



Sound On Sound : Est. 1985

MIDI Guitar Workshop

Tips & Techniques

Technique : Sequencing & MIDI Controllers

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PAUL WHITE has been a devotee of guitar synths ever since Roland introduced the original GR500 back in the 1970s. Technology has come a long way since then, but there are still various techniques and tricks that can be adopted to make using these fascinating instruments a little less traumatic.

Guitar synthesizers have been with us longer than MIDI has, but they have still to achieve the widespread success their designers hoped for. The marriage of guitar and synthesizer has had a chequered history, and the legacy of the many early failures continues to stand between the guitar player and his or her cheque book. Even the more up-to-date designs still demand that the player adapts his or her playing technique to meet them halfway, and for some guitarists the concept of having to play in a style to suit the synthesizer patch being used will remain forever an alien one.

This might seem like a negative way to kick off this article, but it's all fact. Nevertheless, guitar synths do have a lot to offer, especially to the MIDI studio operator who feels more at home on the guitar than on the keyboard. And though guitar synthesis is still far from perfect, in my view the positives far outweigh the negatives.

MENTAL APPROACH

Getting to grips with different sounds is something electronic keyboard players have always had to do, but guitar players are conditioned to expect every sound they play to have an instant, percussive attack. Give a rock guitar player a brass patch with a slow attack and he'll probably complain that the synth can't keep up with him. What he really should be saying is that the attack time of the instrument is too long to allow the notes to develop at the speed he's trying to play. A tuba player isn't likely to attempt double-time triplets, so why expect a tuba synth patch to be able to?

Fortunately, not all guitar players are so stuck in their ways. A great many SOS readers play both guitar and keyboards, which places them in an ideal position to exploit the medium of guitar synthesis in an intelligent and creative way. I count myself as one of those guitar players who has never felt entirely comfortable with keyboards (from the playing point of view), and I tend to record using a mixture of keyboards, drum pads and MIDI guitars to input the music data into my sequencer. Over the years I've tried many different guitar synths, and have seen how they've evolved from almost laughably clumsy machines to surprisingly reliable and sophisticated musical instruments. This article is based on my experiences with my present Roland GR1, though most of the points made in this article can be applied to any pitch-tracking MIDI guitar system.

SETTING UP

It is important that any guitar you intend using with a MIDI guitar synth system is properly set up. This means the split pickup should be mounted as close to the bridge of the guitar as possible, and the spacing between the pickup and the strings should be around 1mm when the string is fretted on the highest fret. This may differ slightly from model to model, so consult your handbook carefully. It is important that the strings pass over the centre of each section of the divided pickup, so as to avoid crosstalk between adjacent strings.

Fret buzz causes tracking problems, so if your action needs sorting out, pay to get it done properly if you can't do it yourself. In my experience, very low actions and guitar synths don't mix.

WIDDLY FIDDLY?

I've already touched upon the concept of pitch-tracking (see box), which on the face of it seems quite straightforward: the string vibrates and an electronic circuit measures the rate at which it vibrates -- end of story. Sadly, reality is somewhat more complicated. Even using a divided pickup to separate the strings, the action of picking a string creates a leading transient which is more noise than pitch, and until this has passed there's little point in the circuitry trying to make sense of the signal.

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Even when the pitch has stabilised, there are other 'polluting' factors waiting to corrupt the pure tone -- such as fret buzz. Furthermore, on most guitars, the level of the harmonics produced when a note is picked is comparable with the level of the fundamental pitch, which makes it harder for the tracking circuitry to lock onto the right frequency. On many instruments, there are rogue 'dead spots' at certain positions on the fingerboard, where the fundamental frequency dies away faster than the second harmonic. This can lead to certain notes jumping up by an octave as they decay.

In the case of a keyboard instrument, establishing the start and end time of a note is as simple as the opening and closing of a switch, but with a guitar synth there is no switch, only the output from the string. The start of the note is triggered by the action of picking a string, but the end of the note can be less easy to define. If the string is simply allowed to vibrate, the synth will continue to play until the note has decayed to a level that is too low to track reliably. Depending on the guitar and the model of guitar synth, this can be anything from a few seconds to tens of seconds.

A note may also be terminated by damping a string with the right hand or by lifting the fingers of the left hand off the strings. In the case of synth voicings which have a long release time, damping the strings provides a more controlled way to end a note, since lifting the fingers from the strings in the usual fashion can cause the pitch of the sustained note to droop a little during the release period.

Having established that guitar synths prefer to track cleanly vibrating strings, here are a few playing tips:

- Many of the traditional techniques used to make guitars sound interesting are counter-productive when playing a guitar synth. For example, using the side of your thumb to 'dig in' as you pick is great for producing 'squealing' harmonics, but such harmonics can fool the tracking system of your synth into playing the wrong note. Plain picking may be boring, but it will produce the best results.
- Strumming damped chords or 'chicken pickin' is bad news for guitar synths. These very valid playing techniques sound fine on guitar, but in reality they comprise mainly unpitched noise which will cause the guitar synth to mistrack in an embarrassingly unpredictable way.
- Conventional fast strumming (or widdly-widdly hammering) doesn't work well as the notes are too short for the synth to lock onto reliably. If you're using a piano sound, then think what a piano player might do -- try an arpeggio or a simple finger-picking pattern instead.
- Instruments like the piano have a rigidly fixed pitch. If you want your piano sound to be authentic, don't bend the notes or use the whammy bar. If your guitar synth has a Bend Off function, this might produce better results.

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- Don't think like a guitar player, think as if you are playing the instrument you're imitating. For example, if you're playing a solo flute patch, don't play chords -- flutes are monophonic. Use note bends and the tremolo arm to simulate the way vibrato is applied to the instrument. Similarly, listen to the way your instrument is orchestrated. String parts can sound more convincing if you use just two or three notes at a time rather than six-note chords. If the sound you're using has a slow attack, then play slow, uncomplicated parts to let the sound develop. If the slow attack throws your timing, then listen to the sound of your pick on the guitar and take your timing cues from that.
- If your guitar synth has a noticeable delay on the bottom strings, try playing the part one or two octaves higher and then use the Transpose function to bring the pitch of the synthesized sound back to where you want it. This will reduce the tracking delay considerably. Of course, the tracking delay doesn't matter at all on sounds with a slower attack, such as strings or atmospheric pads.
- Because you never know exactly how long a plucked note will sustain, use the Hold pedal for long chords. This will also prevent any octave jumping if you happen to hit a rogue note.
- Roland's GR1 guitar synth has the ability to transpose the synth sounds for each individual string on the guitar. This can be useful to create more authentic instrument sounds. For example, if you drop the bottom two strings by an octave, piano parts will sound more 'two-handed', while a string part can be made to appear like a combination of violins and basses. If your guitar synth doesn't have this feature, it is often possible to achieve the same result 'off-line' by using your sequencer's note range, track copy and transpose functions.
- If you do have a rogue note on your guitar (on my Strat, it's the fourth fret on the 'D' string and the fifth fret on the 'A' string), you can effect a temporary solution by fixing a small metal G-clamp to the headstock to change the mass (and hence the resonant frequency) of the neck. Use a piece of cardboard under the clamp teeth, so as not to mark your guitar. This usually shifts the dead spot to a different note. If you're recording a piece that requires the constant use of a certain note, and you can't rearrange the piece to use the same note on a different string, then this trick might just get you out of trouble.
- Most people don't appreciate how much the amplified sound of a guitar affects the way that the strings vibrate. When using a MIDI guitar patch that's, say, an octave above the regular guitar pitch, the sound from the monitors can change the guitar string vibrations so that they emphasise the second harmonic, which may consequently aggravate pitch jumping. The solution is to record while monitoring with a different patch; if this is too musically distracting, use headphones.

GUITAR SYNTHS AND MIDI

Instruments like the Roland GR1 come with their own sound modules, and these are driven directly from the tracking circuitry rather than via MIDI. Though the sounds can also be accessed over MIDI, the outcome is that any parts played live using the synth's own internal voices are likely to track more accurately and with less delay than going via MIDI. If you're working with tape, it stands to reason that the more virtuoso parts of a composition might be best played live onto tape rather than recorded into a sequencer. You can still use a punch-in/out footswitch to help you replace any mistakes.

One way modern guitar synth designers have found to improve note-tracking is to use MIDI pitch bend controller information to continually correct the pitch of the tracked note. Hammer-ons tend to be implemented entirely by pitch bend information, so if you are working with a sequencer, the notes you see on the edit page may be a little different from what you actually played. For example, a hammer-on trill will be shown as a single picked note followed by tons of pitch bend controller data.

To enable each string of a guitar to be used for independent note bends over MIDI, each guitar string must be handled by a different MIDI channel. The most guitar-like results are achieved using a synth that can work in MIDI Mode 4; in effect, this puts each guitar string in control of its own monosynth. Even when there is no intention to bend notes, it is essential to stick with the one-channel, one-string approach if hammer-ons and slides are to be tracked accurately. How well a guitar synth

works with an external synth seems to vary depending on the model of synth expander being used. The tracking delay is increased slightly but, in the case of newer instruments such as the GR1, this isn't usually sufficient to cause concern.

There are occasions when it can be advantageous to simply plug the guitar synth into a module set to Poly mode. Though bends, hammers and slides can't be used, this mode does provide a reasonably reliable way of triggering simple parts such as block chords or straight melody lines.

SUMMARY

Guitar synths aren't perfect by any means, but with a little imagination a proficient guitarist can create music that would be difficult to realise with a keyboard synthesizer. One of the most powerful performance techniques at the guitar player's disposal is the ability to apply finger vibrato to individual strings with variable depth and rate, which makes things like cello emulation very realistic. Another strength, which I haven't touched on yet, is the way in which guitar sounds (either clean or heavily processed) can be layered with synth voices to create a unique hybrid sound which still retains some of the 'organic' characteristics of a 'real' instrument.

Of course there will always be things that guitar synths are supremely poor at -- such as inputting percussive parts. I think I'd rather rewrite this article using the patch naming facilities on a typical effects unit LCD rather than try to programme a complex drum part from a guitar! Half the battle is knowing when to stop and use something else, which is why I also use conventional keyboards and drum pads in my MIDI studio. But what I don't want you to do is to write off guitar synths as being so imperfect that they're unusable -- even the cheap-and-cheerful Shadow SH075 is a supremely useful little box for interfacing your guitar-playing skills with the sonic world of MIDI.

In addition to providing us guitarists with access to an almost unlimited range of sounds, working with a guitar synth seems to stimulate new ideas. You will almost certainly find yourself heading in new musical directions that might never have occurred to you while playing either a conventional guitar or a keyboard synth. Go on, surprise yourself -- try out a guitar synth.

PITCH-TRACKING

Despite the occasional technological departure, the most popular guitar synths rely on the principle of pitch-tracking in order to turn the note being played into MIDI information. This necessitates a slight time delay between the string being plucked and the note being established; the string has to vibrate in a meaningful way before its frequency can be measured. Consequently, the lower the frequency of the note, the longer the delay between picking the string and the MIDI note data popping out.

On some of the earlier guitar synths, this produced a very noticeable delay on the bottom couple of strings that was serious enough to throw the guitarist's timing quite badly. On newer instruments, the tracking delay has been reduced to the point where it is unnoticeable by most players, though it can still cause problems when playing fast passages on the bottom two strings.

HINTS AND TIPS

The following tips and guidelines might be useful to anyone using a MIDI guitar in conjunction with a sequencer or with external expander modules.

- Always ensure that your guitar synth and any expander modules are set to the same MIDI pitch bend range.
- To record a guitar part using complex string bends, the sequencer must be set to record on *all* MIDI channels simultaneously. On *Creator/Notator*, this is achieved by setting the track channel to 'Original'.
- Guitar synths tend to generate occasional spurious, low velocity, short duration notes due to handling noise while playing. These can often be cleaned up by using the 'delete notes shorter than...' function in your sequencer. Similarly, double-triggered notes can be removed by using the 'check for duplicated notes' function.
- If the slow attack of the sound you are using is making it hard to play in time, pick an alternative sound with a more positive attack to use while recording the part. You can easily switch back to the original sound once the part has been recorded in your sequencer. Alternatively, monitor the conventional guitar sound as played through a practice amp.
- Make full use of any sustain or hold pedal functions available to help when playing sustained chords. Such functions as 'note length quantize' and 'force legato' can also be used to good effect to create certain musical styles.
- Because the MIDI data from a guitar synth is always slightly late, timing-wise, try applying the negative delay time on your sequencer to bring the existing sequencer tracks (especially the drum part) forward by a few tens of milliseconds while recording the guitar synth. This will fool you into playing a little early, and experimentation will determine what negative delay time is right to offset the inherent delay of the synth. You can then use quantization if further precision is required, but over-quantization can easily ruin the feel of a performance. If your sequencer has it, try using the 'percentage quantize' function. Don't forget to turn off the negative delay once the guitar part has been recorded.

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