
**1 Computer Control**
The Commodore 64 provides memory management and menu-driven operation of the music system through software. The disk drive, or cassette recorder, can be used to make digital recordings of sequences and store them for later use

deviates in tempo, then the input data will become a chain of 'un-barred' notes. Once the sequence is set to replay, there will be no problems until a grouping occurs that is neither $\frac{3}{4}$, $\frac{4}{4}$, $\frac{5}{4}$ nor $\frac{7}{8}$. As soon as this happens, the sequencer facility fails. This also means that a metre such as $\frac{12}{8}$ cannot be entered at all, even if the tempo is perfect: an unfortunate omission, since $\frac{12}{8}$ is a commonly used 'swing' metre in jazz, rock, funk and reggae.

Providing a sequence *has* been entered successfully, the data is displayed on the screen in columns, showing the octave in which the note-event occurs; the pitch of the note within the octave; the duration in musical terms (crotchets and quavers); 'gate'-time (a parameter used to add a sense of phrasing to the musical line), and the 'touch-sensitive' values of the keyboard, from 0-9.

This type of display in fact gives more information on a note-for-note basis than the Micon's use of standard notation, which has never incorporated either gate-timings or velocity levels — at least not in numerical form. This is because the ability to specify such parameters has entered the musical vocabulary only with the advent of electronics.

However, many musicians without formal training soon develop an ability to look at a section of standard notation and, by using the rise-and-fall shape of the notes outlined on the stave, get some idea of how a tune will sound, or what a group of notes in a chord adds up to harmonically. This means that, with practice, notation can be read, and a musical sequence 'heard' mentally in real time. Column displays may be excellent for checking data, but few people can hum a tune from them. An ideal system would include both types of display but, failing this, the Micon's crude version of standard notation is more effective and better suited to developing musical skills.

## CONCEPTUAL SYNTHESISERS

The main problem facing the musically inclined home computer owner may not be that of finding the right MIDI package; it is likely to be obtaining a MIDI-compatible synthesiser sophisticated enough to make the best use of the interface without the user needing a second mortgage to pay for it. If we require that the synthesiser should be able to handle 50 per cent of the backing tracks for a typical 1984 pop single, we find that such instruments cost in the region of £800 to £1,500. Below that range, most synthesisers are extremely limited in their application.

A possibility to consider is what has been called the 'conceptual synthesiser' — typically, an advanced software package and keyboard peripheral that utilises the sound-generating potential of a microcomputer, rather than an interface to a synthesiser that is likely to have been designed before MIDI was developed.

An example is the PDSG (programmable digital sound generator), manufactured by Clef Products. This interfaces with the BBC Model B microcomputer. It includes a 61-note velocity-