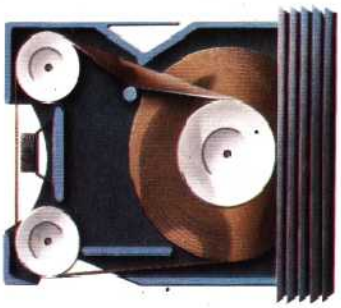
cassette but much cheaper than a disk. Such devices exist and are known as 'floppy tapes' or 'stringy-floppies'. Originally developed in America for Tandy's TRS-80 Model 1 system by Exactron, the first stringy-floppy used a continuous loop of tape in a cartridge housing; the idea was borrowed from the eight-track audio

Interface Lead
This flexible ribbon cable links the first Microdrive to the Interface 1 unit

tape system that was fashionable some years ago. The principle of operation is simple: the tape loop circulates constantly, so the various programs can be found much more quickly. A catalogue of all the programs and files stored on the tape is also kept (just like the directory on a disk), so a list of the contents is always available.

Because the information is recorded digitally rather than by audio methods, the transfer of information can be much faster than with an audio cassette tape — at least five times as fast, and often more. No complicated and expensive interfacing is required: the unit uses a normal parallel port and all the necessary operating software is either built into the drive or comes as a ROM to be plugged into a spare socket inside the computer. The name given to these drives describes their halfway status between a tape and a floppy disk — they use tape but operate like a disk.

Unfortunately, the first units were beset with problems. The mechanisms worked well but the tapes themselves proved unreliable. The major failing was that the tape simply couldn't take the strain of being constantly pulled out of the middle of a coil and wound back on the outside. This was not a problem with the eight-track audio tapes as they were much wider and moved far more slowly. Very few versions of the original stringy-floppy reached the UK; one was produced by a company



The Microdrive Wafer
The tape contained inside the Microdrive wafer is a continuous loop of video tape about 2mm ($^{3}/_{32}$ ins) wide. Video rather than audio tape is used simply because of its strength and long life. Compared with an audio cassette the tape is both thinner and narrower, making it very easy to damage.

In operation the loop of tape circulates within the Microdrive in approximately seven seconds and information is transferred at around six Kbytes per second, a significant improvement over the 1.5 Kbytes per second of the Spectrum's cassette interface. Any program stored on the wafer can be found and loaded in about 15 seconds. Each tape can hold up to 100 Kbytes of information, but Sinclair guarantees only that 85 Kbytes will be available for use. Each wafer must be prepared for use by 'formatting' the tape, a process activated by a simple BASIC command. Formatting checks which parts of the tape are capable of being used, and skips over any bad patches

called Aculab but it suffered from the tape quality problem. Until the introduction of Sinclair's Microdrive the floppy tape system was regarded as something of a lost cause.

The principles behind the Microdrive are just the same: a loop of tape is constantly rotated past a record and replay head. Furthermore, the tape is smaller than ever, at about 2mm ($^{3}/_{32}$ins) in width, under half as wide as the original floppy tape. Its reliability, however, is yet to be proven.

One alternative storage system that offers high speed with proven reliability is the digital cassette tape. Professional units have long been available but at high prices. With the introduction of the Philips micro digital cassette system, devices like the Hobbit (see page 94) have started to appear. Although the tape is not in the form of a loop it offers remarkable speed. The directory is kept in the middle of the tape, which can wind in both directions under the control of the operating system. Applications of this type of micro cassette have recently appeared in the Sharp PC-1251 and the Epson HX-20 portable computers.

The only major problem with all three systems of storage is that the software available in their respective formats is limited. The PC-1251 and HX-20 computers have the facility to load programs from a conventional cassette and then save them onto the internal micro cassette. The Hobbit and the Microdrive can be connected to the computer at the same time as a normal cassette recorder, making copying even easier.

In terms of proven reliability the digital micro cassette system has the edge over both stringy-floppy and conventional cassette systems. Whether it will ever replace them is a matter for speculation.