CAMERA OBSCURA

The BBC Micro offers users a wide range of graphic modes, enabling complex pictures to be built up onscreen. Numerous graphic ROMs are also available, and now the EVI Video System allows an onscreen image to be produced by simply pointing a camera at the desired object.

The EVI Video system — also known as 'Snap' — is priced to fall well within the budget of a home computer user. Complete with software, it costs only £130 — less than half the price of any comparable video interface. The Snap system consists of a small electronic camera that is connected by a ribbon cable to the BBC's user port, together with software on either cassette or disk. With this system you can transfer the image of any object or scene onto your computer's screen simply by issuing the correct command. You can use Snap just for fun, but more serious applications are possible — the system could form the basis of an 'intelligent' burglar alarm, or could be used for image recognition, perhaps even giving 'sight' to a robot.

Snap works by virtue of a quirk of electronics. Inside the camera, behind the lens, is a 32 Kbyte RAM memory chip. Unlike normal chips, this has been manufactured with a transparent window in the top surface of the chip. The image from the lens is focused onto the surface of the silicon wafer that makes up the chip, on which there is an array of 256 by 128 tiny memory cells. These cells, like those in any other chip, have a property that is usually 'invisible' to the user. When a cell is exposed to light it slowly loses its stored charge, and the rate at which it discharges is proportional to the intensity of the light falling on it. In the Snap camera all the cells are first fully charged by writing a specific value to all memory locations, thus turning each one 'on'. After a short period, any cells receiving light slowly discharge. After a pause, all cells are re-read to ascertain the value in each. Those that have received no light will still have the same 'on' value, while those in the path of sufficient light will have discharged, changing their stored value, and so will be read as 'off'. The system software plots a lit point on the screen in a position that corresponds to each 'off' cell in the memory array. In this way, a reproduction of the image on the chip is transferred to the BBC screen.

The time period between the computer writing all the memory cells to 'on' and then reading them again determines the 'exposure' of the picture. The Snap camera is capable of producing many pictures each second if the lighting is bright enough; in normal room lighting you can take a picture in under a second.

EV1 Moving Pictures
The software with the Snap camera is called EV1. It continuously displays on the screen what the camera 'sees'. It also allows pictures to be dumped to a printer, frozen on screen, or saved to disk. The computer finds what it estimates as an appropriate exposure setting, although this can be changed manually by pressing the up and down arrow keys

The picture resolution is limited by the 256 by 128 array of memory cells on the camera chip. This is not particularly high — it is about the same as a Mode 2 or Mode 5 BBC screen — but it gives a very reasonable picture quality, comparable to a newspaper photograph. A more important restriction on quality is not the resolution but the result of another feature of the memory chip. The array of cells is, in fact, split into two separate segments on the chip surface. A gap between these two blocks means that a strip across the centre of the image is not detected by the camera, and the resultant screen image thus has a small missing section. Surprisingly, this is not too serious and on many pictures is entirely unnoticeable.

The Snap camera itself is encased in a small plastic box about the size of a cigarette pack. At the front is the lens and on the base is a standard