

ACORN USER

BBC micro, Electron and Atom magazine

July 1983 £1

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BBC MICRO · ATOM · ELECTRON

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As you'll have read in last month's *Acorn User*, this year sees the first Acorn User Exhibition to be held at the Cunard International Hotel, Hammersmith, London W6, August 25-28.

You'll find everything you need to make the most of your micro at the Acorn User Exhibition:

- Hardware
- Software
- Add-ons
- Books

And, of course, Acorn User magazine.

Admission will be £2 for adults and £1 for children. If you're a subscriber to the magazine, look out for half-price entry vouchers nearer the time of the show.

Reduced price admission will also be available for school parties. For further details, write to:

John Jones or Susan Phipps
Acorn User Exhibition
20 Orange Street
London WC2H 7ED
Tel: 01-930 1612

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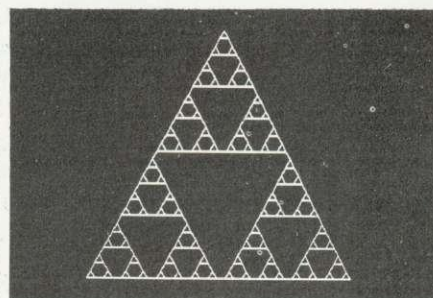
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How to submit articles: You are welcome to send articles to the Editor of *Acorn User* for publication. *Acorn User* cannot undertake to return them unless a stamped addressed envelope is enclosed. Articles should be typed or computer written with double line spacing. Black and white photographs or transparencies are also appreciated. If submitting programs a cassette or disc is vital. Payment is £50 per page or pro rata. Please indicate if you have submitted your article elsewhere. Send articles, reviews and information to: The Editor, *Acorn User*, 53 Bedford Square, London WC1B 3DZ.

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BEEB, BRAILLE & THE BLIND

With the introduction of a new micro, there normally follows a range of input/output devices. These may include joysticks, alternative keyboards, speech input and output. Generally, these are aimed at the leisure market, but their adaptation for the disabled has been an interesting development.

In the past, the disabled have been assisted with equipment that is very specialised and, consequently, costly. With micro hardware, adaptations can be achieved through software – important in relation to cost.

The BBC model B has been used with alternative input devices and synthetic speech output to provide a configuration that can be used in schools for the blind and partially sighted. With the exception of the interface for the Perkins braille, the applications described in this article have been achieved

*Dr Thomas Vincent
has used BBC micros
at the Open University
to help teach students
who are blind or
visually handicapped*

through software developed for commercially available hardware.

Early in 1982, the MEP and DoI funded a project at the Open University to investigate the use of the BBC micro for the visually handicapped in schools. This followed two successful years of using micro and speech synthesisers in the homes of blind OU undergraduates. The objective of the new project was to develop a range of software that would

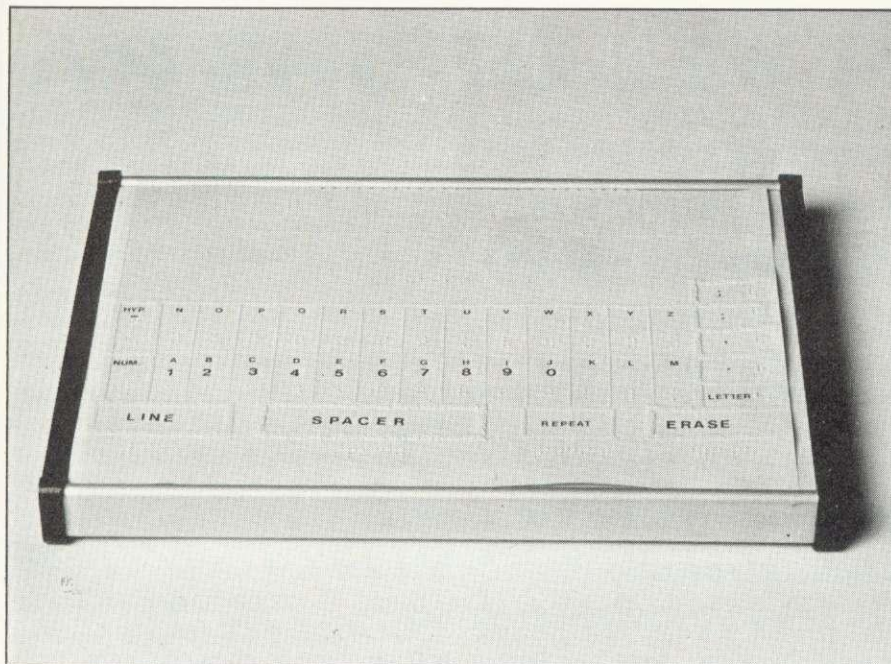
provide programming in Basic and computer-assisted learning.

The hardware in current use is shown in figure 1. Interfaced to the BBC micro is a Star Microterminals concept keyboard, a Votrax-Type'N'Talk speech synthesiser, and a Perkins braille. The last is the standard device used by the blind to produce hardcopy braille (combinations of dots produced by pressing the six main keys). It has been adapted by adding micro-switches under each key which transmit signals via an interface to the user port.

The interfacing of the Perkins braille is important as it gives an opportunity to assist in braille teaching. A young person may have difficulty in 'reading' what they have typed because their tactile sensitivity to the raised braille dots may be at an early stage of



BBC micro flanked by Perkins Braille, with Votrax on top of the monitor



Star Microterminals keyboard with braille-embossed overlay

development. Hence, providing a spoken output offers some help.

One of the teaching programs allows a pupil to type in any word which is spoken and can be repeated or corrected. Once the program is loaded by the pupil only needs to use the Perkins brailier. The teacher can access a complete record of the pupil's work from the micro keyboard at any time. For the partially sighted, the words are displayed during typing with double-height characters (mode 7).

Enhancement of tactile sense is achieved with a concept keyboard, which has 128 individual sensitive areas. Overlays are used which have braille-embossed characters (a character occupies one individual area, and is selected by pressing one adjacent area). In this way all of the 63 braille characters can be represented and selected. Programs developed for the Perkins brailier have a procedure which makes the output from the concept keyboard compatible with its output. Hence, the same program can be used with either input device. The program recognises which device is being used by the range of ASCII values: concept keyboard, 128-255; Perkins brailier, 1-127.

The Votrax-Type'N'Talk provides an unlimited vocabulary for various applications. In some cases look-up tables are incorporated. These change the text before it is sent to the speech synthesiser to achieve improved pronunciation. For example the word 'error' is pronounced

better if it is changed to 'airor'. This technique is adopted with a Basic interpreter modification that gives programming facilities with synthetic speech as the output medium. A screen can be used, but the interpreter is designed for a blind person, hence it is assumed that programming can be achieved without visual output. Full editing with the 'copy' and 'cursor' keys is available.

An important feature is that Basic programs written with the standard interpreter will run under the modified interpreter. This helps a teacher writing a program for a visually handicapped person where program development or debugging is more conveniently carried out with a screen display rather than speech. The only restrictions with the modified interpreter are the use of mode 7, and HIMEM must not be changed. All other facilities are available although graphical representations do not have an immediate speech equivalent.

It is hoped that the text-to-allophone speech chip from Acorn will provide higher quality speech at a lower cost and can be incorporated into the configuration already developed. Existing software has been designed with this change in mind.

At least for one section of the disabled community, the exploitation of commercially available hardware through software development has become possible.

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