Special Effects
Home computer-controlled music synthesisers are becoming increasingly popular. Musical effects, which 10 years ago were only available on the most expensive professional equipment, can now be bought for around £100 to £200. The one pictured here has a facility to read into its memory, music that has been encoded onto paper as bar codes. It is now ready to be reproduced or altered by the player. Many of these home synthesisers will link directly into a home computer, to take advantage of the screen and additional memory. However, more and more home computers incorporate some form of music synthesis

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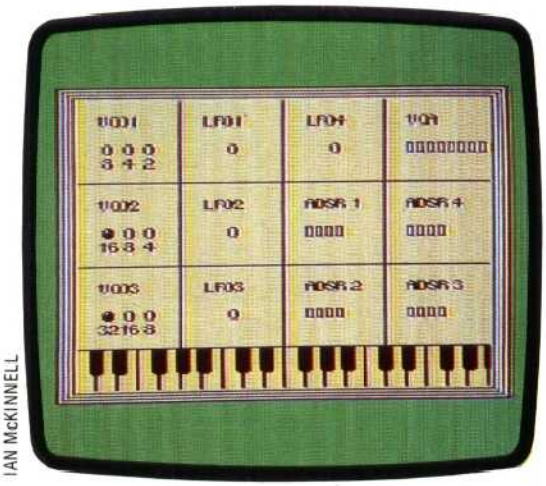
this through a number of electronic processes. Each process modifies or chips away at parts of the sound to turn it into the shape required. Subtractive synthesis encourages the musician to experiment with different combinations of processes, and is relatively easy for the beginner to get to grips with.

By contrast, anything created on a digital synthesiser needs to be as carefully planned as the construction of a large building. This is because the device makes use of 'additive synthesis' — the final sound is produced by adding components, one on top of the next. One has to be fairly near to the end of the process before the sound is even barely recognisable. However, it is possible to take

Musical Boxes
Many home computers now have packages available for them that exploit their music-making capacities. The screen display in these packages can be used to make a visual interpretation of the music being played, or can help the novice musician by interpreting the QWERTY keyboard into an approximation of the one found on a piano



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a conventional sound, analyse it down into its basic components, store these in the computer's memory, either in internal RAM or on disk or tape, and use them as 'bricks' in constructing the sound required.

As well as the ability to create such a wide variety of individual sounds, computers can also be used to store musical sequences and compositions. Most top-selling synthesisers have a sequencer (the device that stores and recalls the sequences of sounds) as an option, if not built in as standard. The Fairlight, for example, can store up to 30 minutes of sound on its disk memory, and for up to eight 'voices', which can be thought of as individual instruments. The Synclavier has double that number.

It can easily be seen that with the most expensive synthesisers (and here we are talking about £15,000 and upwards), the composer, musicians and conductor are rolled into one person — who to a large extent is a computer programmer as well.

If you have ever tried to play back a tape recording of your own voice at a higher speed (or for that matter played a 33 rpm record with the turntable set to 45 rpm) you will be aware that the pitch rises dramatically. One of the intriguing features of computer-controlled synthesisers is their ability to overcome this effect and play back a piece of music at a faster or slower speed than its original performance without altering the pitch, or conversely to transpose the tune into a different key at the same speed.

It is even possible to take, say, a trumpet track, duplicate it, and at the same time change the sound to that of a French horn. The two instruments can then be played together in unison, or alternatively, in harmony. This is called 'track bouncing'.

Many of these machines are instructed by means of a composition language (the Synclavier's is called SCRIPT), which looks not dissimilar from BASIC — complete with line numbers — though perhaps a little more cumbersome to use. The most outstanding feature is called 'reverse compiling' — play a piece of music on the keyboard, and the computer produces a listing for your composition in SCRIPT. This is equivalent, if you can imagine such a thing, to being able to play a new game of your own devising on your computer's screen, then pressing a button to get a complete program listing for your game!

If your timing hasn't been quite perfect then it is possible to edit and replay the SCRIPT listing using a conventional (QWERTY) keyboard and screen, just as in BASIC. A less flexible but prettier system comes with one of the Yamaha synthesisers: it