

via the alphanumeric keyboard, but it enables time and accentuation to be changed on a note-for-note basis. The Fairlight has an eight-voice capacity, so a user may enter eight different sequences, played by eight different sounds or 'instruments'. Each of these may be slightly out of time — by a matter of milliseconds — with the others, and the whole performance is co-ordinated by the Fairlight's internal clock.

It may well be asked what use it is for music to be performed in this 'inaccurate' way, especially by a computer. The answer is that people never play exactly in time, and one of the elements of performance — especially among jazz and some classical players — is the way in which a musician may 'bend' musical time when executing a passage. An operating system like the Fairlight provides a way in which certain styles of performance can be simulated. These simulations can be used in experimental and research work, just as computer simulations are used in the design of car bodies, aircraft wings and Space Shuttle heat-shields.

Many musicians are justifiably concerned that instruments such as the Fairlight will replace people, especially as the simulating capacity of such equipment develops. Groups like Wang Chung, Duran Duran and Culture Club use Fairlights as part of their production process, and it is often impossible to tell what is actually being played and what is Fairlight-performed. However, once a user gets to know the operating system, it becomes clear that the Fairlight is much more than just an expensive mimicking device. It is a genuinely new musical instrument, and has a potential that is still largely unexplored.

Although it is the best known, the Fairlight is not the only such instrument available. At twice the price of the Fairlight, the Synclavier system (costing around £30,000) has similar facilities, but on a larger scale. Data is stored using hard Winchester disks with a 40 megabyte capacity. An entire album could be produced and recorded within the Synclavier system itself, making an advanced 24-track digital machine completely unnecessary.

But even the Synclavier has its limitations. At present, all the available sampling instruments have one thing in common — they reproduce the sampled sound as close to the original as possible, unless the user has intervened to make a specific modification. But a trumpeter, in the middle of a live performance, can make a considerable difference to the next sound to be played simply by changing breath control or lip position. A competent player does this almost without thinking. The next step for sampling instruments would therefore be to produce a 'player-responsive' system.

The Kurzweil, which is still a prototype, incorporates a pattern-recognition program. This means that when a note is played on the music keyboard a number of different samples are scanned, and characteristics from each sample are

combined to produce the individual sound. The type of characteristics selected should reflect the way in which the music is played. Such a system would increasingly resemble the character and feel of a real acoustic instrument. The only difference is that no one upright or grand piano is exactly like another. All Kurzweil CMI 'pianos' will be identical in character and feel — unless users develop a method of writing their own 'character and feel' software.

A system even more advanced than the Fairlight, Synclavier and Kurzweil combined is rumoured to be under development by Lucasfilm — the company responsible for *Star Wars*. Called the ASP (Audio Signal Processor), this is expected to incorporate every type of musical digital sound facility that is presently available only in a large music studio complex into one operating system. So, just as the computers and synthesisers of the 1950s took up space equivalent to the area of several rooms and yet now occupy only a desktop, we can expect the recording studio of the future to be a portable package.

The incorporation of digital technology has not been confined solely to sound-generating systems and devices. Modern recording studios usually include a number of sound-treatment units as part of their basic equipment. An example is the *reverb unit*. Music is routed through this



Fairlight MCL

The music composition language used by the Fairlight MCL is menu-driven, so choices are made from clear, thorough menus on the screen. The waveforms displayed on page 584 were generated with a list of sound parameters in data statements, similar to a BASIC listing, then displayed and printed out using commands from the menu

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0001 1B=24:G=1/24:V=15
0002 R,764: (B4:D4):5: (B4:D4):7
0003 R,5: (B4:D4):V10,7/3: (B4:D4)V11,7/3: (B4:D4):E4:V15,7/3
0004 (B4:D4):5: (B4:D4):7
0005 R,5: (B4:D4):V10,7/3: (B4:D4)V11,7/3: (B4:D4):E4:V15,7/3
0006 (B4:D4):5: (B4:D4):7
0007 R,5: (B4:D4):V10,7/3: (B4:D4)V11,7/3: (B4:D4):E4:V15,7/3
0008 (B4:D4):5: (B4:D4):7
0009 R,5: (B4:D4):V10,7/3: (B4:D4)V11,7/3: (B4:D4):E4:V15,7/3
0010 (B4:D4):7/3: (B4:D4):7
0011 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0012 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0013 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0014 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0015 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0016 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0017 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0018 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0019 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0020 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0021 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0022 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0023 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0024 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0025 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3
0026 (B4:D4):V10,7/3: (B4:D4):V11,7/3: (B4:D4):E4:V15,7/3

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