

technique

recording
acoustic guitars

recording acoustic guitar

While physical modelling preamps may take the hassle out of recording electric guitars, you're still going to need to reach for a mic when recording acoustic guitar. **Paul White** shows you how to get the best recorded sound, and offers a few of his favourite tricks of the trade.

The advances in digital technology over the last few years have brought a whole range of usable electric guitar sounds within the reach of even the most cash-strapped home studio owner. Preamps from manufacturers such as Digitech, Line 6, Roland and Yamaha have managed to physically model the sounds of desirable amp and speaker combinations, allowing many musicians to record their electric guitars without having to plug in a single mic.

However, things haven't yet got so advanced that the same can be said of acoustic guitar. A few people have tried physically modelling the acoustic guitar, but with only limited success -- these sounds are convenient to have when playing live, but aren't really good enough to stand up to scrutiny in the studio. In fact, better results could probably be attained with a good MIDI sound module and some clever programming, though this approach rarely produces truly natural results either. And using sampled phrases isn't ideal either, given that the chords of acoustic parts usually need to change with the track.

It is for this reason that most home recordists still have to mike up an acoustic guitar when they want one in a track, even when they do their best to generate most other parts artificially. Recording an acoustic guitar is a complex task, however, and there are a number of different miking and processing techniques available which can be brought to bear. The aim of this article is to show you how to get the best recorded sound, and also how to go about slotting it successfully into your mix.

Preparing For Recording

This may sound rather obvious, but it really is important to make sure that the guitar sounds as close as possible to how you want it to sound, before you bother thinking about miking anything up. Deal with the basic things first: is this the right guitar for the job? If not, then consider borrowing another for



the session, or even investing in another yourself. There are engineers who buy guitars in order to get the sound they want, even though they're not really guitarists themselves, so don't rule this option out if the right guitar sound is important to you!

Choose an appropriate type and gauge of string for the instrument and for the kind of sound you're after, and make sure that the guitar's action is set up correctly so that it plays without buzzing. There are many different types of steel-cored wound string, all of which have subtly different properties. The most commonly used types on acoustic guitars are bronze, phosphor bronze and nickel wound. An instrument with lighter gauge strings (perhaps an 11 to 50 set) will generally be easier to play, but the sound will be thinner. On the other hand, very heavy strings (perhaps a set beginning with a 15-gauge top E) can sometimes sound tubby and lacking in overtones on the wound strings. The best compromise is usually the heaviest set of strings which are still comfortable enough for the guitarist to play. Accurate tuning is paramount so check the tuning using an electronic tuner between every take.

If the guitarist is using a pick, it is always worth trying one of a different thickness -- generally, thin ones work best for layering multiple tracks of 'acoustic guitar bed' parts. Don't be afraid to spend half an hour or more getting the right sound at source, because time spent at this point has the potential to make every subsequent stage of recording and mixing much easier.

Another thing to bear in mind is that the sound of acoustic guitar recordings can depend a great deal on the environment in which the instrument is played. Acoustic guitars thrive on live acoustics, and insufficient natural reverb is a common problem when recording them in small home studios. While artificial reverb can be used to liven up the sound of a dead room, getting a sympathetic natural acoustic always produces better results, even if you are wanting to add more artificial reverb later. Obviously you can have too much of a good thing here, and too long a reverb time will sound muddy and confused, but this is usually less of a problem in small studios.

To get a more live sound out of your room, try to position the guitarist so that the instrument is played close to some reflective surfaces -- hard floors, doors and solid furniture can all help here. If carpeting on the floor of your recording room is dampening the sound too much, then a simple solution is to place a sheet of hardboard, plywood or MDF on the floor beneath the instrument. It may actually be worth the effort of running long cables out to another, better-sounding room, if you have one, if the sound simply isn't working in your normal recording room.

If you are willing to experiment with the instrument and the room, listening carefully at each stage, then you should be able to arrive at a situation where the guitar sounds good both to you and to the performer. If you can do this, then the most important task has been accomplished -- you're now ready to select your mic.

Dress Code

Bear in mind that anything which has the potential to tap the body of the guitar can ruin an otherwise perfect take. Common offenders include belt buckles, jeans rivets, and buttons on a shirt or jacket, but the guitarist's watch can also sometimes cause problems as well. *Mike Senior*

Miking Up

Large professional studios will have a broad range of different mics to choose from, but many home recordists are faced with a much more limited choice, so the decision is usually fairly straightforward. The first thing to realise is that there are few dynamic mics capable of doing justice to the acoustic guitar, other than perhaps the Sennheiser 441, because of

their inherently limited high-frequency response. High frequencies are vital to acoustic guitar sounds, and therefore you'll probably need a condenser mic to get the best results, as these are more sensitive and pick up much more high-frequency detail.

Whether you choose a true capacitor model or a cheaper, back-electret design may well be determined by your budget, though manufacturers such as Joemeek, Rode and Audio Technica are now making capacitor designs available at ridiculously low prices. This is not to say that back-electret mics aren't capable of turning in a good performance, but be aware that those models that are powered by batteries may have lower sensitivity and headroom than those models which will only run off phantom power -- some are little more sensitive than a good dynamic mic!



Purists will often pick a small-diaphragm capacitor mic for its greater high-frequency accuracy, and one with an omni polar pattern for a more transparent sound than can be achieved using a cardioid. However, if you're one of the many people who have one or two large-diaphragm cardioid mics only, that doesn't mean that you should have trouble getting good results. For a start, omni-pattern mics usually require a recording room which sounds significantly better than most home studios, so a cardioid pattern will usually suit smaller rooms better.

Whichever mic you choose, the positioning of it is crucial. In a live situation it's normal to see mics placed very close to the sound hole of an acoustic guitar, because the important considerations are level, separation, and the avoidance of feedback. In the studio, however, you're after a more natural sound, and such miking is therefore less useful. It is true that a lot of the sound energy of an acoustic guitar comes directly out of the sound hole, but much of that is heavily coloured by the body resonances of the instrument. This boxy and boomy sound usually needs heavy EQ'ing to render it usable even when playing live, and this really isn't the way to go when recording. If you've got your guitar sounding right at source, you shouldn't have to be using drastic processing during recording.



Natural guitar sounds balance the different vibrations from all over the instrument with each other, and with sonic reflections from the player's surroundings. If a mic is used too close to the guitar, the direct sound from the part of the instrument it is nearest to will dominate the sound from other parts of the instrument and from the room. You risk miking up only a part of the instrument when what you're really after is the bigger picture.

On the other hand, if your mic is too far away from the guitar, you can end up with a lot of room ambience, leaving the original sound distant and unfocused. You may also find that your mic exhibits unacceptable levels of noise when you apply the level of preamp gain which distant miking requires, especially if you're using a less sensitive model.

As for the specifics of mic positioning, a common approach is to set up the mic around 40cm from the guitar, with the capsule aimed at the point where the guitar's neck joins the body. This will usually produce a well-integrated sound -- the levels of direct and reflected sound will be about right, and the sound hole's contribution will be controlled because the mic doesn't point directly at it. If you have a pair of enclosed headphones, then you can

easily experiment with tweaking this mic placement while listening for the best sound. If you find a promising sound in this way, remember to check it out on your monitors before committing yourself -- headphones can sometimes be rather misleading. As a general rule, moving the mic further towards the neck will brighten an excessively bassy sound, while moving closer to the sound hole will bring more warmth and fullness to the sound. Moving the mic further away from the guitar will increase the proportion of room ambience overall, while moving in further will dry the sound up. Alternatively, if you like a closer-miked sound, but would prefer more room ambience with it, try using an omni-pattern mic instead of a cardioid, if you have one.

Even though the basic mic placement described above is by far the most commonly used, it doesn't *always* produce the best results. For example, if you're after the sound that the guitarist hears, then a single mic or a pair of mics set up to look over the player's shoulder at about head height can often capture a convincing tonal balance, particularly when using a large bodied guitar that is excessively boomy miked from the front. It can also be educational to point the mic in even less obvious directions, such as at a nearby reflective surface, or even at the underside of the guitar. Such alternative placements are often quick to try if you're wearing headphones, and can sometimes turn up a brilliant sound that no amount of theory would have predicted.

Using More Than One Mic

So far I've described mainly mono miking, and in a lot of cases that's as far as you need go, even when the guitar is a major part of the mix. However, there are a number of multi-mic techniques which can be of use. Because much of the art of recording acoustic guitar is concerned with blending the tonalities of the guitar's body, strings, sound hole and neck into one cohesive sound, one approach is to use different mics to capture individual elements of the sound. These individual elements can be mixed to create the overall tonal balanced you're after -- almost like a sort of natural EQ. A mic at the sound hole could provide warmth, where one on the neck could provide extra brightness, for example.

The main challenge when using such a technique is to make sure that all the different signals are in time with each other when mixed -- if there are delays between signals, this could cause phasing problems. Some engineers get around this problem by placing all the different mics at exactly the same distance from the guitar's sound hole, and this can be successful. However, others record each of the mics on a separate track and then attempt to match their phases when mixing down -- this is a very similar technique to that described in detail last month by Craig Anderton in his article on aligning mic and DI signals.

Many acoustic guitars now incorporate a piezo transducer under the bridge saddle and can therefore also produce a DI feed. While it might be tempting to simplify the recording task by recording only this DI signal, the result is usually disappointing when compared to the same instrument miked up properly. An under-saddle transducer, however, effectively only picks up vibrations from the strings, albeit that their vibration is influenced by the rest of the instrument, whereas a microphone, suitably placed, will pick up vibrations from every part of the instrument, combined with audio reflections from the immediate environment, making for a much more natural sound. Having said that, pop records don't always demand accuracy and sometimes you can get a sound that works well within a mix by combining the harsher DI'ed sound with miked sounds, in which case the techniques in Craig's article will

Nashville Tuning

One way to get a bright, jangly acoustic guitar sound, which can cut through cluttered pop mixes, is to take advantage of a technique referred to as 'Nashville' tuning. This is where the bottom three strings of a conventional steel-strung guitar are replaced with strings designed for the upper three positions. The new strings can then be tuned to pitches one octave higher than the strings that they replaced. *Mike Senior*

be even more relevant to you.

Multi-miking is also used for recording guitars in stereo, or for creating pseudo-stereo effects. For solo guitar recitals and small ensemble work, stereo miking can be an interesting alternative, though it can make the location of the guitar in the stereo image less solid, and more difficult to pan precisely when mixing. It is possible to use any of the range of stereo mic recording techniques -- I covered these in detail in *SOS* March 1996. However, a number of engineers favour pseudo-stereo effects, such as panning mics pointed at the body and neck of the guitar to opposite channels. Alternatively, you could use one mic over the guitarist's shoulder and another 20-30cm from the middle of the guitar neck. The advantage of this approach is that the neck mic produces a bright, detailed sound with very little bass end, and will cause less low-frequency phase cancellation if the track is ever played in mono. Having different tonalities at either side of the stereo image can provide a wider, more interesting stereo image, though you'll probably want to avoid extreme panning unless you're after the illusion of a guitar three metres wide!

As with any studio recording, the composition of the cue mix you feed to the guitarist will be extremely important, so be prepared to take a little time over it -- the article on basic overdubbing in *SOS* March 2001 goes into this in detail if you need a few pointers. One thing to particularly bear in mind is that, given the sensitivity of the mics traditionally used in acoustic guitar recording, it's easy to pick up obtrusive spill from the cans. Solo the recorded track to check for this, and if there's a lot of spill coming through (from a click track, in particular) then consider turning down the overall cue mix level or using a different pair of headphones -- closed-back models are obviously best in this application.

Processing Acoustic Guitars

Even if you set up the guitar and the mics with the utmost care, recorded acoustic guitar sounds will usually still benefit from a little processing. This should be kept to a minimum while recording, so that you leave your options open for the mix. As a rule, it's always safer to leave EQ until the mixing stage, especially as you ought already to be pretty close to the final tonal balance. Compression can be used when recording, but err on the side of caution, as it's difficult to undo the effects of too much compression later on. A compressor which sets its time constants automatically works well here, but if you don't have that option, try a release time of around 300mS and an attack of around 10mS. Use a ratio of between 2:1 and 4:1 and adjust the threshold for no more than about 6dB of gain reduction during the loudest peaks.

Once recorded, the sound may benefit from equalisation to adapt it to the other sound sources in your mix. The first thing to try is just rolling off some bass using a shelving equaliser at 80 or 100Hz, as this can help the sound sit better in many types of track. It can make a big difference, for example, if other sounds in the mix have strong low mid-range components, and if you listen carefully to rock or pop mixes

Motion Sickness?


The way some guitarists move as they play can be vital to the sound they produce. However, any movement of the guitar in a studio environment can play havoc with carefully tweaked mic placements. If you find that you are often encountering this problem, then you might consider investing in a miniature microphone which can be fixed to the guitar itself. A number of companies manufacture miniature mics for this use, though a cheap lavalier mic might do the trick if you're on a budget. *Mike Senior*



that include acoustic guitar, you'll notice that the low end is quite often played down in this way. Any obvious resonance can be tackled using your equaliser's peaking filters. Boominess can be countered by searching the 100Hz to 250Hz frequency range and then applying just enough cut to tame it, while zing and air can be added by using a wide-band boost at between 12 and 16kHz. Gain of a couple of decibels ought to be enough in these cases if you've taken care while recording.

Additional reverb may be needed if the recording was made in a small room or studio, or close-miked or DI signals dominate the recorded sound. Mono recording can also be given a sense of space and width by adding a little stereo reverb. Ambience settings with pronounced early reflections are particularly effective in adding life and sparkle to acoustic guitar, though plate and room settings can be used as an alternative where you want a more obviously spacious sound. The main objective is to get a well-balanced tone with enough ambience or reverb to match up the guitar sound with the rest of the mix. Where a DI signal has also been recorded, a pseudo-stereo sound can be produced by panning the miked sound to one side and the DI'ed sound to the other, and here a little added reverb or ambience can help 'glue' the two sounds together.

Golden Rules

I've recorded and mixed more acoustic guitars than I care to remember, the most challenging of which was a memorable album featuring Gordon Giltrap, Bert Jansch and Vikki Clayton, among others. In my experience, it doesn't matter what type of instrument you're using -- a steel-strung or nylon-strung guitar, even a 12-string -- the same basic principles apply. The best results are always achieved by working with the natural sound of the instrument rather than trying to make it something it isn't. Mic choice and placement always work better than EQ. And unless you're after something unusual you should only need to add the bare minimum of EQ and compression to add the final polish -- this really is a case for applying the old maxim, 'If it ain't broke, don't fix it'. 

Adding Extra Attack To Rhythm Guitars

The attack phase of each strum in a rhythm guitar part is often more important to a track than the sustain portion. In such cases, use a gate or expander to duck the level of the less important element of the sound when it comes to mixdown. You'll need to use short attack and release times, if you're going to catch each individual strum, but the amount of gain reduction between peaks need only be small to make a significant change in punchiness. *Mike Senior*

Glossary

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Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ, UK.

Telephone: +44 (0)1954 789888 Fax: +44 (0)1954 789895

Email: info@sospubs.co.uk Website:

www.sospubs.co.uk

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