

RECORDING ACOUSTIC GUITARS

Here are some random tips and thoughts on recording acoustic guitars taken from several of my postings to the newsgroups.

-- The most important part of getting a good sound is the source itself. If you have a cheap acoustic guitar that sounds poor by itself, it certainly isn't going to sound any better on a recording. Any instrument that sounds really good by itself should be fairly easy to capture in a recording, assuming your equipment is not doing something to screw it up.

-- Where you are recording can have a big impact as well. The sound of the room will be captured along with the performance, no matter how close you place the microphone to the source. If you are close to a reflective surface (a wall, for example), the reflections from that wall may actually cause some weird phases anomalies with the direct sound at the microphone, and can do weird things to the sound. Try moving the performers and the microphone around a bit and experiment to find the best sounding position for your recording environment.

-- Microphone placement can make a big difference as well. A one microphone technique that is pretty common is to use a small diaphragm condenser (such as an AKG 451) and position it so that it is roughly pointing at the junction of the neck and the body of the guitar, and angled more towards the body. You can get in pretty close if you want that closer, brighter sound, or you can move back and even up (then angled down towards the guitar) from there until you find the sound you are after. The closer to the body, the warmer the tone (typically), while the more you move up the neck generally will make it brighter. Usually pointing right at the sound hole is a bad idea because it will be too boomy. If you also have a large diaphragm condenser and want to go for kind of a natural stereo image, I've had good luck by using the above technique for the small microphone, and then placing the large microphone near the other side of the guitar, aimed roughly at the bridge... again moving it around to find the sweet spot for that guitar. I've also had good luck in the past using a couple of small diaphragm condenser (such as KM84s) set two or three feet in front of the guitar, centered at the sound hole, but in an X-Y type of configuration (so that neither mic is actually pointed right at the sound hole)... this gives a different kind of natural stereo image and works even better when you are in a really nice sounding room. Also, no matter which technique you use, experiment quite a bit with the distance between the microphone(s) and the guitar, as just an inch or two can really change the sound.

Those are a few general tips that are applicable to any microphone setup. As far as specific microphones for acoustic guitars, I like to use small diaphragm condenser microphones when doing the one microphone technique. Some of the audio technica small diaphragm condenser microphones, in the AT 40xx series, are very nice for acoustic guitar and don't cost as much as the studio standard AKG 451 (which they don't even make any more)... or, if you have a slightly larger budget, the Neumann KM184 microphone would be an excellent choice as well. For large diaphragm condenser microphones, the Neumann TLM 103 or TLM 193 are great microphones that work for a wide variety of situations, and cost quite a bit less than the higher end Neumann microphones. On a lower budget, the Rode NT1 is a pretty good sounding large diaphragm condenser microphone.

When I was looking for an acoustic guitar microphone for my project studio, I was pretty much used to using AKG 451s and Neumann KM84s at the big studio. But I needed something easier to find and easier on the wallet, and someone suggested the AT 4031 microphone. AT has some higher priced ones, but the person I was dealing with thought that the 4031 was the best buy for the money and would be the closest sounding to the 451. I worked on an acoustic project with a friend of mine and we tracked guitars in the hallway of the home I was in then with the AT 4031 running through a Drawmer 1960. We also tracked some guitars for the same project out at the big studio I worked at with an AKG 451 going through some really nice pre-amps and either an LA2A or 1176. When we compared the tracks, the guitar player liked the sound I got with the AT 4031 much better than what we did at the big studio. The AT 4031 is naturally a bit warmer sounding than the AKG 451, which tends to be a bit brighter (which I usually like when I'm doing rock/pop stuff and there are many other things in the mix). For the solo ac gtr stuff, the sound of the AT 4031 was the winner for that particular project, with that guy's particular guitar. All the tracks were very nice sounding, but he just favored the sound of the AT4031 a bit more than the 451.

As far as pre-amps go, get as nice of a sounding microphone pre-amp as you can afford, preferable one with a built-in compressor as well to do double duty on the way into your computer. I have both a TL Audio dual tube pre-amp/compressor, and a Drawmer 1960 tube pre-amp/compressor that I use in my home studio, and they both have their purposes. On the lower end of the scale, many people like those little ART Tube MPs. Very inexpensive little tube microphone pre-amps that sound pretty decent for the money.

Another common weak link of an audio chain are the A/D converters for getting the audio into the digital world. The cheap converters on the older Sound Blaster type cards simply won't cut it. Some of the newer SB Live cards will sound better, but still would not be my first choice. I would get a serious pro sound card, preferably one where the interface is away from the computer, or, better yet, get a card that has digital inputs and then buy a decent set of outboard A/D converters such as those made by Apogee (the Rosetta, for example) or Lucid. Some of these are useful, and will make a big difference when tracking to ADATs or other stand alone digital devices. If you get better sounding converters with the appropriate digital outputs to connect to your particular recording device, you can definitely make a difference in the sound quality.

I think that most of the time, the people posting to news group are more interested in the technical side of how to capture a sound, and most of us just take for granted that they are starting with a great sounding instrument with a great player and just need to know the "best" way to capture that. I try to point out as often as possible that you really have to have great sounding instruments with great players and a decent sounding space to record them in (either a dead space or a nice sounding room) before you start worrying too much about the technical aspects. No matter how good you are as an engineer, it's really tough to make a bad sounding instrument and a bad player sound good. I used to work with some heavy/death metal guys at the big world class studio whose bass player just didn't have the technique to play good... when he was trying to play fast, he would get this really "thwappy" muddy sound because he was just kind of tapping on the strings instead of pulling or "plucking" each one properly (or whatever the term would be). When he played slower passages with long notes, he did just fine. I tried to explain to them that there wasn't much I could do to give them that crisp defined bass tone with the sounds he was producing... so, the next time they came in, the bass player had gone out and purchased a several thousand dollar Pedula (?) bass,

thinking that it would solve his problems. It sounded slightly better, but certainly didn't improve his technique any.

As far as acoustic guitars go, I have had the opportunity to work with many of the top session players here in the Seattle area, and they can definitely make just about any guitar sound good. The guy I worked with a lot would always bring three or four really nice acoustics along with him and let me choose which one I thought sounded best for the particular. He had (I believe) a Guild, Martin, Takamine, and Taylor (can't remember the model numbers). For the pop stuff I was doing, I always liked the sound of his Taylor the best and usually went with that, although I picked the Guild or Martin for some other tunes. Another acoustic singer/songwriter friend of mine had an awesome sounding Takamine as well that really worked great for her. I also always had a negative image of the Ovation guitars, and never liked to record them.... I thought they worked better in live situations and would never consider using them in a studio, until I was working on a big album project with Jill Cohn, and her guitar player had a really nice, higher end Ovation (I didn't know there was such a thing) that actually sounded great in the studio. We did some tracks at the big studio as well as in my project studio, and it really suprised me at how well it sounded in both situations, even on songs where the acoustic guitar was pretty much the only instrument. Of course, he is an excellent guitar player as well, and that helped a lot, but he also knew how to pick a great sounding instrument for him. That was kind of suprising since I had the generalized notion that Ovations simply did not record well (from my limited experience with the cheaper ones I guess).

It is primarily the combination of the player and the instrument that is the biggest factor in sound quality. Even in the hands of pros, there really is no way to generalize about which brand or model guitar or other instrument is going to sound the best, since you could have two guitars of the same make and model that might sound quite a bit different from each other... I think there are too many variables and too many ways to set up an instrument like a guitar. A pro will know how to choose a great instrument to begin with and will be able to set it up properly for his/her playing style.

Recording Acoustic Guitars

We show you how to get the best sound on tape...



Whether we're aware of it or not, we've all heard the sound of acoustic guitar on records. From Elvis slapping out a rhythm on the body of his old 6-string during the Sun Sessions, through the Rolling Stones 'Street Fighting Man' where the acoustics were fed through a cheap cassette machine to distort them, right up to the more conventional present-day use by a host of indie bands, singer-songwriters and C&W acts.

Apparently, in the state of Tennessee, making a country and western record without an acoustic guitar is a prosecutable offence that carries a heavy jail sentence. Honest. (Mind you, there are some who would say you ought to be slung in jail for making any country and western record...)

The fact is that the acoustic guitar in its different forms remains a staple in many forms of music - whether used solo (either instrumentally or to accompany a voice), or as a rhythmic component or the featured melodic lead instrument of a backing track. This month we'll take a look at ways of capturing the sound of the instrument on record.

Close to you

For a classical recital, the acoustics of the recording space are an important factor, but for those involved with pop music, recording the instrument with one or two relatively close microphones is the usual method. Although the recording space can make a difference, any quiet room isolated from outside noise can be used. As with electric guitars, the instrument needs to be in good shape, properly set up with a new set of strings and with no loose bits that could rattle or buzz and spoil an otherwise perfect take.

The most straightforward way to record an acoustic guitar is to use one microphone directly in front of the instrument, bearing in mind that the type of microphone and its positioning are all-important. While it is possible to record acoustics with a dynamic mic like a Shure SM57, a condenser set to a cardioid pattern would be the favoured choice - to capture the full body of the sound as well as the top end zing of the strings. Preferably use a large diaphragm model like the AKG 414 or Neumann U87, although excellent results can be obtained with smaller mics such as the AKG 451 or even the budget AKG C1000S.

Before placing the mic anywhere near the guitar, it's important that the player is comfortable and that any possible sources of extraneous noise have been eliminated or minimised, as a sensitive condenser will pick up on these. Get the guitarist seated on a chair or stool that doesn't impede their arm movements and that can support their weight without creaking.

A guitarist will need to rest their feet either on the floor, a rung of the stool, or a raised footrest of some sort, and if they insist on tapping along with the rhythm, a carefully placed cushion should help the situation (under their feet, not over their mouth, although you may be tempted). Rattles and buzzes from the guitar should have been sorted out by this point, but if a broken string has to be quickly replaced, remember to cut any excess length off at the machine head to stop it rattling.

For the headphone mix, use closed headphones to minimise any spill, and try to get the mix as quiet as the player can comfortably work with, as click tracks, snares and hi-hats bleeding from the headphones are easily picked up by sensitive mics. Another point to note is that the guitarist will probably be able to hear some of the guitar acoustically, even when wearing headphones, so bear in mind when adjusting the amount of acoustic guitar in the headphone mix that what the guitarist is really hearing is a blend of the two.

Mic positioning

Using one mic in front of the guitar, the three main factors that affect the sound are the horizontal distance from the guitar, the position along the axis of the strings and the angle that the mic is set at. The horizontal distance of the mic from the guitar affects the sound recorded, as the further away from the guitar the mic is, the more of the sound of the room will be picked up. Also, as the sound of the guitar comes not just from the soundhole but from all the vibrating wood, a mic placed at a distance will capture a fuller overall sound. Many engineers prefer a distance of about 18" from the guitar, but if you prefer a drier sound, keep the mic about 6-8" away from the strings.

Lateral positioning of the mic along the axis of the strings is the crucial factor in variations of tone. A mic positioned directly over the soundhole will pick up a lot of low end boom. This will decrease as the mic is moved towards the guitar neck, but some of the body of the sound may be lost. A good starting position is midway between the soundhole and the 12th fret, which should give a nice tonal balance, with the option of moving the mic in either direction for a change of tonal emphasis. Small changes of position can make a big difference to the sound, so it's always worth moving the mic before reaching for the EQ knobs.

Angling the mic, both in the horizontal and vertical plane, can also affect the tone. If the sound with the mic midway between the soundhole and 12th fret is almost right, rather than moving the mic, try angling it so that its capsule is not parallel with the plane of the strings. Angling it a little towards the headstock end of the guitar will cut out some of the boom from the soundhole; angling the mic so that it's pointing towards the 12th fret is a favoured position for some engineers.

Adjusting the angle of the mic in its vertical plane is useful for changing the tonal balance between the bass and treble strings. If you want more of the bass strings to come through, angle the mic so that its capsule is closer to the bass strings than the treble.

EQ and compression

Having tried out different mics and positions, if the sound is still not 100% right it might be time to try out some EQ tweaks. Filtering out the extreme bottom end with a high-pass filter is always a useful move because as well as minimising unwanted boom, it can also eliminate any rumble transmitted up the mic stand. Most desk input channels and standalone preamps have a filter operating below 80 Hz. A cut in the lower midrange frequencies should reduce any muddiness in the sound - the 400 to 600Hz frequency range is a good place to start looking. For an extra bit of top-end sparkle, a mild boost at around 15kHz will help, but be sparing with the EQ at this stage - try to keep the sound as natural as possible. EQ can always be applied in the mix. In fact, when acoustic guitars are used as a rhythm instrument in a track, it's quite often the zing and sparkle of the upper frequencies that is needed, with a good part of the bottom end and midrange taken out to stop any clashing with other instruments.

A little compression when recording will help to keep the signal level more consistent, but don't overdo it. A few dB of gain reduction should suffice, and more can always be added at the mix stage. Another approach to recording an acoustic guitar is to use two mics, either blending the two signals together for a mono sound or panning them apart in stereo. This method usually involves the use of two condenser

microphones, one pointing at the neck, the other at the body.

The body mic (a large-diaphragm condenser being the recommended choice) is aimed somewhere between the soundhole and bridge and is intended to pick up the body and warmth of the sound. At the neck end, the mic, which can be a small-diaphragm condenser, should be pointing towards the 12th fret and will provide the top end of the sound. As with a single mic, experiment with the positions of these two and use EQ and compression to taste.

Pickups

Many acoustic guitars now come fitted with piezo pickups, primarily to allow the guitar to be heard at sufficient volume in live performance, where miking, if not nigh-on impossible, would certainly be inconvenient. Now, although the quality of these pickups varies enormously between different makes and models of guitars, they can often yield a surprisingly good sound for recording, and may be the only practical option for getting a clean acoustic sound when recording a band playing together in the same room. Using the piezo pickup is simply a matter of plugging into a DI box or the instrument input on a standalone preamp/recording channel type unit and recording the output.

Some guitars will have built-in EQ controls alongside their piezo pickup, although the degree of adjustment may be somewhat limited, making it likely that extra EQ will be needed. Piezo pickups can often sound a little harsh or edgy and may require some upper-mid cut somewhere between 2 and 6kHz.

If you are short of mics or don't have a quiet space to record in, using the pickup may be the way to go, but for optimum sound always make sure that there is a new battery fitted. If the space and mics are available there is still a case for recording the pickup sound < it can be used in conjunction with the acoustic signal if a microphone is used simultaneously. If the situation allows, it makes sense to record the mic and pickup signals on separate tracks for more flexibility at mixdown, when they can be panned to produce a stereo effect or combined for a different tonal variation.

Layering parts

Acoustic rhythm guitar parts do sound good when doubled up, and there are several ways to do this. Playing and recording the same part twice with the same sound will produce two performances with slight variations between them. Panning these hard left and hard right will give a track a nice wide bed of acoustic guitars. Taking this a stage further, a capo can be used, allowing parts to be doubled using chord inversions played higher up the neck, and these can be layered up for a very full sound.

Although more time-consuming to set up, Nashville tuning can be used to add a top-end sheen to the sound. This tuning is accomplished by stringing up a 6-string acoustic with the octave strings from a 12-string guitar so that its bottom four strings are an octave higher than normal.

Some people prefer the sound of everything ringing on an acoustic guitar, but the sound of the strings between the nut and the machine heads, particularly on a 12-string with a long headstock, can blur the sound somewhat. The way to kill these overtones is to wedge a small piece of foam behind the bridge and under these strings. It's not much, but it can improve the clarity of the recorded sound.

Elvis has left the building

Before we finish, here are a couple of low-budget tweaks that could make quite a difference. With a player using a pick, a mic placed near the acoustic's strings is likely to record some degree of pick noise. If this proves to be a little bit too loud, simply try using a softer pick.

To get a brighter sound in a carpeted room, place a sheet of wood on the floor directly in front of the guitar - the reflections will brighten the sound up. If you can't afford a quality condenser mic, try using

the inexpensive Tandy PZM mic placed on a table level with the guitar, and a few inches in front of it. You might be pleasantly surprised.

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Recording The Acoustic Guitar

While the acoustic guitar remains one of the most simple instruments by design, it also remains one of the hardest to get a great sound on in the studio. It's really not brain surgery, but knowing some of the basic laws of physics doesn't hurt. Unfortunately, I skipped school that day and didn't learn my physics, so I had to learn how to get a great acoustic guitar sound one mistake at a time. After making those mistakes, I sat down and formulated these laws which are considered to be the Ten Commandments of recording the acoustic guitar (by me anyway).

For the sake of argument I'm going to assume that if you're reading this, you own a 4 track, or an 8 track recorder, a fairly small console, some basic outboard equipment, and you don't own any \$2,000 microphones. If you own 13 foot long console and a 48 track digital machine, you can skip this article because you probably know what I'm about to tell you.

Rule 1 • A condenser mic will almost always sound better than a dynamic mic for acoustic guitars. There are several condenser mics that are currently on the market in the \$350 price range that sound great on acoustics.

Rule 2 • New strings will always sound better for recording than old.

Rule 3 • Skinny strings sound brighter than fat ones (can you believe I get paid to write crap like this?!)

Rule 4 • The sound you get has a great deal to do with the dynamics of the player.

Rule 5 • Get down on your knees and position your ear as if it were the microphone while somebody else is playing the guitar. Move your ear around to find "sweet spots". You'll learn more from that, than you will by reading this article. Don't try it with an electric guitar!

Rule 6 • If you have somebody that is assisting you on the session, have them move the mic around what you think will be the sweet spot while the player is practicing the part he or she is about to lay down. Have your assistant wear headphones so you can communicate with him while the moving of the mic is taking place.

Rule 7 • A limiter/compressor will almost always help you get a better sound.

Rule 8 • Don't believe everything you read. I only have seven commandments, not ten.

Let's get right to it. If the sound you want to get is a country/pop, strummed sound similar to the Eagles "Lyin' Eyes", here's the formula: Place the microphone about 6 to 8 inches from the guitar's sound hole, but angle the mic toward the area where the fretboard and the sound hole meet. If you point the mic directly into the sound hole, it will be very full -- probably much too full, and very boomy. Use a compressor/limiter to knock down any peaks (3:1 ratio), and set the threshold a little lower to give it a slightly "squashed" or tighter sound. Set the threshold higher to just limit the peaks and give a more open sound. You may need to EQ out some boominess. If so, try rolling off some bottom (100Hz), or cutting a couple of db at 300Hz. To add some "silk" on the top end, try something in the 8-10K range, but be careful, too much will add noise to the track. Positioning the mic so it angles toward the pick will give more attack-less sweetness.

For that John Cougar Mellencamp sound, try medium gauge strings, a little more compression, and try adding a little EQ around the mids -- lets say 700Hz-1.2K. That will give you a sound that is a little more "woody" (a highly technical term).

"Ya, well what about Melissa Ethridge," you say. Try this on for size. Use a guitar with a built-in pick up and a microphone to boot. You will undoubtedly get some phase anomalies, but that's part of the sound. Experiment with moving the mic closer and farther. That will affect the phase relationship of the two sound sources. Sooner or later, you'll hit on something that will put a smile on your face. You can pan the two signals left and right to get a broad stereo sound, but make sure that if you check the sound in mono, that there's still some signal left. Keep an eagle ear on Mr. Phase, he can be a tricky bugger.

And now ladies and gentlemen, for the most often heard acoustic guitar sound at the 1993 Grammys . . . it's that Eric Clapton classical/gut string guitar! Piece of cake. Once again, use a condenser mic, but place it about ten inches away from the guitar. As a matter of fact, try placing it about 3 to 4 inches up the neck, but aim it at the players picking fingers. This angle will reduce boominess by virtue of the mic's cardioid polar pattern producing a natural roll off when it's aimed off-axis, while simultaneously delivering the attack of the fingers. Try and say that three times in a row! The added distance will pick up some of the guitar body's resonance. A compressor/limiter is a must for this case because of unexpected peaks. A 4:1 ratio is a good place to start, but set the threshold fairly high so that the most of the guitar's natural dynamics are left in tact.

When mixing acoustics guitars for rock or alternative tracks, you will usually have an electric guitar or two in the track as well. My personal preference is to pan the acoustic and electric across from each other. Send one full left, and the other full right. You'll quickly discover that the electric will overpower the acoustic and the most effective way to even them out is to compress the acoustic a little bit more than what you may have already done going to tape so you can bring the acoustic's level up high enough to compete with the electric.

Another simple but effective trick is to have the acoustic and electric guitars play parts that counter each other rhythmically (giving them each their own space), and have them each play in a different octave. That will give you a full sounding track that remains open and airy at the same time. You can also make an acoustic guitar sound bigger or more rock-like by panning the original to one side and a delayed signal (short delays are best) of the same guitar to the other side. That effect can be taken one step further by using the pitch change option on your delay to "de-tune" one of the guitars just a pinch (one cent is a good place to start). The delay will provide the brain with the psychoacoustic information it needs to perceive the guitar as bigger, while the pitch change will make it appear "fatter."

Funny how fatter is always better in the world of recording, but not in the case of the human body. Just a tangential observation . . . must be time to go. See you next month.