



**CHECKOUT**

# MICROSIGHT

*Surya checks out a low cost microcomputer-based image analysis system from Digihurst.*



*The complete system: closed-circuit TV camera, Microeye interface and BBC micro — plus a digitised PCW Editor!*

Image analysis is a fancy-sounding title for the task of capturing an image and processing it in various ways. This processing may include such operations as storing

the field of quality control; checking components as they pass along a conveyer-belt. Other uses include applications as diverse as detecting stress patterns in

Since I'm going to be using the phrase rather a lot, I'll refer to image analysis as IA from now on (not to be confused with AI!).

Microsight 1 is to produce a low cost system using a micro rather than a mini as the host computer. The system currently interfaces to the BBC Model B, 48k Apple II, RML 380Z, Commodore PET and ACT Sirius 1. A disk drive is required. This review was carried out using a BBC B.

## Overview

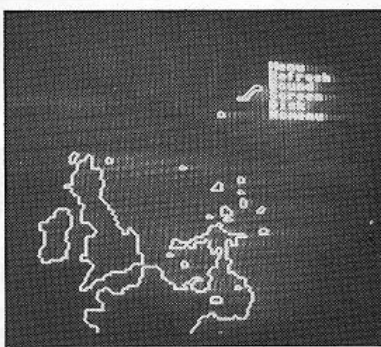
From the outset, I feel I should make two points. Firstly, although it is possible to use Microsight 1 for practical applications, the system does not readily lend itself to some of the more obvious uses of IA such as quality-control. Industrial applications, such as the conveyor-belt example already mentioned, require equipment that is both rugged — able to cope with dirt, dust and the odd knock or two — and fast. Quality control is often the bottleneck in a production process, and the whole idea of an automated system is to speed up the process. Microsight 1 is neither rugged nor fast.

Secondly, Digihurst is clearly not aiming at end users. While you don't need to be a technical whizz-kid, you do at least need to possess a good working knowledge of micros and to feel happy with the jargon which the documentation makes no attempt to avoid. You'll also need to be a competent, though not exceptional, programmer if you want to be able to do anything useful. The software supplied as standard does little more than prove that the hardware works, and at present only one piece of applications software is available (see Microscale below). It is left to the users to interface their own software to that supplied.

This said, I was generally quite impressed. At £570 for the basic system, hardware and software, Microsight 1 does make 'hands-on' experience of an IA system a practical proposition for schools, colleges and the more solvent hobbyist interested in experimenting with such a system.

## Hardware

The main hardware component is the Microeye interface. This consists of a 25x18x7cm box. The only control on the box is a large on/off switch on the front with the parallel interface and video socket on the back. The same uncluttered appear-



*A boundary function displays outlines*

ance is found on the inside, with everything neatly laid out on a single board (see photo).

The image is captured by means of a standard CCTV video camera of the type commonly used in High Street store security systems, and passed to the Microeye interface via a BNC to BNC cable. The Microeye interface then feeds the digitised image to the computer via an 8-bit parallel port.

## Software

The standard software supplied comprises a Basic calling routine, two Basic disk-handling routines and six machine-code programs.

The Basic calling routine is a very short and simple program to present the menu, process menu selections and transfer control to the appropriate disk-handling routine or machine-code program. The first of the disk-handling programs deals with transfers between disk and screen memory, while the second concerns itself with RAM transfers.

All the processing and display work is performed by the six independent machine-code programs. The exact facilities offered naturally depend on the capabilities of the host machine.

## Documentation

The documentation comprises two spiral-bound A4 photocopied texts, each about fifty pages in length. The Microsight Manual gives an overview of the system, from both a hardware and software angle, while the implementation guide tells you about the version for whichever machine you are using.

The bulk of both texts consists of listings of the Basic and machine-code programs together with detailed technical explanations of same. This is essential if the user is to be able to produce custom-designed software for the system.

The Manual gives adequate, though not particularly expansive, explanations of both hardware and software. Once you've got hold of the basic principles of the thing and want to begin actually using it, most of the information you'll need is probably contained somewhere within the two texts. Whether you'll be able to find it, however, is another matter since neither text includes an index. I have other complaints about the documentation, the scarcity of



*Map work is an ideal application*

examples being one of them, but the lack of an index is a glaring omission.

Overall, I felt that the documentation did little to aid the familiarisation process.

## Using Microsight 1

Setting up the system is simplicity itself. Connect two cables, switch everything on, load the software and away you go. All being well, you will be presented with a menu of six options. Images are loaded into the micro using the R)efresh option. The camera is continuously sending signals to Microeye, but it takes five seconds for this image to be digitised and downloaded to the micro. Whatever is in front of the camera must remain (reasonably) still during this time.

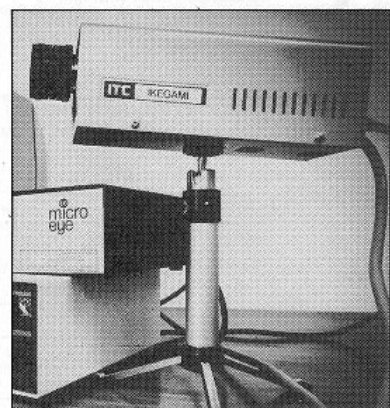
I found that producing a recognisable image on the screen is very much a hit-and-miss affair, the documentation giving few hints. The camera seemed to be set for fairly low light levels, giving an over-exposed image in average office lighting even with the aperture shut right down to f16. It was usually necessary to switch off the strip-lighting to obtain a correctly exposed image.

When you feed in an image using the R)efresh key, the image is displayed using (in the BBC implementation, at least) about 25% of the screen. This allows fairly fast plotting when adjusting the exposure, focus, contrast and threshold value. Once a satisfactory image has been obtained, the C)olour option expands the image to fill most of the screen (a test window on the right-hand side is reserved for the menu).

The threshold value is set by the T)hreshold key, explained in the implementation guide as follows: 'Threshold allows the threshold value to be set during run time.' Uh-huh. A little experimentation suggests that this setting allows the exposure of a processed image to be adjusted. This can be used, within limits, to compensate for an under- or over-exposed image.

D)ump allows you to dump the image currently displayed to either D)isk or Epson P)rinter. N)omenu simply switches off the menu display (recovered using the space bar, though the documentation doesn't appear to mention the fact).

P)rocess transfers you to a second menu which enables you to carry out further processing. If you bought Microscale as



*An ordinary CCTV camera is used*

# MICROSIGHT 1

part of the package, then this will be called by the P)rocess option. P)rocess itself offers you only one further processing option, B)oundary. Boundary removes all shades of grey, displaying instead the boundary between black and white areas as a thin white outline (see photo). With Microscale present, you may then carry out measurements of the outlined objects.

## Microscale

Microscale is an optional program costing £340. As the name suggests, Microscale is intended to facilitate the measurement of objects.

I don't want to appear greedy, and Microscale is a very nice piece of software, but if I were paying over three hundred pounds for a program, I'd expect a little more in the way of documentation than the three-and-a-half pages found at the back of the implementation guide. The documentation gives only a very brief explanation of what the various commands do without giving any examples of how to use the program for practical applications.

If you want to measure objects in millimetres rather than pixels, a perfectly reasonable requirement one would think, you are given no help from the documentation. It is left to you to calculate the varying ratios between pixels and millimetres for different object-to-lens distances, and so on. With so little help from the guide, it was difficult to judge the quality of the program.

Microscale is used by guiding a cursor-arrow to mark points on the screen or to create rectangular 'windows'. The program will calculate the distance between any two marked points, the area within a window or the area and perimeter of a chosen boundary.

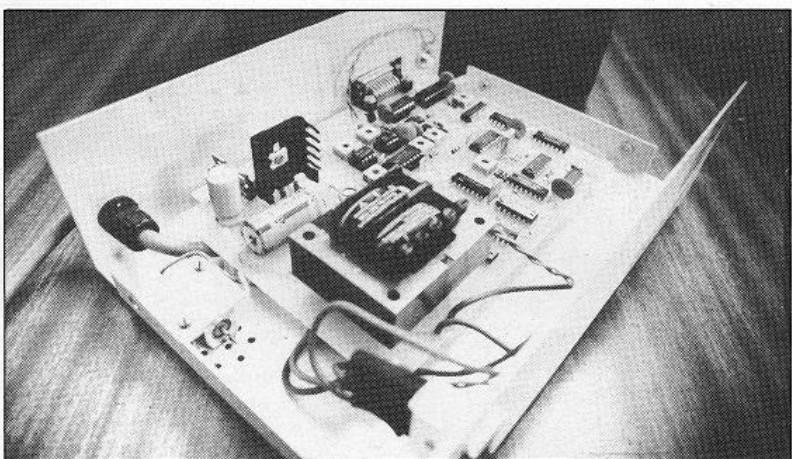
A section of the keyboard is defined as a keypad for moving the cursor in one of eight directions. To measure the distance between two points, you move the cursor to the first point, press the D)imension key and then repeat the process for the second point. The distance between the two is then displayed as x and y values.

To measure the area of an object, you use the B)oundary function to obtain an outline of the object then indicate the particular outline with the cursor-arrow. Pressing the A)rea key will display the area contained by the outline. A similar process is used to obtain a P)erimeter value.

Microscale is extremely easy to use and certainly seems to be a very powerful piece of software, but it really does require some adequate documentation to enable full use to be made of it.

## Applications

Among the current users of Microsight are a pharmaceutical company using the system to detect growth in culture dishes, a dentist analysing dental charts, and someone, according to Digihurst, is using it to measure pebbles . . .



The Microeye interface — a single, uncluttered board

As with most things in the computer world, the hardware may be ingenious but it's the software that counts. Microscale could be used for a number of applications in itself (measuring distances on maps, for instance), but most applications would require specially-written software to interface to the software supplied.

After my earlier, not particularly complimentary comments on the quality of the documentation as an introduction to the system, it has to be said that in the area of interfacing — both hardware and software — the manual and implementation guide really come into their own.

On the hardware side, the manual gives circuit diagrams of each part of the circuitry, a full description and diagram of the parallel interface connections plus a schematic diagram giving an overview of the complete system together with information on the main settings and possible adjustments.

On the software side, full listings are given of all the programs and routines together with a breakdown of what each section does. I didn't have time to do much in the way of experimentation, but it seemed simple enough — for example, to take one image every minute, storing the latest one on disk each time. With the extensive notes supplied explaining each of the programs and routines, a reasonably proficient programmer should be able to set up a simple applications system.

## Conclusions

Microsight is obviously considerably less sophisticated than more expensive mini-based systems, but it is a working IA system suitable for research and educational use.

For practical purposes, Microsight 1 is likely to be somewhat limited in its uses. The lack of applications software restricts its use to the enthusiast, though software houses would doubtless produce custom-designed software to suit a given application — at a price.

The very fact of a micro-based IA system, however, is a significant achievement, particularly when a complete working system sells for less than £600. It brings practical experimentation and research

into IA into the reach of schools and colleges as well as the odd dedicated hobbyist. The power of Microscale suggests that Microsight could form the basis of quite a sophisticated system given some well-written software.

To what extent it will be used for general applications will depend on the software produced for it. It is by no means impossible that the education and R&D fields will produce software which will prove useful in other, less specialised fields. Whatever happens, an interesting idea and a good bet for schools.

## Prices

Microsight 1 £569.25  
(Includes camera, cables, interface, software & documentation)

Microscale £339.25

Microeye interface (if ordered separately) £339.25

All prices include VAT. Microsight 1 is available for the BBC B, 48k Apple II, RML 380Z, Commodore PET and ACT Sirius 1. For other machines, contact Digihurst's technical sales dept. A more sophisticated, solid-state system is available for £3444.25.

For further details, contact Digihurst on (0223) 208926.

*PS: Following my comment on the price of Microscale and the lack of documentation, Digihurst has informed me that it will be issuing an updated Microscale manual. With regard to the price, managing director Peter Kruger stated that the system 'is not a mass-produced item but requires an immense amount of tailoring to any particular application. We have not, so far, applied it to the same problem twice, therefore we have to include a large proportion of support costs with the software. We find it more honest to do this than to sell the product cheaply and then tell the user he has to pay the same amount again, or more, for a visit from us to apply it.'*