliminate most of the leakage allowing you to gate the kick much easier later.

On the live floor, you must maintain enough volume from all of the instruments so that the musicians can still hear each other reasonably well, or you've defeated the purpose. So, turning down the volume of the amps won't help. A great way to check if you have good separation is to record a small section of a song using your set-up then listening back. What you should be listening for is the volume increase in, for example, the snare drum when the guitar is not playing. If the snare drum gets dramatically louder, there is too much leakage in the guitar mic. You can apply this test to different combinations of tracks.

Even desperate attempts to isolate/separate instruments, like hanging blankets or constructing temporary rooms made of plywood, are better than nothing at all. I can't stress the importance of having control of your instruments once they have all been recorded. Just like anything, experimentation and common sense are key to achieving a good recording. If you can't afford to buy gobos then do what I did, just make them. They may not look pretty, but unlike record companies, sound is more important than presentation.

DNA Recording Facility is owned and operated by Chris and Dave Tedesco and hosts Steve Chahley as Chief Engineer, assisted by T.J. Booth. Contact: www.dnafacilities.com.

Understanding Phase

by Chris Tedesco

This is one of those things that you must always be conscious about during sessions, much like listening for instrument tuning, which just so happens to carry some of the same principals.

It's safe to say that audio signals are made up of two basic principals: time (frequency) and volume (amplitude). These factors make up a sin wave (sinusoidal wave) when displayed on a graph. This is where the term "sound wave" comes from. The sin wave moves in both the positive and negative direction. The height of the wave represents the amplitude, and the length of the wave represents the frequency. Frequency is measured in Hertz (Hz), which is just a fancy way of saying "cycles per second." One cycle is when the wave travels from zero to "its" amplitude in the positive direction, then to its amplitude in the negative direction, and then back up to zero *(Fig 1.1)*. The amount of cycles that happen in one second gives you the frequency. For example, twenty cycles in one second is 20 Hz and 20 thousand cycles per second is 20 kHz, which is also the average audible range for humans. We listen to audio in its analog form because our ears work like mics. A speaker pushes out in the positive direction of the wave, and pulls back in the negative direction of the wave. Our ears react in the opposite direction so on a speakers "push," our eardrums "pull," and vice versa – like talking into a mic.

Why am I telling you about sound waves?

It's because phase, in essence, is the direct comparison of sound waves being played overtop of each other. Let's use a portion of a 20 Hz wave as an example. If we zoom in on one cycle, we see that it begins at zero, and travels to the positive (push) amplitude, and then to the negative (pull) and back to zero. If we put the exact same 20 Hz frequency overtop of it that has the same amplitude, we end up adding the two waves' amplitudes together to make a theoretically louder 20 Hz.

If we "reverse the phase" on one of them, we get a "figure eight" type of sin wave *(Fig 1.2)*. All we've done is started the wave from zero to its negative amplitude first, and then to its positive amplitude and back down to zero. It's a mirror image split horizontally. The result is a complete theoretical cancellation of both waves, which means no sound! This comparison can also be made using two waves with different amplitudes or frequencies. Their sum, however, follows some pretty complex physics and mathematics. The result is an altered wave in both frequency and amplitude.

How does this affect us in the real world? Imagine a vocalist that wants to record in the control room using the studio monitors to listen instead of headphones. We can apply the cancellation theory in this case. First we must set up a mic and speaker on the points of an equilateral triangle *(Fig1.3)*. The height of the mic must be at the height of the centreline of the speakers as well. We have to switch the control room mix to mono, which means that both speakers are emitting the exact same wave. If we reverse the positive and negative wires on one of the speakers, we have just flipped the phase of that speaker. In theory, at the point where the wave from the left speaker meets the right speaker (exactly where you placed the mic), the sound will cancel out, leaving you with a vocal track that amazingly has only vocal on it. Because the vocalist's ears are further back from the crossing point of the two waves, they can still hear the track while they are singing, it just sounds out of phase. Listening to something out of phase is causing one of your eardrums to push and the other to pull, making it seem unbalanced and unpleasant, but it gets the job done! If you are going to attempt this trick, make sure you double check that you have set it up properly – triple-checking your measurements, and starting off at a very low volume. If you do screw it up, you will probably get the worst feedback loop ever, which could blow up both your eardrums and your speakers, so be careful!

DNA Recording Facilities is owned and run by Chris and Dave Tedesco and hosts Steve Chahley as Chief Engineer.

Fig 1.1

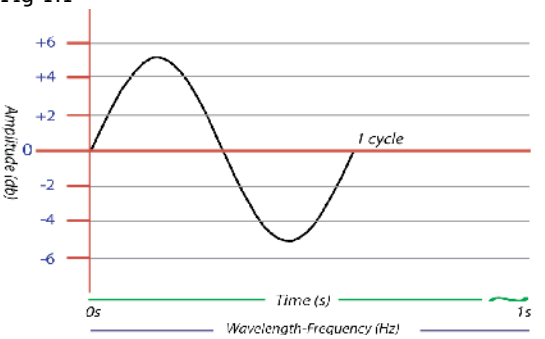


Fig 1.2

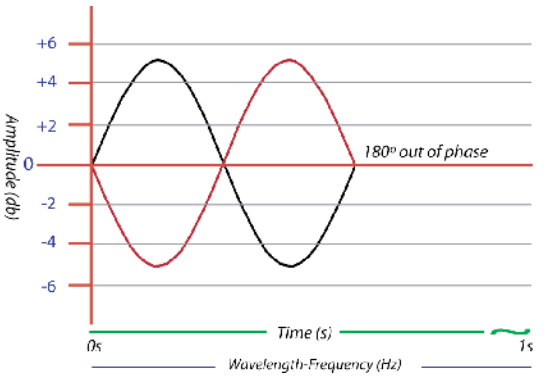
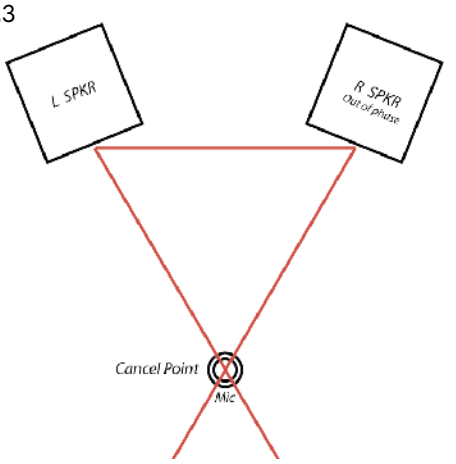


Fig 1.3



Recording On A Tight Budget

by Chris Tedesco

Good quality recording hasn't become that much cheaper over the years. Because of this, home recording has become more popular. With a tiny investment, you can get some decent-sounding recordings right on your computer. When artists want to use a large studio to make records, then budget becomes a very real issue.

The goal is to get the best-sounding recording possible with your budget. Sometimes, sacrificing a bit of sonics for performance will get your further. Paying a good producer to help you with the music will benefit you more than paying a good mix engineer to mix the project. For a lower budget, recording certain aspects at home will give you more time to get the performances right rather than sweating the clock at a larger studio.

What will you be using the recording for? To shop around to labels, to sell at live performances and pass around, or both? Figure out how many songs you want to record based on the intended purpose, budget, and the "calibre" of your set.

Choosing Your Route

If you want to shop the songs to labels or private investors, there are no set rules. Major labels today don't want to spend any money in the development of artists, so a full album should be a good idea. What happens if they ask you for more material? Shopping an EP should also do the trick, but do they want to release six songs instead of 12 when the cost of reproduction is the same, for example? With regards to private investors, they want to hear good songs, which includes sonics.

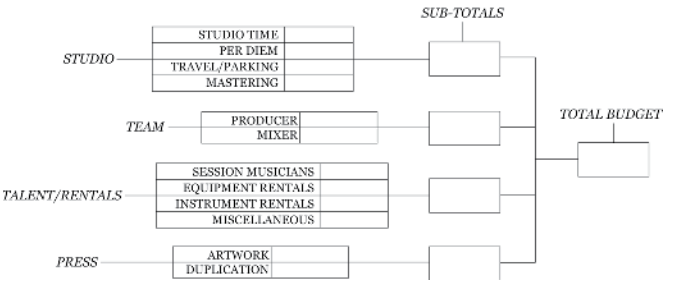
Record your strongest songs and abandon the idea of filling up an album with just that – fillers! If you're selling them or giving them away at shows, a good quality demo could be right for you. Most people wouldn't buy a CD with less than five songs on it. And we're back at square one! However, you can record three songs with a lot better quality and performances in the same time you allocated to record five or six.

Budgeting Your Project

There are ways to get a good recording with a lower budget. Doing it all at home is not the answer unless you have next to no money. Even though home recording has come a long way, a well-built and well-equipped studio with a great engineer has yet to be surpassed. By the time you rent equipment and learn how to use it effectively, you may have wasted money that could have been put towards a larger studio. In home recording, you still have to deal with rooms that are not acoustically tuned, isolation issues, and terrible live floors.

One way to do it is to budget for two days at a larger studio. On the first day, you could track all of your drum parts and whatever else that you can fit in, like bass guitar or some guitar overdubs. Then, spend as much time as you'd like at home tracking the rest of the instruments and the vocals and get the performances right. When you're ready, use the second day at the studio to mix. The studio should end up costing you between $1,800 and $2,000, which will end up sounding a lot better than spending that much money on rentals.

The other way is to track live off the floor in a larger studio. Take one day of studio time to set up, record, and mix. This will end up costing you about $1,000, but you will be able to get more songs out of it. Also, this frees up cash if you need to rent instruments or to use towards artwork and duplication. The following chart could be used to set a budget for your project.



Choosing A Studio

Find a studio with great equipment, an excellent engineer, nice rooms, and, of course, a good vibe. Also, you should look for a studio that is willing to help your cause – a place where they don't mind going that extra mile for you to try and get your project on the road. There still are a few studios that support artists with smaller budgets, and if the owners are interested, spec deals are also an option.

At DNA we try to encourage independent artists to inquire about studio time even though they have a tight budget. If only the rich could afford to record music, there is a major problem. We would like to see more independent bands making good-sounding records, and if we can help – all the better.

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Tips For Recording Guitar

by Inaam Haq

USE THE RIGHT INSTRUMENT

A good guitar recording starts with a capable player and a quality instrument. Often, guitarists will rent guitars so they can have more or better options for their recording. A good quality instrument should have a good tone, be less susceptible to noise, and should stay in tune better. Selection is important, too. Some models of guitars are better suited to certain applications over others. The appropriateness of your instrument selection will have a great influence on the character of your tone due to variances in the pickups, the type of body construction, even the type of wood used for the body and neck. Choose the right instrument for the part or vision that you have in mind.

STAY TUNED!

It never hurts to be in tune. Strings can sometimes slip in tuning, even over the course of a single song. If the guitar hasn't been properly set up and intonated in a while, some chords may sound perfectly in tune while others may be off. It's not unheard of to record a section, stop, retune, and continue. You need to do whatever it takes to get the best recording, even if it means retuning and punching in every D chord! The funny thing about tuning is that it can sometimes present itself days later. You might return to a song to add other parts, and find that the new parts aren't sitting so well with what's already there. So be vigilant about tuning, and everything will sound that much sweeter in the end. Route a send from the board or software to a tuner that everyone can access without having to unplug. There's no excuse not to tune!

MIC IT UP

Many people subscribe to the standard "throw a 57" on the amp, and this often yields great results quickly. To expand your palette, combine the signals from more than one mic to get a blend that you couldn't get otherwise. Make sure that the multiple mic signals are in phase, or exploit their out-of-phase quality for a completely different tone. Some alternate mic choices are large-diaphragm dynamics, ribbon mics, and often a large-diaphragm condenser that might be further away to capture some of the room.

USE THE ROOM

Most of us don't listen to guitars with our ears pressed right up against the speaker, so why should our recordings be that way? Incorporate a room mic into your recording to capture some of the natural sound we experience when we hear an amp in a room. Vary the mic placement to find what works for you. Move the amp around, and you may hear it interact differently depending on where you put it in the room.

TURN IT UP

Guitar amps like to be loud. Speaker breakup and distortion are optimally achieved by running the amp at higher volume, so it's a good idea to get the cab, or amp, in an isolated room. You can't make decisions about how the guitar sounds in your recording if the bleed from the amp interferes. Ideally, the head can be in the control room so that you can monitor on the speakers and communicate easily with the guitar player beside you. If you have a combo amp, try using a longer cable to get the amp on the other side of the door. If the guitarist is in same room as the amp, then you're going to need a talk back mic. You'll also need to send them a mix that doesn't have too much guitar in it, or make sure you can offer them headphones that have some isolation, because the guitar will already be loud in the room.

LISTEN IN CONTEXT

When you are auditioning guitar tones, it's best to listen to the guitar within the context of the song. It may sound great on its own, but if the guitar doesn't cut in the mix or eats up too much space then you'll have to undo what you worked hard to get in the first place! Also, listen to how the guitar sits in the track in terms of tuning because a guitar that sounds perfectly acceptable on its own can still rub the wrong way against the other elements in the track.

EXPERIMENT

Don't be afraid to print with effects. Reverb on an amp has an entirely different character than reverb in a mix. Timed delays can influence the groove of a part, so let the guitarist play to it. If you're in doubt, record a clean DI channel of the guitar to mess around with later.

AMP SIMULATORS

While they may not have the depth, power, fluidity, or response of the real thing, amp simulators definitely have their place when a quick "sketch" part is all you have to do, or if volume and space are an issue. Software amp simulators can also open up a world of (sometimes too many) options for changing the tone of a guitar after the fact. Or, go for the real thing and re-amp the guitar to replace or augment the original tone.

MINIMALIZE

For a live set-up, a guitarist may need to switch between tons of different pedals throughout the show, and may have spent hours tweaking his or her pedal board just so. But if you need to track a rhythm part using one just of them, and there are five in the chain, any unused pedals that aren't "true bypass" will degrade some of the tone. If any pedal isn't part of the sound you're going for at that moment, take it out.

Inaam Haq is the Senior Engineer at Cherry Beach Sound.

Recording The Ultimate Vocal Performance Part I

by John "Beetle" Bailey

Unless you're making an instrumental record, cutting a vocal is the most important thing you'll ever do in the production of a song. When a vocal performance is stunning, who wouldn't love to hear it a cappella? The rest of the production pales in comparison to the importance of getting a great vocal. If I had to, I would record the whole band on two tracks, and give the rest of them to the vocal arrangement.

Although many a recordist has laid claim to being absolutely crucial to the singer's performance (especially in the tuning department), plenty can admit to having destroyed it. Merely having a microphone in the room while the singer is performing the perfect take is paramount, and everything else is a nuance.

Consider Using a Vocal Coach. Sure, you're producing the record, but that doesn't make you an expert on cutting a great vocal performance. Almost every world-class singer has a vocal coach, so why shouldn't your singer? Especially if you're working with a younger, or less experienced singer, you'll be amazed and inspired by the result. After a few sessions together they will have developed a trust and a rapport that you won't achieve in the humiliating process of recording. Make sure you budget for having the coach come in for the recording session.

Deal With The Room. If the room sounds like ass, so will the vocal. Simple. Small rooms can be particularly challenging because the room's "note" and its harmonic overtone series (the stronger axial modes) are at a higher pitch. You'll likely have an unpleasant ringing in the room unless you've dealt with some trapping and absorption. This becomes especially noticeable when the singer pulls back from the mic during loud parts and (if you're using one) the compressor releases and brings up the nasty reflections in the room.

Know Your Recording Chain. Have your shit together, and know your gear before the singer gets there. If you mess around with your gear for more than 30 seconds, you'll quickly start to lose the vibe. You should have a good idea where the gain should be on the mic preamp, and have everything patched and working. Have a good reason for any piece of gear in the chain other than a great mic preamp, and know that it's working properly. Other than a basic high-pass filter to help clean up the low end, try to avoid any EQ on the way in. Change the mic instead.

Less is More. Consider putting away the pop screen. Realize that you're compromising the fidelity of the vocal recording and causing all kinds of phasing for the sake of filtering a few plosives. You can easily go in and process any thumps manually, and the rest of the recording will sound better without it. Also, consider bypassing your de-esser and processing the sibilants manually. Again, having a dynamic processor automatically shaving off a lot of high-frequency content is a big compromise for the sake of a few sibilants.

To Compress Or Not To Compress? Although the vibe of having a great compressor in the chain can be really cool, there's no undo button for it. Unless you have a world-class piece of gear in front of you, be careful about how much compression you use on the way in. Be especially careful with VCA-style compressors, because only a rare few of them have a character that's desirable beyond the basic job of gain control, which can be done much better with a plug-in these days. At least a solid-state Electo-Optical compressor/limiter (like an 1176) or the tube-based predecessor (an LA-2A) will add a bit of character, but keep an eye on it.

Choose The Right Microphone. Once you've ascertained how loud the singer is going to be, if you have a few minutes, try a couple of different microphones to see which one best complements his or her voice. Clearly, a bright-sounding mic will help complement a darker voice, and a warm dark-sounding mic will help to tame a brighter voice. If you're short of time, put up a mic that you know well for the application.

The Curse of Distorted Vocals. It wouldn't seem like it, but most singers, if they're really belting, can distort almost any high-end condenser mic. The capsule and the amplifier inside the mic (especially if it's a tube) just can't handle really high SPLs, and the signal will be distorted long before it sees a mic preamp. Because of this, recording a loud singer is almost always better on a really good dynamic mic like a Shure SM7 or an Electrovoice RE-20 than on your most expensive large diaphragm condenser mic. You might want to record the verses on the condenser, and the choruses on the dynamic.

John 'Beetle' Bailey owns and operates The Drive Shed Recording Studios (formerly Arnyard Studios) in Toronto. He won the Recording Engineer Of The Year Juno award in 2007 for "The Sisters Of Mercy" performed by Serena Ryder, and "Rain" performed by Molly Johnson, and was nominated in 2008 for "Something In The Air Between Us" performed by Sophie Milman, and "I'm On Fire" performed by Harry Manx and Kevin Breit. He can be contacted at 416-744-7468 and at info@johnbeetlebailey.com, or on the web at www.johnbeetlebaileycom.

Recording The Ultimate Vocal Performance Part II

by John "Beetle" Bailey

There's No Replacement For Mic Technique. Although I would highly recommend having a lyric sheet in front of you, with all the loud and quiet bits marked so you can ride the gain while tracking, the truth is this: a singer with great technique, who knows to pull back (or to the side) while singing high and loud, and get really close when singing soft or low, gets the credit for a great vocal recording (not the engineer). When you work with a real pro, you quickly realize that you could have put up a tennis shoe, and they would have sounded amazing. The signal path you choose is merely a change of character in the recording.

Check The Polarity. It won't sound at all different to you, but it'll make all the difference to the singer. Since we hear our voices largely through bone conduction inside our heads, if the signal arriving in the headphones is opposite to what's arriving at the ear via bone conduction, the singer's voice will feel thin and distant in the headphones. Have them sing a bit and give them a thumbs up /thumbs down signal while you toggle it, and you'll be surprised. There will almost assuredly be a clear preference.

The Dreaded Headphone Mix. If you're doing an overdub (as opposed to tracking with the band), then the best possible thing you can do is learn to live with whatever the singer needs, give them your mix, and deal with it. You'll probably have to monitor the vocal much louder than you normally would, but you should really be hearing the same thing at all times, especially if you're stacking a lot of background vocal parts. Have a few different kinds of headphones around so the singer can choose a pair that feels comfortable, and sounds acceptable to him or her. Although closed-back headphones are great for isolation purposes, they will likely feel a bit odd for singers. Open-backed headphones, where singers can hear a bit of themselves in the room are preferable, and many singers will track with one ear off. Because the human ear is designed to shut down when you're yelling or singing loud, compression can sometimes work against the singers, and it feels like their voices disappear in the headphones when they sing loud. If they find it irritating, try to forego the compression for later.

Get A Decent Headphone Amplifier. You've spent thousands on mics, but the headphone amp is the $50 special. It probably sounds like crap when you drive it hard enough for a drummer, and when the vocal is loud enough for a singer, it's probably crapping out then as well. Spring for a better quality headphone amp – your life will be easier in the long run, and singers will hate you less. You'll probably do better with low-impedance headphones (in the 50-75 ohm area). You should probably avoid 600-ohm headphones unless you have an amp that can deliver a lot of voltage gain without clipping. Simply put, you can have about 14 pairs of 55-ohm headphones sitting on a power amp, and still only load it down to 4 ohms.

No Excuses About Latency. Realize that if you're using any sort of native-based system and your audio hardware has even a tiny bit of round-trip latency, it will be really hard for a singer to feel comfortable with headphones, and completely negates the point about checking polarity. If you don't have the courage and the fortitude to learn the intricacies of the DSP mixer on your native-based system, then pony up the cash and buy the real thing: a hardware-based DSP system that has latency measured in samples (not milliseconds).

Compiling The Perfect Performance. Keep everything (even if the producer tells you to trash it). If you blow away your warm-up pass, or any incomplete takes, you'll probably regret it later. Even if you only use one word from a take, it's enough justification for keeping it (hard drives are cheap!). Once you start sifting through all the takes you've collected, try to edit the performance together to make it sound as though it was recorded in one pass. It doesn't matter if there's three cuts or three thousand – there's no excuse for edits that haven't been

cross-faded, leaving clicks and pops all over the place. Unless the song is going to change platforms to a different workstation, try to avoid "consolidating" or "merging" the audio. If you're not mixing the song, the next person to get this will be furious with your editing, and will probably have to spend a lot of time correcting all the impossible waveforms. If you're going to do any tuning, always make a copy of your vocal edits, so that the un-tuned version always exists. I guarantee you that if a record label is really excited about your production, they probably have somebody who is way better at cosmetic vocal surgery than you are!

Recording the perfect vocal is not an accident. You can't control how well the vocalist is going to do on that particular day, but there's a lot you can control. Everything has to go just right, but if you're prepared and you know what to expect, you'll have captured that singer's best work, and it'll sound great as well!

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Leakage

by Robert Breen

The best engineers I know, and I know quite a few, are never completely happy with any of their work. They are always striving to improve. If you find yourself in the same situation, you're not alone! I'm hoping in writing this column I can share a few cool engineering tricks I've picked up that will help you get the sounds you're looking for, manage situations you didn't anticipate, and hopefully make your recording life a little easier.

I once asked producer Steve Berlin of the legendary group Los Lobos (who produced the Tragically Hip's *Phantom Power* and a zillion other things) if he had any advice for aspiring young engineers. "In every session," he said, "there's always a point where nobody knows what to do next, and everyone is looking at you. You'd better have an answer. The best advice I have is to actively work, I mean work hard, at finding your own identity as a producer. Figure out what you like – 'I like an SM57 through Neve preamps and 1176s on guitars' – whatever it is. Find strategies that you know you can fall back on that always work for you in almost any situation. This will change as you learn more, but you need a starting point, and it takes a lot of conscious effort to figure out."

It requires experimenting and willingness to mess things up. I look everywhere for ideas, and I don't count anything out, even if on the surface it doesn't seem to make any sense. I remember the first time I did a session with a live band together in a huge room. I wanted separation, so I put the drums over here, the sax way over there, and the electric guitar, 'cause it was loudest, way, way over there. Well, guess what? You can't just make an electric guitar go away by moving it a few feet. The delay time between the close guitar mic and the spill into everything else makes this lovely, loose, echoey sound … great if that's what you're looking for, but I wasn't exactly trying to make a Dick Dale record.

The modern approach to solving this problem is simple: move acoustic instruments into entirely different rooms, build "doghouses" around the amps with baffles, or just DI everyone and overdub things later. Unfortunately, this leaves the recording with little sense of space or atmosphere – an attribute of many great records, which thankfully engineers are learning to love again! Besides, the guitar tones in those doghouses are pretty darn woofy (go figure).

I've discovered you can't really discount what engineers were doing in the '40s, '50s or '60s when they were inventing this stuff. They probably didn't know what they were doing half the time … but what they did know, I'd argue better than we do, are a lot of technical basics. They knew mics. They didn't have much outboard, after all. They knew how to use mic patterns and placement to tailor the EQ of a sound and reject nasty leakage. They used the range of a mic, or how well it picks up when you're not right next to it, to "mix" leakage favourably. They understood acoustic baffling. They could successfully place and mix instruments right there on the studio floor.

You can pick up a lot of great tricks from looking at old photos and videos as well as from your peers. Here's one of my favourites: in a lot of rooms, you can get the least leakage and the most rejection by putting instruments closer to each other! How can that be? Isn't that backwards?

For example, let's start with the bass amp. Stick it right next to the drums. Yep. Bass is largely omnidirectional, but speakers are figure 8, with the sound coming from the front and the back. So aim the relatively dead side of the bass amp towards the kit, and put a single baffle in the way to manage what's left. It'll give the sound coming out of the amp someplace to go – forward, away from the kit. A doghouse kind of makes this big resonating boom that splashes everywhere. Aim the amp towards a soft wall some distance away and you won't get too many reflections coming

back into the kit, and the tone of the amp opens right up. I've been able to easily replace tracks later using this approach.

Leakage isn't problematic, and the leakage you do get isn't terribly delayed, so your rhythm section sounds tighter. You can do the same kind of thing with guitar amps, and I've found it works even in smaller spaces with minimal baffling. Heck, sometimes, the drummer's headphone bleed is worse!

You'll know you've gotten it right when you solo the drum tracks and think you've worked magic!

Robert Breen is a studio owner, past Chair of the Audio Engineering Society Toronto Section, instructor at The Ontario Institute of Audio Recording Technology (www.oiart.ca), and owner of www.canadianaudiodistributors.com, exclusive Canadian importer of Peluso microphones. He previously worked as an engineer and studio manager at Ocean Studios in Burbank, CA.

Recording Drums

by Murray Daigle

Find A Great Drummer

The drummer is the single most important part of the entire process. There is no mic, no kit, no room, nor processor that can fix bad drumming. Drums are an acoustic instrument, and in relationship to rock, pop, and most mainstream music, they are considered just that – a single instrument. If they don't sound balanced and pleasing when you hear them in the room with the drummer, chances are they won't sound any better in the final mix.

Tuning, Schmooning

Head selection and tuning seem to be the most overlooked, understudied, and misunderstood skills in the entire recording process. I could write an entire article on this alone. Drummers all seem to have the same answers about this: "Well, I kinda just put my heads on and turn the thingies till they don't buzz and stuff." Could you imagine if a guitar player came in the studio with absolutely no idea how to tune his instrument? It seems ridiculous to me, too. Bottom line – learn to tune drums.

Use Your Heads

Always start a recording with new drum heads! Which ones?

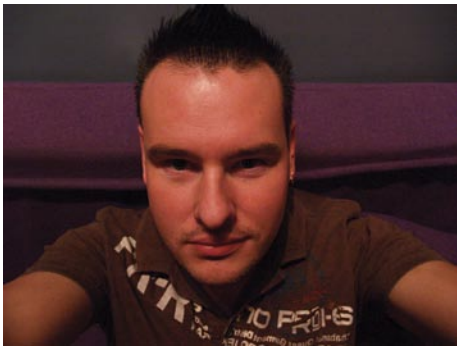
Put simply, the thinner and more basic the drum head, the longer the resonance, the more overtones you'll hear, and the more natural the sound. Thinner heads without damping devices in their design are easier to tune. Heavier and more complex heads dry up the sound, which can be a very desirable effect depending on the sound you are after. Coated heads have more "crack" in the attack and a smoother decay while clear heads give a clean articulate attack, lots of resonance, and bigger low end response, especially on toms. Learning to mix these attributes with good tuning and drum choices can make very powerful sonic differences. A note to the drumming world: Your bottom heads do wear out. Really!

The Snare

Snare drums go a long way to defining the sound and vibe of a recording. This is one of my starting points when coming up with the overall sonic picture of a project. There are a million and one options; learn what they all sound like: steel, wood, brass, copper, size (12", 13", 14", 15"), depth (1 ½" all the way to 16"), cast rims, wood rims, plus hundreds of top head and bottom head choices. Learn how to mix and match to get the desired tone and attitude you want.

Ease The Strain

My HUGE pet peeve is the strainer or snares. YES, these definitely wear out and much faster than you think. Also, drummers seem to have some compulsion to tighten them until they almost completely stop buzzing and totally dampen and detune the bottom head. DON'T! It's supposed to buzz. If you want less, use a smaller strainer. Remember, once you stretch it out, that's it. If you are getting a strange or uneven buzz, it's probably because your strainer is over-stretched and ruined or your snare is tuned poorly. When you put a new one on, stretch it out slowly – just enough to make it buzz evenly.



Mic 'Em Up

Mic position is something that is tough to get your head around. It seems that the closer you put the mic to the drum, the more isolation you should get. This isn't necessarily true, due to the laws of physics and the way sound travels, and isolation isn't really the goal. Getting extremely close to drums with mics usually doesn't result in a very big or natural sound.

I will mic a kick drum anywhere from 3" off of the beater head inside the drum, to just outside the resonant (outside) head. Sometimes, I add a second mic up to 3 ft. away if I want more outside tone. Go in the control room and use your ears to make the decision.

For the snare, place the mic on a 15-degree angle (almost horizontally) pointed toward the centre of the skin about an inch in from the rim. In this case, getting the mic a little closer can give you some proximity effect (or low end boost), but still experiment and don't be afraid to get two or three inches away from the drum.

With toms, I am usually between two and six inches away from the top head. Drummers who keep their toms closer to a flat position (most good drummers do) will make your life a lot easier. This generally produces much better tone for two reasons: the stick has room at the drummer's fully-extended arm position to hit the drum near the centre, with a lot of power; it also lets you get the mic angled facing straight at the centre of the top head, which is the main sound source.

For overhead mics, I generally use stereo pairs: always two of the same mics. I prefer large-diaphragm condensers, but most engineers favour small diaphragms. I have had incredible success with both. There are, however, a lot more reasonably-priced high-quality small diaphragms on the market these days. So, if budget is an issue, I would go that route. Experiment with position until you like what you hear. I normally like to start about 48" over the top of the snare drum, using it as the centre point for my stereo image.

Now with a "close" or "spot" mic on every drum and stereo overheads, you are pretty much ready to go. Most engineers and producers add "room" or "ambient" mics as well. I have mixed sessions with as many as six or eight of these in different positions, capturing different nuances of the room. If you are new at this, I suggest starting with one. Place it as far away from the kit as you can get it at about waist height. Keep it a foot away from any wall. One common trick with this mic is to compress the crap out of it during mix down. Then add it to the mix sparingly until it gives you the amount of "attitude" you are looking for.

If you have a rack full of Neves or Focusrite Reds, use them on everything. If not, use the best quality preamps yo can get your hands on for the kick, snare, and overheads – don't sweat the toms and room mics as much.

Check each line at the preamp stage and make sure nothing is clicking or distorting. Get good solid levels going into your recorder or computer, but leave about 4dB of head room. I promise, the drummer will play louder when the music starts. It also leaves a little room for the occasional transient or peak that pops up.

Murray Daigle is an 18-year veteran of the Canadian and international music scenes with a reputation spanning the globe for his work as a producer and sometimes artist. Murray also owns and operates MDS Recording, one of Canada's premier recording facilities.

Monitors & Placement

by Murray Daigle

The Truth

It has been said many times that studio monitors are the most important pieces of gear that an engineer owns. I agree. In fact, there are only two pieces of gear that have significantly changed my habits and improved the quality of my work overnight. The first was the computer-based DAW – finally leaving tape behind for good. I don't pine over memories of the "good old days"… trust me, it's WAY better now. The second was my pair of Genelec monitors.

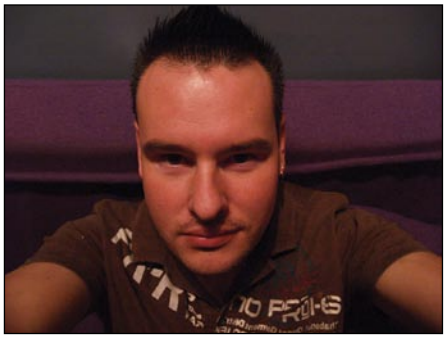
I was actually roped into buying them by a very clever sales rep. My studio was in a serious growth spurt, and I was looking at buying a lot of new gear in the interest of upgrading to increase my clientele and rates. He lent me a few pieces of gear to try, but insisted I take the Genelecs. At the time, I wasn't unhappy with the cheap monitors I was using and I didn't see monitors as something clients would notice or be willing to pay a higher hourly rate for.

Out of nothing other then curiosity and a slight case of gear-slut-itis, I plugged the monitors in and put on a CD: Michael Jackson's *Dangerous*. I literally thought I could reach in between the speakers and touch his voice. I knew it was a good-sounding CD, but I had never heard it like that.

Next, I put on one of my mixes. Everything sounded wrong. Elements I thought loud were muddy and buried. The mid frequencies were harsh and disconnected, and there were a lot of low end bumps and noise jumping out. My first thought was, "Wow, these expensive monitors suck." But being a pretty open-minded guy, I decided to try a remix trusting the Genelecs. I was sure the mix would sound terrible when I took it out of the studio. I could tell because all the settings on my console were wrong. Every time I EQ'ed a track heavily or added a lot of compression, I could hear all this distortion in the top end. I also had to be very careful dialing in mid frequencies, as the speakers only seem to like things seated in certain positions. I also had to make careful filtering choices to pull the bumps, mud, and wooliness out of the low mids and bottom. Nothing on my console looked right, but somehow the mix seemed to glue together better; there was more depth and the clarity was incredible. I burned a CD and headed for my car to listen, then to my home stereo, then the cheap boombox at my girlfriend's place, then to the bank, and then to meet the sales rep and pay him for my new monitors.

The fact is that good monitors tell the truth. They allow you to make the right decisions. Without them you are flying blind.

Lesson learned: buy the best monitors you can possibly afford!



Shop smart – avoid the hype and buy quality. There are a lot of great monitors out on the market today. Go with powered monitors. There are a lot of technical reasons for this, but for the most part, they are always better. Look for the most even frequency response and low distortion. Any other quality comes down to taste.

Here are some helpful guidelines to help you get the most from your really cool new speakers.

Symmetry

Best case is a completely symmetrical room. Then placement of the monitors that is symmetrical in relation to the room boundaries, both horizontally and vertically. If your right monitor is 6 ft. from the right wall, then the left speaker should be 6 ft. from the left wall. Pay attention to the ceiling as well, and take note of any irregularities in the vertical plane.

Location

Ideally, no speaker should ever be located within 4 ft. of any untreated wall. Generally, this increases the low-end responses and results in an overly boom sound. But how realistic is that in your project studio? Do your best. If you have to have them up against a wall, get some acoustic treatment behind them that will absorb some low frequencies.

The Triangle

This part is absolutely essential. Position your monitors so that they make an equilateral triangle with your mix position. The distance between the two monitors should be 1.25 - 1.4 times the distance from you. The speakers should be angled in toward you slightly – between 15-30 degrees is usually about right. Even with small nearfields, you want to be at least a metre away.

Height

The height of the speaker is often overlooked. You should always check the manufacturer's recommendation for this because it can vary significantly. If you lost your manual or there is no info available, start by getting the midway point between the woofer and the tweeter on the speaker at about ear level. Try some mixes and see how they are translating.

Obstruction

I know this may seem obvious, but make sure there is nothing blocking the path between you and your speakers. Ideally, you don't want anything even close that can cause uneven reflections. When I edit at home on my laptop, the screen gets in the way because my monitors are far back on my desk. When I flip the screen down, there is a significant difference in the sound. Fortunately, I don't ever mix at home.

Take A Stand

If at all possible, buy professional, studio-calibre speaker stands or at least some kind of acoustic isolation product so that your monitors don't sit directly on your desk or console's meter bridge. The vibration through the surface, desk, or console causes very undesirable results.

Read The Manual

This is just good overall advice when buying new gear. New monitors are very sophisticated in their design and many have electronic and acoustic modeling components that need proper set-up to work properly. Also, keep in mind that manufacturers are always striving to bring cutting-edge technology to the marketplace, which can gradually change or even be contrary to accepted standard practices.

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Why Should You Master?

by Noah Mintz

Why do you need to master your album? Doesn't it sound good the way it is? There is a simple answer to that. No, it doesn't. Chances are your album needs mastering and not by the person who produced, mixed, or recorded it. It needs to be mastered by a real, dedicated, experienced mastering engineer. Look at almost any album you own. It's probably been mastered by a full-time mastering engineer. Almost 100 per cent of the top 100 albums (current and all-time) have been professionally mastered. Is your album recorded so much better than those?

Mastering is one the most misunderstood parts of the audio production process. Its importance is often overlooked, and mastering becomes an afterthought. In reality, mastering is extremely important. So why is it the one stage that some people seem willing to compromise? You've spent so much time and effort writing, recording, and mixing your music. Why would you sacrifice all of that work to sub-par or no mastering?

Mastering is more than just making it louder. It's a third party, an objective ear. A mastering engineer is someone who knows how to make your collection of songs a record. It's not just about adjusting the way your music sounds, but also the way it feels. Only in a properly tuned room, with the right gear, can a mastering engineer ensure that your music has the right feel. There is a meta-physical aspect to mastering: you start with an intention with your music and during the production, recording, and mixing process that intention can get further and further away. Mastering can help push your album back towards that intention.

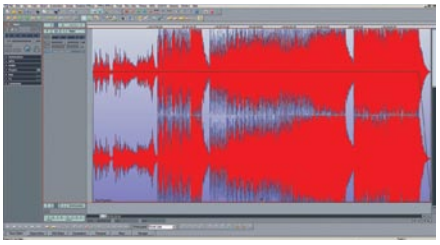
Mastering rooms are much more accurate listening rooms than most recording or mixing rooms. The acoustic design of the room is one of the most important parts of mastering – a good mastering room sounds better than anywhere else, yet translates to any system. If it sounds good in the mastering room, it should sound good almost anywhere. Only a room specifically and professionally designed for mastering can sound like this.

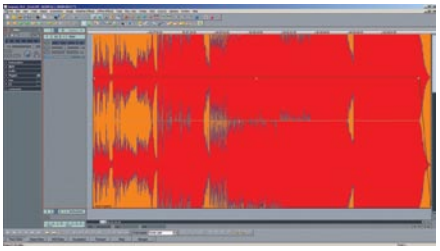
Recording is taking the instruments and vocals and putting them on individual tracks, and mixing is taking the individual tracks and putting them down to left and right stereo tracks. Mastering is taking the stereo tracks and putting them together to make an album. It's the polish on the gemstone, the finish on the deck – but it also can be the nail in the coffin. Bad mastering is worse than not mastering at all.

The loudness of your music is a very important part of the mastering process. In fact, adding gain to the audio will affect the way it sounds and feels more than any other processing. Sometimes, a mastering engineer will use EQ just to adjust the sound back to the way it sounded before it was made louder. The reason for this is the Fletcher-Munson curve – the way your brain hears the music at different volume levels. This is not only applied to speaker volume, but also to the gain applied to the mastered audio. When you change the dynamic relationship of the music, you also change the tonal structure of the audio.

Any audio engineer can make an album loud. It's about how you get loudness. Gain staging, compression, peak limiting, and converter clipping all add to loudness and sound different. A good mastering engineer will know the best combination to use (or not to use). Sometimes doing almost nothing is the best thing for the project.

Look at these two example waveforms:





They are sourced from the same song, but would you believe they both

sound as loud as each other? Waveform A has more dynamics, more air, and more space, and would sound better on the radio, your iPod, and on your stereo. Waveform A makes you feel better when you listen to it. Waveform A has been properly mastered using an expensive, high-quality analog/digital hybrid mastering chain and an experienced mastering engineer. Waveform B is hyper-compressed. When you listen, it gives you ear fatigue and makes you feel uneasy. Waveform B has been mastered unprofessionally using all plug-ins – not to say plug-in mastering is all bad. There are some great mastering plug-ins; however, if plug-ins are the studio's only choice for mastering, you may want to question how dedicated the facility is to mastering. Does the engineer do mixing one day and mastering the other? A dedicated, experienced mastering engineer will bring a specialized set of skills to the mastering process.

Why should you master you album? You should master your album because you care about it, and because you put your heart and soul into it. A mastering engineer has dedicated audio skills, a proper room, and very expensive gear just to ensure that no harm comes to the integrity of your recording. Your music is worth mastering and needs it.

Noah Mintz is a Mastering Engineer at Lacquer Channel Mastering and the creator of enhancedMP3.com technology.

10 Tips For A Great Mix Part I

by Brian Moncarz

1 Try to start with a faders-up mix. Just push the faders up – don't worry about EQ and pans. Just push the faders up and get familiar with the track. Don't just dig into the mix. I like to really get comfortable with what I'm listening to and then start to think about the end game, and where things should be.

2 I think some engineers change from song to song, but what I like to do is start with a really cool kick drum sound. Once I do the faders-up mix, I clear the board, and then I pull my kick drum tracks up. I'm a little insane when it comes to recording kick drums – I'll use four mics sometimes and some drum samples as well, and then we'll blend them all. I'll compress, EQ, and get a really good kick drum sound because, to me, that's the whole foundation of the mix.

3 Add the rest of the instruments with effects. Once I'm done my kick drum, I add the snare and the rest of the drumkit. I then use effects – whether it's reverbs, compression, or EQ. I then build my bass and my guitars, and then I add vocals.

I'm always thinking about the vocals, and oftentimes I'll have the fader up, but have it muted. I'll mute and unmute the vocal just to see how things are going with the vocal, and really try to get everything to gel together.

4 Stereo bus compression. To me, it's such an important part of the mix. I'm fortunate that we have an SSL console at Rattlebox Studios that allows me to have a kick-ass stereo bus compressor. That is the reason we got the SSL. That has actually changed my life – it's that one component of the board that just glues everything together for you really nicely. I'm not talking about a lot of compression; just maybe pulling it 2dB and it just really glues everything together and makes things sound tight.

5 Think about ways to add excitement to your mix, and move away from linear-sounding mixes and get it to be dynamic. Sometimes it takes me a while to get there. I'll start mixing, and obviously it's going to be linear – you're getting a global sound for everything. Then you have to think about carving things up and making the verses different from the pre-chorus, which is different than the chorus. Bob Ezrin always called it colour changes. Think about the mix in terms of colours, and all your different components need to change.

It's all about getting that excitement out. When bands write songs, they're usually pretty dynamic and exciting. The verse is more tamed-down than the chorus, and it's easy to mix those dynamics out. If you're not careful, it ends up really being linear – a vocal with some stuff underneath it, when it should really move and change. If you think about it as a puzzle that's being put together, you don't have to be afraid to mix the guitars a little too loud because when it goes to mastering it's going to get tucked anyways. For me, it's really about getting that excitement. For example, when I was mixing the A Collision record, I mixed a lot electronic elements with aggressive rock, almost in a Nine Inch Nails or A Perfect Circle sort of vein – maybe a little poppier. There's this one song called "Clay" on the record that was a really difficult song to track. It had lots of big guitars, and I was finding just that the verse was sounding almost bigger than the chorus, which is a big problem.

I re-thought the whole thing. I recorded it and produced it, but maybe I wasn't thinking about my end game when I should've been. What I ended up doing on the second day of the mix was to come back and say, "We really need to change this." We just needed to take things out of the verse and screw it up a little, and EQ things differently in the verse than in the chorus. Just because you've tracked it doesn't mean you have to leave it in your mix – take stuff out. I took some guitars out, I filtered them a lot, and when the chorus hit we thought, "Whoa, where did that come from?" I treated it like they were two separate songs. The verse was like an electronic song, and the chorus was a big rock song. It really worked – the bandmembers thought, "Wow, this is killer! What did you do here?" It was an exciting thing.

Brian Moncarz began honing his organic production style 10 years ago in various Toronto area studios. A musician himself, Moncarz's list of credits include, The Junction (Universal Music), Kyle Riabko (Aware/ Columbia), Silverstein (Victory Records), Pilot Speed (formerly Pilate, Maple Music), Rise Electric (featuring Lukas Rossi, EMI Publishing), Machete Avenue (Underground Operations/Universal), and Moneen (Dine Alone) – see the feature this issue – plus engineering gigs with Bob Ezrin and David Bottrill (Tool, Silverchair, Peter Gabriel). Brian and David Bottrill have opened Rattlebox Studios in Toronto as a joint venture. Check out www.myspace.com/rattleboxstudios.

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by Brian Moncarz

10 TIPS For A Great Mix, Part II

6 Six is something that Bob Ezrin told me and it's something I totally live by: don't be polite. He would always tell me, "You're being too polite. Dig in with that EQ. Don't be afraid to boost 4 kHz by 8dB if that's what you need to do." It took me awhile to get that. I was always like, "I'm doing too much," but really, if it's what's needed and it sounds good, do it.

As long as you trust your ears and have confidence in what you're doing, it's going to be great. It takes a while; it takes time, but if you can master that and live by those words, it's true. Don't shy away from adding that bottom end if it's what's necessary. That's a big one. Once I understood that it changed things for me.

7 Use delays, reverbs, and compression to create depth in your mix. That's something I learned from Dave Bottrill. He's a master of adding the 3D elements to music just by adding reverbs. He's the master of reverbs. That's a huge thing I took away from him, just mixing with him – to not to be afraid to put the reverbs on. As long as you're careful and don't make it sound too wet, it'll actually add that 3D quality to the mix. To me, it goes back to that earlier point about excitement because a mix that sounds really nice, full, and deep is a good mix.

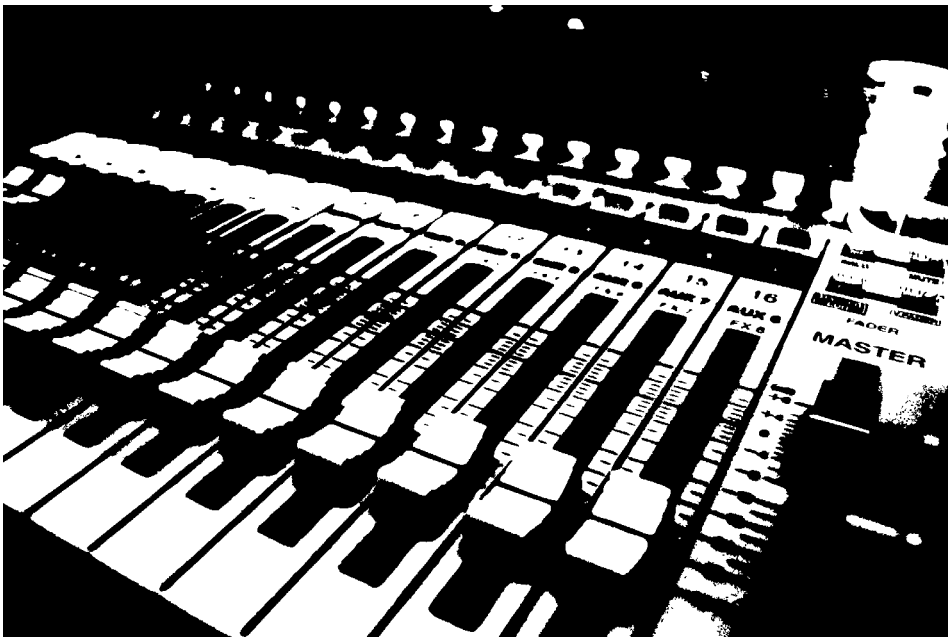
8 This one's just a funny thing, but get rid of all unnecessary noises and cut around your toms. I don't do this for everything, but do it a lot of the time – especially more recently where I've been doing a lot of bigger rock records. What happens is the toms resonate the entire time the drummer's playing the kick drum. It's just inevitable. You find the first transient, make a cut; you sort of let it decay and put a fade in and cut, and do that for all your tom hits.

It can be a little tedious, but it makes a world of difference. Another thing I learned from Dave was to go into the mix and make sure that the guitars aren't left up if they're not doing anything and getting rid of all that unwanted noise. Now if we were doing roots rock, I most likely wouldn't cut around the toms there. That's a nice instance where resonating toms are part of the drum sound. It's sort of genre-specific.

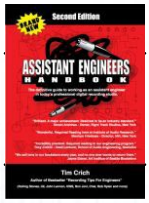
9 Switch it up. Don't get stuck in a rut. Often times what I'll do is I'll download a trial of a plug-in or something or bring a piece of gear in that I'm not used to using, just to do something a little different. If you keep doing the same thing all the time you become so cookie-cutter and boring. You don't grow as an engineer or producer, and I constantly want to experiment with different things.

I come from that school of "let's try this!" Try everything. If someone makes a suggestion for a mix, don't say no. I find because you tried that crazy idea it led you to another idea, and that was the idea that actually made the mix. People are so quick to say, "No, it won't work," but if someone in a band suggests something, I always try it. It makes the mixes better all the time.

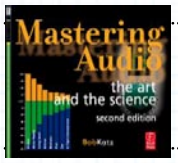
10 Trust your ears. It doesn't matter if it's the first project you've mixed. We all listen to music. We've all spent our entire life doing it because we love music so if you know it or not, in the back of your mind you have this wealth of musical information stored there that you can reference at any time. Don't be afraid to bring in albums that you love when you're mixing.



RECOMMENDED READING



ASSISTANT ENGINEERS HANDBOOK – SECOND EDITION BY TIM CRICH
Over 300 pages of non-technical tips, tricks and how-to's. Including Studio Etiquette, that every assistant needs.
http://musicbooksplus.com/bassistant-engineers-handbook-second-edition-p-10893.html



MASTERING AUDIO – THE ART AND SCIENCE, SECOND EDITION BY BOB KATZ
Written by an award winning, highly respected professional, *Mastering Audio* gives you a thorough introduction to the unique procedures and technical issues involved in mastering.
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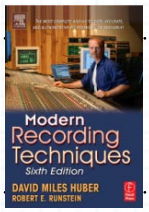
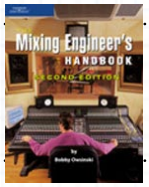
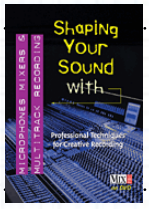


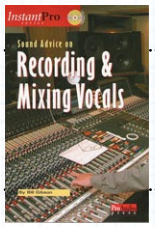
MODERN RECORDING TECHNIQUES, SIXTH EDITION BY DAVID MILES HUBER & ROBERT A RUNSTEIN
Modern Recording Techniques provides everything you need to master the tools and day-to-day practice of music recording and production.
http://musicbooksplus.com/bmodern-recording-techniques-sixth-editionb-p-5758.html



RECORDING ENGINEER'S HANDBOOK BY BOBBY OWSINSKI
Learn the tricks the professionals use to record exceptional audio tracks for hit records and learn directly from these award-winning engineers and producers as they reveal how they make their hits in the studio.
http://musicbooksplus.com/brecording-engineers-handbookb-p-5568.html



SHAPING YOUR SOUND MICROPHONES, MIXERS & MULTITRACK RECORDING DVD BY ARTISTPRO
Hosted by world-renowned educator, producer and engineer Tom Lubin, this DVD will give you the skills you need to make good recordings sound great.
http://musicbooksplus.com/bshaping-your-sound-microphones-mixers-multitrack-recordi-p-3606.html



SOUND ADVICE ON RECORDING & MIXING VOCALS BY BILL GIBSON
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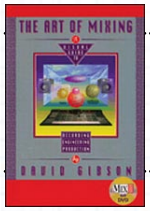

THE ART OF MIXING DVD BY DAVID GIBSON
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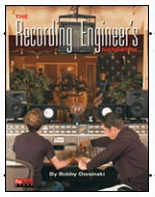

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