Holding back the ears

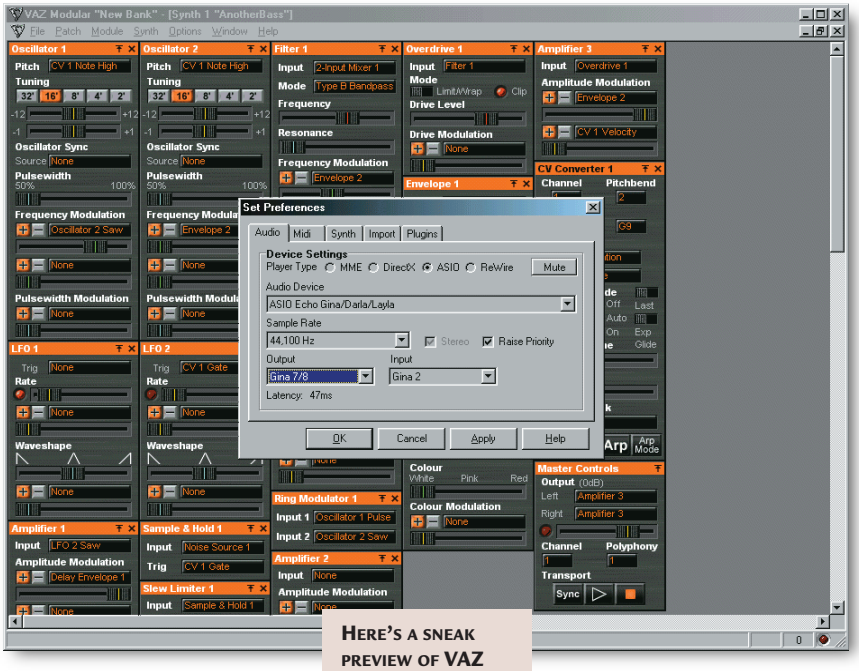
Steven Helstrip looks at ways of avoiding that sound delay between your PC and your speakers.

If you have ever plugged a guitar or microphone into your sound card to try out a handful of plug-in effects, you'll no doubt be aware of the effects of audio latency. Essentially, latency is the time delay between audio entering your PC and emerging from your speakers once all the processing has taken place. In a typical system with standard MME sound card drivers, these delays can amount to 800ms or more. As you can imagine, it's just about impossible to play or sing in time when your monitor signal is almost a whole second behind.

A similar delay is found with software synthesisers: when you press a key on your keyboard, an age can seem to pass before anything is heard. Although many software synths and effects claim to work in real time, with some PC set-ups, nothing could be further from the truth.

The whole subject of latency has only become an issue for musicians over the past few years. Before PCs could handle multiple audio tracks and 'real-time' effects, the only alternative was to invest in expensive, dedicated hardware.

However, now that the virtual, software-driven studio has become a reality, latency seems to be causing more than its fair share of frustration.



HERE'S A SNEAK PREVIEW OF VAZ MODULAR USING STEINBERG'S ASIO DRIVERS

What causes latency?

Latency is brought about by a number of factors that can vary from system to system, depending on your sound card, its drivers and the way your audio software is configured. In a typical example, such as listening to software effects with a microphone, sound first has to pass through your sound card's analog-to-digital converters and find its way to the card's driver software. From here the sound data waits in a buffer until the operating system has a moment to deal with it. It's at this point that most of the delay is introduced, since the OS is always busy juggling other tasks.

Once the data is in the hands of the operating system, it needs to pass through several layers of code before reaching the software that will apply the effect. The effects algorithm will introduce a further delay while it chews up the data before passing it back to the operating system. After working its way through more buffers, queues and layers of code, sound eventually emerges from the sound card's digital-to-analog converters. When applying effects to audio from disc, or playing a software synth, these delays can be reduced by as much as a half, as there are fewer queues for sound data to get held up in.

Latency seems to be causing more than its fair share of frustration

Working to speed things up

Microsoft's attempt to reduce latency (among other things) was to write a set of optimised drivers, called DirectX. These drivers basically provide lower-level access to hardware, bypassing several layers of the operating system. Although this work was originally intended for games developers, most audio programs – particularly software synths – support DirectX for this very reason.

Unlike MME drivers, DirectX enables two or more programs to use the same sound card simultaneously. However, DirectX is still far from ideal for music production since it only supports audio playback and not record. So it's not much use for audio sequencing work, unless, of course, you only switch to the DirectX drivers once all your parts have been recorded.

The best solution so far has been Steinberg's ASIO (Audio System Input/Output) 2.0 drivers. ASIO cuts latency by bypassing the operating system altogether, effectively providing direct access and control of audio hardware. As well as being able to record and play audio, ASIO provides zero-latency hardware monitoring and allows multiple programs to share a single card. At present, though, I only know of four programs that support ASIO. These are Cubase VST, Emagic Logic, VAZ Modular and Retro AS-1.

Another drawback of ASIO is that each sound card requires a unique driver. Although many high-end cards now come with ASIO drivers, the majority still don't. Some sound cards have it all, though. Terratec's EWS88MT and

Software drum machines are upping the tempo

After much anticipation, Steinberg's LM-4 has finally arrived. For those who missed January's column, LM-4 is a virtual drum machine for the VST 2.0 plug-in format. What's so special about that? Well, it's the start of something big – a new way to make music with your PC.

Although there are already a handful of software drum machines, this one has its outputs connected straight into VST mixer channels, enabling EQ and effects to be applied to individual sounds. And because VST 2.0 instruments have full MIDI implementation, drums can be played real time (latency permitting), all from within the same program.

LM-4 comes equipped with 20 drum kits, each comprising at least 18 drum sounds. Some of the better kits, however, have velocity-layered samples to add greater realism. So, when you lightly tap the ride cymbal key on your synth, a lightly played ride cymbal is what you'll hear. Give it a good thwack though and the ride will ring out more like a crash. Surprisingly, the kits on offer are not particularly dance orientated. Aside from a couple of electro-style kits and one for drum and bass, the remainder is a selection of live kits for pop, rock, jazz and R&B.

The first thing I tried with LM-4 was to play back a selection of live-played drum patterns. The quality really was something to get excited about, particularly when I started to play around with some EQ and reverb. LM-4 provides six outputs (one stereo and four mono) and all sounds are freely assignable. Other parameters include volume, pitch and velocity sensitivity.

STEINBERG'S LM-4 IN ACTION WITH A FULL COMPLIMENT OF EFFECTS

Rock 'n' roll

Once you have your MIDI tracks in place, LM-4's playback is rock solid. However, I did find that unlooping, say, an eight-bar section would cause LM-4's playback to be muted. To get the sounds back, you have to stop and restart playback. Creating your own drum kits is another area that needs attention.

At present, you are required to write script files and save your samples to special folders. Even after following the instructions several times, I still had no idea how to do this and still don't. My solution was to overwrite some of the more obscure drum sounds that came in the box.

Should you buy it? Apart from a few shady areas, LM-4 is excellent value at £99 (inc VAT). Its sound quality is excellent (much better than playing the same instruments as a SoundFont) and you gain all those extra outputs for mixing. If these kinds of features get you excited, then I wouldn't hesitate.

Event's Gina ship with ASIO, MME and DirectX drivers. To illustrate the difference ASIO and DirectX drivers make, I'll use the Gina as an example.

When using the MME driver at 44.1KHz, Cubase VST reports a latency of 557ms. Switching to the DirectX driver reduces this to 204ms. When the ASIO driver is selected, the card's latency drops to just 25ms. Terratec's EWS88MT on the other hand, manages just 8ms when set to the same sampling rate. Increase this to 96KHz though, and it drops to a staggering 3ms. Now that's more like it.

With the recent release of version 9, Cakewalk now incorporates a new WavePipe driver that is claimed to reduce latency by as much as 80 per cent. Although we haven't tried it out for ourselves yet, Et Cetera Distribution claims it is 10 per cent quicker than ASIO and simply requires standard MME drivers to work.

If your MME drivers aren't very good, then WavePipe can't work its magic

Other sources report that WavePipe is greatly dependent upon the quality of the MME drivers it is working with. This means that if your drivers aren't very good, then WavePipe can't work its magic. Also, unlike ASIO, there are no plans yet to release an SDK so other software developers can use the technology.

PCW CONTACTS

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LM-4 costs £99 (£84.25 ex VAT) and is available from Arbiter on 020 8970 1909