Laser Show

Optical (laser) disc technology opens up two major applications for home computers: interactive video and mass storage

Whenever one overhears a conversation about home computers, the first statistic quoted is invariably that of memory size. Certainly, the internal storage capacity of the computer is important, but the capacity of its mass storage system is likely to prove more critical in the long term. After a couple of months, the enthusiastic home computer user will have accumulated a considerable number of cassettes, or several boxes of disks. Yet most of these programs are never modified, and they would be better stored in ROM cartridges than on delicate magnetic media. What would be very useful is some form of digital storage system that was read-only like a cartridge, but had a much greater capacity.

Such a system does exist— in the form of the optical laser disc. Currently, though, this system is used in the home only as an alternative to the video cassette recorder for showing pre-recorded material. Another use of the same technology is the compact audio disc, which is replacing the turntable and stylus format of hi-fi systems.

The difference between these two types of systems (apart from the diameters of their discs) is in their methods of operation. Whereas a video disc is an analogue system, a compact audio disc stores its information in digital form — i.e. as a sequence of ones and zeros. This information is turned back into the original audio signal by a digital-to-analogue convertor, which is the electronic opposite of the process that created the information in the first place. Because there are so many stray electric fields in the domestic environment, it is impractical to use magnetic media like floppy disks for video recording. In any case, the amount of information on an optical disc can run into millions of megabytes, and that is much more than even a Winchester disk can hold.

There are several optical laser disc systems available, but the most successful to date is that introduced by Philips. This system uses a 14 inch (35 cm) plastic disc, which is really only a protective envelope. The information itself is buried deep inside the plastic as a series of pits in a sheet of metal foil. As on a floppy disk, the stored information is catalogued on the video disc, so that, given the right sort of disc player, it is possible to move instantly to any single piece of information. Once the read head is in the desired location, the information is read back from the disc by the laser beam. The light passes through the plastic and falls on the surface of the metal foil. A light sensitive cell then reads the information as the light is reflected from the pits in the foil. The information is recorded on a single spiral track, with one frame of the video for every revolution. This gives a total of 54,000 frames on each side of the disc, or 36 minutes of playing time.

The main potential uses for optical discs in the field of computers fall into two areas. The first, and already available, development is that of 'interactive video'. A transmitted television programme is non-interactive — the viewer has no control over the order in which the scenes are presented. With interactive video, however, textual and visual information is stored on a video disc, which is connected to a computer. The disc can then be used as a reference library, with the displayed text superimposed over the video pictures on a conventional television screen. In response to prompts from the computer, the user can select specific 'tracks' or 'scenes' on the video disc to be played. Alternatively, the disc can be used as a training aid, with live action or stills being displayed on a television and the trainee's answers to relevant questions input to the computer, which can monitor and report on the user's performance. Interfaces between a domestic video disc and a home computer are still not widely available, though many enthusiasts have constructed their own. Philips do, however, market a professional model of their LaserVision, which can cope with interactive video on its own, or can interface with a computer by means of an IEEE488 or RS232 port.

The other area in which optical disc technology is likely to be exploited is the provision of computer software. Imagine, for example, the advantages of supplying a computer with all its systems software — word processor, database, spreadsheet, and several dozen games — on a single, incorruptible disk. This is likely to take the format of the compact audio disc, but as yet no compact disc player has been fitted with a computer interface. With such a huge market potential it is reasonable to expect domestic compact disc players with such interfaces within a very short time, as well as dedicated compact disc players for personal computers. Sony and Philips have already announced their intention to produce a dedicated disc player for computers, called CDROM.