NEW MUSICAL EXPRESSIONS

In the introduction to this series, we saw how the use of electronics in music-making has developed. To begin with, simple tones were produced with oscillators, and the range of available sounds was limited. Today digital encoding of sound — called sampling — is available, and musicians can use any sound to produce music.

Despite the many developments in this field over the past 60 years, it is worth remembering the simple controlled voltage characteristics of an oscillator. When any physical object — whether a bee's wing or a human vocal cord — vibrates, the surrounding air expands and contracts very rapidly, producing a waveform that is interpreted by the human ear and brain as sound. If an electrical voltage is applied through a modulator (like a car's induction coil) to a tiny strip of metal, the metal will vibrate, creating the simplest wave form — the sine wave. The pitch, or frequency of vibration, of the resulting oscillation depends on the voltage applied and, to a lesser extent, on the density of the metal strip. This tiny sound-generating unit is called an oscillator. Voltage control has been the primary method of producing synthesised music for decades.

The MIDI interface, first announced in 1983, is a unit that is designed to allow one digital system (such as a computer) to control another — a synthesiser, for example. Its development is a result of the advances in electronic music-making over the last decade or so.

For several years, recording studios have contained many different pieces of sound-processing equipment — an impressive array of filter and reverberation units is often seen as proof of a studio's worth. Similarly, in live performance, a synthesiser player in the 1970s had to be entirely surrounded by banks of keyboards, each with a multitude of controls.

When considering what happens in a well-equipped recording studio, it is useful to think of the party game 'Chinese Whispers'. In this game, a sentence is passed from person to person. The last player then recites what he has heard of the original sentence. A straightforward sentence may have been changed into a collection of nonsense words, or vice versa. A similar process occurs in the recording studio, but here the original sentence is a collection of musical sounds. And instead of a chain of listeners, each producing a garbled version of the original, there is a group of sound-processing units, each one controllable and doing a specified task. Anyone using this equipment would probably use a central plugboard to make connections, or else connect units together directly. The controls on each unit would be calibrated manually in a matter of seconds by a skilled sound engineer, but the problems of synchronisation and communication inherent in such connections are easily imagined.

Twin Set
Alannah Currey, Tom Bailey, and Joe Leeway, of the Thompson Twins (shown seated front to back). Originally a seven-piece 'arty' band, they now perform as a trio with taped, sequenced rhythms as backup

The keyboard player of the 1970s had a different problem. Here, the immediate difficulty was not how to produce a sound from each instrument in succession — the player had only to move a hand from one keyboard to another. It was more likely that he would experience difficulties when two keyboards were to be played at once, but harpsichordists and church organists had known how to do this for centuries. Even complex music like a Bach fugue could be performed on one keyboard alone, and, anyway, most studio work would not have been done in one 'take'. Instead, each synthesiser part would be recorded on its own, with subsequent parts superimposed on the first, using different parts of a multi-track tape. Performing such music however, needed one skilful artiste, or two average musicians, or tape loops and a sound engineer.

But the most important development of the 1970s was in the sound-generating units *inside* the