

Tools of the trade

Your mixing armoury should contain both essential tools to tackle problem sounds and creative devices for sonic sculpting. Let's take a look at what you really need to make your tracks shine...





Mixing is like rock climbing. The skill and experience of the practitioner is paramount. The longer you do it, the better you get, until you're towering above the competition. And, of course, if you work with poorly chosen tools, you'll come tumbling down from the heights and make a hideous mess (in the sonic sense).

OK, so mixing isn't really like rock climbing at all, except that if you're working with inferior or inappropriate tools you're going to be at an inherent disadvantage. With that in mind, let's have a good look at the main types of tools you're going to need (and some that are just plain useful), and test your knowledge by touching on the technical background of each device to find out how it works.

Volume/pan

The most important tool in the mix engineer's box is the humble volume fader and pan pot combo. A mix is a careful balance of sounds, and in a stereo system there are essentially only two parameters we have at our disposal: balance and level. Every other tool is simply a way of modulating individual frequencies and elements of a mix over time, but technically it all boils down to level and pan.

Compressors/limiters

The trouble with recording is that for some reason, no electrical or electronic device is as good as our ears and brain at capturing sound. Or perhaps we're just more used to hearing things through our ears. The point is, recorded music has a horrible tendency to sound too quiet, to lack punch and presence, and to overload and distort, especially when it has a wide dynamic range.

Compressors combat this in a very simple way: they 'squash' the overall fluctuations in the sound. You can specify the point at which the compressor starts to affect the signal (the threshold), the speed with which it happens

(attack), the speed with which the volume returns to its original level (release) afterwards, and the amount of reduction applied (ratio). Once you've squashed the dynamic range of the sound, you can turn the overall level up without it overloading and sounding terrible.

In extreme cases, this is called limiting, and that means that absolutely no signals will pass above a certain 'threshold' (highest level), at which point you can raise the overall volume to 0dB without risking distortion. Maximisers are essentially repackaged limiters that are designed

Check out...



PSP MasterComp: Ideal for phattening up your finished master, but also excellent for adding genuine analogue vibes to any signal. \$249 www.pspaudioware.com PC/Mac

Waves L3 Ultramaximizer: This is regarded by many as the ultimate limiting plug-in for driving your tracks as loud as they can go without losing audio quality. £400 www.waves.com PC/Mac

Sonalksis SV-315: A fantastic plug-in with a nice analogue feel and a sound that far exceeds its pricetag. £150 www.sonalksis.com PC/Mac

Your mixing toolbox

to make your signals sound louder (see *Making It Loud* on p56 for more on this).

Thanks to the way our ears and brains work, the higher the average sound level, the louder things appear to us. Strangely, quieter music at a consistent level appears louder than music with fluctuating sound levels and higher peaks.

Reverb

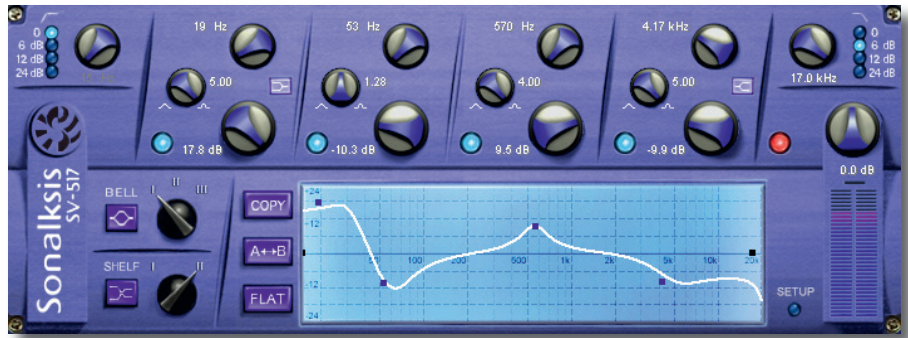
Whenever a noise is made, it sends sound waves travelling off in all directions. Some hit your ears, and are perceived as sounds, while others bump into things, ricochet off them and then reach your ears. These reverberations are quieter and tonally different, and usually arrive so quickly that you don't even notice them – your brain attaches them to the original sound. The only time they're obvious is when they aren't there, which is often the case with dry recordings or electronically produced sounds or samples.

The obvious solution is to record sounds in more natural environments, thus capturing the natural reverb with them. Unfortunately, this is extremely difficult, and nigh-on impossible to amend once captured. So reverb units were originally designed to inject some natural-sounding (and controllable) life into recorded sounds. All the early imitations were

Check out...

Wizoo Wizooverb W2: For realistic sounding convolution reverb, you won't do much better than this.
£169 www.audio.co.uk PC/Mac

IK Multimedia Classik Studio Reverb: When you want the sound of classic digital reverb algorithms, accept no substitute.
£229 www.ikmultimedia.com PC/Mac



▲ Chop or boost? Whatever your approach to frequency manipulation, you need a good EQ

based on causing bits of metal (springs and plates, usually) to vibrate, and sounded nothing like real spaces, but in the process engineers created a variety of useful techniques that are still loved and emulated today. Modern versions are based on digital emulations and offer varying degrees of realism, usually at the expense of ever-increasing CPU consumption.

EQ

Sound is a series of waves at different frequencies. The longer the wavelength, the lower the frequency. The effect of low frequencies on our ears (and any objects not fastened securely) is a low bass sound or rumbling vibration. At the other end of the scale are sounds with short wavelengths that appear high-pitched and shrill and can be damaging to both our ears and wine glasses. We call these sounds treble. Sounds in between these two extremes are rather imaginatively referred to as midrange.

Every instrument, voice or other sound will occupy certain parts of the frequency spectrum to greater or lesser extents. The key to great mixing is figuring out what frequencies are giving a sound its characteristics (or which parts of the sound are the bits that make it pleasurable or useful) and highlighting them. This can be done in three ways: by chopping out unneeded frequencies in a sound, by boosting the desired frequencies, or by removing unneeded clashing frequencies in other sounds to make space for the noises you want to accentuate. Some engineers maintain that chopping out unneeded frequencies is usually the best tactic, as boosting frequencies can simply add more sonic clutter. Others, equally experienced, follow the maxim 'if it sounds right, it is right'. Either way, the tool for chipping away at frequencies or boosting them is EQ.

There are a number of EQ types. The shelving EQ affects all of the frequencies above or below a certain set point. The fully parametric EQ (sometimes referred to as a notch filter) allows you to specify not just the frequency range to be boosted and the amount of boost, but also the amount either side of the target frequency that

is affected (using the Q or bandwidth parameter). Then there are the basic high- and low-cut filters, which simply remove all the frequencies above or below a certain point. Finally, there are the classic graphic equalisers, of the type you often see on consumer audio equipment. These have a large number of EQ bands that can be cut or boosted, and have preset and slightly overlapping Q ranges.

Check out...

PSP Neon HR: For the money, you'll struggle to find a better EQ plug-in. Seriously stunning and almost as smooth as the finest analogue out there.
\$299 www.pspaudioware.com PC/Mac

Waves Q-Clone: This little beauty is similar to a convolution reverb in that it captures the characteristics of your EQ hardware and reproduces it perfectly in plug-in form, along with all the sonic benefits that that entails. Also comes with a stack of presets and new library updates. Not cheap though!
£722 www.waves.com PC/Mac

Sonalksis SV-517: A fantastic EQ plug-in from the Liverpoolian developers.
£150 www.sonalksis.com PC/Mac

Gates

In the early days of recording, every stage of the process added some electrical hum, tape hiss, mains noise, interference and countless other aural artefacts. And then we made it worse by compressing the hell out of everything to make it more audible, including the noise! This is where gates came in handy. Gates only allow sound through once it reaches a specified level. These days, things aren't so noisy, and

Check out...

DB Audioware Quantum FX: A wide variety of great cross-platform effects, including a useful gate with true sidechaining.
£189 www.db-audioware.com PC/Mac

Your mixing toolbox

computer editing allows you to remove noise by hand, but gates still have plenty of creative uses (such as creating chopping effects and gated reverb), and they can be handy for removing unwanted noise and reverb on sampled sounds.

Exciters

One of the key tools for giving your signals a bit of sheen is the exciter. Exciters work in a variety of ways. Some involve frequency offsetting, to compensate for the dull sound produced by different frequencies passing through circuits at different speeds. Others generate harmonics high up the frequency spectrum for added brightness. Some boost certain higher frequencies, and others use a combination of these processes. Exciters are also available for bass sounds, ranging from frequency-boosting devices (again) to harmonic generators and bass-specific compression algorithms.

Such devices are usually pared down to one simple 'more' or 'less' control, making them very quick, simple and easy to use, both on complete tracks and individual elements requiring a little more presence or sparkle.

Check out...



BBE Sonic Maximizer: Simply one of the most stunning and essential plug-ins available anywhere. Makes everything sound clearer and bigger.
£79.99 www.bbesound.com PC/Mac

iZotope Ozone 3: This plug-in offers a number of tools, including a useful exciter.
£170 www.maudio.co.uk PC/Mac

Beware though, because while some can sound fantastic, others (particularly cheap or free ones) can make your signals sound very harsh.

Hardware emulations

Since the onset of digital audio, people have been hankering after the sound of old or classic hardware. The sound of synths, amps, mics, stompboxes – you name it – have all become highly sought after. Fortunately, technology allows us to emulate the sound of a great deal of classic hardware in the computer. So if you want the sound of an electric guitar rig, complete with amp, flanging, reverb, distortion and compression, you've got it! Or perhaps you want some classic digital reverb emulations, or a tape-delay unit, or the sonic characteristics of a £4000 Neumann microphone? You got 'em! So while we wouldn't suggest for a second that these things sound exactly the same as their

Check out...



NI Guitar Rig 2: Okay, so it's not cheap, but it's a tiny fraction of the cost of the analogue gear it recreates nearly perfectly, and it even comes with real pedals.
£350 www.native-instruments.com PC/Mac

IK Multimedia Amplitube 2: Cheaper than Guitar Rig as it doesn't include any hardware, but also sounds stunningly realistic.
£269 www.ikmultimedia.com PC/Mac

Antares Microphone Modeler: Ever fancied the sound and characteristics of a selection of classic mics but haven't got the funds? Then this is for you!
£183 www.antarestech.com PC/Mac

track has lots of quiet parts, the hiss and hum can become very audible again. And if you're sampling an old vinyl recording with crackle and pop, you'll need a way to get rid of it.

In such cases we can employ a range of digital tricks that fall into the category of noise-removal tools. These work in a variety of ways, but one of the most ingenious is to take a sample of the noise before the music or other sound starts. The software will then remove these elements in varying degrees from the signal. High-end noise-removal products will even let you analyse the parts that have been taken out so you can hear whether anything vital has been lost. Noise removal can sometimes cause a dulling of the signal, but once applied, you can then safely apply an exciter to add sparkle without noise. Genius!

Check out...



Waves Restoration Bundle: If you absolutely have to have the Rolls Royce of audio restoration tools, look no further than this stunning offering from Waves.
£750 www.waves.com PC/Mac

Peak SoundSoap: If £750 seems a little steep for your requirements then Bias offer two options: Soundsoap 2 (£69) and its bigger brother, Soundsoap Pro (£399).
www.bias-inc.com PC/Mac

MAGIX Audio Cleaning Lab 11 XXL: If you don't have much to spend then this handy little application might be the one for you. Unlike Soundsoap 2, it works on PC too.
£50 www.magix.com PC/Mac

▼ Guitar Rig, including the Rig Kontrol controller/audio interface



hardware counterparts, most are close enough, some are all but indistinguishable, and all have the advantage of total recall, extremely low relative price, perfect portability and complete integration into your PC recording setup.

Noise removers

We've already established how much noise can creep into recordings. Everything from hum and hiss to digital clipping and vinyl popping can ruin an otherwise perfect take, or absolutely swamp a recording, particularly when you subsequently apply compression. Gates can do a great job of sorting this out, but they only really work when your signal is consistently loud, or if the unwanted noise isn't overpowering. If your

Chorus

Have you ever listened to the difference between a group of people singing and one person singing the same thing? One is a lot more powerful and full-sounding (if you need to ask which, then you're reading the wrong magazine!), and the same applies to almost any type of sound.

This type of effect is called chorus, and there's a harmonically rich quality to it that adds warmth and depth to almost any signal. Usefully, it can also have the effect of making sounds blend into a mix, making it as useful for sound placement as it is for affecting the actual character of the sound. In fact, most processes can serve to push sounds back or pull them out in a mix, in addition to their main intended effect.



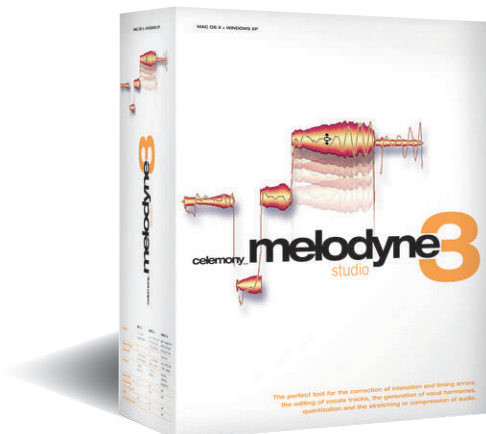
◀ Voxengo's Analogflux Suite features some powerful mix effects

Check out...

COModPack: Most sequencers come with a variety of chorus and similar effects, but if you fancy a change, COModPack includes a cool chorus effect.
\$39 www.codeoperator.com PC/Mac

Voxengo Analogflux Suite: Voxengo make a variety of cool plug-ins for Windows, and this one also includes a nice analogue sounding chorus effect.
\$80 www.voxengo.com PC

Most digital chorus effects work by making a few copies of an incoming signal and detuning them. To each copy, LFO modulation is applied to reduce the somewhat robotic nature of the resultant sound. Almost none, of course, can perfectly replicate the nuances of multiple independent performances played or sung together, but as with many effects (plate and spring reverbs, for example) chorus has become a valuable process in its own right.



▲ Pitch correctors: a Godsend for the tonally challenged, and a valuable effect to enhance an already-good vocal part

Delay

Once upon a time, someone thought, "I know! If we take a piece of magnetic audio tape, place it on a continuous loop, with one recording head to record the incoming signal and a number of staggered playback heads to play back what was recorded coming in, we can make sounds repeat themselves rhythmically over and over, and we can put these in time – or slightly out of time in a groovy way – with the music we're playing!" Hence delay, one of the first truly creative effects, was born.

Nature does provide its own version of delay (think of people shouting in very large caves... aves... aves... ves... es...), but only the

Austrian national yodelling team and other mountain-based musicians would find recordings unnatural without lashings of delay all over them, so studio engineers began playing with a process that was actually designed to be unusual, unnatural and cool!

Since those early days, we've developed all sorts of additional uses for delays, including creating pseudo-arpeggios and almost gated reverb- or chorus-like slapback effects, for example. And as with other effects, delays can be used to make things sound cool, to mask shortcomings in a recording, to add energy or, critically, to help a sound settle into the mix.

Pitch correctors

In the good old days, the most essential prerequisite for being a singer was the ability to sing at the correct pitch. Then the 80s gave birth to the vocal pitch corrector. These devices (now

Check out...

Melodyne: Arguably the most powerful pitch-correction and editing tool on the market, and available in three different flavours: £130 (Uno), £230 (Cre8 3) or £500 (Studio 3).
www.celemony.com PC/Mac

Antares Auto-Tune 4: Auto-Tune is to pitch-correction what Hoover is to vacuum cleaners – maybe not the best anymore, but excellent and synonymous with class.
£234 www.antarestech.com PC/Mac

Check out...



NI-Spektral Delay: Not for the faint-hearted, this is a seriously powerful delay plug-in for the more technically minded sound designers out there.
£220 www.native-instruments.com PC/Mac

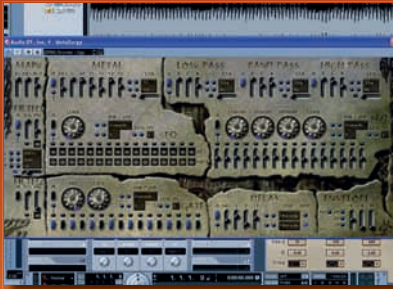
Audio Damage DubStation: This little beauty is just the thing for old-skool tape-delay style action.
\$39 www.audiodamage.com PC/Mac

PSP 608 MultiDelay: One of the most powerful delay plug-ins available and a creative dream.
\$149 www.pspaudioware.com PC/Mac

plug-ins) analyse the pitch of an incoming signal and adjust it slightly to place it in key. This meant that tone-deaf charlatans who couldn't hit a convincing middle C with a shotgun if you drugged it, tied it to a barn door and aimed for them, could suddenly release chart topping singles and be acclaimed as the most defining vocalists of the year.

They aren't all bad though. Despite launching an army of former soap stars into short-lived and ill-conceived pop careers, pitch correctors have also allowed us to take otherwise modest performances from normally good singers and fix any offending notes. They also allow you to subsequently change notes, which is particularly handy if your singer has gone home. And they also allow some cool but now dated-sounding vocal tweaking known as "the Cher effect". Yes, *that one!*

Check out...



Ugo Metallurgy: One of the best value multi-effects plug-ins ever; includes fantastic flanging and is essential for any PC user. \$20 www.ugoaudio.com PC

Audio Damage Phase Two: For classic and truly analogue sounding phaser action, you can't do much better than this. \$49 www.audiodamage.com PC/Mac

Phasers and flangers

Few terms create more confusion than phasing and flanging. The problem is that what we now refer to as flanging was originally called phasing, and the effect we now call phasing is not a great deal removed from flanging. Clear so far?

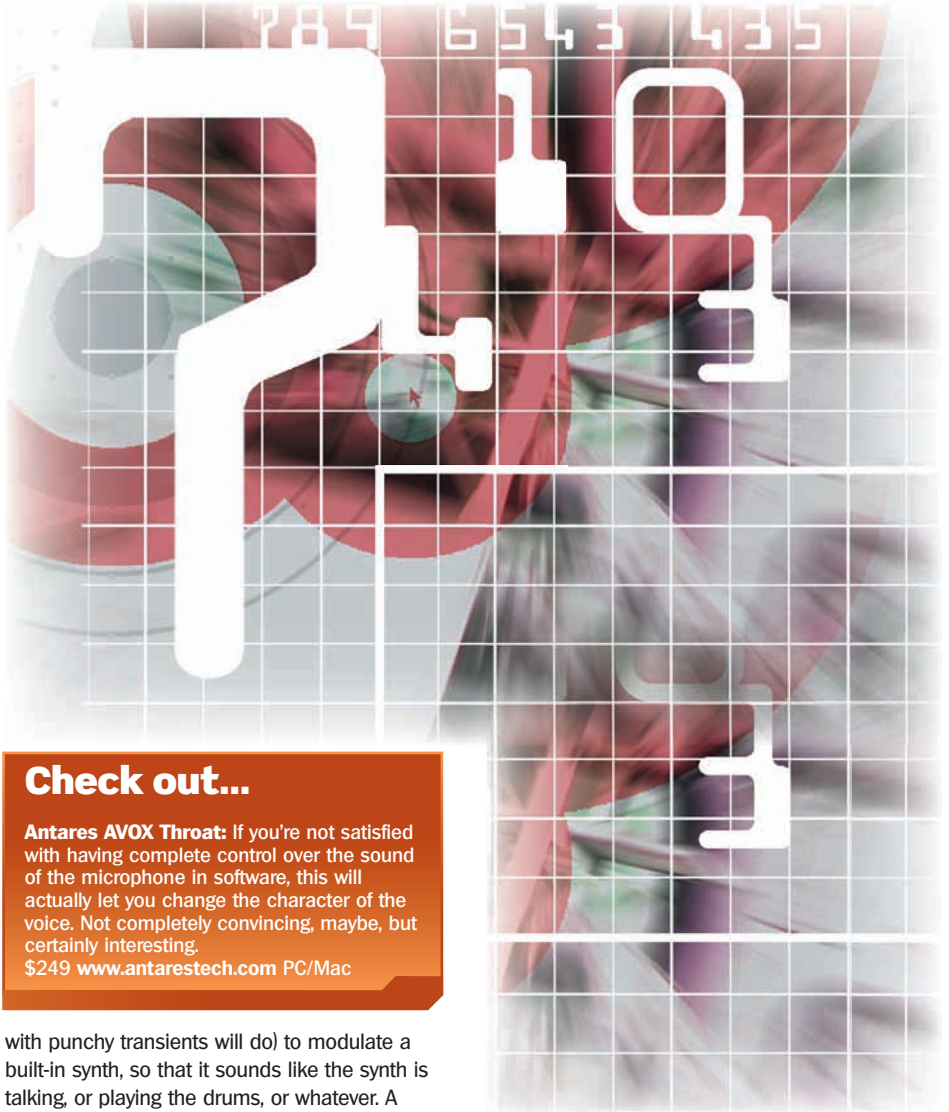
The flanging effect stems from the days when bored engineers would play back two versions of the same signal via two synced tape decks, and then slow down one with their finger, and then the other, creating a nice whooshing sound that most magazines and manuals refer to as being like a jet-engine flying low over buildings (but only because we can't think of a better description – it's really not a lot like that at all).

Phasing is almost the same, but without the whooshing. And no, that doesn't mean it sounds almost exactly like a plane not flying low over concrete buildings! It creates an airy quality as the frequencies cancel each other out subtly. Apart from giving a useful weird vibe, phasing and flanging can be used to take the edge off harsh sounds, to make them blend into mixes, to create crescendos and special effects, or to add evolution and variation to otherwise boring and monotonous elements.

Weird vocal tools

Pitch-correctors aren't the only whacky and wonderful effects that were spawned from the digital age. There are also effects that we'll classify as 'weird vocal tools'. These encompass anything designed to creatively bugger up your vocal parts (or any other signal), rather than something that was designed to fix them.

Examples include vocoders, which use an incoming signal (usually a vocal, but anything



Check out...

Antares AVOX Throat: If you're not satisfied with having complete control over the sound of the microphone in software, this will actually let you change the character of the voice. Not completely convincing, maybe, but certainly interesting. \$249 www.antarestech.com PC/Mac

with punchy transients will do) to modulate a built-in synth, so that it sounds like the synth is talking, or playing the drums, or whatever. A similar thing is the talkbox, which is like a vocoder, except that it accepts two incoming signals, allowing you to modulate a guitar sound with a vocal, or a vocal with a drum loop, or a vocal with another vocal, even.

Other more modern plug-ins, such as the unpleasantly-named Throat, allow you to alter the characteristics of a voice, making it sound older, younger, bigger, smaller, masculine or feminine. In a world full of formulaic sounds, any tools that allow you to mangle your sounds in unique and creative ways can only be a plus.

Distortion and overdrive

It's difficult to explain why, but we humans absolutely love the sound of distortion. Maybe this works on a similar principle to really hot curries, and the harsh sounds release some kind of endorphin-charged adrenalin cocktail into our systems, but whatever the reason, everything from basslines to guitars can be enhanced with lashings of growling overdrive.

The effect needn't be that extreme, of course, and small amounts of very subtle simulated analogue overdrive give a warmth and character to many signals. That's why you'll find it built into so many instruments, from electric pianos right through to guitar amps.

Now, if you already own one of the aforementioned emulator packages for guitars, you will almost certainly have some distortion at your fingertips, but each has its own character, and there are an increasing

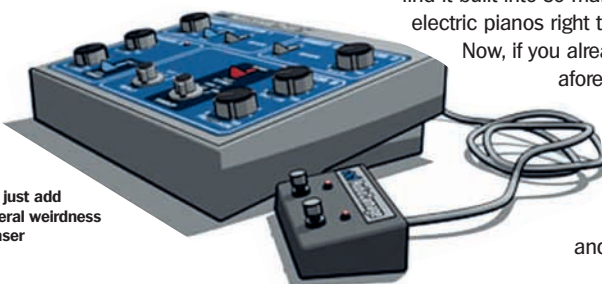
number of carefully designed digital-style distortion units too. We recommend you try out as many as you can and hear how each can be used to give sounds bite, warmth, energy, or to simply mangle them into completely new sounds.

Check out...

Camel Audio CamelCrusher: It's always worth having lots of different distortion plugs, as each has its own unique character, and this one's great as well as free! www.camelaudio.com PC/Mac

Stereo effects

As essential as panning is for crafting an exciting stereo mix, particularly for placing real instrument recordings and creating a realistic sound, sometimes you want something that will just make parts sound huge and unnaturally wide, or give a lead vocal a sense of space to make it sound more three-dimensional. Dance music in particular has a lot of powerful sounds that, if panned, can unbalance a mix quicker than you can say 'pan pot'. In such cases, stereo wideners can be just what the mix doctor ordered. They work in a variety of ways, but one of the most common is to slightly offset one side of the stereo signal, creating a sense of perceived space in the brain of the listener. Other techniques involve dynamic panning of all or parts of the frequency spectrum, while other methods, such as tremolo, can be used to rhythmically pan parts.



► Take the edge off harsh sounds or just add some general weirdness with a phaser

General tools

Every good mix engineer needs a selection of bog-standard tools at his disposal. Examples include phase shifters, which are particularly handy if you're recording drums and find some frequencies from adjoining mics are cancelling each other out, and gain tools, in case your mix levels are generally right, but one channel is still too quiet with the volume all the way up. Tuners are extremely handy too, and level meters are essential to check both the incoming and outgoing levels of signals in the mixer environment. And busses and auxiliaries allow us to create groups of signals that can be effected and balanced together before they're all thrown into the main mix.

Nearfield monitors

Absolutely the most overlooked bit of studio gear out there is the humble monitor. The number of home studios that have all the plug-ins and sequencing power in the world teamed up with a pair of crap old hi-fi speakers is phenomenal.

Here's a tip: You cannot create a decent mix without being able to properly hear what's going on, warts and all. The best hi-fi speakers are unsuitable for the job as they're designed to flatter sound and make it more appealing, while your average hi-fi speakers aren't designed so much as thrown together using the very cheapest parts available.

Pro studio monitors give a clear and detailed sonic picture, with as flat a frequency response as possible, so that what you hear is exactly what's there, without any emphasis or disguise. And nearfield monitors are designed to work in a small environment, projecting their sound a meter or two in front of them, before the sound has a chance to be overly coloured by the room's acoustics.

Check out...

Mackie HR824: Probably the industry standard monitor in the £1000-£1500 range, and deservedly so. Loud, clear and detailed. £1200 www.mackie.com

Genelec 8030a: Another pretty pricey pair, but still stunning value and great sounding. £740 www.scvlondon.com

Yamaha MSP3: In all our tests these have stood apart from the competition in the lower price range with their truthful sound. £190 www.yamaha.co.uk

Buying monitors

So how much should you spend on your monitors? As much as you can afford, and then a little more! We're not suggesting that you take out a massive loan, but if you've saved up £300 for some monitors, wait another few months until you've saved up another £300. Seriously, mastering studios spend tens of thousands of pounds on their monitoring, so strive for the best you can get and always test any potential purchases with a commercial mix you're familiar with.

And as for the active (built-in amps) versus passive (requiring an external amp) debate, in the budget to mid-level range, actives do tend to offer better quality, as poor amplification and cabling can be as damaging to the sound quality as bad monitors. Active speakers will have amps and speakers that are properly matched and configured, giving one less cause for confusion. **cm**



► Fork out for a quality pair of studio monitors like these, and you won't get any nasty surprises when you listen to your mix on a hi-fi system