

*The following appeared in edited form in Muzik ETC in Graham Collins' Synthesizer Basics column. All right reserved.*

This month our "Stupid Synth Trick" shall be of a more advanced nature. Indeed, this month dear readers, we venture into dangerous territory. We will now walk upon the path of heresy to true believers. I speak of emulative synthesis. Worse still, the imitating of those sounds that traditionally have only come out of vintage analog synthesizers, by machines that are, well, neither vintage nor analog. The fact is, that we don't *always* have a Prophet 5 or CS80 lying around handily in the studio when we want *that* sound. There are many machines that are capable of producing some really beautiful sounds that are lush, organic, and interesting, but require a bit of coaxing to get there. Now in truth, nothing will replace a CS80s filter sound (**retro-historical note - as of Dec 2003 the current 'virtual' CS80 on the market has already basically proven me wrong!.. that didn't take long**), but many of the things that we associate with the 'analog' sound are little more than technological imperfections in oscillators that simply do not appear in digital machines. Fortunately, they often have the tools to duplicate less accurate technology even if they aren't clearly labeled such.

The technology that goes into an average analog synth is by its nature not the most stable stuff around. While different oscillator designs are more stable than others, the inherent out-of-tune behaviour of analog oscillators is the type of sonic 'fingerprint' that our ear identifies as contributing towards that 'warm' sound. Your typical digital synth has been perfectly tuned to a standard equal-tempered scale, but fortunately there are several ways that we can play around with this. Detuning oscillators slightly against each other is a fairly well-known way to fatten things up. However, often we can adjust the tuning of individual oscillators by minute amounts in a couple of more interesting non-linear ways. The first is to change slightly the oscillator scaling. If used in tasteful amounts, this will shrink or expand the overall tuning scale by an amount similar to the way that improperly calibrated analog oscillators sound. Notes aren't simply "out-of-tune", they are subtly out of tune and "rubbing up" against other notes in the scale as well as against the other oscillator. Much like real life, the general rule in sound is that for a 'warm' result, the more things you can get to subtly rub against each other the better! Ahem.

Innuendo aside, the essence of what I just said is generally true. What we want to do is detune the oscillators in as many ways as possible. Incidentally, some synths will actually give you 2 ways to manually detune oscillators. One will be a proportional offset while the less common is a straight Hz offset. Experimenting with judicious uses of both can often give you more detuning in the higher or lower notes due to the exponential way we perceive sound. Don't worry if you didn't "get" what I just said...just play with 'em if you got 'em.

Applying a very little bit of a very slow LFO to the pitch of one oscillator can mimic some of the subtle tuning drift that occurs in analog oscillators as well. Often, an LFO will give you the option of being key-synced i.e. it returns to the beginning of its cycle with each key pressed. For our purposes today, you would want to turn this off so that it just cycles through the waveform endlessly regardless of what or whether you play--just like the real thing. Sometimes you can modulate an LFO by another source such as another LFO. Getting 2 LFOs to cross-modulate ever so slightly can be just plain good karma in this instance. Why? Well, a slight bit of voltage cross-talk in analog synth circuits isn't exactly unheard of. I mean, what we're really doing is 'virtually' emulating flaws right? Think about it.

This brings us to randomness. mmmm randomness. That most wonderfully ill-used word, the defining of which always messes with my headspace. I digress. Some synths have some type of 'random' feature which when applied, changes by a set degree the pitch of any note played. This can be somewhat useful for crudely imitating the dynamic voice allocation feature of some analog synths when their oscillators are out of tune. Interesting, but personally I don't find it very convincing to my ear. 'Random' features like this ignore the fact that most oscillator tuning issues are not in fact random at all. When you graduate from nerd school you get to actually *hear* the different detuning processes at work, and attempts at 'randomness' seem well, flaky. That being said, adding just a bit can fatten things up on repeated notes.

The final thing to look at is whether the machine has global scale tuning. Many newer

synthesizers let you select between different types of historical tunings or even individually tuning each note on the keyboard. If you have it then use it. Throwing in a slight 'clunker' note here and there across the keyboard can really be convincing. The most important thing to remember with all of these however is subtlety. Slight imperfections in tuning stability are the result of many small issues not one big one. Experiment as always and have fun. Until next time then!

***Graham Collins is an Ottawa composer/synthesist. His website is [www.pongthrob.com](http://www.pongthrob.com), and he can be reached at [graham@pongthrob.com](mailto:graham@pongthrob.com) He invites any and all discussions on the nature of randomness, chance and stochasticism.***