technique one-room recording

recording in one room

Some of the most common problems encountered when working in a home studio arise from having to record in the same room as your recording equipment. However, good-quality recordings are still perfectly possible in such conditions. **Hugh Robjohns** advises on how to obtain the best results.

Whilst recording in the same room as your equipment is not an ideal situation, the bottom line is that it is perfectly feasible with vocals, electric and acoustic instruments, and even drums. In fact, recording in the 'control room' isn't something that only happens in the home studios of amateur and semi-professional musicians. It swings in and out of fashion in the most prestigious professional studios too, for there are some worthwhile advantages to the technique and, with a little care and preparation, first-rate results can be delivered. Fortunately, common sense can go a long way within such a recording environment -- however, some of the things you can do to improve your studio technique are less obvious, but can still help you get the best out of your existing equipment.

The sound quality of one-room home studios can often be considerably improved, for a start, just by cutting out all manner of background noise. Removing or minimising all the unwanted sounds in the recording space will significantly increase the usability of the sounds picked up by the recording microphones. Sources of such acoustic noise in the home studio are many and varied: not only will your studio's electrical and mechanical equipment produce some, but you'll also get noise from other people within the building, from your household equipment (such as the central heating and plumbing), and from all the familiar external sources -- cars and trains and planes, and so forth.

Dimming The Lights

Although subdued lighting in the control room might well help the creative juices to flow, light dimmers have been known to cause a few headaches too. Most wall-plate dimmer switches are pretty crude and often result in noisy mains supplies as well as acoustic buzzing from the switch unit itself. A better solution is to fit lower-wattage bulbs in the main room lighting, or to use a number of small, low-wattage decorative lights instead. Not only will this avoid the nasty mains and buzzing wall panels, but it will also reduce your electricity bill!

The Sound Of Silence

But even in the sanctuary of a blissfully quiet control room, there is a range of practical recording techniques to consider and develop in the interest of ensuring the best possible recording quality given the confines of a small roomry this experiment: switch on all of your equipment, close your eyes and listen carefully. Don't rush this -- give your ears a chance to attune themselves. After a while, the chances are you'll hear a cacophony of whirrs, whines, buzzes and hums emanating from your

machinery.

The typical wall-wart transformers supplied with so much equipment these days are often very prone to buzzing. What's more, few products manufactured in America are tested with both 50 and 60Hz mains supplies -- while the units may be perfectly happy at one frequency, their transformer laminations often rattle and buzz at the other. However, the degree to which transformers buzz can often be related to the state of the incoming mains supply -- how sinusoidal the 50Hz waveform actually is. Furthermore, because the cleanliness of the mains often varies according to its usage at various times of day, you may well find that certain equipment buzzes only intermittently. You could try to take advantage of this by keeping a log for a few weeks: if a pattern emerges then you'll be able to plan sensitive recording assignments for quieter periods. Alternatively, you could invest in a power conditioner (such as those by Smart Sound which are reviewed in this issue) in order to clean up the offending mains feed.

Sometimes units seem fine on their own, but start producing audible noise the moment they're installed in a rack. The problem here is that rack panels can often act as sounding boards, radiating and amplifying even the smallest of transformer-generated vibrations. The least disruptive solution to this would be to use rubber washers between the rack ears and rack strips, in order to mount units more compliantly. However, in my experience, the best solution is to take the unit out of the rack and rest it on some dense foam on another surface.

Screaming Fans

The buzzing of transformers, although a pet hate of mine, can be overcome quite easily. However, the inherent noises generated by computers are rather harder to deal with. It's not really surprising that these machines make such a racket, as computer processors produce a lot of heat and the cheapest way to cool them is by forcing air over them with fans. These may run constantly, though you can get ones which have variable speed control related to the internal temperature and, given a choice, the latter are clearly better for use in an audio environment. It is possible to purchase better-quality (quieter) fans than those typically installed in PCs and Macs, although a degree of technical expertise is often required to replace the standard one.

Hard drives (especially when you are using more than one) are another annoying noise source. Martin Walker covered techniques to reduce the noise of hard drives in his 'Reducing Acoustic Noise In The Studio' article in *SOS* January 2000. However, I have found that the best solution is to put your computer hardware somewhere else! There are plenty of systems available which allow remote connection of monitor, mouse and keyboard over long distances, so there is no reason not to remove your computer and drives to a cupboard or to another room -- the only minor inconvenience might be loading CD-ROMs and floppy disks. I installed my PC in a large cupboard under the stairs, running five-metre cable extenders through a hole above the skirting board stuffed with a small sand-filled cloth bag to provide further noise (and fire) isolation. This simple technique reduced the noise level in the room by a good 20dB and turned a completely unworkable monitoring environment into a reasonably good one.

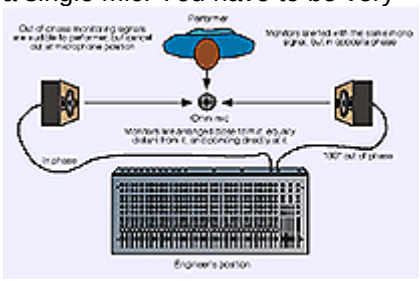
If you can't move your computer outside your

recording environment, you can still build it a dedicated sound-deadening box. This shouldn't tax the woodworking skills too much -- all that is required is a plinth and covering lid. Use thick felt or similar material inside to provide sound absorption and make sure that there is no direct path through which sound can escape -- in other words, make the cable entries snake through a felt-lined labyrinth through which only reflected sound can escape. Don't forget to allow cooling air to enter and escape (note where the computer expects to draw air in and expel it before designing your box), and apply the same kind of labyrinth idea again to minimise the escaping noise whilst permitting unimpeded air flow (remember hot air naturally rises). The bigger you can make the box the better, since it will enclose a greater volume of air and allow more physical space for the labyrinthine passages.

Okay, so the equipment is silent, the computer has been hushed and you are feeling justly proud of your achievements when... the central heating pump starts, the radiators gurgle, someone flushes the toilet and the floorboards upstairs squeak just to join in the fun! While these typical household noises *can* be eradicated, it's much more practical to find ways of working around them. Switch the central heating off and wait until the house is empty before recording, for example. If you are fortunate enough to have a home studio in a detached building it may be practical to make your recordings at night when the world seems a much quieter place. Bear in mind, though, that that very tranquility may mean your music-making causes greater disturbance to others, unless you have excellent soundproofing.

Phasing Out Spill

Normally, monitoring during recording will be on headphones and, obviously, open-backed or semi-closed designs will generate a lot more leakage and spill than decent closed-back types. However, it is also possible to use the main monitor loudspeakers, as long as you only need to record through a single mic. You have to be very careful with the playback levels, though, otherwise there is a very real danger of feedback howl.



However, if the performer requires a high playback volume in order to 'get in the groove', there is one technique which might help. It involves placing an omnidirectional mic on the exact centre line between (and as close as possible to) the two speakers, then feeding a mono mix of your backing track to both speakers, though with one feed phase-inverted with respect to the other. The performer has to be positioned either facing the monitor wall or, more appropriately, facing the back of the console -- either way, he or she must not obstruct sound from either speaker from reaching the mic. The idea is that the sound from the speakers will cancel at the microphone, while the instrumental or vocal sound will be recorded normally, and it can be made to work surprisingly well, although some people find listening to out-of-phase speakers rather unpleasant!

Just When You Thought It Was Safe...

No matter how peaceful your control room, being able to hear a pin drop won't protect you from the scourge of electromagnetic interference. The classic problem is the strong alternating magnetic field of a computer VDU or television set interfering with electric guitars equipped with single-coil pickups, though I have experienced similar problems with other electro-mechanical instruments, such as Hammond tonewheel organs.

Obviously, using humbucking pickups is one solution, but if you want the classic sound of a single-coil pickup there are a number of specialist manufacturers now making authentic-sounding models specifically optimised for this situation -- the Kinman and DiMarzio pickups reviewed back in *SOS* November 1998. Whilst moving-coil and ribbon microphones can suffer the same problems, electrets and condenser microphones are immune.

Rather more common is interference from mobile phones. Often, the effects of a phone are readily apparent -- the dit, dit-dit, dit-dit noises every so often when the phone tries to tell the network where it is -- which always seem to find the nearest loudspeaker! However, the

same interference can also affect recording devices of all types and formats in complete silence; the results only becoming apparent during replay of that once-in-a-lifetime performance. The only guaranteed safe practice is to make sure mobile phones are switched off. If you can't do that, ensure they are as far away from the equipment and cabling as possible.

Finally, always use the best-quality screened cables you can, making sure to keep analogue cables away from both mains and digital cables. It is important that digital cables are also screened, as a poorly screened S/PDIF lead laid alongside a mains cable can acquire considerable jitter through electromagnetic induction and interference, especially if the mains happens to be rather spiky and non-sinusoidal.

Crisp And Dry

The key to successful one-room recording is to maximise the separation between any ambient room noise, and the sound of the musical instrument or voice. That means adopting close-miking as a technique and setting up the mic as far away from the noise sources as possible -- which basically means at the other end of the room. However, avoid getting too close to any boundary wall, and especially the room's corners if at all possible, as these are regions where standing waves will be made worse, and where reflected ambience will be stronger.

Directional mics can obviously be used to advantage when there is a specific source of unwanted noise to reject -- and that includes reflected sound from walls, ceiling and floor as well as noise from distant equipment (and *its* reflections!).

Not all instruments benefit from very close miking, however. You may find, for example, that this results in excessive proximity effect problems if you're using a mic with a cardioid polar pattern. If the instrument is static, EQ can be used to correct the bass boost, but if the

instrument is moving (if your performer is swaying for example) relative to the mic, the degree of bass tip-up will vary and EQ will be less helpful.

I am a fan of omnidirectional mics (which do not suffer the proximity effect at all) but, because of their equal sensitivity to sound from all directions, they have to be used around 30 percent closer than a cardioid for the same amount of 'room sound'. However, if the mic is too close it may focus on such a narrow aspect of the instrument that an unacceptable sound is produced, so compromise is clearly the name of the game.

Phantom Engineering

If you're recording your own performance then the next problem will be how to activate your recording equipment from you recording 'sweet spot' several feet away! One approach would be to set up automatic looping with Punch In and Out points programmed into your sequencer or recorder, and another would be to use a remote footswitch to operate the punch manually. In either case, you are still going to be doing a lot of running up and down setting the system up, selecting tracks and so on.

An alternative idea is to take advantage of the MIDI remote control facilities in your MIDI + Audio sequencer -- this will allow you to assign all the

From Wall-Warts To Rack Wart

Unfortunately, there is little that can be done to silence a cheap buzzy transformer. I wouldn't advocate disassembling the unit and packing the box with foam or cardboard in an attempt to dampen it -- not only is this unlikely to stop the buzz, but it

relevant commands(record arming, locate functions and so on) to specific notes on a keyboard which can be placed conveniently within arm's reach. Even if you can't see your computer's screen this system can still be made to work very well indeed. However, if you don't have a sequencer which can translate MIDI note messages to the relevant MIDI machine-control commands, there are a number of MIDI controllers (such as the Kenton Control Freak and Peavey PC1600x) which can send such specialised messages and therefore directly control MIDI-compatible recording hardware.

Just as with analogue recording, it is best to start recording a second or two before performance begins. In the days of tape transports this was necessary to prevent the clunk (and reverb) of the pinch-roller solenoid from trashing the opening notes. However, it is still good practice with hard disk recorders, as their noise can noticeably change when they start recording and playing back large amounts of data into the buffers -- remember that changing background noises attract far more attention than constant background noise.

might also cause a fire! A far better solution would be to purchase a higher-quality power supply, ideally built in the country where you are based.

However, better still would be to acquire a dedicated rackmount power unit designed to supply several pieces of equipment requiring low-voltage AC or DC supplies. There are several available -- check out the recent reviews of Ticket Audio's Powerline and HZ's Octopuss Power Distributor (*SOS* December 1999 and July 2000 respectively).

Spit And Polish

Finally, no matter how good your control room, there will always be some extraneous sounds somewhere that need to be removed. Fortunately, console automation and workstation editors can quickly come to the rescue: editing out the 'silence' between wanted material or using automation to dip its level is far superior to employing noise gates which always clip the beginnings of everything. However, if you tackle unavoidable noise problems at source and experiment with microphone technique you shouldn't need too much in the way of such remedial action. You'll be able to just get on with recording your music, safe in the knowledge that you're getting the most out of your recording environment. SOS

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