

EDUCATIONAL COMPUTING

DECEMBER 1983 £1

AN EMAP PUBLICATION



Please do not adjust your set . . .
Throw it away and buy a monitor!

Plus: Special Education and RML Software Update

GSL

A **GSL** COMPUTING PUBLICATION

COMPUTING NEWS

DECEMBER 1983

ISSUE 3

A NETWORKING MARRIAGE FOR THE BBC MICRO FROM GSL AND AMCOM



Rod Lewis (left), **GSL's Sales Manager**, discussing **E-NET's speed, simplicity and versatility** with a customer.

E-NET allows up to 200 computers to share a common, large central disc store, and overcomes many of the inconvenient features of earlier network systems.

E-NET uses a hard disc unit as the central disc store, allowing upwards of 8 Megabytes of storage. It has effective, simple structures to limit the disc space available to any user, and to permit access by any user to library programs. Many users of the few simple networks installed so far have complained of the difficulty of monitoring pupil's use of disc space, but **E-NET** overcomes all these problems by doing the monitoring for you. You simply allocate a space limit to each user on the Hard Disc using the

"GSL's Impressive Customer Base"

- C.E.G.B.
- MANY UNIVERSITIES
- TROWBRIDGE CONSORTIUM SUPPLIES
- BBC PUBLICATIONS
- THE ROYAL NAVY
- BRITISH TELECOM
- HAMPSHIRE COUNTY COUNCIL
- PIRELLI
- NATIONAL COAL BOARD

GSL Analogue Signal Display & Analysis System for the BBC/Acorn (Model B) Microcomputer

This system enables a BBC Microcomputer (Model B) to function as a two channel, large screen, storage oscilloscope, for frequencies up to high audio values.

The basic system comprises an analogue to digital interface unit which is connected to the computer via the 1MHz bus. The accompanying software package enables input signals to be displayed in the time domain and also, if required, analysed via fourier transformation to give frequency domain representation.

The main features of the system are:

- Two channel, large screen, display of signal amplitude vs time, with grid scaling information, channel identification and pk/pk measurement.
- Repetitive or externally triggered sampling of input signals.
- Display time (total sampling period) variable from 0.002 sec. to 25 secs.
- Number of sample values = 100 per channel.
- Minimum sampling time = 20 sec. (inclusive of both channels).

AMCOM'S E-NET is a flexible network filing system for the BBC microcomputer, specially designed in conjunction with **GSL** for Education use. It uses the network interface in the BBC machine so that if you already have networked machines it only requires fitting a new ROM in each clients machine and installing the Hard Disc Unit. (If you do not have network B's then a network interface has to be fitted to each machine).

simple command program. For most schools and colleges this size disc will allow each user to have a reasonable file store, but it can be extended if required by adding further hard disc units. Important files can be easily copied to minifloppies if required.

E-NET has many useful extra commands. For example a simple command which only operates from the master (teacher's) machine, and which forces each client machine (in a certain specified room or area) to load and run

a particular program is included. This is very fast, and flexible, and allows for efficient use of C.A.L. packages. Care has been taken to ensure that the command structure is simple enough not to intimidate the non-specialist, while remaining flexible and robust.

E-NET allows one or more printers to be connected to the network and although this is connected to one of the network computers this computer can still be used even while the printer is in use.

| | Price £ |
|--------------------------|---------|
| 5 MB Winchester System | 1650.00 |
| 10 MB Winchester System | 1950.00 |
| 20 MB Winchester System | 2400.00 |
| 65 MB Winchester System | 4700.00 |
| 105 MB Winchester System | 5130.00 |
| 140 MB Winchester System | 7000.00 |
| 280 MB Winchester System | 9500.00 |

E-NET is fast, simple to use and versatile. The first system being installed for use in September, and demonstrations can be arranged.

Large stock of Computer Peripherals always available

GSL know from talking to their customers that nothing is more frustrating than responding to an advertisement and finding the advertised goods are out of stock or not readily available. **GSL** hold large stocks of all computer peripherals advertised.

- The **GSL** range is constantly growing and currently included:
- BBC MICROCOMPUTER
 - SHUGART DISK DRIVE RANGE
 - NEC PRINTERS
 - EPSON PRINTERS
 - PRINTER BUFFER
 - MICROVITEC COLOUR MONITORS
 - SANYO COLOUR MONITORS
 - KAGA GREEN SCREEN MONITORS
 - TORCH Z80
 - VARIOUS SOFTWARE INCL. WORDWISE
 - PRINTER PAPER

EDUCATION APPROVED DISK DRIVES MATCHING ACORN BBC MICRO

All disc drives supplied in metal case finished to match the Acorn BBC microcomputer.

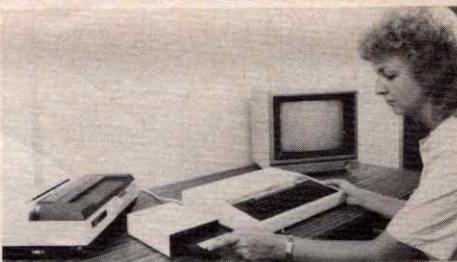
Shugart SA200 Capacity 100K — Price £144.50 including Leads.

Less than two-thirds the height of standard models, Shugart's single-sided SA200 5-25 inch minifloppy disk drive offers 125 or 250 Kbytes of capacity in a low cost highly reliable package. Low cost, compact size and high reliability make the SA200 an ideal choice for entry level desk top applications in personal computers, word processors, memory typewriters, portable computers or terminal add ons. Package includes all interconnecting leads.

Shugart SA455 Capacity 200K — Price £238.00 including Leads.

Shugart SA465 Capacity 400K — Price £281.50 including Leads.

Prices excluding carriage and VAT.



The complete system is compact and easy to use.

Shugarts SA455/465 half height mini floppy disk drive offer a compact alternative to standard height drives for desk top systems requiring maximum performance in a greatly reduced space. Since users can quickly double existing storage capacity by fitting two drives in the space formerly occupied by one standard minifloppy the SA455/465 drives provided and excellent means to increase storage capacity without increasing space.

Return to **GSL COMPUTING LTD**, I am interested in the following: (please tick)

- The **GSL** Winchester System
- 5 MB
- 10 MB
- 20 up to 200 MB
- The **GSL** Slim Line Disk Drives
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Send me by return full technical information

or phone Rod Lewis on Andover (0264) 58744/51699

• TELEREF 101

E. U.

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Ed's Spot

EDUCATIONAL COMPUTING December 1983 Volume 4 Issue 10

1983 has been a marvellous year for *Educational Computing* and as we see it out with the December issue, I would like to thank all our readers for their support and contributions. 1984 may have pessimistic overtones for some, but not for us! I look forward to an even more action-packed year: indeed, we intend to play our part with a special issue in January dealing with developments in software (see Next Month).

On the *Learning To Cope* front — which has appeared in the past at the beginning of the year — the 1984 issue will be published next summer. We have had to delay its publication because of increased commitments on staff by an extra issue of *Educational Computing*. However, in this month's issue, we have an extensive section on special education featuring six or seven different applications.

Our cover story is all about monitors. After using one for a considerable length of time, I cannot envisage going back to the days of wobbly screens and the running colours of a TV set. They are definitely worth the investment. We look at eight different models as well as the technology behind the development of monitors.

RML users will be happy to see Software Update for the 380-Z and 480-Z micros: we hope to bring you up to date with educational software for all the popularly used machines in the early issues of next year. Don't forget that Newsoft brings you news each month of recent program releases for a number of micros.

And finally, if you can't decide what to buy your nieces and nephews this Christmas, turn to our book reviews section with no less than 14 books for youngsters on various aspects of high technology.

I hope you all have a very happy Christmas and a prosperous New Year.

Next Month

Our first ever January issue will reach you on or before January 6th, but be prepared for something a little different. We have dedicated the entire issue to developments in software — what kind of material you might expect to find in widespread use before too long including sections on Logo, word processing, databases, graphics, simulations, Prolog and telesoftware. We will help you decide what programs to buy with an extensive reviews section and a special feature on selection criteria. We look at the major software suppliers and their plans for 1984 and we bring you *Educational Computing's* Top 10 — the best programs of 1983.

E.C. Needs you

If you would like to contribute to *Educational Computing*, unsolicited articles are welcomed. We cannot promise to publish every one, but your letters and articles provide us with invaluable information which acts as a guide for future issues. For all would-be writers, it would be of great help if your copy is typed with double spacing and one-inch margins. Published material will be paid for at the rate of £50 per page, or pro rata. Please indicate if you have submitted your article elsewhere. We would also appreciate the inclusion of any photographs — colour or black and white, illustrations, diagrams and listings with contributed articles. These will, of course, be returned on request. Please send your copy to The Editor, *Educational Computing*, 8 Herbal Hill, London EC1R 5EJ.

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Your thoughts and opinions featuring the star letter of the month with the consequences of new technology for schools and society providing this month's Viewpoint.

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New series from BBC School Radio and TV, Acorn's takeover of the Computer Education in Schools (CES) project, competitions and more including a comprehensive diary of forthcoming events.

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Hardware based news featuring ROM expansion for the BBC micro, a repackaged version of the Apple IIe, robotics, control modules and a Christmas present idea.

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Details of the new Macmillan/Sinclair material, software for geography teachers and other recent educational program releases from UK software houses.

15 Software & Book Reviews

No less than three pages of reviews as we look at *Timeman One, Lines and Angles, Geography France, Reversals and Equations & Inequalities*; with a round up of books for young children.



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18 Micros Made Easy

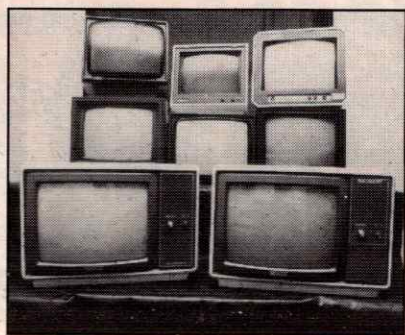
How to start and what you might expect: the experiences of one head teacher in the integration of the micro in the primary classroom.

21 Software Update

A complete guide to programs for RML's 380-Z and 480-Z micros covering all age groups and many different subject areas.

27 Sharpen Up Your Image!

(Cover story)
 A four-page guide to monitors including an introduction to the techniques (and jargon) used. We look at no less than eight different models from leading suppliers.



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32 Special Education

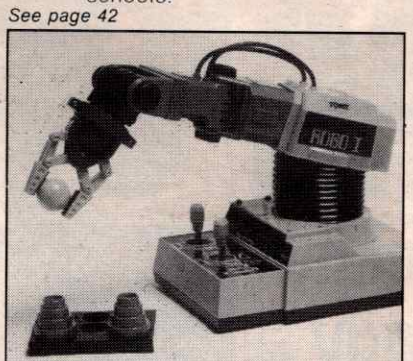
An extensive report on how people are utilising the micro in different areas of special ed; including work with very young physically handicapped children, the development of a unique speech synthesiser system, research into communications for deaf and partially hearing children, computer holidays for handicapped people, talking computers for the blind and software development projects from the Rotherham Special Education Computer Users Group. We also look at a variety of new devices. (Our Prize Conundrum is on page 39.)



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42 Machine Reviews

Two pieces of hardware are examined including Tomy's Robo 1 and the Tarren Digigraph, both of which have interesting applications in schools.



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The only way of receiving regular copies of *Educational Computing* is to take out a subscription. 1984 sees the commencement of Volume 5: we are now a very well established magazine with experienced contributors who have a wealth of information to share with you. A subscription costs £11 a year for 11 issues: just fill in the coupon below and send it to:

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Name

Position

Establishment

Address

Signed

Date



It is always encouraging to receive readers' letters — whether they be praise or complaint. It occurs to us that many of you put in a great deal of effort when writing to Postbag, so we have decided to offer £10 for the star letter of the month. We can also offer advice to anyone with a particular problem in obtaining hardware or software. If you feel particularly strongly about something or want to air your opinions, why not participate in Viewpoint, for which we also pay handsomely! Please write to the Editor, *Educational Computing*, 8 Herbal Hill, London EC1R 5EJ.



Does anyone know what VELA can do?

As all of my acquaintances are aware, I am by nature a quiet, retiring, myopic individual who would not say boo to a goose. Therefore, prior to the publication of your last Postbag, I naturally decided to observe the correspondence between Bob Sparkes and Andy Lambert with equanimity and quiet amusement, believing — as an incorrigible optimist — that sanity and common sense would prevail in the end.

However, the second Sparkes letter has incensed me sufficiently (in my capacity as VELA's software designer) to pen this letter and to pose the question: "Does Bob Sparkes really understand what VELA can do? Is he finally off his chump?"

I would like to correct some earlier innuendos in Sparkes's letters: VELA was designed originally for the laboratory. Therefore, the 2114 RAM chips were chosen because they were cheap. If the user wants low power operation, they can replace the existing chips by pin for pin compatible RAM (4334s) and also CMOS PIAs type 6321 for the 6821s. These modifications will reduce the current consumption to 300 milliamps. Therefore, a set of 4AH rechargeable Nicads will operate VELA

for 13 hours continuously.

CMOS RAM (6116) is now being fitted in VELA as standard, together with the facility for a back-up Nicad battery inside VELA — to keep the data 'alive' until you return to base. Visions of a VELA user trudging through Yorkshire peat bogs with a car batter strapped to his back are therefore fallacious — VELA plus Nicads can be held in one hand and the combination is truly portable.

I do not understand statements like "the VELA software is frozen". Graham Bevis (national co-ordinator for MEP in electronics and control technology) can verify that, right at the beginning of the project (November 1982), I had, right at the front of my mind, the idea that the VELA- μ C link should be bidirectional and therefore, not only allow for data to be transferred one way (to the μ C for more complete analysis) but also for the eventual downloading of programs from a microcomputer — should the user want to do this.

We did not think the "average science teacher" wanted the downloading facility straight away. Therefore, the linker routine to enable the downloading will be on the next EPROM (ready in January 1984). So, not only is more software being written, but VELA is the only laboratory microprocessor based device which can be reconfigured completely by the user and is hence an excellent project device, too.

I often wake up sweating at night, wondering

whether we are leading teachers up the garden path with the VELA development, and wondering whether I am wasting my spare time on all this work. I have resigned myself to the point of view nobody really knows and that the DTI scheme and MEP regional centres will at least allow the teacher to make up his or her own mind by gaining access to and using a VELA in their work. Obviously, in the future, there will be more sophisticated devices which will better the VELA, but the problem we all have is deciding how long we can afford to be without such a measurement aid. And when these new devices come along, will they be supported by good documentation?

I do not understand his comment that "teachers are not in control". Our philosophy here is that the teacher is more in control of the micro with VELA because VELA is a tool to enable the teacher to use their own experience in order to problem solve and/or demonstrate, minimising the effort of setting up a measurement aid. The teacher may not be more in control of the software but does the average science teacher want to be writing software?

It is obvious that the microcomputer is more powerful than a microprocessor controller like VELA — but the standard microcomputer was not designed by experimentalists to improve the quality of scientific measurements. The standard microcomputer was designed for the computer buff to play with, and the standard microcomputer manual was written to be unintelligible to non-computer buffs.

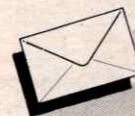
The microcomputer can improve the quality of scientific measurements, but the software has to be written and loaded and signal conditioning protection has to be provided (i.e., an interface box) at the front end and you need a TV or VDU to read the result of the measurement process.

To my mind, as 90 percent of our time is devoted to measuring single voltages, times and frequencies, it is, as Bob Sparkes himself admits "a waste of a powerful machine's time to be tied up in a data logging process" or indeed to use a screen to make a single value measurement of a physical quantity.

There are many more points I could raise, but I do not have the time or energy to waste in pursuing the matter further — I am too busy "unfreezing" VELA software!

Dr Ashley Clarke,
7 Gledhow Wood Avenue,
Leeds 8.

You can't please all of the people... It is time to draw the VELA debate to a close; after all, the product's specification and performance will speak for itself. Ed



No compromise in extension scheme

The Department of Industry has recently sent to schools details of its Micros in Schools extension scheme. This allows schools to purchase a variety of peripheral equipment at 50 percent of the listed price.

I have been trying to persuade the DoI to allow us to buy part of one of their packages only — we would like to upgrade our 380-Z memory and also purchase a colour monitor — but we have no need of the Walters printer since we bought a printer 18 months ago and have it networked to our system.

I wonder if any of your readers have succeeded in cutting through the red tape which seems to have wound its way round the components of the DoI package? My letters and telephone calls have met with blank refusal. It seems as though a school which, at its own expense, has upgraded its memory from 32K to 56K is allowed to take the remainder of the package but one which has already bought its own printer has to buy another!

It would seem unethical to have to sell equipment which had been the subject of a government grant... or would it?

C M B Newton,
Head of computer studies,
Runtun Hill,
West Runtun,
Cromer,
Norfolk NR27 9NF.



Warning: copying can kill!

Your article Editing, Copying, Formatting in the October issue was, I am sure, of value to teachers who genuinely want to make back-up copies of seemingly expensive educational software. I hope it does not, in the long run, prove counter-productive.

Now that it is theoretically possible to copy even protected tapes and discs, short-of-cash schools may be tempted to buy single copies and copy for neighbouring schools. Should this become the norm, educational publishers will rapidly give up producing software.

Most educational software is not overpriced; certainly, we at Chalksoft try to produce quality software at minimum prices (the £2 to £3 prices that some of your readers seem to want would make us go bust even more quickly than will

VIEWPOINT

Schools, society and technology

Simon Trotter raises some of the issues discussed in a recent NUJ training course regarding the development of the teacher's role in a fast-changing technological society.



£1.50 to build and fit into a matchbox!

The introduction of the present generation of technology has, in some cases, had positive effects on people's jobs. Some occupations have become more interesting. For instance, the introduction of word processors may mean that a legal secretary has fewer documents to retype when corrections or alterations have to be made. The time saved may allow the secretary to be released for more interesting administrative duties.

Jobs may become better paid. For example, a pool typist who trains to operate a word processor can command a higher salary than previously.

Workers have become more productive and this increased productivity may promote the effectiveness of an organisation, rather than leading to cuts in staff. Certain charities form a case in point. Word processing has enabled them to vastly increase the number of personalised letters they produce, allowing the same number of staff to approach more potential benefactors in a personal way.

The negative aspects of new technology present a mirror image of these advantages.

Technology has made many jobs less interesting. Secretaries who train as word processor operators may find themselves doing more typing and less administrative work as their firms seek to make maximum use of the available skills and equipment.

Similarly, skilled and semi-skilled engineering jobs have become less creative and more akin to machine minding. This de-skilling process allows fewer trained workers to take over jobs which have hitherto been the preserve of the highly skilled — and well paid — tradespeople. As a result, engineers' pay has been under great pressure in recent years.

New technology has led to straightforward job loss as processes or products have changed. The insurance business has lost clerical staff, for example, and skilled jobs in watchmaking have entirely disappeared in the wake of the integrated circuit digital watch.

Patterns of employment have changed in more subtle ways, too. Improved forms of communication allow more people to work at home. This has many advantages to the worker, especially if he or she has children to look after or dislikes living in town. It also opens up far more opportunities for disabled people.

New technology may affect attitudes to work. For example, new skills may seem less valuable to the worker than traditional craft skills, even though to an outsider the level of expertise required by the job remains the same. This was the experience of a group of print workers in Germany, whose traditional processes involving typesetting with hot metal were replaced by typing at a computer terminal.

Other workers have found their expertise incorporated into computer programs, so that when once they possessed skills which had been learnt over years of practical experience and of which they had been justly proud, now the machine has absorbed their knowledge, leaving them feeling redundant. Their pay and conditions may not have suffered — although they may do so in time — but their self confidence has. Expert systems constitute examples of this kind of program.

The structure of employment is changing, too. Traditionally, organisations have had a pyramidal structure, with many low paid workers at the base and progressively fewer, higher status workers towards the top of the hierarchy. It has been argued that one effect of technology so far has been to narrow the base of the pyramid, so that fewer people are

employed doing low paid boring jobs.

Certainly, this has happened in some areas, but it has not necessarily been the result of new technology. What seems to be happening now is that as technology becomes more sophisticated, it is capable of reducing numbers of administrative and lower managerial staff.

It is likely, therefore, that the traditional pyramidal structure is to be replaced by one which is wine glass shaped: having a relatively large number of low paid workers whose jobs, in financial terms, are not worth mechanising; a few administrators and lower managers; and considerably more higher managers whose skills have yet to be computerised. The achievement of such a structure would radically alter promotion prospects in the organisation concerned.

So, what is the position of the teaching profession with respect to the developments so far discussed? There are two broad contexts in which we can respond — as trade unionists and as educators. Both are equally important.

Let us consider the trade union context first, because in this frame of reference it is easier to see the way ahead. If, as seems likely, manufacturing industry is capable of producing more with fewer workers, then three possible courses of action present themselves. First, unemployment can be allowed to rise, continuing the existing trend in which those in work maintain or improve their standard of living, whilst the unemployed gradually become poorer.

Second, the increased profits resulting from improved efficiency in manufacturing could be used to finance improvements in education, health and the social services. There is an insatiable demand for people to care for and educate others, and these tasks are not generally susceptible to mechanisation — although technology can make such services more effective.

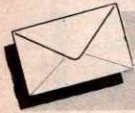
Third, we can take steps to share out the existing work more fairly than is at present the case: by cutting hours and overtime, increasing holidays and sabbaticals and by introducing earlier retirement. We can also try to improve the status of unpaid work. But these work-sharing measures can only be taken against a background of financial security, and it is essential to recognise this fact.

The implications of new technology for teachers as educators are less straightforward, although once ideas are formulated it may be

widespread copying!).

I would like to see Educational Computing take a firm line on this point and would have expected you to make that point in the article. Copying must not happen. Those who do it are effectively killing the development of quality educational software.

Brian Kerslake,
Joint managing director,
Chalksoft Ltd,
37 Willowslea Road,
Worcester WR3 7QP.

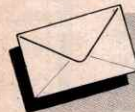


Can flashing VDUs be dangerous?

It has been brought to my notice that flickering on the VDU or flashing programs can cause epileptic fits in children. In my area, one child is reported to have had a fit while watching a flashing program. This child had no known history of epilepsy.

Has there been any research done on the subject? Has the medical profession shown any interest or concern? Should the VDU be at a set distance from the child or group of children? I would be interested to hear the opinions and comments of your readers either through your columns or direct to me.

Ian Cairns,
8 Grosmont, Great Lumley,
Chester-le-Street,
Co. Durham DH3 4NG.



English teachers get in touch

I am a lecturer in EFL at Westminster College and I am to be seconded for two terms to the Inner London Educational Computing Centre, where part of my work will involve a study of currently available programs for EFL, ESL and literacy. I shall also be preparing a discussion paper on the principles and future development of CAL in these fields.

I should be most pleased to hear from any reader who has an interest in language teaching through CAL, or who has experience of writing and/or using programs involving the teaching of English at any level, and who would be prepared to complete a questionnaire on the subject.

Margaret Leonard,
24 Brockley Rise,
London SE23 1PR.

easier to achieve objectives in the microcosm of school than in society at large.

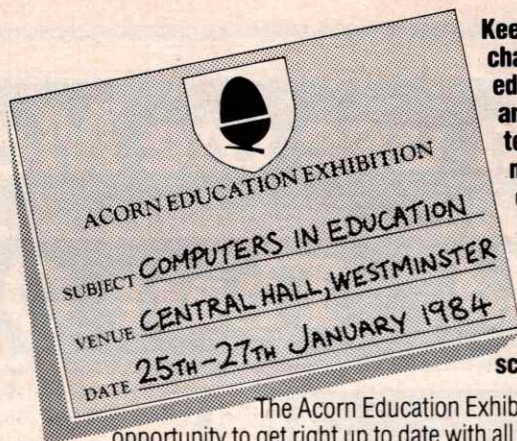
The first consequence of new technology is that it allows us to make our teaching more effective. Used as word processors, databases and aids to thought-provoking activity — for example, Logo — computers can help pupils to process information and understand concepts in ways which have not hitherto been possible. Video cassettes, video discs and teletext represent important methods of providing access to information.

These developments, assuming that they are made available to schools, will allow an expansion of resource based learning in which pupils take increased responsibility for their own work and are less dependent on classroom lessons. The management of this kind of learning is a skill quite different from those involved in classroom teaching, and teachers who become expert in this new area will add to their professional prestige and prospects.

The second consequence is that young people must leave school knowledgeable in new technology. The type of familiarity required involves a general understanding of the potential and limitations of new technology. This familiarity must be based on first hand experience of computers and the use of good software. It must also include discussion of the social implications of computers.

There are two major reasons for this. One is that it will increasingly be expected of them by employers. The second is that in their working lives, young people will be faced with technical change. The right kind of knowledge will enable them to evaluate alterations to their working conditions. It will also allow them to develop new products and processes based on microtechnology which enhance rather than diminish the quality of life. The experience of Lucas Aerospace demonstrates that a workforce can indeed generate ideas in this way.

So far, we have been concerned with those pupils who leave school for employment. What about those who become unemployed? Some people argue that youngsters should undergo education for leisure, in recognition of the fact that many will experience long term unemployment. The danger of this strategy is that we create a self-fulfilling prophecy. If we fail to teach the skills which form the base of future training, or which are themselves marketable, we may condemn young people to unemployment.



Keeping in touch with the changing methods in education is a must for any progressive teacher. And that means knowing about computers. And that means knowing about Acorn Computers — the leading manufacturer of computers in use in schools today.

The Acorn Education Exhibition gives you a unique opportunity to get right up to date with all the latest developments in hardware, software peripherals and services. Over 60 leading suppliers of Acorn related products will be there, as well as Acorn themselves.

This is an ideal opportunity to listen to informative talks, try out systems, watch demonstrations and collect literature away from the interruptions of students.

The Central Hall, Westminster is in Victoria Street, almost opposite Westminster Abbey, one minute from Parliament Square.

Buses: 11, 24, 29, 70, 76 and 88
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Parking: NCP, Abingdon Street.

Admission is by ticket only and is limited to educationalists over 18. Every educational establishment in the country is being mailed with tickets, but if you would like more just write to: Ticket Office, Computer Marketplace (Exhibitions) Ltd., 20, Orange Street, London WC2H 7ED, stating your requirements.



ACORN EDUCATION EXHIBITION

Central Hall, Westminster
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| E.H.T. | Minimum 19.5kv Maximum 22.5kv | Minimum 19.5kv Maximum 22.5kv |
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| DISPLAY | 80 characters by 25 lines | 80 characters by 25 lines |
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Powerful extensions. Colour LOGO features a "hatch" command which allows you to create multiple turtles that are capable of running separate programs simultaneously. You can execute virtually any number of turtle graphics programs all on the same screen - a fascinating programming concept for students of all ages. This "multiple turtles" feature even makes it simple to create dynamic action games.

EDUCATIONAL SUPPORT FOR THE BBC MICRO FROM BEEBUG PUBLICATIONS



LARGE NUMBERS OF SCHOOLS AND COLLEGES HAVE ALREADY JOINED BEEBUG. IT IS BRITAIN'S LARGEST COMPUTER USER GROUP, AND IS DEVOTED EXCLUSIVELY TO THE BBC MICRO.

BEEBUG MAGAZINE

Members receive 10 copies of BEEBUG Magazine each year. It is packed with Programs, Articles, Hints and Tips, Reviews of Software, Hardware and Books, and up to the minute information. A monthly magazine cassette is also available containing all the programs in each issue.

Here is a summary of last month's contents.

November issue: Program Features: **Reversi**, a challenging board game, **Lunar Escape**, and addictive arcade type game, **SNARFER**, a very useful disk recovery program. **SHAPER** for defining multiple character shapes, **RAPIDS**, another short game, **DEMOLITION**, a sizzling display with matching sound effects. Plus articles on a **Clock Display**, the **Teletext Mode** (part 2 of a series), an introduction to

interrupt Programming, a new **Mode 8** and **The Beeb in Slow Motion**. Plus **Extension ROM Board Reviews**, **Games Reviews**, **Book Reviews**, **M-TEC Torch Basic review**. Plus News, Hints and a new Competition.

BEEBUG also runs extensive discount schemes with retailers and software houses. For example members can purchase Wordwise for £38 all inclusive.

BEEBUGSOFT

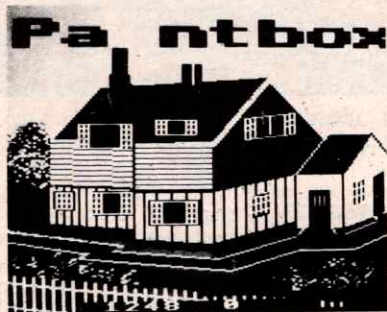
Additionally members have access to an expanding range of professional software produced by BEEBUG at special prices. Here are some examples.

PAINTBOX Sophisticated drawing package

PAINTBOX is probably the ultimate joystick drawing program for the BBC Micro. Use it to doodle or to design sophisticated full colour pictures.

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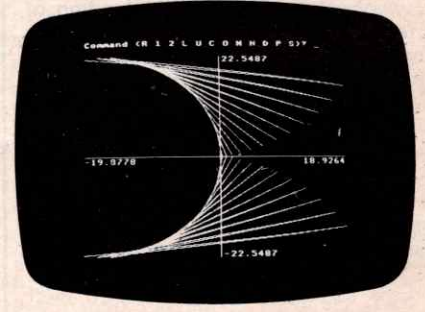


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SUPERPLOT is the ideal program for anyone interested in screen representations of mathematical functions.

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Children and staff at Little Green School make friends with a robot.

Juniors enjoy their donated robot

Junior school pupils from Little Green School, Rickmansworth, have been given a prototype robot to use with specially designed software by Micro Scope Ltd, an electronics firm based in Maidenhead.

The robot itself was built from a kit by an employee of the company attending a further education course, who also wrote the software for it, again, as part of that course. After its completion, the company realised its potential as a tool for teaching the possibilities of using a computer as a control device and decided to donate the robot to a school already using a BBC micro.

The pupils have had the robot for about a month now and are using it to perform fairly simple tasks such as playing chess and solitaire, block building and basic maze escape games.

13 year old outshines competitors for Lisa

A 13 year old who has not yet started a computer course at school and has only been using a computer for eight months, has won The Observer/Lisa computer competition which attracted 6,500 entries. The competition was run in The Observer during September.

Declan McKeown from Downpatrick, Northern Ireland, has won a customised Lisa with full complement of software, monitor and Apple printer worth £6,500 in total. He also wins a trip to California in January where Apple's founder-president Steve Jobs will present his prize. To complete the prize, Declan will be flown to Disney World.

Declan's achievement is even more remarkable since the competition was designed with adults in mind and, indeed, the majority of entrants were business people. The competition required entrants to answer five questions correctly on the computer industry plus a tie-breaker which consisted of compiling an acronym. Declan's was SLAVE (Sophisticated, Logically, Advanced, Versatile Electronics).

Declan is "over the moon" about winning the competition — over the Atlantic is probably more appropriate!

Community computing explored in Scotland

Scotland is once again maintaining its image as initiator of progressive developments in computing. Since 1981, the Scottish Community Education Microelectronics Project (SCEMP) has been exploring the effective use and potential applications of micros in community education.

SCEMP has published its third report since it was established by the Scottish Education Department. The report gives a factual account of the year's activities and an external evaluation of SCEMP's work will be published in 1984 by Dundee College of Education.

An example of SCEMP's work is its role as a public information service. It assisted Motherwell Library in creating a file containing information on clubs, services, leisure activities and educational courses available in that area. SCEMP wrote a customised program for the library and the system is now fully operational and utilised by the public.

If you want to find out more about community computing and its potential, contact SCEMP at 74 Victoria Crescent Road, Dowanhill, Glasgow G12 9JN.

ICL-CES becomes Acorn's 'ACES'

Acorn has bought Computer Education in Schools (CES) from ICL. The deal, confirmed only as we went to press, transfers to Acorn the entire staff of CES, as well as full rights on all its existing teaching materials. Through CES, Acorn now controls a range of CAL material which has a presence in 60 percent of secondary schools.

Geoff Wood, marketing director of Acorn International and overall head of the new unit, described the agreement as "a radical departure" for Acorn. "We are established on the hardware side; it would be complementary to establish ourselves in

education on the software side also," he said.

Under Acorn, the unit will diversify from its present concentration on materials for computer studies O level. "We shall move more into primary schools. And we will begin preparing material for other subjects at secondary level. An important area will be the writing of software for commercial studies. This is the last subject to be covered in many cases and the one which should be supported most," Wood said.

The most recent CES release, published while the unit was still part of ICL, is an IT awareness package for the 11 to 13 age group called *Computers, Information and You*, comprising a pupil's book, teacher's notes, activity sheets and associated software. The package, which has generally been well received, is likely to form a pattern for future CES activity. And the unit is working already on a second book in the same series.

CES's other activities, such as their participation in the training of teachers and their advisory visits to schools, will be unchanged by the move. "The only difference it will make," said a member of the CES staff, "is that the stuff will have Acorn written on it instead of ICL."

Indeed, both parties are emphatic that CES customers will not be affected in any way by the deal. "CES has merely changed its location," said Wood. "We have exactly the same staff and commitments."

ICL attributes the sale to rationalisation. "We do not sell machines into the education sector, and Acorn does," said a spokesman. "CES had become rather peripheral to our main concerns."

The unit, described as "highly successful" by the spokesman, had been a part of ICL since 1969. Part of the take-over agreement was that the new owners of CES could continue to support all its existing customers. Despite these assurances from both sides, however, we understand that the source of future support for the unit's RML material has not yet been settled.

Acorn's purchase of CES is highly significant, demonstrating the company's determination to extend its influence in the educational sector. Like many other manufacturers, Acorn has shown itself willing in the past to collaborate with other software publishers. But the acquisition of a complete department — lock, stock and barrel — from another company is only one step removed from the purchase of an entirely independent software house. It seems likely that more such purchases will follow.

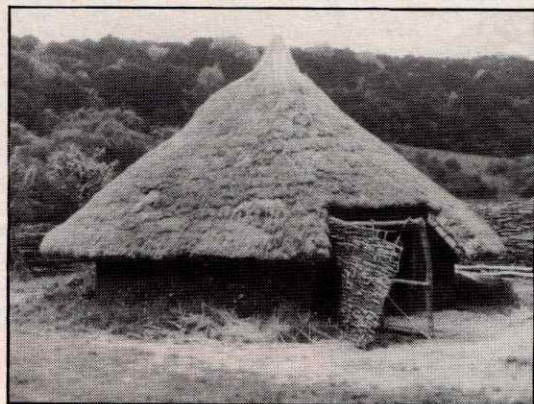
MSC encourages micros in careers field

News of another competition with a computer as a prize can be found in a magazine called *Newscheck*. The prize to be won is a BBC micro donated by Acorn, and the competition is open to careers teachers, tutors and officers.

Newscheck is a monthly publication, distributed free to careers officers, secondary schools, libraries and anyone else who is interested, and is published by the Careers and Occupational Information Centre, the publishing branch of the MSC. The competition launches the first technology issue of *Newscheck* (the November issue) and closes with the second issue in April next year.

The competition consists of designing a program to help in the entrants field of work, so it might be designing a self-assessment quiz or a careers game. For those of you who have had no experience with computers and programming at all, there are comprehensive suggestions on how to design a program.

So, if you want to enter the competition, or are just interested in *Newscheck*, contact the Careers and Occupational Information Centre, MSC, Moorfoot, Sheffield S1 4PQ. Tel: 0742 703461.



Tinterne House at Butser ancient farm where an HX-20 is being used in research work.

Iron Age meets the twentieth century

And now for something completely different. Old and new have been brought together through the donation by Epson (UK) of an HX-20 portable computer to the Butser Ancient Farm Trust — a research project into farming methods used in the Iron Age, circa 300BC.

You may be curious as to how the HX-20 can be used constructively on such a project. Well, project director, Peter Reynolds, uses it to monitor and measure the growth of ancient cereal crops as well as the control groups of modern crops, which are all part of the reconstruction and operation of an Iron Age farm. Also, the breeding patterns of varieties of

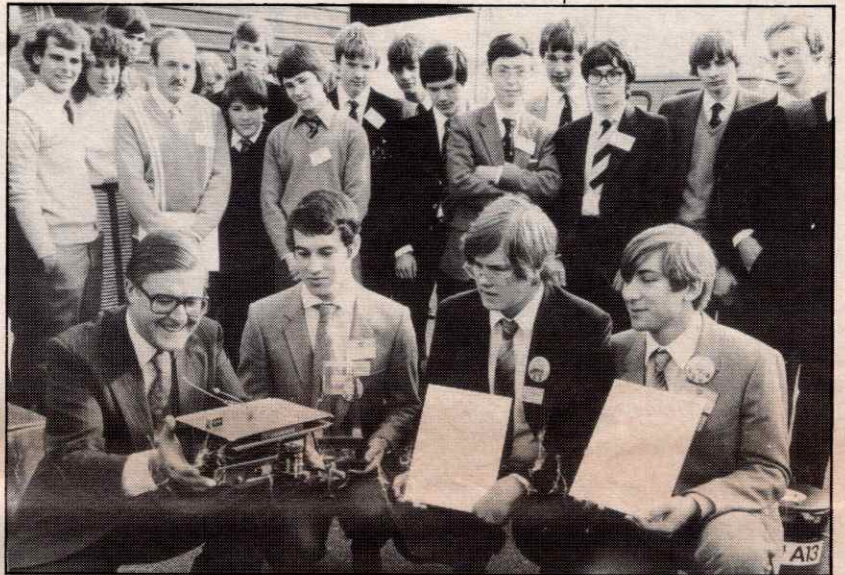
prehistoric breeds of sheep are recorded as well as data from a weather station. At the end of the day, the information gathered on the HX-20 is transferred to a larger computer.

Peter Reynolds describes the project as a huge open air scientific laboratory for research into prehistoric agriculture and archaeology.

Impressive software offer from RML

On the software front, Research Machines has announced that from the end of November, school purchasers of the RML Chain Network (Release 2) system will automatically receive a range of software worth £1,800. This consists of major computing languages including a full implementation of Logo, Basic and Pascal, all with colour graphics; program development aids such as RML's assembler ZASM and text editor TXED; word processing packages, including Wordstar; teaching tutors and classroom, library (SIR) and viewdata applications. Schools who already own a network and intend to upgrade it to the specification of this new system will also be able to take advantage of this rather impressive offer.

Research Machines has not forgotten higher education either. A total of £2,500 worth of software is available for £395: this includes all the material available to schools plus a spreadsheet package called Multiplan, Cobol and Fortran. What is more, present, past and future users of the Link 480-Z and 380-Z disc systems can buy two software packages at a reduced rate. For £39, one package includes Quest-D, Word, Logo and Touch 'n Go and for £95, the second package includes Pascal, TXED, Assembler, SIR and telesoftware.



£2,000 in prizes for Buildarobot winners

Robots are making news at the moment, in more ways than one. 21 schools from all over the country reached the finals in BP's Buildarobot competition, in which prizes totalling £2,000 were presented by Kenneth Baker recently.

The competition was divided into two categories, the winners of which received £500 each. The first category, the race of the robot, saw 17 schools design robots that had to find and retrieve a small cube in the fastest possible time. The second category was an open one in which entrants had to design a robot to perform a task of their own choosing.

Hinchingbrooke School from Huntingdon came first in the race of the robots taking just 4.7 seconds to retrieve the cube, using electronic eyes in the back of the robot's head and insect-like arms to perform the task. The winners of the second category were pupils of Mellow Lane School, Hayes, Middlesex, who designed a prototype of an industrial robot which could recognise the shape of any object on a conveyor belt and manipulate it into place. Well done to all those who took part — it is good to see collaboration between industry and education and the inventiveness that results.

Ken Baker takes a close look at the fastest school-built robot which won £500 and a trophy in BP's Buildarobot competition. With him are the winning team from Hinchingbrooke School including Philip Thompson, Stewart Bromley and John Higgins.

BBC Radio celebrates 60 years service

With 60 years' experience of broadcasting to schools, BBC School Radio, in collaboration with MEP, has designed new computing series for junior, O level and CSE students.

The programmes kicked off in November on Radio 4, with five weekly broadcasts called *Using Your Computer*, for nine to 12 year olds, as part of the *Introducing Science Extra* series. *Using Your Computer* has been designed as a self-instructional course on how to use the BBC, 48K Spectrum and 480-Z micros — i.e., the micros in the Dol primary scheme. Software to accompany these programmes (two cassettes of two programs, each costing £7) is available so that children actually use the computer whilst listening to the radio.

Continued on page 9

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For the same age group, *Junior Electronics* starts on February 29 next year at 2.20pm and, again, consists of five weekly programmes. Not only do pupils perform practical work by using the computer at the same time as listening to the radio, but they are guided through simple projects, learning to construct basic electrical and electronic circuits on a specially designed circuit board.

The circuit board is on sale from BBC Publications, price £5.25, and there is a DoI subsidy of £1.50 on the first kit for each school. The fifth transmission in the series is a Radiovision programme which shows the relevance of the practical work to everyday applications. Filmstrips cost £5.40, available from BBC Publications.

For O level and CSE students, a series of 10 programmes called *Microtechnology* starts on January 20 at 10.45am. They are presented in a similar way to *Junior Electronics* with five practical sessions and five Radiovision programmes. *Microtechnology* shows the application of the basic principles of microelectronics to technological developments using a kit of parts and a specially designed circuit board and power supply unit that costs £18.50. The filmstrips for this series are £6.30 and software will be available next spring.

None of these series presupposes any prior specialist knowledge on the part of teachers, and the first transmissions are designed solely for them. There are also very comprehensive notes to go with the series.

Starting on May 10 at 2.20pm, BBC Radiovision is catering for A level geography students with four pairs of programmes in which computer techniques are used to illustrate A level topics. These topics are traffic analysis, settlements and shopping, drainage basin and industrial location. Once again, there are four computer programs to accompany the series: on two cassettes for the BBC micro and on one disc for the 480-Z.

A fifth series for 14 to 16 year olds is to be broadcast next spring. It is part of the Secondary Science series and is called *Electronics and Microelectronics*. The 10 broadcasts will take place nightly so must be recorded using time-switches to be played back during school time. To help you with this, the BBC will be circulating more information on time-switches and suitable recording equipment to schools in the near future. Again, the Radiovision format is used and there is also practical work with the aim of making a four-bit binary counter by the end of the series.

Lastly, for anyone interested in computers, experienced or not, a new series starts on January 14 on Radio 4 called *Chipshop*. This is a computing magazine programme in which topical news and features are presented each week with accompanying free transmitted software.

Not to be outdone, BBC TV is featuring a couple of new computer programmes to be broadcast next spring, as part of the Continuing Education series. The first is *Computers For Control* consisting of five programmes looking at the computer as a control device. The contents will include studio demonstrations, real control applications from industry in this country and the US and practical projects designed by the National Extension College in Cambridge. By the end of the series, the beginner will have had a complete introduction to robotics and control applications.

The second series, *The Electronic Office*, will be of interest to anyone dealing with information technology in office work. The series looks at advanced office systems and the accompanying demand for new skills; how word processors and computer terminals can be used; and the problems small firms may encounter when computers are introduced into their business.

If you are interested in finding out more about any of these programmes, both on TV and radio, write with an SAE to Broadcasting Information Service, PO Box 7, London W3 6XJ.

NEWS IN BRIEF

Curriculum Comment . . . In association with MEP, we are hoping to publish the second issue of this highly successful supplement next spring. Curriculum Comment aims to open up the curriculum debate to include not only academics and the inspectorate, but interested and caring teachers and parents. Only when the problem of deciding what should be taught, in the wake of vast technological development, is tackled at grass roots level will any real progress be made.

If you would like to join in the debate, and contribute to the next issue of Curriculum Comment, send your article of no more than 1,500 words to The Editor, Educational Computing, 8 Herbal Hill, London EC1R 5EJ, no later than February 3rd, 1984.

Primary Contact . . . The second special issue of Greater Manchester's Primary Contact on the topic of micros in primary schools is now available. The issue runs to some 282 pages with more than 50 articles contributed by teachers, advisors, researchers and parents. Copies are available from Roland Fairbrother, Editor/GMPC, Didsbury School of Education, Manchester Polytechnic, 799 Wilmslow Road, Manchester M20 8RR; priced £4.75 each (inc. p & p). Cheques should be made payable to Manchester City Council.

Areas covered include the introduction and management of a micro, curriculum applications, Logo, simulations and Adventure games, MEP news and a number of reviews done by our own Dave Fatcher covering the BBC Buggy, the Zeaker and the Edinburgh Turtle. **E**

December

5 Expert Systems: The Challenge for Information in the 90s? One-day conference organised by Aslib and BCS Expert Systems specialist group. Venue: Royal Aeronautical Society, 4 Hamilton Place, London W1. Fee: £70. Apply to: The Conference Organiser, Aslib, 3 Belgrave Square, London SW1X 8PL.

ALSO ON 5TH, start of CTEC training courses for December on **Advanced Techniques for Programming in Basic, Wordstar Word Processing, etc.** Venue: CTEC, 102/108 Clerkenwell Road, London EC1. Contact: Richard Lee on 01-251 4010.

6 7th International On-line Information Meeting. Three-day conference and exhibition about on-line information retrieval. Venue: Cunard International Hotel, London. Contact: John Ozimek on 0865 730275.

ALSO ON 6TH, Northern RIC has organised a **viewing session of physics software** for secondary teachers from 6 to 7.30pm. Venue: Resources Centre, Coach Lane Campus, Coach Lane, Newcastle-upon-Tyne. Contact: Tina Carr on 0632 700424.

ALSO ON 6TH, **Elementary Electronics: An In-Service Strategy.** Two-day course organised by SMIC. Venue: SMIC, Furnace Drive, Furnace Green, Crawley. Contact County Advisors before booking. Fee: £15.

7 World Communications — Tomorrow's Trade Routes. One-day conference concentrating on the impact of developments in new technology and telecommunications on world trade. Venue: Royal Lancaster Hotel, London. Fee: £125. Contact: Richard Gaunt on 01-637 7347.

ALSO ON 7TH, a day course organised by the Chiltern Regional Centre called **All About The VELA.** Venue: Advisory Unit, Endymion Road, Hatfield. Fee: £1. To book, contact 070 72 65443.

ALSO ON 7TH, MICE (Microcomputers In the Curriculum for English) is meeting at 7pm to discuss the direction **software development** should take. Software will also be on demonstration. Venue: Milton Keynes. Contact: Phil Moore on 029668 264 (during the day).

ALSO ON 7TH, a presentation starting at 1.30pm organised by Merseyside and Cheshire RIC called **Basic Biology**, which is an introduction to biological computing. Venue: Computer Education Centre, Liverpool Polytechnic, 70 Mount Pleasant, Liverpool. Contact: 051-207 3581.

8 West Herts. Branch of the British Computer Society has organised a **visit to Case's new automated plant** to see the manufacture of their data and office communications equipment, starting at 8pm. Venue: Watford. Contact: Peter Greatrex on 01-580 2355 (daytime).

ALSO ON 8TH, **The BBC Micro User Show.** Four-day event. Venue: Westminster Exhibition Centre, Greycoat Street, London SW1. Starts at 10am. Admission: £3 (adults), £2 (children).

9 A presentation of QUEST — Information Processing in the Classroom, starting at 1.30pm organised by Merseyside and Cheshire RIC. For venue and contact see entry for 7th.

12 CGS Institute has organised a three-day conference called **The Fifth Generation.** Venue: Cavendish Conference Centre, London. Fee: £600. Contact: Diana Pitcher on 07535 58811.

13 Another three-day conference organised by CGS Institute called **Networks: Future Impact on Data Processing and Office Systems.** Venue: London Tara Hotel. Fee: £600. Contact: Diana Pitcher on 07535 58811.

14 A day course organised by Chiltern Regional Centre on **Networks and Schools.** Venue: Advisory Unit, Endymion Road, Hatfield. Fee: £1. To book, contact: 070 72 65443.

15 **Your Computer Christmas Fair.** Four-day event. Venue: Wembley Conference Centre. Contact: 01-643 8040.

16 **The Teaching of Programming (Development Group).** Three-day residential course organised by SMIC to design and produce a classroom package for use in the teaching of programming. Venue: La Sainte Union College of HE, Southampton. Fee: £50 residential, £15 non-residential. Contact: Alan Smith on 0703 28761 ext. 249.

ALSO ON 16TH, a **presentation of Nelcal software for primary teachers**, starting at 1.30pm organised by Merseyside and Cheshire RIC. For rest of details, see entry for 7th.

ALSO ON 16TH, a symposium on **formal methods of information systems development in industry**, organised by ACM and the British Computer Society. Venue: University of London, Institute of Education, 20 Bedford Way, London WC1H 0AL. Fee: £25 (members), £35 (non-members). Contact: Dr J Cooke on 0509 263171.

January

5 Start of the spring course schedule organised by the Polytechnic of the South Bank. Courses include **Microcomputer Appreciation, VisiCalc/SuperCalc, etc.** Venue: Faculty of Administrative Studies, London Road, London SE1. Fee: £55. Contact: Sally Justice on 01-928 2790.

11 **Technology and Therapy for Disabled People.** Day course and exhibition organised by Roger Jefcoate. Venue: College of St Mark & St John, Derriford Road, Plymouth. Contact: Ian Jane on 0752 776434.

25 **Acorn Education Exhibition.** Three-day event. Venue: Central Hall, Westminster. Contact: Timothy Collins on 01-930 1612.

26 **SMIC open-house session.** 2pm to 6pm. Venue: SMIC, Furnace Drive, Furnace Green, Crawley. Contact: 0293 546216.

February

6 Three-day course organised by Rediffusion Computers for **business people to learn how to write programs.** Venue: Education Centre, Crawley, West Sussex. Fee: £275. Contact: 0293 31211.

9 **Living & Learning — Technology and Disability.** Day course organised by Southwark Social Services and Stars Organisation for Spastics. Venue: Aylesbury Day Centre, Bradenham Boyson Road, London SE17 2BA. Fees: £5 and £7. Contact: Maurice Horsey on 01-701 8686.

13 **Conference on Machine Translation.** Three-day conference organised by Cranfield Institute of Technology and the British Computer Society. Venue: Cranfield Institute of Technology, Cranfield, Bedford. Fee: £176 non-residential. Contact: Douglas Clarke on 0234 75011 ext. 3135.

March

13 **The 3rd Scottish Computer Show and Conference.** Three-day event organised by Quadrilect. Venue: Holiday Inn and Albany Hotels, Glasgow. Contact: Jenny Mann on 01-242 8697.

April

9 **Educational Technology International Conference.** Four-day event organised by The Association for Educational and Training Technology. Theme of conference is Educational Technology in Transition. Venue: University of Bradford. Contact: Dr Gordon Mills on 0274 733466 ext. 588.

13 **Micros and Primary Education (MAPE) Easter Conference.** Three-day event. Venue: Newman College, Bartley Green, Birmingham. Fee: £36 (residential), £24 (non-residential). Contact: Senga Whiteman, Newman College, Genners Lane, Bartley Green, Birmingham B32 3NT.

CALL FOR PAPERS for the **computer as an aid for those with special needs**, an international conference on 17 to 19 April 1984 to be held at Sheffield City Polytechnic. Summary of 100-200 words is required by December 15 and full paper by February 29, 1984. For further details, contact: Mr E Hudson on 0742 665274 ext. 360.

CALL FOR PAPERS for the **6th Annual National Educational Computing Conference**, to be held at the University of Dayton, Dayton, Ohio, USA on June 13-15, 1984. Papers should be 15 pages long on actual experiences with computer use in the classroom. Deadline is December 15, 1983. Contact: A J Turner, Department of Computer Science, College of Nursing Building, Clemson University, Clemson, South Carolina 29631, USA.

CALL FOR PAPERS for the **10th International Improving University Teaching Conference** to be held at College Park, Maryland, USA on July 4-7, 1984. Two manuscripts of a maximum of 10 double-spaced pages, and a 200-300 word abstract should reach College Park, Maryland by February 1, 1984. Contact: Improving University Teaching, University of Maryland University College, University Boulevard at Adelphi Road, College Park, Maryland 20742, USA.

CALL FOR PAPERS for an edited volume called **Communication and Simulation**, planned for late 1985/early 1986. Contact: Danny Saunders, The Polytechnic of Wales, Pontypridd, Mid-Glamorgan CF27 1DL. **E**

DIARY



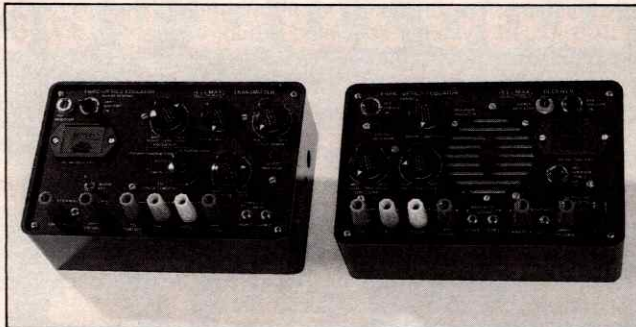
FIBRE-OPTICS EDUCATOR

A new product for teaching the older and newer technologies

The Fibre-Optics Educator has been developed to aid the teaching of **Optics (light), Electronics and Telecommunications**. The package comprises fully portable optical transmitter and receiver units, together with numerous accessories, with which a multitude of applications and demonstrations relating to the standard syllabuses may be carried out in an instructive and exciting way.

Examples include:

- showing the properties of **visible** and **infra-red** radiation, including reflection, refraction and general ray optics, using a novel approach;
- illustrating the fundamental principles of fibre-optics and telecommunications;
- transmission of high quality **analogue** (e.g. speech and music) and **digital** data (including morse code) over **optical fibres** and **free-space**, using a variety of electrical interfaces;
- 'listening' to various light sources, such as mains lighting, torch light, sunlight or the transmitter's variable frequency generator;
- measuring the frequency of a rotating disc or vibrating object using light reflection or transmission, with an optical cable acting as a probe;
- clarifying the important differences between analogue and digital techniques.



The versatility of the Fibre-Optics Educator makes it well suited for use in schools, colleges, universities and technology training centres. A comprehensive manual is included with the equipment, and this enables the teacher or lecturer to be able to easily put together a number of useful and convincing lessons based on the standard syllabuses in optics (light), electronics and telecommunications.

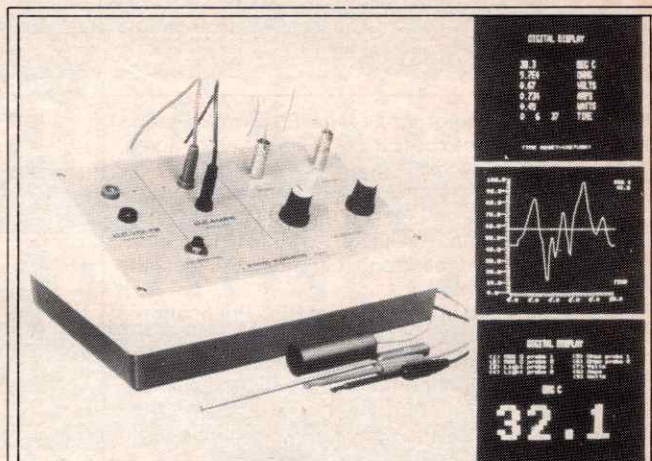
The Fibre-Optics Educator is able to demonstrate the fundamental concepts of telecommunications in a simple-to-understand way. Telecommunications and computing are the two major components of Information Technology, which will soon have such a dramatic effect on our everyday lives, and so an understanding of telecommunications as well as computing is essential for anyone who is to be prepared for these changes.

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As supplied to education authorities specification R.G.B. (analogue and digital levels) and models. 1 volt P.P. composite video (remote model only) Teletext decoder available to plug into chassis (remote model only). Remote control of computer via monitor (remote model only).

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Minimise the chances of losing your micro

Security is a growing problem in many schools and computers are becoming increasingly at risk. One effective answer is a device called Microsecure, which has been designed specifically for the BBC micro.

Microsecure consists of a base frame that is bonded or screwed to the working surface and an upper frame that is attached to the computer. The unit is then latched into the lower frame, locking it securely to the desk or working surface. This should considerably reduce the possibility of theft.

Unless you have the key supplied with the device, you cannot unlock your micro and lift it out of the frame. So keep it safe! There is plenty of room, by the way, for all necessary cables and connectors when the micro is locked down.

A complete Microsecure costs £26 but you can purchase lower frames for £18 so that the computer can be moved between locations and fixed securely in each. Further details from Selmor Engineering Industries Ltd, 24 Mulberry Street, Tower Hamlets, London E1.

Apple IIe repackaged for home users

Apple has repackaged the Apple IIe to meet the need of people who want a business standard machine for their own personal use, at home for example. The system comprises a 64K Apple IIe, disc drive, TV modulator so that the computer will run with a domestic television set, user guides and various vouchers to help buy further peripherals and software.

The professional home computer system is priced at less than £1,000 and is available from dealers and retailers. The vouchers allow the purchaser to claim a free one-day training course on specific software applications as well as money off a monitor and software including Apple Logo and a series of discovery games. There is also a discount on an adaptor for Micronet.



The Apple professional home computer system costs less than £1,000 — available from dealers and retailers.

Additional ROM room for the Beeb

An expansion board for the BBC micro providing extra sideways ROM capacity has been launched by Advanced Technology Products. The device, called Sidewise, allows up to 16 ROMs to be supported. Each ROM can be either 8K or 16K and it is even possible to fit 8K byte CMOS RAM chips into two of the sockets.

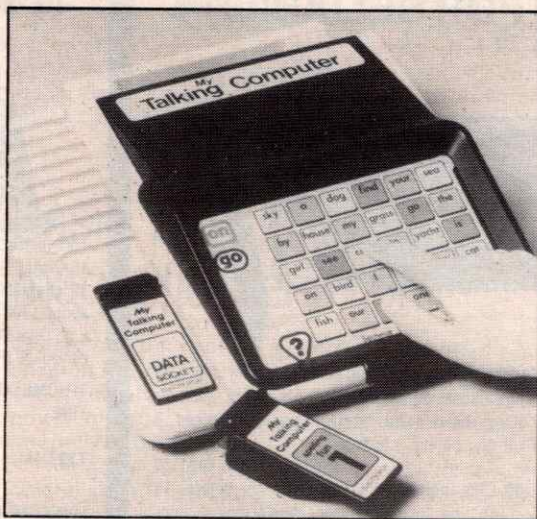
Unlike some of the ROM boards on the market, Sidewise is very simple to use. No soldering is required and the board is easy to fit. You simply remove the operating system ROM and the analogue to digital chip and refit them on to Sidewise.

The board is made of thick fibreglass and does not flex. Comprehensive documentation accompanies Sidewise which is easy to follow with lots of diagrams. The package costs £38 and further details can be obtained from Advanced Technology Products, Station Road, Clowne, Chesterfield S43 4AB.

Appealing long after Christmas is over

An American company called Electroplay has introduced My Talking Computer for young children. The device was designed and assembled in Britain and should be in the shops before Christmas. It should also make an appearance in infant schools as well as at home.

My Talking Computer consists of a membrane keyboard, speaker and ROM cartridge. There are 16 programs available: four dealing with early maths, six reading and language development programs, a talking calculator and four games. The star of the package though is a talking clock with movable hands.



A child's first computer is how the manufacturer sees it: we used it in the office for weeks!

My Talking Computer does not have a screen display: instead there are colourful customised card overlays for the keyboard. The quality of speech is very good though the female American accent could be improved upon.

The device is strongly constructed, made of tough moulded plastic. It will work with batteries or direct from the mains. There is also an earphone socket.

Suggested retail price is £49.95. Further software is planned with another slot-in cartridge which will probably cost in the region of £10. Further details from Electroplay, 93 High Street, Esher, Surrey KT10 9QA.

Complete robotics training system

Some months ago, we introduced the Hero 1 robot which had made a guest appearance on a London television programme. Now, the Hero 1 comes as part of a complete robotics training system, designed to provide practical knowledge of the basic elements of robotics and industrial electronics.

Hero 1 is controlled by an on board computer (6808 microprocessor) and carries sensors to detect light, sound, motion and obstructions in its path. It can be programmed to pick up small objects, to speak, to travel over predetermined distances and to carry out specific functions according to prearranged schedules. The unit measures 20 inches by 18 inches, and weighs nearly 40lbs.

A stepper motor rotates the head through 350 degrees. The head contains the sensors for detecting motion, light and sound as well as experimental circuit board, LED display, hexadecimal keyboard, abort button and mounting point for the arm.

The arm rotates horizontally through 350 degrees and vertically from the shoulder through 150 degrees. The claw or gripper moves 90 degrees above or below



Hero 1 and its accompanying training course is probably the most advanced product for teaching and learning about robot technology currently available for the price.

the axis of the arm and through 350 degrees horizontally with a six-inch span. Maximum payload is 450 grams.

The torso provides mounting surfaces for the main circuit boards and the base contains the mechanical components of the main drive and steering mechanisms plus the batteries.

The 6808 microprocessor interfaces with all sensors, on board real time clock, experimental circuit board and drive motors. It can be programmed via the keyboard, external teaching pendant or standard cassette recorder. It has seven operating modes: Executive, Utility, Program, Repeat, Manual, Learn and Sleep.

Hero 1 detects and quantifies ambient light levels over the visible spectrum and can be programmed to respond to the absence or presence of light in its environment. It can also sight objects using its pulsed ultrasonic system which has a range of eight

feet. Sound levels can be detected in the range 200 to 5000Hz.

Movement or motion is detected using a continuous wave ultrasonic system: an average size adult walking towards the sensor can be detected at a distance of 15 feet, though sensitivity depends on size and relative movement of the object detected.

Hero 1 can generate 64 phonemes through its synthesised speech system which can be linked together to produce a variety of sounds and simulated speech.

The Robotics Educational Course which accompanies Hero 1 comprises 11 teaching units providing about 120 hours of study. 11 subject areas are covered including Robot Fundamentals, Alternating Current and Fluidic Power, Direct Current Power and Positioning, Microprocessor Fundamentals, The Hero Robot Microprocessor, Data Acquisition (sensors), Data Handling and Conversion, Voice Synthesis, Interfacing and Industrial Robots at Work.

Hero 1 is available from Zenith Data Systems for £2,495, complete with the training course. It is also available in kit form from Maplin Electronic Supplies. Further details from Zenith Data Systems, Bristol Road, Gloucester GL2 6EE. Tel: 0452 29451.

Teaching modules for control technology

Working in close co-operation with teachers of computing and electronics, Centec Electronic Systems has developed a range of control modules over the last two years as part of a widely followed course which is now accepted by various exam boards as part of GCE O level Technology.

These modules are now available for most micros with I/O port and include universal buffer module, A/D converter, D/A converter, variable analogue and binary output module, simple DC motor and current buffer module, 16 channel A/D converter and hexadecimal output module. Prices range from £14 to £43, plus p & p.

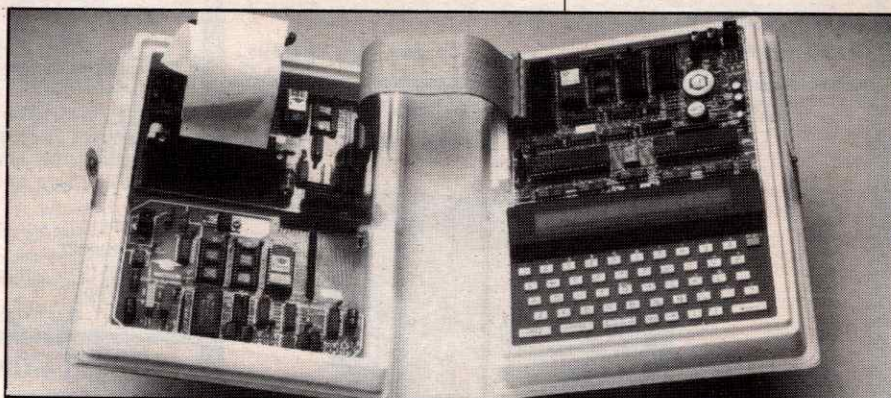
Using these modules, the principles of feedback, data transmission, electrical noise, waveform processing, speech analysis and so on can be carried out without the need for specialised electrical knowledge.

Centec has also introduced Puzzle Boxes, designed to teach the identification of hidden components. Two types are available: white puzzle boxes contain diodes, shorts, fixed value resistors and open circuits; whereas black puzzle boxes contain the components in a simpler layout.

Mounted components are available too, each housed in a clear plastic case. The range consists of transistors, resistors, diodes, capacitors and switches as well as common arrangements of individual components such as the diode bridge and high and low pass filters.

Educational discounts are offered and special modules and units can be designed as required. Further details from Centec Electronic Systems, 47 Spur Road, Orpington, Kent BR6 0QT. Tel: Orpington 35353.

Single board computer upgraded by Flight



Building upon the success of the MPF-1B single board computer, Flight Electronics Ltd has introduced a more advanced version called the MPF-1Plus. Designed around the Z80, the new unit costs £140.

It will run Z80/8080/8085 machine code, has a Z80 assembler (line and two pass) and contains 8K Basic interpreter and 8K Forth (both optional). Two 4K CMOS RAMs are supplied as well as 8K monitor ROM. A coned speaker gives the usual keyboard bleep which can also be interfaced with an optional TI speech synthesiser board.

The display is a 20-character, 14 segment green phosphorescent display (no video monitor) and there is a cassette interface running at 165 baud. The keyboard has 49 keys in a QWERTY layout.

Three manuals are supplied with the system: user manual, experiment manual and monitor source listing program. There are five accessory boards which allow the MPF-1Plus to become a low cost development system as well as an educational tool. Other boards are in development.

Flight Electronics also supplies a student work book which offers a step by step guide to the fundamentals of a microprocessor system. Further details can be obtained from Flight at Flight House, Quayside Road, Bitterne Manor, Southampton SO2 4AD. Tel: 0703 34003.

MICROWORLD

Flight's MPF-1Plus has some quite sophisticated development features when one looks at the cost of it — in the region of £140.

BBC Microcomputer System

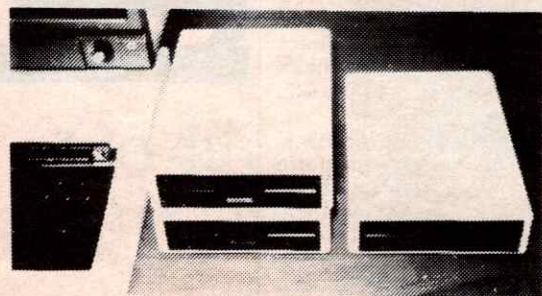
OFFICIAL BBC COMPUTER DEALER



This is the best microcomputer currently on the market. 32K RAM, 32K ROM, 8 modes of operation, full colour, full-size keyboard, internal expansions such as disc interface, speech synthesizer, Econet interface. - In short, it is a personal computer capable of expanding into a small business system.

| | | |
|-----------------------------------------------------------------------------------------------------------|------------|---------|
| BBC Microcomputer Model B | £348 + VAT | £399.00 |
| BBC Mod B + disk interface | £409 + VAT | £469.00 |
| BBC Mod B + Econet interface | £389 + VAT | £447.35 |
| BBC Mod B + disk and Econet interfaces | £450 + VAT | £517.50 |
| BBC 100K disk drive | £230 + VAT | £264.00 |
| BBC dual 800K disk drive | £699 + VAT | £803.85 |
| Torch Z80 disk pack including Z80 2nd processor, 64K RAM and CPN operating system + Free Perfect Software | £699 + VAT | £803.85 |
| BBC Teletext receiver (Aug) | £196 + VAT | £225.40 |
| BBC cassette recorder and lead | £26 + VAT | £29.90 |
| Disk interface kit (free fitting) | £86 + VAT | £96.60 |
| Mod A to Mod B upgrade kit | £50 + VAT | £57.50 |
| Fitting charge for A to B upgrade kit | £20 + VAT | £23.00 |
| 16K memory upgrade kit | £20 + VAT | £23.00 |
| Games paddles | £11 + VAT | £12.65 |
| 12" Monochrome monitor incl. cable | £89 + VAT | £102.35 |
| 16" Colour monitor incl. cable | £209 + VAT | £240.35 |
| User guide | £10 + VAT | £10.00 |
| Econet interface (free fitting) | £60 + VAT | £69.00 |
| Speech interface (free fitting) | £47 + VAT | £54.05 |
| BBC disk manual - formatting disk | £30 + VAT | £34.50 |
| Parallel printer cable | £10 + VAT | £11.50 |
| BBC word processor (view) | £52 + VAT | £59.80 |
| BBC Fourth language cassette | £15 + VAT | £17.25 |
| BBC Lisp language cassette | £15 + VAT | £17.25 |

100% BBC COMPATIBLE MITSUBISHI AND TEAC SLIMLINE DISK DRIVES



These drives are supplied ready cased with all the necessary cables, formatting program and user disk system guide.

There are some useful utilities included, e.g. Epson Screen Dump Program, Memory Dump, Free, Duplicate, Merge and Relocate. Power consumption of these drives is very low (0.2A typ. at +12V, 0.4V typ. at +5V per drive). Power is taken from the BBC computer.

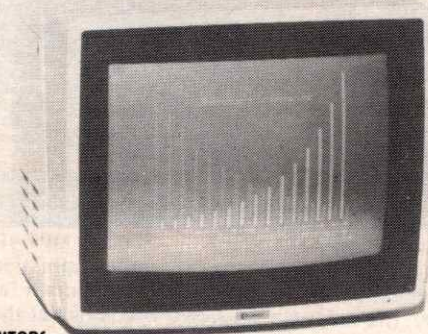
| | | |
|-------------------------------------------|------------|---------|
| Single drive 100K 40 tracks | £169 + VAT | £194.35 |
| Dual drive 200K 40 tracks | £329 + VAT | £378.35 |
| Single drive 400K 80 tracks | £239 + VAT | £274.35 |
| Single drive 400K 40 80 tracks switchable | £259 + VAT | £297.85 |
| Dual drive 800K 80 tracks | £449 + VAT | £516.35 |
| Dual drive 800K 40 80 tracks switchable | £469 + VAT | £539.35 |

COMPLETE WORD PROCESSOR FOR ONLY £1,099 + VAT

This package consists of BBC Microcomputer, View, wordprocessor, 400K Slimline disc drive, High resolution 12" Green monitor, Juki 6100 18CPS Daisy Wheel printer and all the necessary cables and documentation. The above package can be supplied with components of your own choice, e.g. 800K disc drive or a different printer. Please phone us for a price for your particular requirement.

Special package deal £1,099 + VAT = £1,263.85

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12" Green screen monitors with composite and sync. input. Suitable for most computers.

* 18 MHz band width, high resolution £89 + VAT = £102.35

* 15 MHz band width, normal resolution £69 + VAT = £79.35

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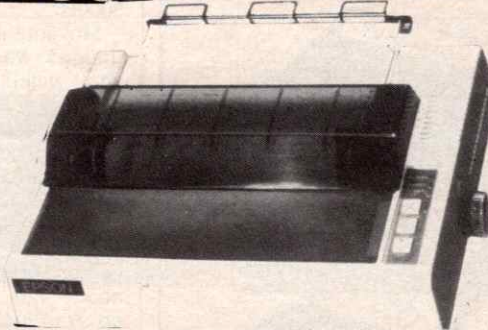
* MICROVITEC RGB input 14" + monitor supplied with RGB lead for BBC £209 + VAT = £240.35

* SANYO SCM 14" Normal res. 14", 400 dots, RGB input supplied with RGB lead £199 + VAT = £228.85

* SANYO SCM 14M Medium res. 14", 600 dots, RGB input supplied with RGB lead £299 + VAT = £343.85

* SANYO SCM 14H High res. 14", 800 dots, RGB input supplied with RGB lead £399 + VAT = £458.85

EPSON FOR RELIABILITY



EPSON FX80: 80 column, 160 CPS, normal, italic and elite characters. 256 user definable characters, superscript, subscript, 11 x 9 matrix, bi-directional logic seeking, hi-res bit image printing (960 x 8 dots/line), friction and tractor feed. 9 international character sets, Centronic parallel interface.

FX80 PRICE £349 + VAT = £401.35

EPSON RX80: 80 column, 100 CPS, normal, italic and elite characters, 11 international character sets, hi-res bit image printing, bi-directional logic seeking, 4" to 10" adjustable pin feed, Centronic parallel interface.

RX80 PRICE £239 + VAT = £274.84

MX-100 136 column, 100 CPS, friction and tractor feed, up to 15" adjustable carriage, hi-res bit image printing, true descenders, Centronic parallel interface.

MX-100 PRICE £399 + VAT = £458.85

RS232 Interface for all above printers £55 + VAT = £63.25

EPSON RX80FT (friction & tractor) £269 + VAT = £309.35

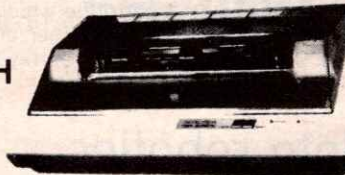
FX100 £479 + VAT = £550.85

Roll holder for FX80 £12 + VAT = £13.80

Ribbon for MX80, FX80, RX80 £8 + VAT = £9.20

Ribbon for MX100 £12 + VAT = £13.80

SEIKOSHA DOT MATRIX PRINTERS WITH HIGH-RES GRAPHICS



GP-100A 80 column, 50 CPS, dot addressable hi-res graphics, 10" wide, fully adjustable, tractor feed, 7 x 5 print matrix, Centronic parallel interface.

GP-100A 50CPS PRICE £175 + VAT = £201.25

GP-250X 80 column, 50 CPS, 10" wide, fully adjustable, tractor feed, true descenders, 64 user definable characters, double height and/or double width printing, 8 x 5 print matrix, Centronic parallel and RS232 (serial) interfaces both included.

GP-250X PRICE £219 + VAT = £251.85

NEW GP-700A 7 COLOUR PRINTER

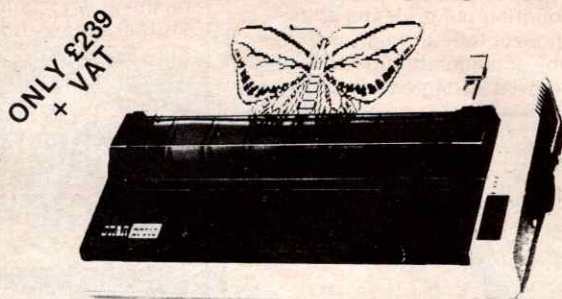
This latest addition to Seiksha range gives you print in seven colours, 10" wide carriage, friction and tractor feed, 50 CPS print speed, dot addressable high-res graphics, 4 hammer printing mechanism, 10 CPI or 13.3 CPI, special Quiet printing mode, Centronic parallel interface.

GP-700A SPECIAL INTRODUCTORY PRICE £349 + VAT = £401.35

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We guarantee that our prices are the lowest on the market. If you can find any item advertised and in stock at less than our price we will match that price.

NEW LOW PRICES ON STAR



The most cost effective quality matrix printers to be launched this year. DP510 and DP515 features include friction and tractor feed and roll holders as standard, 100 CPS print speed bi-directional logic seeking 9 x 9 matrix gives true descenders, 2.3K buffer as standard hi-res bit image plus block graphics, sub and super script, italic printing, auto underlining, vertical and horizontal tabulation, left and right margins set, skip over perforation, back space and self test.

STAR DP510 10" carriage 80 columns, SPECIAL PRICE £239 + VAT = £274.85

STAR DP515 15" carriage 136 columns, SPECIAL PRICE £359 + VAT = £412.85

RS232 INTERFACE FOR ABOVE £50 + VAT = £57.50

POCKET COMPUTERS AND CALCULATORS

* **CASIO PB-100** Basic language pocket computer, 544 program steps, Qwerty keyboard, 12 char display £34.75 + VAT = £39.95

* **CASIO FX-700P** Basic language, scientific functions, 1568 program steps, Qwerty keyboard, 12 char display £43.44 + VAT = £49.95

* **CASIO FX802P** Basic language computer, scientific functions, 1568 program steps, built-in mini printer, Qwerty keyboard, rechargeable batteries and charger, 12 char display £78.22 + VAT = £89.95

* **CASIO FA-3** Cassette adaptor for PB100, PB300, FX700 £17.35 + VAT = £19.95

* **CASIO FP-12** Printer for BB100 and FX700 £39.09 + VAT = £44.95

* **SHARP PC-1211** Basic language computer, scientific functions, 1424 program steps, 24 char display, Qwerty keyboard £60.83 + VAT = £69.95

* **SHARP PC-1251** Basic language computer, 4K RAM, 24K system ROM, 24 char display, Qwerty keyboard, user defined key, numeric pad £69.52 + VAT = £79.95

* **SHARP CE-125** Cassette recorder and mini printer for use with PC-1251, incl batt charger £86.91 + VAT = £99.95

* **SPECIAL PRICE** PC-1251 + CE-125 £146.95 + VAT = £169.00

TEXAS INSTRUMENTS TI 99/4A



This microcomputer is based on TMS9900 16-bit microprocessor. It includes 16K RAM, 16 colour high resolution graphic (192 x 256). The screen display is 32 characters, 24 lines TI-BASIC. Full-size keyboard. For Software there are about 1000 programs to choose from. There are a lot of peripherals available, e.g. Disk Drives, Disk Interface, Speech Synthesizer, Extra RAM. Additional Language (PASCAL, TI-LOGO, ASSEMBLER).

TI HOME COMPUTER HARDWARE

| Title | Description | Price inc VAT |
|------------------------------------|----------------------------------------------------------------------------------------|---------------|
| TI99/4A | Complete with UHF modulator and power supply + free cassette lead | £99.95 |
| PERIPHERALS | | |
| Speech Synthesizer | When used with selected modules will reduce electronic speech | £41.95 |
| Peripheral Expansion System | This unit takes all card peripherals and on internal disk drive | £79.95 |
| Disk Drive - Internal | 92K formatted drive, mounts internally in peripheral expansion system | £149.95 |
| Disk Controller Card | Controls up to 3 disk drives, complete with disk manager command module | £109.95 |
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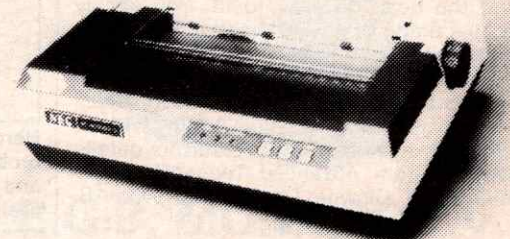


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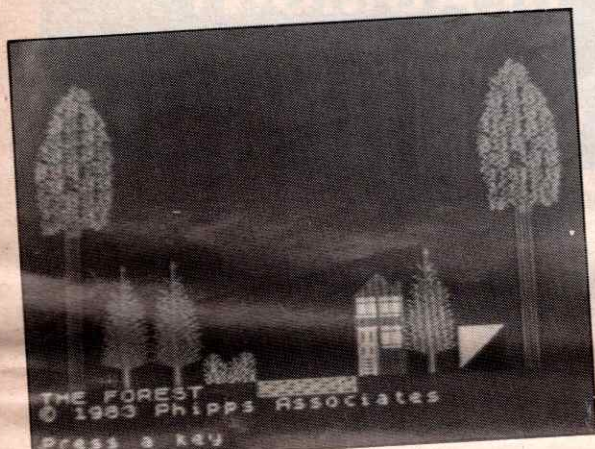
The Forest is a real-time simulation of the sport of orienteering. Orienteering can be described as being essentially a cross-country run through different terrain to which the added dimension of navigational problems is added.

The program is intended to be a useful training aid to orienteers as well as being a game in its own right. However, it has tremendous educational potential, too. In particular, it can assist with the interpretation of contours for navigation. The program displays cross sections through the terrain, contoured three-dimensional views or maps of any part of it at any chosen scale, contour intervals or orientation. These displays complement the normal view presented by the program which is on the view ahead.

One pre-set course is contained in the program, but others can be made up by using the course planner's menu and then save it on tape for later use. The territory known to the computer is not confined to that covered by the map included with the game. In fact, it extends 37 kilometres in each direction. Would-be map makers can practise mapping to their heart's content.

The Forest will introduce novices to the many features of orienteering but it will certainly be of interest and value to geography teachers particularly in demonstrating the relationship between maps and the physical features that they represent. The program comes packaged in a custom built plastic folder with a 32-page book of instructions and a special four colour map drawn to orienteering conventions.

The Forest from Phipps Associates, 172 Kingston Road, Ewell, Surrey KT19 0SD. Spectrum 48K: £9.95 (inc. VAT).



The Forest: great educational potential.

Pilot a glider and learn about thermals

In *Glider*, you take on the role of a glider pilot and through using the program, children quickly become familiar with the scientific principles of the sport. The program presents the concept that the glider, which is non-powered and heavier than air, can be lifted by air in the form of thermals.

In the program, the user has to consider how these rising currents are influenced by what is on the ground — buildings, ploughed fields, expanses of water, as well as time of day and weather conditions.

The program starts with a tow to launch the glider and then you are on your own. The glider can be made to climb, descend and circle. There is a variometer to show rate of climb or fall. The screen display also shows your height above ground as well as the direction of travel. A score is built up according to how far you fly from base, how long you stay in the air and whether you land safely back at base.

Glider (in the Science Horizons series) from Macmillan Education and Sinclair Research. Spectrum 48K: £8.65 (plus VAT).

Appreciation of the environment aided

Survival is an educational game which introduces the players to some of the principles of ecology — the interaction of living things to their environment. Children can clearly see some of the hazards that creatures must face in the wild.

The program presents a number of habitats — sea water, fresh water, grass, woods, hills, scrub and a town — in which a living creature has to survive. The animals featured are a hawk, a robin, a lion, a mouse, a fly and a butterfly. One of these creatures is controlled at a time by the player and they must find enough food and water to stay alive, while keeping alert to escape danger from their enemies.

Survival illustrates well how some habitats are more favourable than others for different creatures. The amount of food available and the likelihood of being killed by a predator is dependent on the habitat in which the animal lives.

This is an excellent series of simulations that enables children to build up a profile of each type of

creature in the program — its energy requirements, predators, lifespan and to see how it makes up part of a food chain.

Survival (in the Science Horizons series) from Macmillan Education and Sinclair Research. Spectrum 48K: £8.65 (plus VAT).

Basic principles of magnetic behaviour

Magnets is the name of a game which aims to give children an understanding of the polarity of magnets and their behaviour. The user is also shown that the power of attraction and repulsion depends on the strength of the magnet.

The game is played by two people, or by one person and the computer. Each player has two types of magnet: pawn magnets which can be moved around the board and supermagnets which are fixed. To win the game, you must either remove all your opponent's pawn magnets from the board or conquer all your opponent's supermagnets.

This is a useful scientific educational game in which children have to consider the basic principles of magnetic behaviour and plan a strategy according to the position and the strength of each magnet on the board. An attractive(!) idea, well presented.

Magnets (in the Science Horizons series) from Macmillan Education and Sinclair Research. Spectrum 48K: £8.65 (plus VAT).

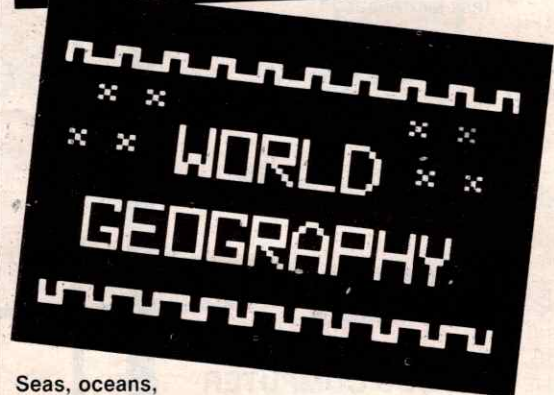
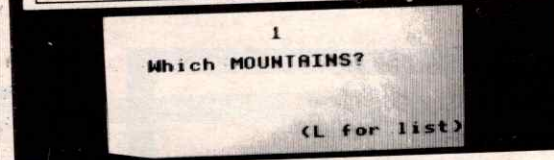
Teacher and pupil data input allowed

World Geography has been designed by 4Mat Software as a flexible aid in the development of atlas skills. The package is made up of a main program and six data files, plus file making utility. The files supplied are seas and oceans, continents, mountains, cities, countries and islands. Each file can hold 12 locations.

A world map is displayed on the screen and a flashing square marks a location and the name of it will be requested. The list of locations that the program covers depends on the data file loaded. This can be called by typing L. The user then inputs the location to match the flashing square.

The most impressive part of the package, however, is the FILER program in which teachers can prepare their own data. The package really comes into its own though when children are allowed to produce files for other children to use.

World Geography from 4Mat Software, Linden Lea, Rock Park, Barnstaple, Devon. BBC micro: £10 (cassette), £12 (disc).



Seas, oceans, mountains, continents, cities, countries and islands of the world.

Practice in six-figure grid references

Map References is a two program package designed for upper juniors and early secondary children to give practice in using six-figure grid references. At the same time, the programs reinforce an understanding of compass directions.

The two programs are Treasure Island and Arctic Patrol. Although they are broadly similar in outline,

they differ in detail and design and in level of difficulty. Treasure Island is all about looking for buried treasure with a map of an island. Arctic Patrol is a more difficult program and concerns a search-and-destroy mission involving submarines under the Arctic pack-ice. It is a shame that this is not just a search-and-find mission.

Both programs use the colour and sound facilities of the BBC micro well. The high resolution graphics facilities available are used to good effect in the map, which enables precise points to be marked.

The package comes with a well produced booklet with a refresher page for those with a limited knowledge of grid references.

Map References from Logical Educational Software, 12 Rowditch Avenue, Derby DE3 3LD. BBC micro: £7.50.

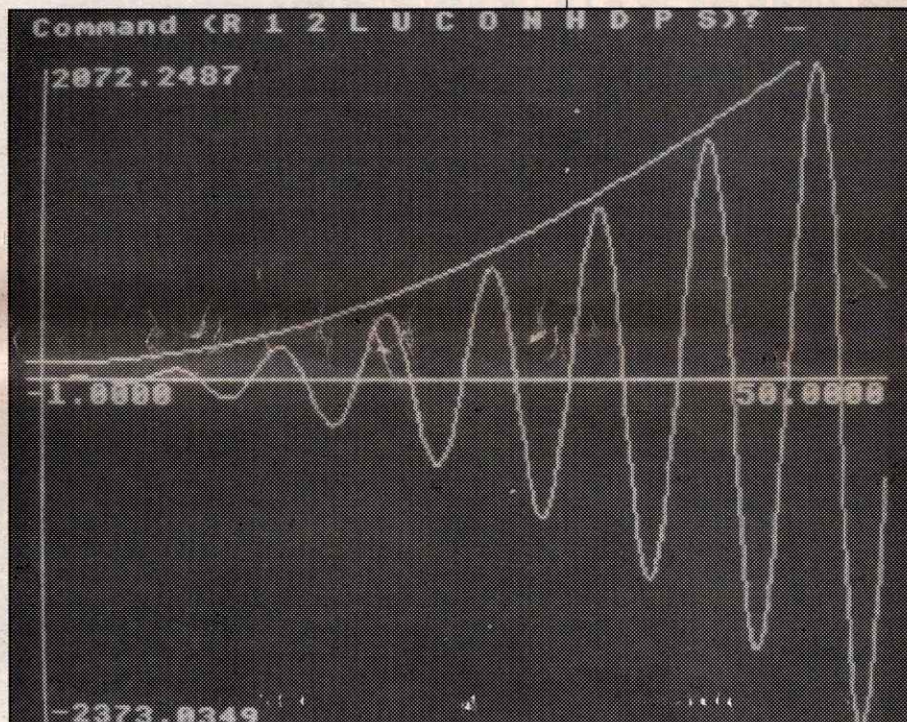
A general purpose plotting program

Superplot is a general purpose plotting program that is most suitable for use in education. It is a versatile package and will plot in any one of the most common co-ordinate systems — Cartesian, Polar or Parametric, though the program defaults to the Cartesian system (that is the regular one used in O level).

You can also overlay functions on one another which allows the graphical solution of simultaneous equations. Roots of equations may be found to any required accuracy by plotting the functions over successively smaller and smaller ranges.

All the graphics are displayed in the lower part of the screen with the top two lines reserved for messages and data. The program has a HELP function called by H which details the commands. As would be expected, *Superplot* also has a printer option.

Superplot from BEEBUG, PO Box 50, St Albans, Herts. AL1 2AR. BBC micro: £7.50 (cassette).



A versatile plotting program for the BBC micro, *Superplot* plots in any one of the common co-ordinate systems including Cartesian, Polar and Parametric.

Learn to read with Deb, Jip, Ben, Sam & Meg

A learning-to-read series of programs for a computer. A worrying thought? When one considers the team behind it all, it becomes rather exciting. A formal agreement between Sinclair Research and Macmillan Education has brought together Betty Root from the Centre for the Teaching of Reading at the University of Reading and the Fisher-Marriott team of programmers.

The result is five programs that go to make a complete early reading course — *Learn to Read 1, 2, 3, 4 and 5*. This series had been carefully planned to take children gradually through their early stages of reading. The aim is to help them move towards becoming proficient readers.

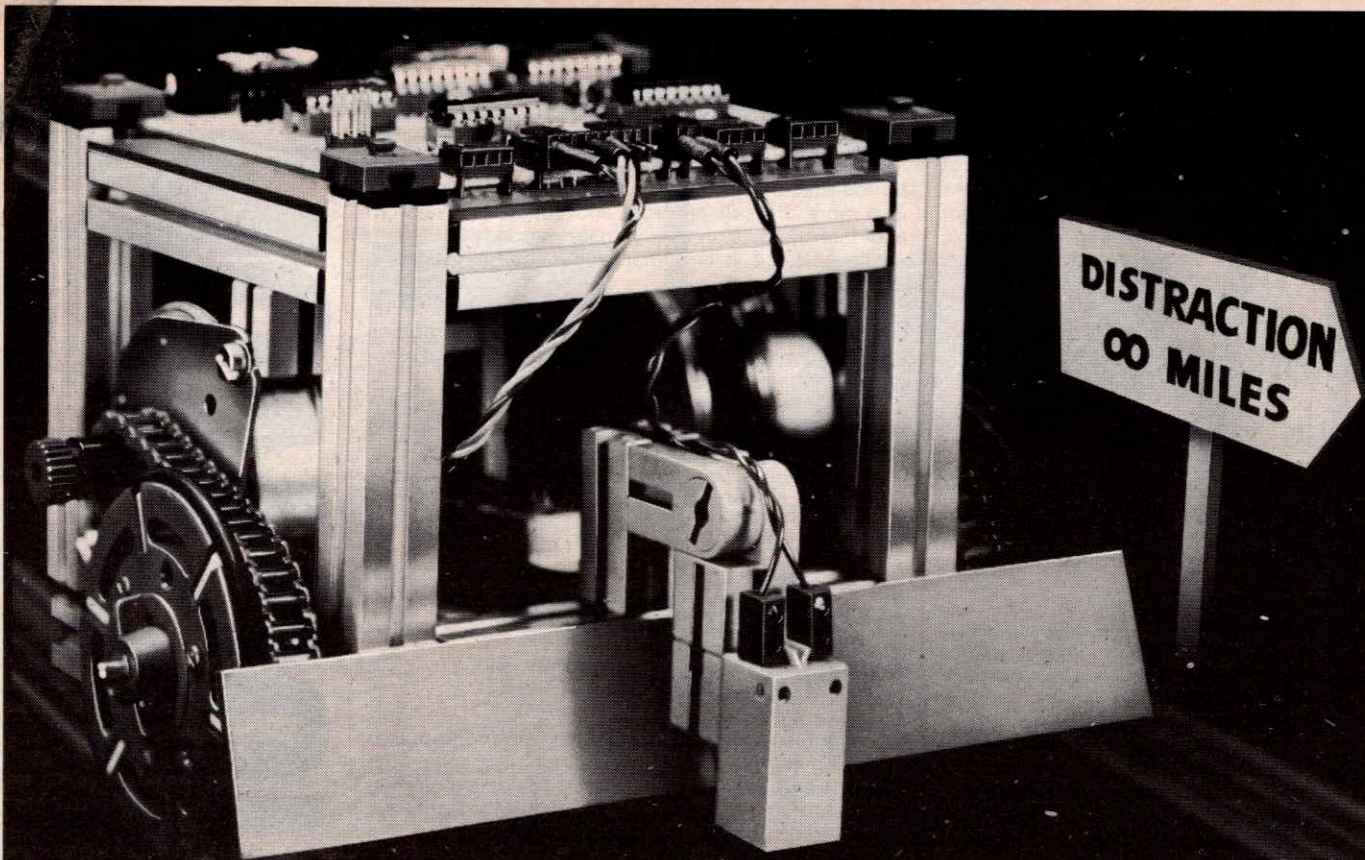
The series has been derived from the well known infant school reading scheme *Gay Way*. *Learn to Read* features the popular animals found in these books, although the software has been designed to be used independently or alongside any reading scheme.

So, with Deb the rat, Jip the cat, Ben the dog, Sam the fox, Meg the hen and the fat pig, children in the three to five age range can work at their own pace and repeat particular parts of each program according to their own needs and enthusiasm.

The programs all provide a substantial amount of activity. For example, in *Learn to Read 1*, there are five parts: NAMES which teaches the names of the animal characters, COPY which is a match-a-letter-to-a-letter game, KIM is a game to help spelling and memory retention, SPELL teaches a simple sight vocabulary and CARD is a computer version of the popular card game Pelmanism to develop memory skills.

Learn to Read (a series of five programs) from Macmillan Education and Sinclair Research. Spectrum 48K: £8.65 (plus VAT).

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The Buggy's software which is based on the 'building block' principle consists of 12 robust application programs and one familiarisation program all of which feature full graphics.

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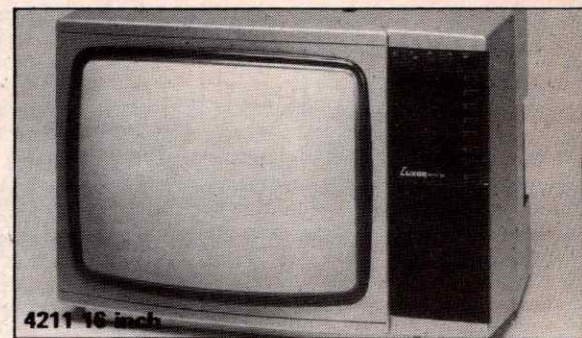
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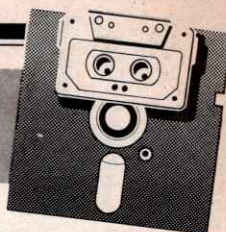
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WHAT TIME IS IT, MR WOLF?

PROGRAM: *Timeman One*
SUPPLIER: Bourne Educational Software
 Bedford Lane,
 Headbourne Worthy,
 Winchester SO23 7SQ.
MACHINE: BBC micro
PRICE: £8.97 (cassette)

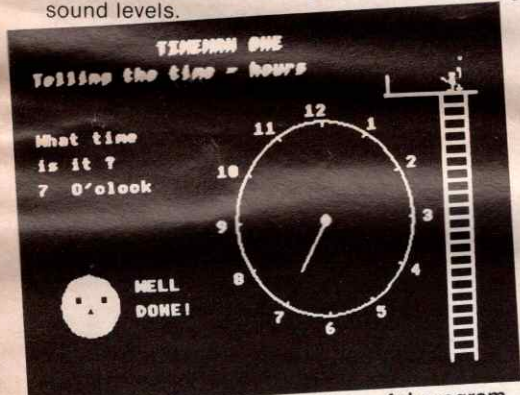
The *Timeman* series of programs is intended to supplement existing teaching methods by using the motivational aspects of the microcomputer to encourage practice and to achieve the required skills.

Timeman One is the first in a series of programs that help children understand time and its related concepts. Other programs in the series introduce the concept of telling (and setting) the time, minutes to the hour, half and quarter hours, am/pm and the 24-hour clock.

The cassette comes complete with a 10-page booklet which fits inside the library case. The booklet adequately describes how to get started and continues by discussing the program's options in some detail.

Essentially, *Timeman One* has been designed to aid children in telling the time and setting a clock. BES recommends its use by children of between four and nine years of age.

A short header program chains the main menu driven program. When running, the program presents a screen comprising nine options. These are: telling hours, telling minutes, setting hours, setting minutes, telling hours and minutes, setting hours, the BES monitoring system and setting sound levels.



Timeman One — an extremely useful program

Taking telling hours as an example, the clock shows the hour hand only which points at random to any hour, the numbers of which are illustrated on the clock face. On entering the correct number, a happy face smiles and congratulates the user and a little man on the right hand side of the screen climbs up two rungs of the ladder.

In the event of an incorrect response, the face grimaces and the user is prompted to try again. Should the second response be incorrect, the right answer is given. For each incorrect answer, the little man steps down one rung on the ladder.

The object of each stage is to try to get the man to the top platform in less than 15 attempts. On reaching the top, he dances to a tune and plants a flag to mark the successful completion of a stage. The number of flags is carried over each stage and is incremented on each successful turn.

Timeman One has a number of facilities which elevate it above the general level of most CAL programs. First, the option allowing sound levels to be set is a welcome feature for most teachers who generally wish to create a busy yet undistracting classroom environment. The ability to turn the sound either very low or off is an absolute necessity in a classroom based program.

The accuracy of setting the hands in that particular option is + or - three minutes of the correct time. Thus, if a response is wrong but within these limits then the computer displays CLOSE and the man steps down one rung. This feature proved to be important to the group of seven year olds whose assistance I sought in evaluating this program.

The motivation of not being totally penalised for being nearly right helped many lesser able children to persevere. Similarly, setting minute intervals proved to be important for a group of 10 year olds.

With more able children, the program has the facility to set the random time functions to one minute accuracy thus providing a more demanding exercise (normally the program defaults to setting multiples of five minutes).

The most valuable feature of the program from my point of view is the monitoring system. This is simply a means whereby the teacher/adult can monitor the progress of up to six children. Each time a new name is entered, a new record is created.

Analysis of the information stored in the monitor can provide a guide to specific problems or more general difficulties, acting as a basis for further practice. But why stop there? A printout of the monitor's information would be even more valuable. Perhaps this facility could be option 10 of future versions of *Timeman One*.

Bourne Educational Software has come up with an extremely useful little program that, with a few additions, would warrant a place in any primary classroom. **E**

NOT FOR REAL REVERSERS

PROGRAM: *Reversals*
SUPPLIER: Chalksoft Ltd
 37 Willowslea Road,
 Worcester WR3 7QP.
MACHINES: BBC micro
 Spectrum 48K
PRICE: £9.25 (inc. VAT)

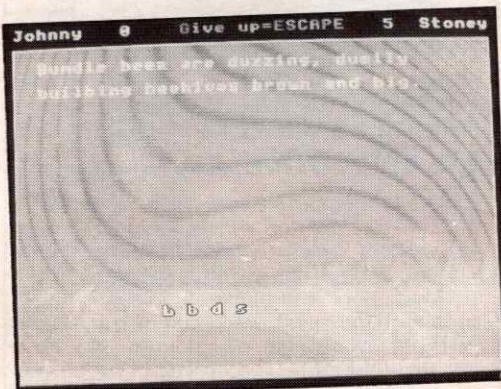
In their reading and writing, children often get their letters reversed, so Chalksoft has written *Reversals* as an aid. The program is all about two seagulls: Jonathan writes stories and Deadstone is rather a pest. Every time Jonathan writes a story, Deadstone flies along and reverses some of the letters.

All this is done in two programs — REVERSALS 1 and REVERSALS 2. In the first, any letter of the alphabet is reversed and in the second, the reversals are mainly bd, pq and sz.

The child using the program controls Jonathan. He is steered by the arrow keys, to pick up the letters that have been reversed. Deadstone may be a pest, but at least he has left them at the bottom of the screen on the beach. When the letter has been collected, it has to be taken to its correct place and dropped into the text by pressing the D key. The correctly placed letter is then coloured yellow, which makes it far too difficult to see even on a monitor.

The programs hold seven or more normally quite short stories. In REVERSALS 1, they are about the main characters of the program: "Jonathan was yellow. His feathers were stained by the oily sea." Whilst in REVERSALS 2, they contain alliteration and a typical story might be: "Devilish dragons drink dewdrops to douse their distinguishing breath." And that is certainly not the worst!

It is a shame that there is no in-built facility for a teacher to use their own text. This is a sad omission. Most of the text is far too difficult for children who really do have a reversals problem. Other bits are not as exciting or as interesting as they might have been.



Reversals — good fun but of limited use.

Children really do appreciate seeing their own stories being used in programs and it is time software houses specialising in educational software did something about it.

As with all recent Chalksoft programs, *Reversals* comes with an INSTRUCT program. This tells teachers or parents what to expect in the main program and how to use and operate it. These instructions are, of course, flown into place by the seagulls.

Using friendly seagulls to help children is certainly a novel way of approaching this problem. But children experiencing reversal problems would not be able to read the stories used. It might be suitable as a general purpose language program, but for real reversers — no way! As well as the stories being too difficult, the text used is far too small.

Children with reversal problems, when they

are reading are usually relying too heavily on processing each letter or syllable and not reading the sentence. This program is encouraging the child to look very closely at each letter but the problem is that he or she does not have the original text to refer back to. The whole idea is really of limited use in helping to overcome the problem.

Also, if a child is having reversal problems when writing, they are unlikely to be reversing letters other than p, q, b and d. Forget about the s and the z; how often do people write z anyway?

However, Chalksoft has put together a fun program. Children without real reversal problems really love it. In fact, teachers only stopped them using it because they could not stand the tweeting seagulls any more!

The program operates reasonably well. The teletext graphics show what is possible, simply and effectively. The colours though are not always well chosen.

It is a pity that the skill used in developing this program has not been better spent. Just think of the graphic sequences that could be used to help children with specific learning difficulties. One day soon this material will come. **E**

BETTER ON THE BLACKBOARD

PROGRAM: *Lines and Angles*
SUPPLIER: 4Mat Educational Software
 Linden Lea, Rock Park,
 Barnstaple, Devon EX32 9AQ.
MACHINE: BBC micro
PRICE: £5

Lines and Angles are two programs designed for younger children. According to the documentation, LINES teaches and tests the concepts of horizontal and vertical; while ANGLES teaches what is and is not a right angle.

LINES opens with a good title sequence in which the title is constructed with some clever line drawing. After this though, the program has a deadly dull section which is nothing better than a series of lines being drawn on the screen and the child having to indicate whether they are horizontal or vertical, by pressing H or V. Such a boring activity is not even enlivened by a reward sequence of any kind.

As reinforcement in the next stage, the concept of horizontal is presented by the sea, the horizon and a red boat. The graphics and animation are basic, to say the least. The sound is nothing better than a fog horn. To be perfectly honest, I have seen better scenes on screens from 12 year olds.

To help with the reinforcement of vertical, we are treated to the vertical take off of a helicopter, which is not really a treat at all. Meanwhile, the child using the program sits patiently and watches. You hope. Plenty of children I know would have left the micro long ago, probably finding more excitement drawing lines on the blackboard.

At last, it is the user's turn to be involved. Control is passed from the programmer to the child. The screen announces that you can fly a UFO. Yes, you guessed it, you can control it by commanding it to go horizontally and vertically. This could be the saving of a disastrous program. Can you imagine the possibilities — fantastic space scene, moonscape, space settlement, stars and so on — but no, it is not to be. Apart from the UFO, just a plain screen with no scene is offered.

The program ends with a sequence in which some simple pictures are drawn by using horizontal and vertical lines. In this part of the program, you first tell the computer how many lines to use. It then asks the user to count either the horizontal or vertical lines displayed.

ANGLES is the second program in the suite. Again, it is a rather bitter example. It starts with an unimaginative slow section that builds up and tests you on right angles. There is then a quite pretty sequence on angles that are bigger or smaller than a right angle.

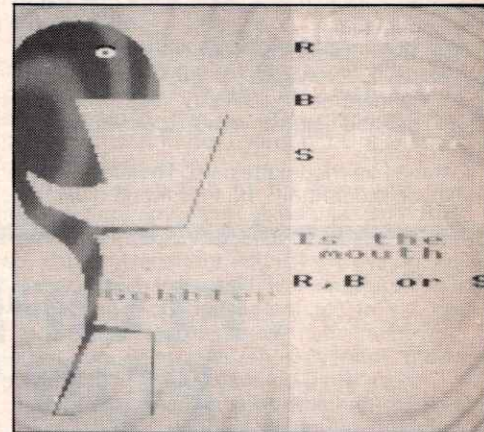
In these opening sections, the micro displays and then tests. There is no help for those who get things wrong.

Somewhere in this piece of software, there had to be something worthy. At last, as the end approaches, you are introduced to Gobbler. The amazing Gobbler, who is not a pretty sight and sounds strange too, starts to move its arms, legs and mouth into all sorts of angles.

The child is asked to say whether the angles created by the arms, legs and mouth are right angles or more or less than right angles. Those who drifted away earlier came back to see what was happening... good news travels fast.

Gobbler is not enough though to save this package. But it does show that the people behind *Lines and Angles* do have something that could be extended and worked up into something of value and worth. If they do, they will need to realise that there is no need to fill an educational program with material that can be covered better in another way.

The micro has power for animation. Lines are best drawn on the blackboard. Vertical and horizontal lines are best hunted for in the school environment. So too are right angles. In addition, the programmers need to think about graphics windows and the colour of text they use on certain backgrounds. **E**



The amazing Gobbler saves the day.

WHAT HAPPENED TO ATLASES?

PROGRAM: *Geography France*
SUPPLIER: Corona Software
 73 High Road,
 London E18 2QP.
MACHINE: BBC micro
PRICE: £6 cassette
 £9 disc

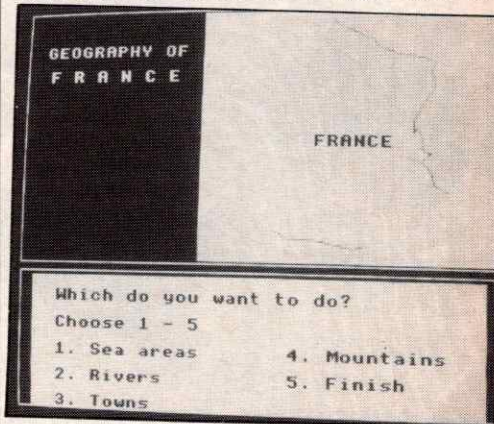
Corona Software seems to specialise in maps on a micro and has brought out a whole series of them with supporting questions. The range is quite extensive and includes France, Italy, Germany, Spain, Belgium, USA, Russia and even India.

But is this geography? It was once, I hear! Thank goodness the days of this sort of geography have gone. Or have they? We had better beware or the micro in education could bring it all back! It is all too easy to fit maps on a micro's screen and call it geography.

The program opens with a pleasant rendering of the French national anthem with the French flag imposing itself across the whole screen. From this, you go straight into the action. The screen display outlines the options you can use. There are four altogether: sea areas, rivers, towns and mountains. You choose your option and off you go.

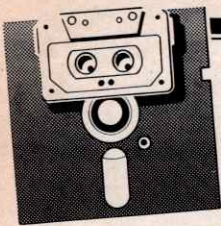
The screen is divided into three areas. The top left is used as the title area, giving the program name (in case you have forgotten) and the option that you are using. The top right is the map window and the bottom half of the screen is the information and questions area.

The map is well drawn and certainly accurate and recognisable. It is yellow surrounded by a light blue. The borders with neighbouring countries are marked in red lines. In the information mode, the rivers, mountains or whatever, are marked on the map clearly and effectively, and in the questioning mode are replaced by numbers. I liked how the



Your choice...

Continued on page 16



Continued
from page 15

mountains were shown by circumflexes and towns by asterisks.

The information contained in the program and what it can test you on is quite limited. You can use the program to test nine towns, three rivers, two seas and five mountain ranges. But this is an asset; at least the knowledge is commonplace and useful. It is certainly not a test of the teacher's knowledge as some so-called educational programs turn out to be.

Unfortunately, responses that you make to the questions are only accepted in upper case, although the program does warn you to press the CAPS LOCK key. I certainly think responses should be accepted as you would normally read them, even if this means the computer automatically putting the first letter into upper case.

One real asset is that almost correct responses are recognised. So, if you cannot spell Mediterranean correctly (like me!) you should get half marks if your response is pretty close.

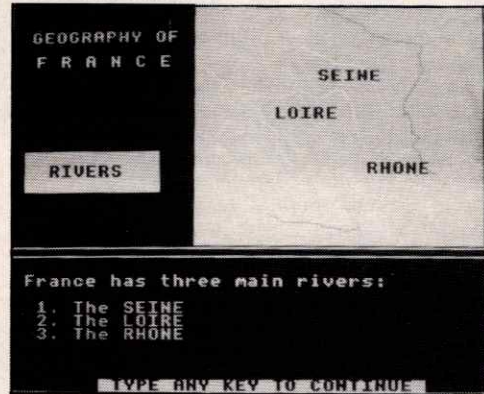
Corona has tried quite hard. The display has been well thought out. It is clear and I like the

different windows idea. The map is effective too. It is the whole concept of the software that is wrong!

I have severe reservations over the use of such a program in school. It is a great waste of a micro. It is also a waste of the child's time too. We do still have atlases, don't we? We do still talk and question children, don't we?

When it comes to using this sort of program, we ought to give children the choice. They may find it fun once or twice, but alongside some of the simulations that are around in the geography or social studies area, programs like this do not have a chance. **E**

Better with an atlas?



O LEVEL TEACH AND TEST

PROGRAM: Equations & Inequalities
SUPPLIER: Rose Software
148 Widney Lane, Solihull,
West Midlands B91 3LH.
MACHINE: Spectrum 16K/48K
PRICE: £5.95

Equations & Inequalities is a cassette of six programs aimed at O level students, covering the whole spectrum (no pun intended!) from linear equations, through simultaneous and quadratic equations and on to inequalities (including quadratic ones).

I started at the first program on linear equations. Unfortunately, to my horror, I discovered I had the first question wrong. How could this be? I checked the program again and found it would not accept any extra spaces in the answer. I looked back to see if any example was given of a correct form of answer. There

was none. Bad mark number one.

The second linear equation program also caused me some difficulty. In a rather lengthy equation, I was a little confused when an x (the letter) appeared right beside an x (the multiplication sign). It would be much less confusing if some method of obvious differentiation was made between the two.

The program dealing with simultaneous equations has been very well designed and some later programs on this cassette have followed the same design. If you encounter any difficulties and request help, just enough information is given so you can move on to the next step of the process. The concept of this help facility is commendable. However, the information provided is sometimes not specific enough. It is difficult to work out where numbers appearing on the screen have come from. These numbers are not explained accurately.

The section on quadratic equations is similar to before although I am unhappy with the fact that the help facility is not available past the first step. It seems to me that the further a student works through a problem, the more complex it becomes and, consequently, the more assistance one needs.

The inequalities and quadratic inequalities programs follow this same pattern. A minor inaccuracy I noted was that both answer examples use a > symbol; only one should use a > symbol, the other one should use a < symbol.

Each program seems to follow the teach-and-test pattern. First, examples are shown and a step-by-step explanation is given. These examples are followed by as many questions as the student wishes to undertake. You can choose to continue or finish after each question.

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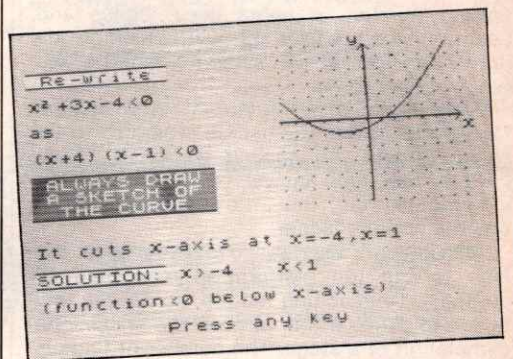
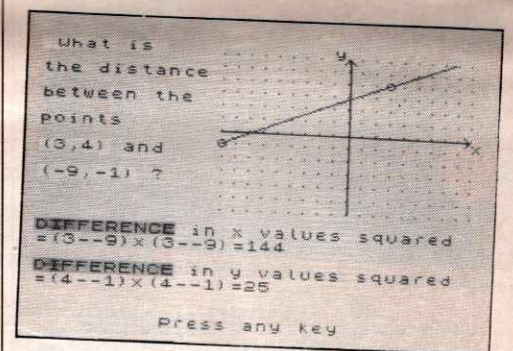
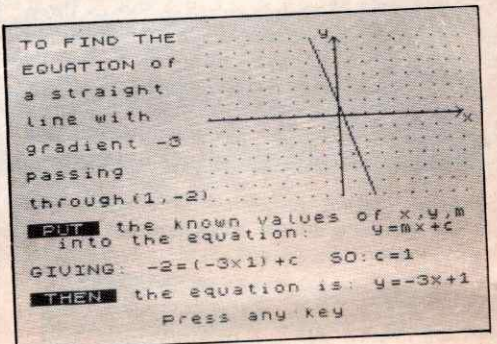
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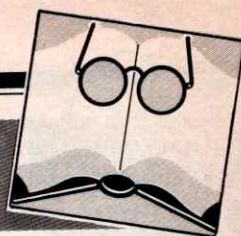


Screens from various sections in Rose Software's O level maths suite covering equations and inequalities. Probably best suited to revision work at home rather than classroom applications.

The colours used have all been chosen carefully, and the graphics displays are of a high standard. All programs run on a yellow background which makes for clarity of both text and graphics. Good use has also been made of inverse text colour, particularly the blue which makes headings really stand out. I would have liked to see the PRESS ANY KEY message in inverse text as well, to make it more obvious.

My main criticism of the screen layout is that it appears at times to be very cluttered. It is so full of text that it may be confusing for many students. It would be a simple task to add line spaces to each page which would go some way to remedying this situation.

Within the concept of teach-and-test, these programs fulfilled almost all my expectations. They represent good value for money, and I see them being particularly useful with revision at home. **E**



BOOK REVIEWS

A SELECTION FOR THE KIDS

14 books for youngsters (and not so young-sters) including 10 new titles from Usborne Publishing. The need for simple, straightforward and easy to understand books about computers and related topics is steadily being filled.

Information Revolution by Lynn Myring and Ian Graham. Published by Usborne Publishing Ltd, 20 Garrick Street, London WC2 9BJ. Price: £1.99 paperback, £3.95 cased.

Information Revolution is an ideal introduction to information technology. The book shows how the information revolution is bringing new machines into common use and changing the way that familiar ones work.

The book has excellent sections on computer shopping with bar codes and laser scanning, electronic banking where electronic funds transfer and the cashless society is outlined, the electronic office and word processing and the revolution in factories — developments like computer-aided design (CAD) and computer-aided manufacture (CAM).

Videotex gets extensive treatment beginning with the basics about getting the information onto the screen and the graphics used, and onto gateways and information providers. The explanations of signal decoding and digital signalling transmission are well done.

The hardware that is revolutionising information technology, such as satellite communication, fibre optics and video technology, are also clearly explained.

This book is of the same high standard as the previous Usborne series. It is bang up to date, the technology of the here and now is shown, discussed and explained. Both pupils and teachers will benefit from this book.

Practise Your Basic by Gaby Waters and Nick Cutler. Price: £1.99 paperback, £3.95 cased.

Practise Your Basic is packed with exercises, puzzles and problems to be solved by writing programs that will help in the mastery of Basic. The book is outstanding. There are programs with missing lines or variables to be filled in. There are program listings full of bugs to be spotted and corrected. There are ideas given for programs to be written.

All the programs in the book are in a standard Basic with text covering all the important Basic commands. It starts with PRINT and goes on from there.

My favourite section is the DATA puzzles, especially the telephone directory program. What was Rusty Robot's telephone number?

If you find yourself in DISARRAY with Basic, maybe you should order this for Christmas reading now!

Robotics by Tony Potter and Ivor Guild. Price: £1.99 paperback, £3.95 cased.

This is a real "what robots can do and how they work" book. The authors start in an historical vein going back to the writings of Karel Capek who in a play coined the word robots, but quickly moves to dispel the myths that adults and children have about them.

One of the best features of the book is how the robot devices that children will recognise from school, TV and magazines are included. Bigtrak features in explanations on steering a robot, for example. When robots that draw are investigated, the Turtle starts things off. When robot arms are explained, pictures looking like Colne's Armadroid are used. In the explanation of sensors, Hebot is featured.

A carefully constructed section on factory work puts over clearly how routine jobs can be done by robots and other machines. Usborne seems to be able to use diagrams and words with a clarity that others lack.

The section 'How to teach a robot' uses situations that seem to make understanding easier for children. But what better example could there be than a chocolate box packer.

Nine pages of the book are given over to showing readers how to build a computer controlled micro-robot. This is a fascinating section. As well as outlining the components the project needs, the use of each one is explained. This section is concluded with a computer program to run the new robot, ROVIBOT.

Well done, Usborne. What a way to round off a book on robotics — create your own. It is a useful project for schools as the parts should be readily available in most electronic components shops.



Practical Things To Do With A Microcomputer by Judy Tatchell and Nick Cutler. Price: £1.99 paperback, £3.95 cased.

Despite an interesting double page spread to start this book off, on what you can do with a computer and the extra equipment you could buy, the text is a little dreary and unimaginative.

Well, who really wants programs like Quizmaster or French Test? Do kids want to find averages and sort data? And when did you last find children wanting to use a computer for cryptic codes? I am afraid this book starts off with the last things I have found children want to do with a micro. To depress you further, there is an inflation calculator; although the horoscope generator and computer poet programs are more fun.

Practical Things To Do With A Micro is saved partly by the last 10 pages where children are encouraged to build some simple circuits and attach them to the computer. This is really where the book should have started!

Creepy Computer Games by Jenny Tyler (Editor). Price: 99p paperback only.

Creepy Computer Games contains seven simple programs written for use on a ZX-81 with 16K memory with amendments for the VIC, Pet, BBC, Apple, TRS-80, Dragon and Oric given. The book also gives suggestions for experimenting with the programs: changing the speed, adding graphics, colour or sound.

Otherwise, the games have limited appeal and no graphics. They range from NUMBER WIZARD — in which the wizard conjures up the

numbers 1 to 9 in the air and rolls two dice: the player then has to give two numbers which appear in the air and when added together give the same total as the two numbers on the dice — to SPIDERWOMAN, in which the user has to guess the letter she is thinking of or else you are turned into a fly. To help find the letter, Spiderwoman is given a word and she will tell whether or not the letter is in it.

At 99p, the book probably represents good value, although the material used for the games is at times unsuitable and morbid. Do we really want graveyard digging games? A book that you will probably want to know about to ensure you avoid it.

Usborne Guide to Better Basic by Brian Reffin Smith and Lisa Watts. Price: £1.99 paperback, £3.95 cased.

This is a beginner's guide to writing Basic programs. The book is a well produced step-by-step guide to understanding, programming and improving your Basic.

Not everyone wants to write their own programs, but in the beginning lots of people want to try. This book will certainly serve to help people understand Basic programs and will, I am sure, encourage readers to adapt other people's programs more effectively.

The book starts with a short guide to the main Basic commands, with plenty of examples to show how these operate. It is done well with coloured screens and clear explanations.

This is followed by how the commands are used in programs. This section is of value in helping children appreciate a modular approach. There is a very good section on loops and strings.

Understanding Computer Graphics by Judy Tatchell and Les Howarth. Price: £1.99 paperback, £3.95 cased.

This book is a guide to computer graphics where you are taken right back to the beginning of ROM, RAM and character generators in an attempt to help you gain an understanding of how a computer makes pictures. The book takes you from the keyboard to what happens inside the CPU until the computer turns on and off some pixels. This is followed by some very clear descriptions about resolution and memory.

For me, the book really comes alive when the screen displays in a game are taken apart. The layers of the scenery are split and explained in a unique style.

But do not think *Understanding Computer Graphics* is all about arcade games and their special effects. There are sections on computer-aided design, TV graphics and computer art. Another useful part focuses on computer simulation.

In the last section of the book are four graphics programs that can be used on a BBC micro, Spectrum, Dragon or Apple. The first two, Pattern Generator and In-betweening, are the best. In In-betweening, you can watch your own computer change one shape to another after you have specified how many in-between stages you want. Pattern Generator draws colourful constantly changing patterns.

This is a worthwhile book which introduces the spectacular world of computer graphics. One thing it will certainly do is to make the reader realise that they have seen lots of computer graphics without even knowing it. A super introduction to the electronic picture made without paint or brushes.

Usborne Introduction to Machine Code for Beginners by Lisa Watts and Mike Wharton. Price: £1.99 paperback, £3.95 cased.

To most people, the mere mention of machine code is enough to get them running back to the security of Basic. Machine code is difficult and time consuming maybe, but here is a book that is perhaps the best introduction around.

The Usborne Introduction to Machine Code for Beginners could be a classic. The book is a simple step-by-step guide to programming in machine code. I can think of at least 10 other books which have said the same, but not lived up to it. This book really does.

You are first taken in easy stages through the basic principles of machine code. This is linked together well in an opening section that helps you to get to know your computer better. What an excellent tour you get: stacks are climbed, memory addresses visited and the data bus ridden. Now you are ready for the CPU registers.

You are shown how to write very very simple machine code programs, for example, to add two numbers together or to flash a message on the screen.

I believe that Lisa Watts and Mike Wharton have written an outstanding book for people who want to make a beginning with machine code on a computer with either a Z80 or 6502 microprocessor. The text, although at times difficult, comes alive with the Usborne beasts and bugs crawling around the excellent illustrations that decorate every page.

The book is certainly different to the other 'Introductions to Machine Code' I have seen. So, if you want to add bytes from memory, know all about the carry flag, jump or branch, try this book. There are lots of puzzles and ideas to keep you going. There is even a list to explain away much of the jargon, too.

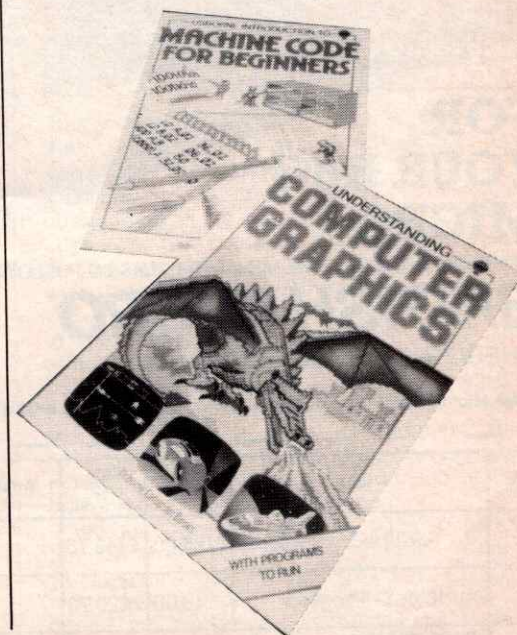
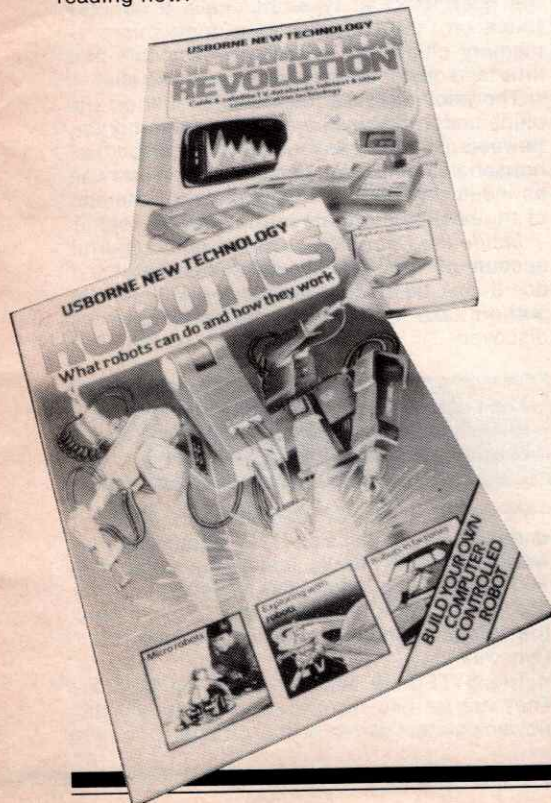
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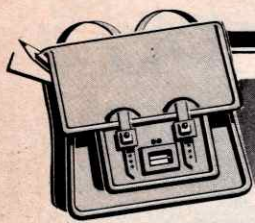
Usborne Guide to Computer Jargon by Corinne Stockley and Lisa Watts. Price: £1.99 paperback, £3.95 cased.

The Usborne Guide to Computer Jargon is refreshingly different from most as it is illustrated which makes it more appealing and interesting. It will serve teachers and children well who want to know what people mean when they drift into jargon. It will also (unfortunately) lead them into talking in jargon themselves.

The book has been carefully thought out and therefore the jargon is introduced in themes. There are keyboard words, screen words, memory and backing store words, CPU words and a whole set on peripherals. There is even a word-finder index at the back of the book.

The book is, in fact, amazingly helpful. It is a STRUCTURED USER-FRIENDLY LISTING of KEYWORDS produced in a good FORMAT! It will be ideal for you to sort out the multi-dimensional array of jargon that confronts us.





MICROS MADE EASY

HOW TO START AND WHAT TO EXPECT

Cathy Conlin, head teacher of Norton Glebe Primary School in Stockton-on-Tees, describes the way her school began work with computers and goes on to look at the way children's behaviour has been affected — in all aspects of their work and language, not just when using the computer.

Through the Dol scheme, all primary schools are being given the opportunity of acquiring a micro. Teachers are being bombarded with literature, courses and television programmes. Parents are being encouraged by their children to buy home computers and so we are being pressurised into providing the necessary education and experience.

What is going to happen when the computer arrives in your school? Where do you begin? How does the work develop? Where is the computer to be based? Which children? Which computer? Which subject area? This article outlines briefly how you can start but as you gain in knowledge, confidence and experience you will probably organise the use of the computer in a different way.

The computer is delivered to your school. Before you take it into the classroom, take it home and get to know it, preferably with someone already familiar with computers. If you do not know anyone, work through the first part of the instruction pack or, in the case of the BBC, work through the Welcome pack.

I know the Dol scheme incorporates teacher

training but it is a little like having passed your driving test and being allowed in the car alone for the first time; you will crash the gears, so be prepared.

With the computer in the classroom, you will need to appear confident in your ability to cope. NB: it is not necessary to be a computer expert but it is necessary to know which program to use, how to load it, how to break out of a program, how to change a program and to be aware of any bugs or pitfalls that may occur.

Arrive at school early having already chosen your program. Plug the computer into place in the class area and load the program before the children come in. Start using the computer with a program containing work with which the children are familiar — dare I mention a drill-and-practice program? They will feel the challenge of the mechanics of the computer without having to cope with unfamiliar problems or demands. The aim should be to give the children feelings of competence, excitement, challenge and success.

Begin by talking to the whole class: stress they are all going to be able to use the computer but it is better for only two to work together at a time. While the children are waiting their turn, give them work that requires minimum attention from you so that you can spend as much time as is needed with those using the computer. This is only necessary the first day. It is amazing how quickly even five year old children manage the micro second time around.

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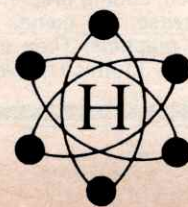
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The reaction and enthusiasm shown by the child

Continued from page 17

Inside the Chip by Helen Davies and Mike Wharton. Price: £1.99 paperback, £3.95 cased.

Inside the Chip aims to demystify the silicon chip or the integrated circuit (IC), a job that certainly needs to be tackled. After all, the silicon chip is probably the most important invention of the century.

The largest and most important section of the book looks at types of chips. It concentrates on the main ones in a home micro — memory chips, the microprocessor chip and interface chips. Each is explored in detail.

The book does not concentrate just on the chips under the keyboard of a microcomputer, however. It also explains how chips control household equipment, games and toys, as well as industrial robots and satellites. At the end of the book, the origins of the chip are told.

Inside the Chip gives a simple and colourful account of how the chip works and what it can do. It has been done extremely well — the authors take the readers on a real journey of discovery.

Katie and the Computer by Fred D'ignazio. Published by Creative Computing Press, Morristown, New Jersey. Price: £3.99.

This book, originally published in 1979, is undoubtedly a classic. It is about another world called Cybernia, inside the computer, and Katie whose father buys a micro. The story starts with Katie typing the word 'flower' into the computer and off things go in the world of Cybernia.

The BYTES are summoned by the Colonel. They are sent to the CPU and eventually the flower painters arrive at the picture tube and

work through the program. Show them as much as they need to know to start and then try to leave them to do it on their own. When the first two have finished working, ask one to say with the micro and choose someone else to join in 'the game'. The one who has already been through the program teaches the new child how to use the computer and helps to go through the program. For the first child, this boosts confidence and reinforces learning. For the second child, help is eagerly given.

So, your monitorial system can be built up until you reach the stage, which comes remarkably quickly, when all the children are happy, confident and secure in their use of the computer. One child teaching another leaves

you relatively free to cope with the other heavy demands on your attention.

When all the children have used an easy program, you can then introduce gradually programs suitable to their learning level, or containing new challenges, such as simulations, graphics and problem solving.

In our school, no child has ever refused to use the computer even at four and a half years of age. Some teachers and adults, however, have been not only reluctant but also aggressively against touching the computer.

I was fortunate and most teachers were willing to have the computer in their area. One who was unsure was allowed to carry out normal teaching while I went through the program with the children. When the teacher saw the reaction and enthusiasm of the

children, all reservations disappeared. The computer was taken home so she could try for herself away from prying eyes. Eventually, she learned to program the computer.

Once the computer is accepted in school, a computer club is a valuable addition to out-of-school activities. Home computers can be bought in, programming can be taught, parents can be helped and children gain experience in using other computers.

Attitudes of parents, like teachers, vary considerably. When we started, no-one knew anything about micros. Now, parents are expecting primary children to be taught with a computer as an integral part of their education.

Whatever kind of program is used in school; whether it is a drill practice or a problem solving exercise, no other activity produces the degree of concentration shown by children using the computer. There is a remarkable degree of oblivion to their surroundings. So far, we have made two videos of our work and in spite of extra people, lights, cameras and a microphone, the children worked through the programs freely.

On another occasion, two boys were working on a co-ordinate program and the bell rang for playtime. The rest of the class went out in the way children do, noisily, but neither Tony or Neil even looked up from the computer. When I informed them it was playtime, they asked if they could stay in and continue playing the game.

Children will go to extraordinary lengths to prolong their turn on the computer. One favourite program is called *Tuckshop*. In this, the children have 19p to spend. They have to choose either sweets, crisps, ice cream, etc., and then type into the computer how much change they would receive. Two boys working together who were familiar with the program chose to buy 19 Blackjacks. When asked why they had chosen to do so, it was due to the fact that a Blackjack cost 1p so they could have 19 goes, whereas the more expensive items meant less time spent with the computer.

In observing children working on the computer, a general pattern of behaviour emerges which is repeated so often it is remarkable. These observations are made from different sets of two children working through a variety of programs.

One child is always dominant; sitting forward on the chair, both hands hovering over the keyboard leaning slightly towards the passive child to prevent any interference of their control of the proceedings.

The dominant child watches eagle-eyed and as soon as there is the slightest hesitation on the other's part will rush forward to type in the answer.

The dominant child reads out what is on the screen and dictates whose turn it is to perform the set task.

On one occasion, in order to test this situation, we deliberately chose two boys who were regarded as leaders in their class and who were of equal ability to work on the *Tuckshop* program. John immediately took control of the keyboard. Andrew sat back while the program was loading, allowing John to take the initiative. However, when the program began and it came to choosing what they were going

to buy, how much it cost and what change was left, Andrew did all the talking and the working out of the answers while John typed in Andrew's findings.

There was a little argument when 2p was left because Andrew wanted to buy two Blackjacks and John said he did not like them. They finally agreed to buy a toffee and share it.

When I refer to one child being dominant and the other passive, these elements do not persist necessarily once they have finished their turn on the computer. On one occasion, a little girl who had had enormous problems settling into school was very dominant on the computer when it came to showing a younger girl how to type in her name. This boosted her confidence enormously.

In infant schools, the question of the upper case keyboard can cause problems. Even if the computer shows upper and lower case on the screen in the correct way, there is still the problem of the keyboard. We overcome this by having the alphabet printed out in upper and lower case on a card which can be left beside the computer as a reference.

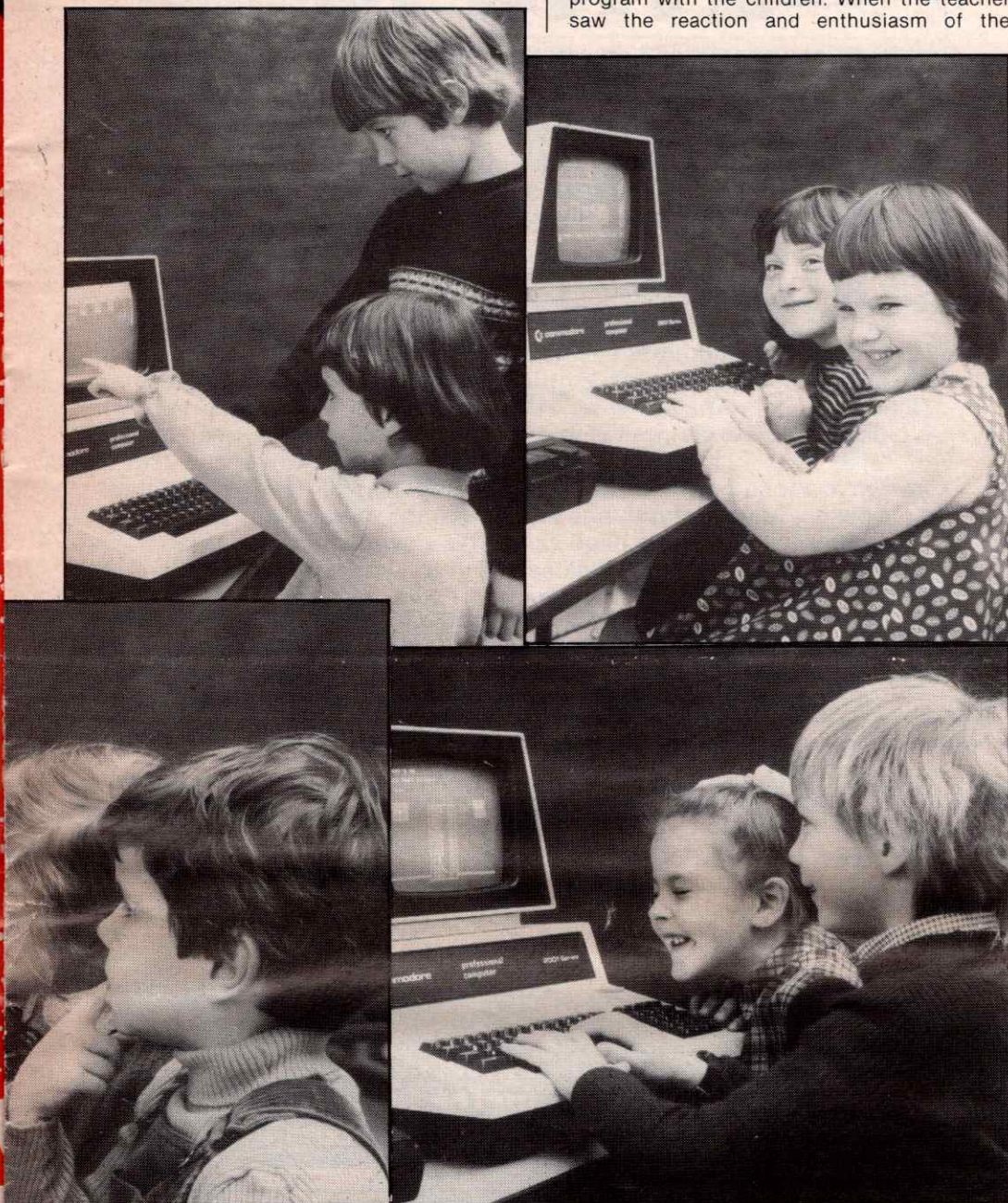
One or two schools I know fitted lower case letters over the keyboard but this poses obvious problems on how the capital letters can be taught. The children just accept it as the language of the computer and do not see this as a problem.

The presence of a computer in the classroom has generated a vast amount of conversation. Listening to the children talking has produced some fascinating results. Children keep up a running commentary of what is happening on screen all the time.

On a few occasions, we placed a tape recorder with an in-built microphone next to the computer. One day, two 15 year olds from a comprehensive school who were helping us, were working through a program with two six year olds. During the course of the program, an argument developed over the spelling of a word to be typed in. As this particular program kept a score, the six year olds were reluctant to type in the spelling given to them as they were convinced it was wrong. The 15 year olds were equally adamant that they were right. The word was typed in and it was not correct. The six year olds were justifiably angry and told the 15 year olds that they should stay at our school until they learned to spell!

When our children begin computer programming, they become aware of having to think logically. Great emphasis is placed on flowcharts and diagrams which the children seem to enjoy working out. A class of five year olds told the story of Red Riding Hood in words and pictures in flowchart form as a frieze to decorate the classroom wall. Individual children have written flowcharts with titles such as A Drive in the Car, A Trip to the Seaside and Going to School.

The spin-offs from working with computers occur naturally in many areas of the curriculum both in the seen and unseen aspects of education. A computer in your classroom is not just a machine in the corner. Use it with the children and you will probably find that their concentration, attitude and enthusiasm for it will affect their approach to other work in school. **E**



s invariably been the key factor in convincing reluctant teachers.

fire streams of electrons to produce colours on the screen. This book certainly abandons the normal approach used for introducing children to computers.

Instead of all those neat lines of print and drawings of the parts, *Katie and the Computer* is a colourful and exciting picture book. Instead of descriptive text about the parts of a computer, you are given a fantasy adventure story.

This is a book that really captures children's interest. The reader of the book, or the listener to the story, becomes involved in the adventure. Computers are portrayed as fun: they are bright, colourful and exciting, which is important.

But, perhaps the most important aspect of the book is how it effortlessly familiarises the reader with the key words of computer hardware and processes. A real computer may not have lots of little people running around in it, but Fred D'Ignazio has done wonders with his real live replacements for the tiny bursts of charges of electricity that do.

What better way to introduce children to computers than this picture book adventure. It is all colourful and all action; exciting and stimulating.

Microcomputers by Helena Sturridge.
Published by Kingfisher Books, 20-22
Great Titchfield Street, London W1.
(Distributed by Ward Lock) Price: £3.95.

Microcomputers is part of the Science in Action series from Kingfisher Books, concentrating on the technology of today and that of the future. The book is a straightforward introduction to microcomputers, emphasising how they work and what they do.

There are plenty of good drawings throughout the book which bring alive some of the difficult sections. The three-dimensional

cutaways are among the best I have seen. However, I was disappointed with the colour photos — they are just not up to date enough — too many Ataris and Pets.

The text is detailed and comprehensive with a good index and glossary. It will be a useful reference book.

But this book is totally spoilt for me, and schools too, by its sexist bias. Out of 21 figures illustrated, only five pictures have females in them. These are all in the passive role as well. If we wish to encourage women and girls to enter the already male dominated world of computing, this is no way forward.



How Computers Work by Ian Litterick.
Published by Wayland Publishers, 49
Lansdowne Place, Hove, East Sussex.
Price £4.75 hardback.

You do not need to know how a computer works in order to use one, but I am sure that some understanding of what goes on inside helps. Ian Litterick's book is a truly excellent guide to what is in the computer, how it is made and the logic of its operation.

The book is lavishly illustrated with some of

the best drawings I have come across. They are by Chris Smithers and, along with the clear layout, really make this book outstanding.

After a brief 'What is a Computer?' section, the book really takes off by taking parts of the computer system one at a time and examining each. The first section on the processor is long and detailed and includes bits, bytes and binary as well as AND and OR gates. It ends with RAM and ROM memory. There are very good sections on permanent memory, power packs, keyboards, visual displays, printing and computers talking to each other.

All in all, everything is there to demystify most things that may need it.

Just Look at... Computers by Leslie Foster. Published by Macdonald Educational, Maxwell House, 74 Worship Street, London EC2. Price £4.95 hardback.

This is a brand new book which is part of the Just Look At... series dealing with science and technology for younger pupils.

Computers is quite simply marvellous: outstanding in its presentation and content. Lots of full colour photographs and illustrations are used to very good effect as well as some quite amusing cartoons.

But where this book really does stand out is in the topics covered: how computers are affecting all areas of life and work is dealt with better here than I have seen anywhere. Up to date, topical examples are given — no patronising here — and often complex and controversial subjects are covered very well indeed — such as computers and the disabled, police records and film animation.

Big bold headings and lively pages enhance the well written text. At the end of the book is a word list (no need to explain what a glossary is) and a useful section covering milestones in computing. Well done, Macdonald Educational. **E**

These materials have been developed by the Microelectronics Education Programme

EDWORD
Educational WORD processor system

The only word processor designed by teachers for pupils to use

This Educational WORD processor has been developed in Clwyd as part of a curriculum development project funded by MEP (Wales). EDWORD is a multi-media package in which the software is held on a single 16K ROM chip. It will run on any BBC microcomputer system i.e. Model A or B using disc, tape or a network. EDWORD will operate with any printer. This is achieved by providing an interactive program (on disc or tape) that will automatically create a file of information about the printer to be used. This printer configuration can be read by EDWORD and need only be created once. One printer is automatically assumed to be available if the content of the printer configuration file is not read

EXAMINATIONS
EDWORD is suitable for examination work

TESTING
EDWORD has been tested and evaluated by schools and colleges.

RESOURCE PACKS
The EDWORD package is sold essentially as a number of 'packs':

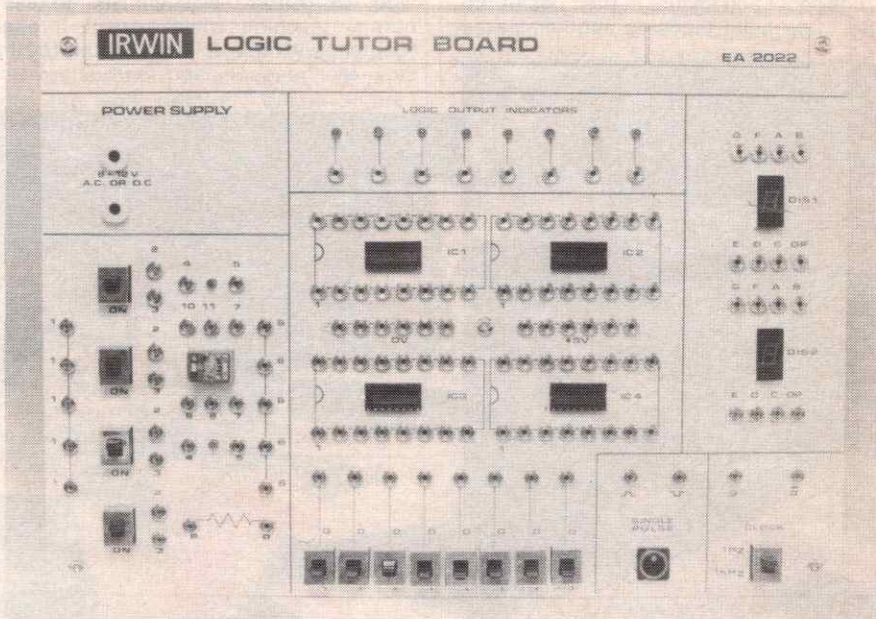
| | |
|---------------|------------------------------|
| User Pack | £38.95 |
| Teacher Pack | £21.95(disc) £18.95(tape) |
| Primary Guide | £10.00(disc) £ 7.00(tape) |

For further details and order form write to:
Clwyd Technics Ltd, Dept EWP/EC, Microprocessor Centre,
Coach House, Kelsterton Road, Flint, Clwyd CH6 5TH
or telephone 0244 816236, Ext. 35

IRWIN

SCIENCE EQUIPMENT MANUFACTURERS

Type No EA2022 Logic Tutor Board



The board is designed to teach logic using either TTL or CMOS. The characteristics of both fourteen and sixteen pin logic devices can be investigated using the facilities the board provides, with the electrical requirements of both TTL and CMOS systems being catered for. The logic tutor board will fit readily into many existing syllabus requirements, and merits serious consideration when new courses are being set up. Over twenty-five pages of project sheets are provided, topics covered being:

Basic concepts; AND, OR, NAND, NOR, Exclusive OR and NOT; Truth Tables; Switch and Relay Logic; Integrated Circuit Logic Gates. In addition, more comprehensive material for use with the logic tutor board, covering the following topics:

Flip Flops; Binary Counters; BCD Counters; Seven Segment Displays and Decodes; Binary Adders; Serial Addition.

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SEND FOR OUR 500 PAGE EDUCATION EQUIPMENT CATALOGUE.

IRWIN-DESMAN LTD. 294 PURLEY WAY CROYDON CR9 4QL TEL: 01 686 6441

Software Production Associates

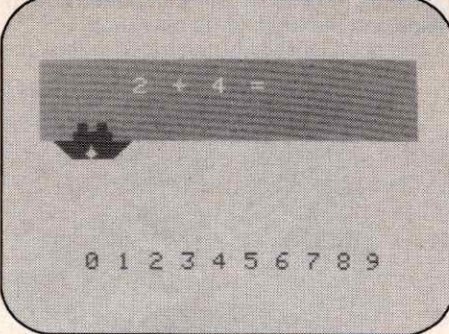
Purveyors of fine software for the RML 380Z and 480Z microcomputers

New Primary Software!

- A new range of educational programs for the RML 480Z is now available for your primary children.
- The programs make full use of colour and sound to provide an attractive and amusing environment for learning.
- Careful design and classroom testing ensure that the programs are suitable for children with low reading abilities and poor keyboard skills.

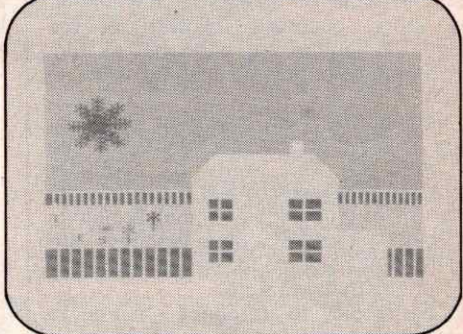
SHIP £5.00 + media

This gives practice in learning or reinforcing simple number bonds. A ship is stepped across a line of numbers 0 to 9 by pressing the space bar or arrow keys. A sum is displayed and answered by dropping a 'depth charge' onto the right number. Moving the ship visualises the relationship between numbers and the process of addition.



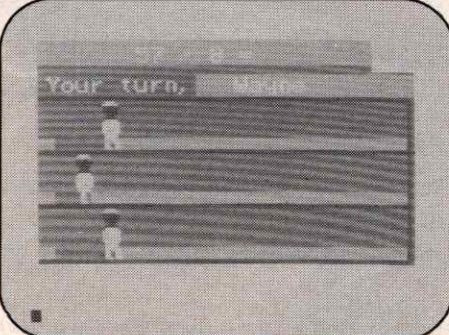
COUNT £5.00 + media

An aid to learning to count and recognise numbers. A number of identical objects are drawn on the screen for the child to count. If desired, numbers are shown on each object for matching with the keyboard figures. The program is made thoroughly enjoyable by a scene that gradually builds up. At the same time a variety of tunes can be played if you wish.



RACE £5.00 + media

A race for three children or teams to reach the finishing line. Two digit additions or subtractions are shown to each player in turn. Their success on the track depends on the time that they take to work out the sum. The teacher can select problems of varying difficulty.



Media: £1.00 cassette, £3.00 disk.
All three are available together in ROM pack for £32.00. Please add VAT at 15% to all orders.

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SOFTWARE UPDATE

Following on from March and April's Software Short Lists, we present the Update to programs for both the 380-Z and 480-Z computers. The much used 380-Z still dominates the 16+ computing scene and the 480-Z is finding a growing niche for itself in primary circles as part of the Dol scheme. The software reflects this trend with much of the material for younger pupils available only on the 480-Z with its enhanced graphics, colour, sound and high RAM capacity (64K). ROM packs are also expected shortly for this machine.

Research Machines Ltd produces its own publication for users of these micros detailing peripheral products and software. *Marketplace* is available from RML at PO Box 75, Mill Street, Oxford OX2 0BW, and contains information on educational programs for all age groups. You may also be interested in a news item on page 7 of this issue giving details of a special offer from RML which is giving software away to current and potential network users. Ginn's *Mary Rose* is the only program we have looked at so far; that was reviewed in the June issue.

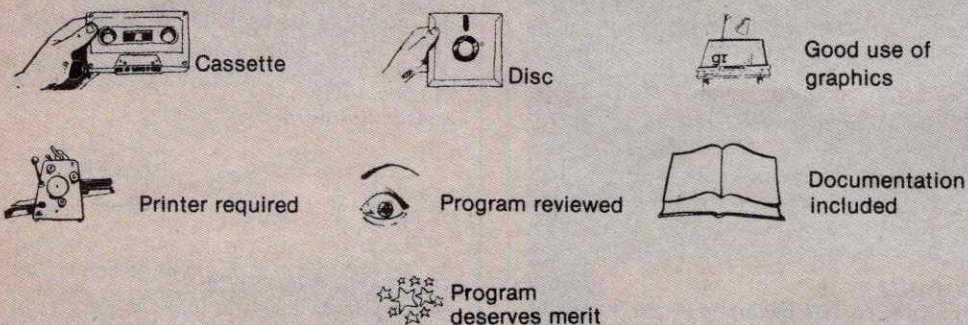
Below is a key to the symbols used on the following pages along with details of various system configurations and requirements. Please remember that although every effort has been made to ensure the information given is correct, it is advisable to contact the supplier direct. If you know of any material which we can include in our Software Update section, for any machine, please write with details to the Editor, Educational Computing, 8 Herbal Hill, London EC1R 5EJ.

In the last issue, we covered programs for the Spectrum micro. There was a mistake in the introduction and it should have read 'all programs that follow are available on cassette.'



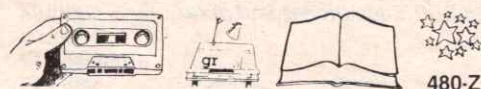
A view of Research Machines' production area at its premises in Oxford.

KEY



The 380-Z is essentially a disc based machine in three versions — MDS-1, MDS-2 and FDS-2 — with between 32K and 56K RAM and CP/M. Most of the programs listed require high resolution graphics with many needing colour, too. COS 3.4 or later and Basic V5 are also minimum requirements. The 480-Z comes in no less than five versions including both stand alone systems and network configurations. Hi-res colour graphics, 64K RAM, Basic in ROM and 40-character screen are all offered under the Dol primary scheme. The 380-Z and 480-Z are generally compatible and unless a program is marked to the contrary, it is suitable for both machines. 32K RAM is taken as the minimum memory requirement. Don't forget that many programs can be run on the 380-Z, normally with 56K, under the CP/M operating system. Prices quoted generally do not include VAT or postage and packing.

UP TO 8 YEARS



480-Z

THE DUDLEY PROGRAMS

These consist of six themes each of four tapes, including: weather, travel, exploration, myself, food and homes. The individual programs follow.

LOOKING AT GRAPHS

A store of climatic information for 12 areas of the British Isles. Data is displayed in pictograms, graphs or barcharts which are then used as the basis for questions.

UNDERSTANDING YOUR WEATHER

Illustrates the passage of a weather system and basic meteorological concepts.

LOOKING AT SCALES

Provides practice in reading different meteorological instruments — thermometer, rain gauge, barometer, anemometer and maximum and minimum thermometer.

SCANNING/WORD FINDER

Two programs — Scanning consists of 40 passages on weather providing practice in comprehension and note-taking, whereas Word Finder is a thesaurus program where the child can explore words on the weather theme.

CAR JOURNEY

Simplified map of some of the major roads in the country and child has to plan a route, with various constraints and hazards which have to be avoided.

SPECIAL AGENT

Game taking child across Europe on rail and air networks chasing a spy. User has limited funds and time.

BALLOONING

Simulation of flight in a hot air balloon and child has to use various skills to fly successfully, illustrating concepts such as expansion of gases, air density, etc.

PUNCTUATION/WORD FINDER

Two programs — Punctuation consists of 40 passages providing practice in punctuation. Word Finder is a thesaurus program in which user explores the connections between a bank of words on a travel theme.

TOMB ADVENTURE

Aim is to find hidden treasure using a compass and map, providing practice in the use of bearings and planning.

MAPPING SKILLS

Develops ability to use Ordnance Survey symbols and co-ordinates as child has to locate features using four and six figure and lettered co-ordinates on a coastal and urban site.

STAR GAZER

Program draws a star map for any time of day and night at any time of the year. Constellations can be enlarged and zodiacal signs displayed, as an introduction to astronomy.

LIBRARIAN/WORD FINDER

Librarian is an introduction to basic reference skills as user has to place books in the right order on a shelf, with various levels of difficulty. Word Finder is another thesaurus program.

MY MATHEMATICAL SELF

Database which stores and analyses information collected by children and produces tables, bar graphs and scatter graphs.

PAST TO PRESENT

Contains illustrations of historical events, people and inventions and these are grouped into sets — e.g., inventions, people, etc., and teacher sets questions.

KEEPING MYSELF ALIVE

Simulation with the aim of keeping a person alive by controlling various functions of the body — e.g., breathing, sweating, etc.

IDENTIKIT/WORD FINDER

Identikit — resource for creating identikit pictures and set of descriptive words can be displayed to accompany features as they are selected. Word Finder is another thesaurus program.

SHOPKEEPER

The user is the shopkeeper and the computer provides customers and till. The shopkeeper has to perform the usual transactions using a variety of coins and give the correct change.

DAIRY FARMER

Simulation of a modern dairy farm in which milk production has to be maximised and the farm run profitably.

GROWING A PLANT

Exploration of environmental requirements of a growing plant. User determines environment and program shows the results.

SPELLING/WORD FINDER

A spelling program with four reading levels and a thesaurus program on the food theme.

HOUSEKEEPER

Practice in the financial decision making of running five different homes — single person, family, etc. — with various different accounts.

TOWN PLANNER

Various amenities — playgrounds, pubs, pelican crossings — have to be sited on a town plan.

CENTRAL HEATING

Demonstrator tool for teachers which simulates a central heating system of a house to show effects of changes in outside temperatures and various types of insulation.

CREATING A MONSTER/WORD FINDER

Two programs in which the profile of a monster and its environment is created and a thesaurus exercise on the homes theme. **£9.25 (plus VAT) for individual programs £33 (plus VAT) for the set of programs in a theme.**

Heinemann Computers in Education



SPELLBOUND

Program testing the accuracy in listening, spelling and punctuation. Teacher can create word or phrase files.

£14 cassette

£15 disc

GSN Educational Software



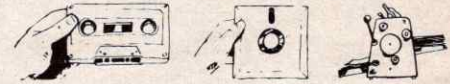
SUMMIT

Mental arithmetic program with five types of questions and levels of difficulty.

£8.50 cassette

£9.50 disc

GSN Educational Software



CROSSWORD

Crosswords can be created from teacher's own words and program prints blank grids and teacher's solutions.

£11.50 cassette

£12.50 disc

GSN Educational Software



HUNT THE THIMBLE

Teacher hides a thimble in a room and child guides the computer to find it through answering various questions, which have been pre-set by the teacher.

£7.95 (inc. VAT)

Vulcan Computing



MICROS IN THE PRIMARY CLASSROOM

Series developed by ITMA and MEP consisting of five modules, which introduce and demonstrate the use of micros in the classroom.

poa

Longman Micro Software

9 TO 14 YEARS



SUBTRACT

Demonstrates teaching of subtraction by decomposition — e.g., 10 turning into 10 ones.

£5 (plus VAT)

Software Production Associates

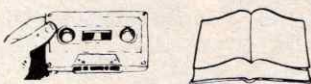


HISTO

To be used in the introduction of data display — as data is typed in a histogram with labelled axes is plotted. Mean values can also be displayed.

£4 (plus VAT)

Software Production Associates



MODARITH

Program in which user can generate a modulo arithmetic table and interchange lines, cyclically rotate lines and delete lines.

£8 (plus VAT)

Software Production Associates

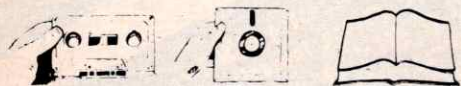
Continued on page 22



SORTS

Graphically demonstrates three most common methods of sorting numbers — bubble sort, insertion sort and selection sort. Displays chosen numbers on screen and demonstrates how they are manipulated during a sort.

£5 (plus VAT)
Software Production Associates



WORD SQUARE

Standard game in which user provides the computer with a number of words and the program hides them in square. Pupil has to find all the words.

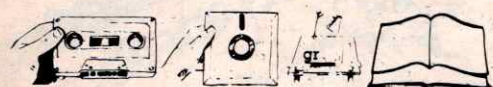
£5 (plus VAT)
Software Production Associates



HANGMAN

Traditional game to guess the computer's word before you get hanged.

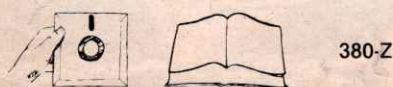
£3 (plus VAT)
Software Production Associates



STARTREK

Educationally useful for younger children giving practice in bearings, angles, decimals, comparative size of numbers and co-ordinates.

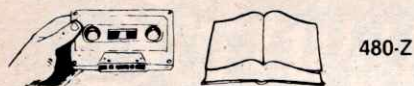
£10 (plus VAT)
Software Production Associates



HELP YOURSELF WITH SPELLING

Spelling program dealing with rules.

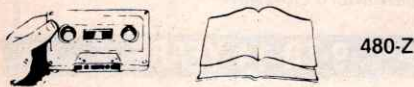
£15 (inc. VAT)
Sussex Software



WORDFLASH

Spelling aid using the 201 most used abstract words as a flash or for typing in.

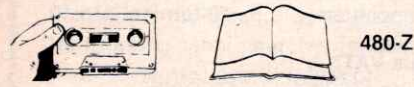
£4.95
Ed Soft Educational Software



ANAGRAM

Uses the 50 most used nouns with simple clues.

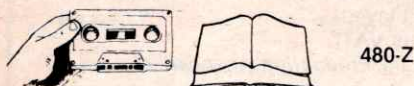
£4.95
Ed Soft Educational Software



MMATHS/PLACEVAL

MMATHS supplies 20 questions on subtraction, multiplication, division and squares. PLACEVAL is an aid for those who have difficulty distinguishing between hundreds, tens and units.

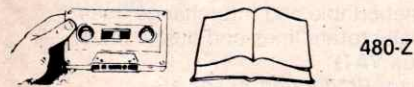
£4.95
Ed Soft Educational Software



KEYRECOG

Keyboard recognition program with questions to test knowledge.

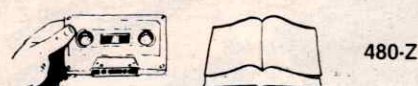
£4.95
Ed Soft Educational Software



COUCAPCUR

Quiz testing countries, capitals, currencies

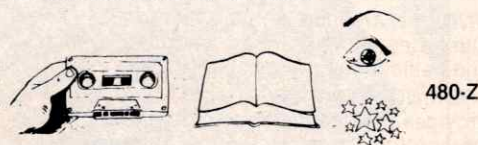
and languages of various European countries.
£4.95
Ed Soft Educational Software



WHATSIT

Animal names are stored in the program and the child has to guess what they are by answering questions. Designed as a concept aid.

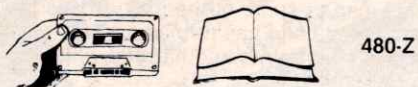
£4.95
Ed Soft Educational Software



MARY ROSE

Two programs based on the rediscovery and excavation of the Mary Rose, requiring an understanding of co-ordinates and bearings. First program simulates the search for the wreck and the second simulates an underwater excavation of the hull.

£32.50
Ginn Microcomputer Software



FRACTION SNAP/TRAINS

FRACTION SNAP reinforces the concept of equivalent fractions and TRAINS provides practice in the rules of number. Both programs are contained in the Micro-Primer 2 pack.

MEPI Tecmedia



FTRAINS

Provides practice in the rules of arithmetic applied to fractions. Available in a Blue File, free to teachers.

MEP Regional Information Office



ENGLAND

Test of atlas skills related to the recognition of towns in England and Wales. Available in a Blue File, free to teachers.

MEP Regional Information Office



FARMING

Simulation of farming in Eastern England. Again, contained in a Blue File free to teachers.

MEP Regional Information Office



SYMBOLS

Program to test the recognition of symbols from an Ordnance Survey map. Teachers can enter their own data for any map extract. Blue File material, free to teachers.

MEP Regional Information Centres



SETT

A Monte-Carlo simulation of a settlement pattern. Blue File material, free to teachers.

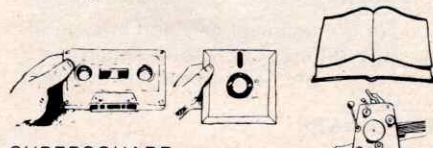
MEP Regional Information Centres



DESCRIBE

Calculates mean, median, standard deviation, histograms, quartiles and skewness. Blue File material, free to teachers.

MEP Regional Information Centres



SUPERSQUARE

Word square program, and finished square may be saved.

£8.50 cassette
£12.50 disc
GSN Educational Software



SUM FUN

Board game for two pupils to promote mental arithmetic skills and speed. Difficulty level controlled by teachers.

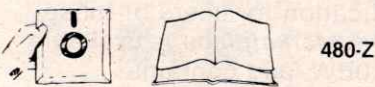
£8
GSN Educational Software



THE MAPE TAPE

Seven programs from MAPE ranging from counting practice to scientific approach to investigation for upper juniors. Free to MAPE members.

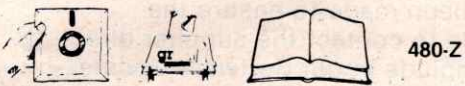
MAPE



MATHS REWARD

Program designed to implement recommendations of Cockcroft Committee on mental arithmetic. Five levels of difficulty.

£7.95 (inc. VAT)
Vulcan Computing

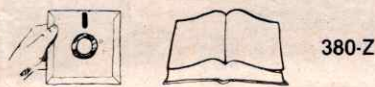


PROBABILITY

Statistics package on random number generation, Chi squares, etc.

£7.95 (inc. VAT)
Vulcan Computing

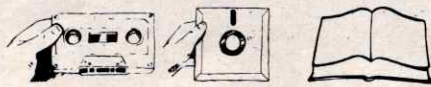
15 TO 18 YEARS



FUNCTION

The program displays the graph of any specified function between any limits, with automatic scaling, and superimposes further graphs onto the original display and finds where the graph crosses the x-axis and other functions. Suitable for maths and science teachers.

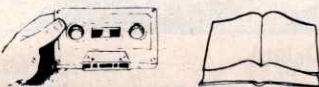
£15 (plus VAT)
Hutchinson Software



SAMPLES

Illustrates sampling theory. User selects samples of any size from a Binomial, Poisson or rectangular distribution and for each sample, the mean and variance can be displayed.

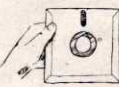
£10 (plus VAT)
Software Production Associates



CENLIMIT

Demonstration of the Central Limit Theorem — a random background population is generated, a histogram plotted and samples of any required size are taken. Histogram of sample means is superimposed on the background population.

£3 (plus VAT)
Software Production Associates



SUPASTAT

Analysis of data including F-test, Kendalls' Tau and W, T-tests, correlation, Chi-square, Mann-Whitney test and a suite for the full analysis of variance.

£60 (plus VAT)
Software Production Associates



GEOMAT

Demonstrates transformation geometry. Enables user to rotate, translate, reflect, glide

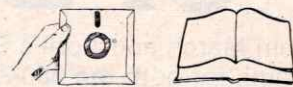
reflect, shear, stretch or enlarge figures.
£12 (plus VAT)
Software Production Associates



MICROBE

Mini-interpreter to show pupils the principles of a computer. The program accepts statements and translates them into simple instructions.

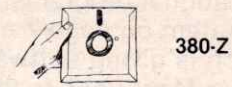
£15 (plus VAT)
Software Production Associates



A LEVEL PHYSICS SUITE

Follows Nuffield physics course. Designed to demonstrate experiments that are difficult or impractical in the classroom. Includes: decay of charge on a capacitor, Millikan oil drop experiment, deflection of alpha particles by a nucleus, etc.

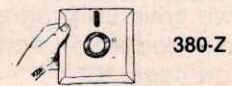
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THE TREATY OF VERSAILLES

Covers the main provisions of the Versailles Treaty, the changes in territorial boundaries in Europe which occurred as a result of the Peace Settlement and implications for the future of post-war Germany.

£15 (inc. VAT)
Sussex Software



HITLER'S GERMANY

Covers the main aspects of Hitler's rise to power, life under the Third Reich and major events in Hitler's pre-war years. Includes comprehension and revision tests.

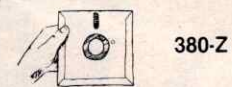
£15 (inc. VAT)
Sussex Software



WORLD WAR ONE

Package of two discs covering the main areas and topics of the war in a series of sections on the war at sea, the Western Front, the Home Front and Weapons of War.

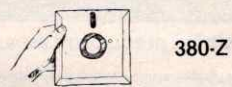
£30 (inc. VAT)
Sussex Software



THE RUSSIAN REVOLUTION

Provides background from the start of the century with emphasis on revolutionary events of 1917 and years to Lenin's death.

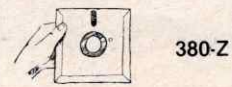
£15 (inc. VAT)
Sussex Software



MUSSOLINI'S ITALY

Deals with the period from 1919 to Italy's entry into the Second World War, covering the growth of fascism in Italy, Mussolini's rise to power, his economic and social policies and his conduct of foreign affairs.

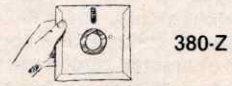
£15 (inc. VAT)
Sussex Software



PRIDE AND PREJUDICE

Program is divided into four sections: story, characters, scenes and social background.

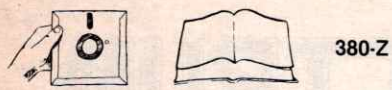
£15 (inc. VAT)
Sussex Software



CRITICAL ANALYSIS — 1

Program which takes pupil through basic notions of rhyme, metre and figures of speech before touching upon more advanced critical ideas.

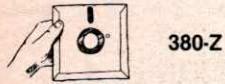
£15 (inc. VAT)
Sussex Software



380-Z

IMC-2 SIMULATION SYSTEM

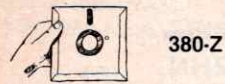
Simulation of the workings of a computer — The Introductory Model Computer, Mark 2. Covers processor architecture, machine language and assembly language.
£22 (plus VAT)
Edward Arnold (Publishers)



380-Z

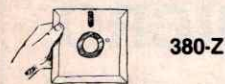
DIFFERENTIAL EQUATIONS

Introduces this topic and how it should be solved using a simulation problem linear step-by-step method. Also uses other methods of approximation and plotting families of solution curves.
£22 (plus VAT)
Thomas Nelson & Sons



380-Z

COMPUTER PROGRAMMING IN BASIC
Provides tested version of examples in the book — *Computer Programming in Basic*.
£17.50 (plus VAT)
Thomas Nelson & Sons



380-Z

FURTHER COMPUTER PROGRAMMING IN BASIC
Provides tested versions of programs in the book — *Further Computer Programming in Basic*, by P Bishop.
£17.50 (plus VAT)
Thomas Nelson & Sons



380-Z

CLIMAP and CLIMUS

Two programs that use data, graphs and music to teach world climates for O and A level.
£5
J A Fenner



380-Z

CENTRAL
Program to calculate centrality values and analyse settlement hierarchies. Blue File material, free to teachers.
MEP Regional Information Office



380-Z

HUFF
Application of Huff's gravity model of the Isle of Wight. Blue File material, free to teachers.
MEP Regional Information Office



380-Z

PERU
Third world simulation of a village in Peru with problems of population/food imbalance. Blue File material, free to teachers.
MEP Regional Information Office



380-Z

DIPPER
Calculates students' T-test, Chi square, analysis of variance. Blue File material, free to teachers.
MEP Regional Information Office



380-Z

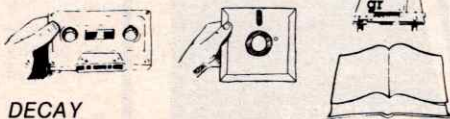
RELATE
Draws scattergraphs, transforms to log values, Spearman rank correlation, linear regression and correlation matrix. Blue File material, free to teachers.
MEP Regional Information Office



380-Z

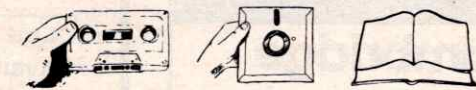
SPATIAL

Demonstrates nearest neighbour, mean centre and standard deviation. Blue File material, free to teachers.
MEP Regional Information Office



DECAY

Radioactive decay package, allowing user to preset all parameters. Gives graphical displays of decay series.
£14 cassette
£15 disc
GSN Educational Software

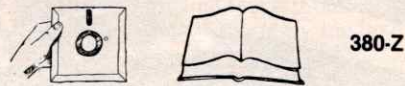


PHYSICS PACK

Five interactive experimental simulations —

Millikan's Oil Drop Experiment, Einstein's Quanta Simulation, Velocity of Light, Determination of the Electrostatic Constant, Multiple Split Interference. For A level students.

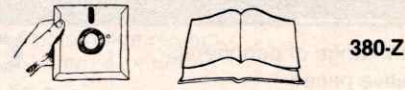
£14 cassette
£15 disc
GSN Educational Software



380-Z

COMPUTER AIDED DESIGN 1

An introduction to CAD. User can draw on screen any shape that is symmetrical about a single axis and then view several three-dimensional representations of it. These can be rotated to give an impression of the finished object and, if desired, can be modified.
£17.25 (inc. VAT)
Heinemann Computers in Education



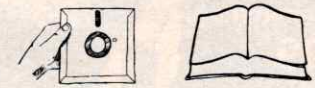
380-Z

TITRATIONS

Assists the teaching of calculations and

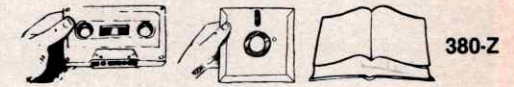
provides more than 320 practice problems, especially suitable for titration practicals. Suitable for CSE/O level and introductory A level.

£14.95 (inc. VAT)
System Software



STOCK

Illustrates the working of a basic stock control system and provides the basis for simulations and project work. Recommended for O/A level and higher ed. courses.
£14.95 (inc. VAT)
System Software



380-Z

TRANSPOTS

Sets up environment based on the South West of England to consider the problem of locating a factory to manufacture goods using china clay. Useful for maths and

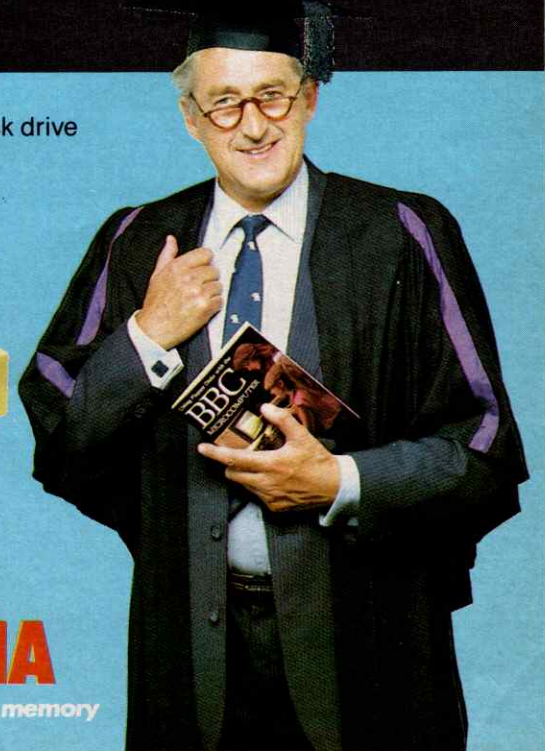
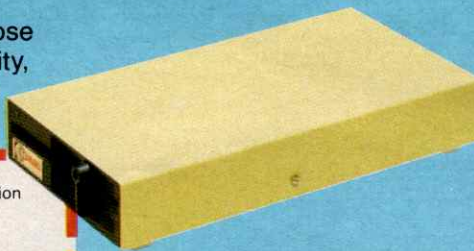
Continued on page 25

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Choosing a microcomputer for use in education is like solving a complex problem — usually there are more questions than answers. Choosing peripheral equipment to suit the micro is part of that complex problem — unless you choose Cumana — whose solution is simple. Quality, availability, compatibility, back-up and price — Cumana provides all the answers;

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| Epson FX-80 FT-3 | £400.00 |
| Juki Daisy wheel | £395.00 |
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| MCP-40 | £161.00 |

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MP BBC MICRO SOFTWARE

NEW ISSUES

MP Software & Services specialise in producing good quality software for the BBC Micro. The range of games, educational and other programs is continually being extended.

CUT'N'VAL *NEW* EDUCATIONAL MATHEMATICS (BBC/B)

CUT'N'VAL is a highly versatile mathematics program suitable for use with children from 7 to 16+. The program is designed to help the understanding of a wide range of mathematical expressions and allows an exploratory or investigative approach by the user. The package comes complete with four sets of demonstration questions and full instructions. Further exercise sets are available from MP Software and can easily be compiled.

£14.50 (CASS) £17.50 (DISK)

ACCURATE *NEW* EDUCATIONAL MATHEMATICS (BBC/B)

ACCURATE is a program designed to assist students obtain a reasonable estimate to questions which require an expression to be evaluated. It is suitable for use with students from 7 to 18. The program gives a set of questions which must be answered within a certain degree of accuracy selected from a menu at the start of the program. They may be set as questions with answers accurate to 5 significant figures or between 5 and 30% of the answer as required. The program comes with full instructions and demonstration exercises. Further exercise sets are available.

£11.00 (CASS) £14.00 (DISK)

BLUE DRAGON *NEW* ADVENTURE GAME (BBC/B)

Somewhere in a strange and dangerous land lies a fabulous treasure guarded by a fierce dragon. Can you survive the perils that await and recover the treasure or will you meet a nasty end!! What is making terrible slurping noises deep underground? And what use is the strange black cloud? Play the game and find out.

£7.48 (CASS) £10.50 (DISK)

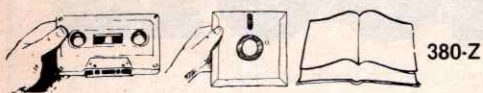
ALL PRICES INCLUDE VAT & POSTAGE WITHIN U.K. SEND S.A.E. FOR FULL RANGE OF PROGRAMS AND PRICE LIST OR ASK YOUR LOCAL DEALER. TRADE ENQUIRIES WELCOME. CHEQUES PAYABLE TO MP SOFTWARE OR PHONE WITH YOUR ACCESS/VISA CARD NUMBER.

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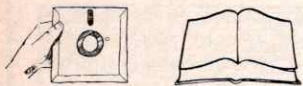
• TELEREF 128

geography classes.
£25 (plus VAT)
 Longman Micro Software



380-Z

POLICE
 Pack based on a police record system designed for use on computer awareness courses.
£14.50 (plus VAT)
 Longman Micro Software



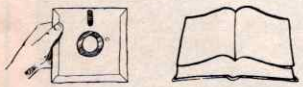
380-Z

EYE
 Two programs which demonstrate how an eye works where pupils need to be familiar with the biological structure of that organ. Shows path of light from a point on an object to the retina and calculates whether the image is in focus.
£14.50 (plus VAT)
 Longman Micro Software

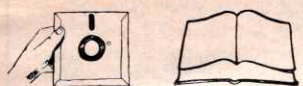


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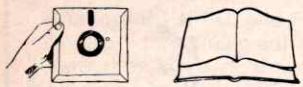
QUARRY BANK
 Three discs — 1 and 2 contain complete census records of Quarry Bank in 1851 and the third disc enables teachers to input census data from their own area on which statistical analyses can be performed.
£35 (plus VAT)
 Heinemann Computers in Education



STATISTICS PACK
 Illustrates regression and correlation using a step by step method.
£7.95 (inc. VAT)
 Vulcan Computing

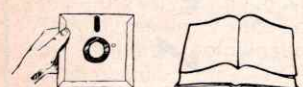


BUSS-SIM
 Business simulation program which is fully interactive.
£14.94 (inc. VAT)
 Vulcan Computing



380-Z

SIXGAM
 Business game in which six firms (of students) compete in a market of six countries for up to 10 years. Suitable for O and A level and tests concepts of fixed and variable costs, pricing, etc.
£75 (inc. VAT)
 Pitmansoft



380-Z

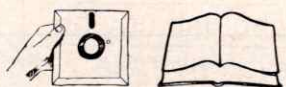
CHEMISTRY SOFTWARE (DISC 1)
 Eight programs to aid the teaching of A level chemistry. Covers acid dissociation, Boyle's Law, Maxwell-Boltzman Distribution, Mole calculations, molecular structures and names,

pH curves, pressure simulation and radioactive decay.
£19.95 (plus VAT)
 Pitmansoft



380-Z

INTRODUCTION TO MICROELECTRONICS
 For A level and higher ed. students, consisting of two discs containing eight self assessment programs and eight simulations.
£49.50 (inc. VAT)
 Pitmansoft



380-Z

SOLE TRADE ACCOUNT
 This program generates trial balances randomly from which final accounts are prepared by the student.
£39.50 (inc. VAT)
 Pitmansoft



MUSE
 Membership is £10 a year. Lots of programs for the 380-Z in English, maths, stats, physics, chemistry, biology, geography, history, admin, utilities and games. 32K plus, Basic V5, COS 3.4 needed at least. Media charges to members, plus program charges to non-members.

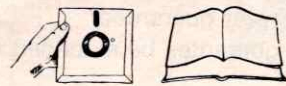


COMPUTERS IN THE CURRICULUM PROJECT

Series of new titles in biology — limited factors in photosynthesis, flowering in soya bean, diet analysis and others; chemistry — formulae game, siting an aluminium plant, organic synthesis, gas laws, etc; physics — electrical impedance, acoustics, collisions, momentum, display programs; and history — census analysis, Campaign and Disraeli and the Eastern Question, 1875-8. All run on the 380-Z with HRG and use Basic 5. All except the history packages run on both cassette and disc.

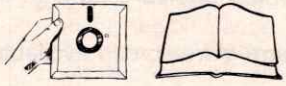
£14.50 (plus VAT)
£37.50 (plus VAT) Census Analysis
 Longman Micro Software

MISC



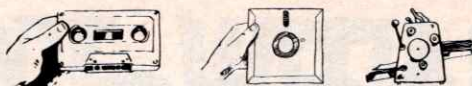
380-Z

EXAMINATION ENTRY PROGRAMS
 Suite of programs dealing with the collection, collation and transcription of examination entries. Individual notes are produced to inform parents what subjects their children are entered for.
£25 (plus VAT)
 Hutchinson Software



380-Z

EXAMINATION RESULTS ANALYSIS
 Suite of programs enabling school examination results to be held on disc and presented and analysed in a variety of ways.
£35 (plus VAT)
 Hutchinson Software



MARKS

For keeping records of pupils' test marks. For each test, computer calculates percentage mark and lists cumulative totals for pupils. Cassette version stores only the last five tests, disc version stores all tests. Caters for up to 50 pupils on a 32K system.
£10
 Software Production Associates



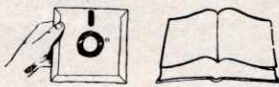
PICTURE

Program enabling pictures, maps and diagrams to be drawn in low to high resolution graphics. Pictures can be saved, transformed and repeated.
£6 (for schools in region)
£12 (outside region)
 Chiltern Computing



WORD

Program illustrating the main features of word processing — text editing, and formatting, producing standard letters, etc.
£6 (for schools in region)
£12 (outside region)
 Chiltern Computing



380-Z

QMAP

For use with QUERY or QUEST-D information retrieval programs, this is a mapping program that plots the results of searches on geographical data. Results are then drawn automatically on to a chosen base map as a scaled dot distribution map.
£6 (inside region)
£12 (outside region)
 Chiltern Computing



380-Z

SUMMARY AND COMPREHENSION GUIDELINES

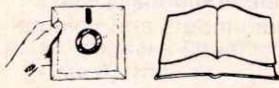
Analysis of multiple choice questions and illustrations of different kinds of question. Also explains sub-skills involved in summarising, from one-word definitions and substitutions to note-taking.
£15 (inc. VAT)
 Sussex Software



380-Z

TITABLE

Suite of programs designed to help construct a timetable. Provides for a one- or two-week timetable cycle, with a five- or six-day week and any number of periods.
£62.50
 Timetable Systems



380-Z

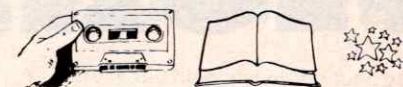
OPTION

Provides a database for 320 students on 32K

machines and 500 students on 56K machines and 85 subjects. It basically arranges options from students' subject choices.

£35

Timetable Systems



480-Z

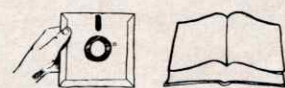
FACTFILE

Three programs — FACTFILE is the main database program in which the child chooses subjects and collects information; DINO which is an example of a datafile and contains information on 25 dinosaurs; and YOUR FACTS which introduces the capabilities of the computer to act as an information store. Soon to be complemented by PICFILE.
£15 (plus VAT)
 Cambridge Micro Software



REPORT

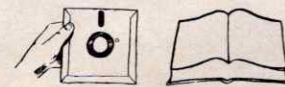
Administrative package which produces a range of printed reports from year, form or set lists to complete subject reports for individual pupils. Teacher specifies grade headings, comments and report layout. Full editing facilities, automatic updating of forms, etc.
£38.50
 GSN Educational Software



380-Z

OPTIONS

Aid to pre-timetabling procedures as it analyses form/pupil/subject choice and uses class matrix and Block Fit.
 poa
 System Software



380-Z

EXAM

Suite of 11 menu driven programs which print a statement of exam entries for each candidate, bill for candidates from whom fees are due, analyses results, etc., for up to 300 candidates.
£36
 G Norman



380-Z

PUPIL LIST ADMINISTRATION

Suite of 21 programs, menu driven, which are basically a database of alphabetical files of all the pupils in a year. Can create, sort, amend and print these files and extract data relevant to the completion of Form 7.
£36
 C M Glover



MUSIC EDITOR

User can create a tune or copy directly from sheet music. Up to two lines of music appear on the screen and up to 5,000 notes are possible.
£7.95 (inc. VAT)
 Vulcan Computing

Here is a list of all the suppliers mentioned in the Update section. Don't forget to keep an eye on Newsoft in the future to stay up to date with new software releases.

Cambridge Micro Software
 Cambridge University Press
 The Edinburgh Building
 Shaftesbury Road
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 Herts. AL10 8AU
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 76 Woodville Road
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 Walton-on-Thames
 Surrey KT12 4BR

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 24 Hill Grove
 Henleaze
 Bristol BS9 4RS

Pitmansoft
 Pitman Publishing
 128 Long Acre
 London WC2E 9AN

Software Production Associates
 PO Box 59
 Leamington Spa
 Warwickshire
 (0926 22959)

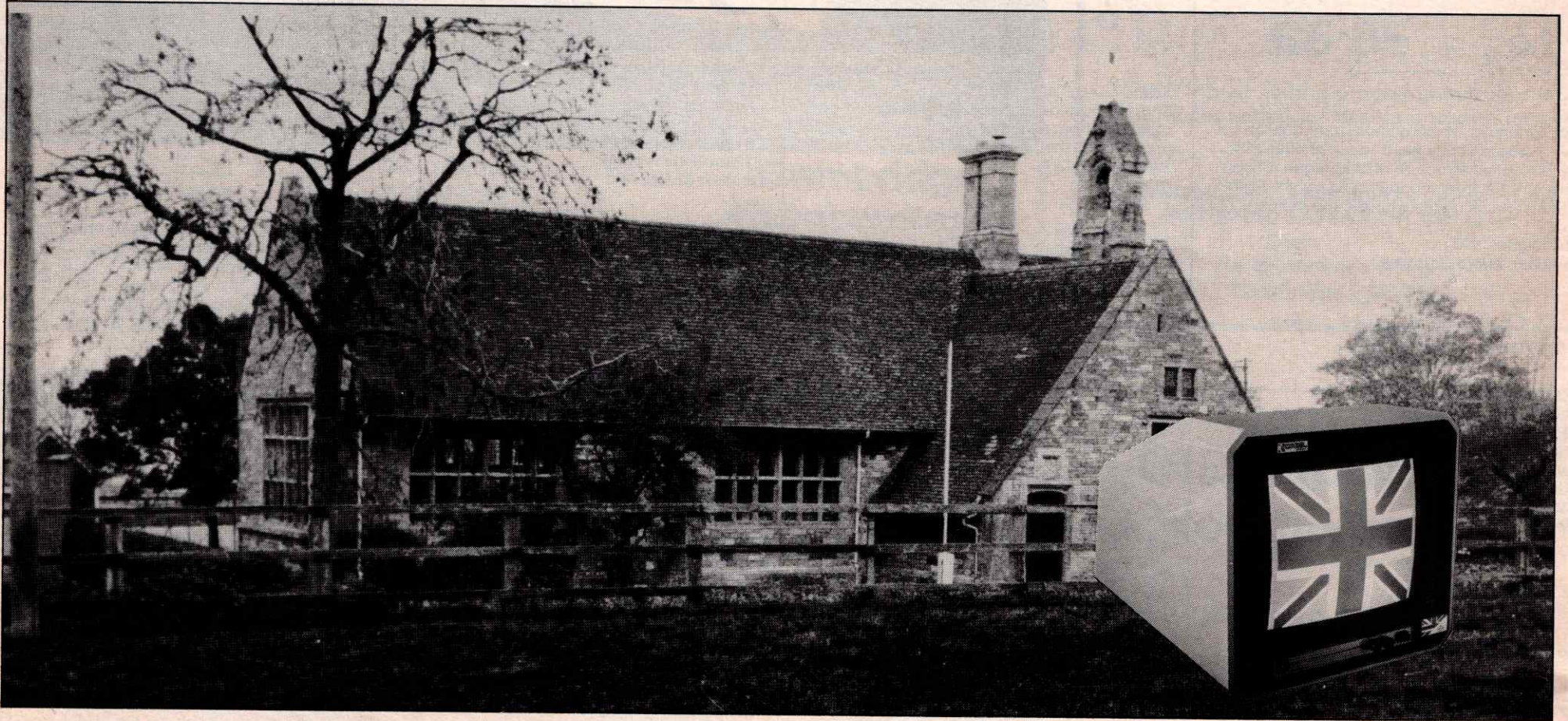
Sussex Software
 Freeport
 Devises
 Wilts. SN10 1SD
 (038082 337)

System Software
 Dept E
 12 Collegiate Crescent
 Sheffield S10 2BA

Timetable Systems
 39 Somerset Road
 Frome
 Somerset BA11 1HD
 (0373 63749)

Vulcan Computing
 32 Guildford Road
 Farnham
 Surrey GU9 9QB
 (0252 724182)

Monitors in Schools Friend or Foe?



Technical Specifications

Colour monitor 14" — Mode CE370A
£179.55 plus V.A.T.

| | |
|---------------------------|----------------------------------------------------------------------------------------------------------|
| Tube | Dot pitch 0.65mm |
| Video Inputs | R.G.B. Analogue, TTL 75 Ohm. |
| Sinc Inputs | Automatic pos/neg |
| Band Width | 7 MHZ at 3db |
| Resolution | Horizontal 430 pixel Vertical 262/312 lines |
| Power supply | Autoswitch mode 200-250 vac 65w (110 vac) |
| Operating Temperature | 0-40 degrees C. |
| Storage Temperature | Minus 40-55 degrees C. |
| External controls | On/Off plus LED indicator, Brightness/Contrast |
| Input connectors | 240 degrees 6 pin Din |
| Black level clamping | Auto |
| Safety regulations | Designed to comply with BS415 Safety Standards (UL & DHHS) |
| Dimensions | (Max.) Height 34.5cm, Width 38.5cm, Depth 36cm |
| Colour Monitor 14" CE370B | as above but will also include additional 1 volt composite video (PAL), audio inputs and volume control. |

Cabel Electronic Ltd reserve the right to alter specifications without prior notice.

Multiple Choice?

| | YES | NO |
|-------------------------------------------------------------------------------------------------------------|-----|----|
| 14" Colour Monitor? | ✓ | |
| True British manufacture? | ✓ | |
| Is it safe? | ✓ | |
| Is it reliable? | ✓ | |
| Is it made in Hong Kong? | | ✓ |
| Has it a two year guarantee? | | ✓ |
| Can the full guarantee be extended to five years for only £20? | ✓ | |
| Is it available now? | ✓ | |
| Do other monitor manufacturers like it? | | ✓ |
| If a fault does occur, will it be replaced within three days? | ✓ | |
| Will it work with BBC and RML Micros? | ✓ | |
| Do you like picking up high voltage appliances encased in metal? | | ✓ |
| Has it a strong moulded case with built in handle for portability? | ✓ | |
| Is there an anti-glare screen available to reduce eye strain? (£10 plus V.A.T. — US Government approved) | ✓ | |
| Has it a clear 80 character display without distorting graphics? | ✓ | |
| Is it the most competitively priced British colour monitor? | ✓ | |
| Have you already paid too much for your monitor? | | ✓ |

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SHARPEN YOUR IMAGE WITH A MONITOR

The most popular means of communication between computer and user is by a monitor or VDU screen. But the use of screen displays is a relatively recent development in computing. In the mid 1970s, most users were linked to their computer by a keyboard with built in printer. All the messages to and from the computer were printed out on paper and not shown on a screen at all.

It was only in the late 1970s that screens became to be used to display information. Now in the 1980s, high resolution colour graphics output is becoming tremendously important in educational computing. It provides more meaningful and stimulating displays. It is important that schools and colleges make use of these ever expanding graphics capabilities, and as they buy their second or third micro so they will have to consider which colour monitor to purchase.

Originally, you could expect to pay in the region of £600 or £700 for a colour monitor. However, the prices of specialised monitors have begun to fall and it is now possible to buy for between £200 and £400. There are even some for less than £200. In the second part of this feature we look at a selection of monitors currently available.

How does the screen work?

Most screens used with micros work along the same lines as televisions. The cathode ray tube (CRT) in a monitor or TV set displays information by projecting a beam at a screen coated with dots of phosphor. These phosphors can be made to glow red, green or blue by firing electrons at them from behind.

The electrons have to be guided to the right spot through vertical and horizontal deflection systems. This deflection system, controlled by the micro, guides the beams to the right points on the screen. This ensures that the beam lights up the right phosphors in order to produce the correct image.

The electron beams sweep across the screen rapidly in a series of lines to build up the picture. This is known as raster scanning. When the beams reach the bottom of the screen, they return diagonally to the top ready for the next sweep.

Behind the phosphor coated glass screen is a shadow mask which guides the beams to the phosphors corresponding to their colour. When the beams strike the phosphors, they glow with that colour.

The way the CRT works and how the electrons are synchronised is interesting but not particularly useful. It is far more important to have some understanding of the different types of picture signals used by monitors and televisions.

What are RGB, TTL and PAL?

There are three main colour video standards in computing. Two of these — TTL (transistor-transistor logic) and RGB (red, green, blue) — have separate connections for each of the three colours and an additional one for the sync signal.

In TTL colour, each of the three signals may be on or off only. This gives a maximum possible combination of eight colours. RGB colour video, like TTL, also has three connections and an additional one for sync, but each colour signal is analogue and can therefore vary continuously from off to fully on. This allows any visible colour to be produced by a suitable combination of proportions of each colour.

Unfortunately, there seems to be some confusion between RGB and TTL signals, caused by the use of different names like TTL RGB and Analogue RGB. It is not helped by manufacturers who label sockets on the rear of micros RGB, as in the case of the BBC, when it produces a TTL RGB output.

The third standard for colour video signals is PAL. These signals are effectively composed of a mixture of RGB signals, and need only one connection as all three analogue signals are combined and all colours may be produced.

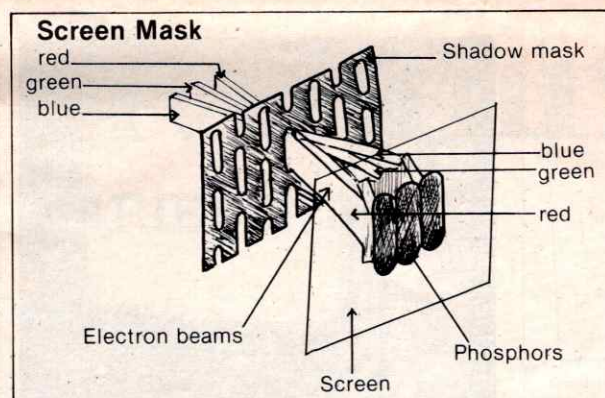
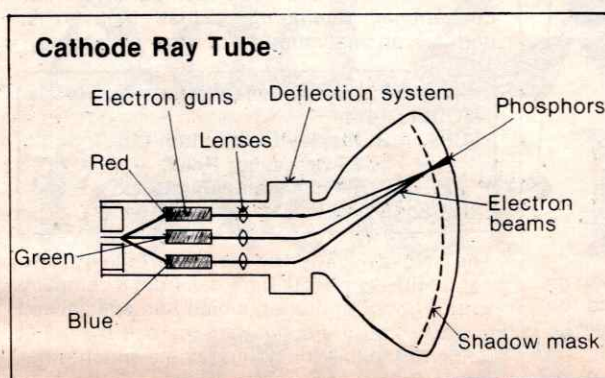
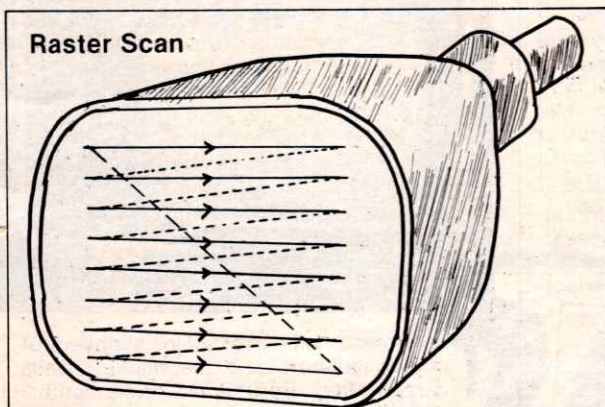
Is there one standard for producing TV pictures? There are, in fact, three international standards for producing TV pictures. These are PAL, NTSC and SECAM. Each standard defines how many lines per screen make up a raster scan and how fast it scans.

In Britain and parts of Western Europe, the standard is PAL or Phase Alternating Line; whilst in France, the standard is SECAM. In the United States, the picture standard is called NTSC output or National Television Standard Committee.

Some problems do arise with the colour coming from different broadcasting standards around the world. So be careful with your monitor if you are intending to input a composite video signal. With an RGB input, there should be no problems.

How do micros display things on the screen? All micros set aside a part of their memory for

How often do you have to adjust the controls on your TV set when running a program? Do you ever feel like the chap on this month's front cover? A monitor is not only easier on the eye, it enhances colour quality and clarity and gives a rock steady image. There are now several monitors to choose from, so how do you decide which is best for you? The first part of our special section covers technical ground and explains some of the jargon. There follows a series of reviews of different models.



the screen display. The display generator looks at the screen memory 25 times a second and transfers it into a picture signal. There are several different ways of representing a screen display in memory: the easiest to understand is probably the bit-mapped display.

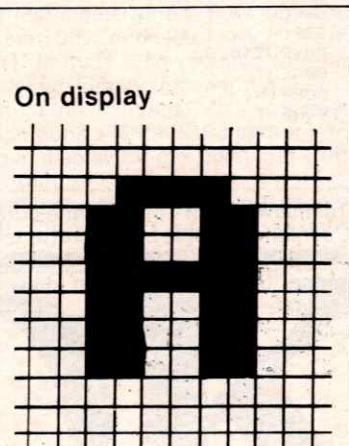
Displays can be made up of thousands of small blocks and the shapes of letters, numbers and lines can be made up by combining these blocks. These blocks are normally known as picture elements or pixels. The Atari has 320 x 192 whilst the IBM PC has 640 x 200. At its best resolution, the BBC micro has 640 x 256.

With a bit-mapped display, the computer remembers which blocks are on or off. However, this takes up rather a lot of memory. And, if the display is in colour, even more memory is used. The BBC micro when working in its best resolution of 640 x 256 pixels with only two colours uses a massive 20K of memory.

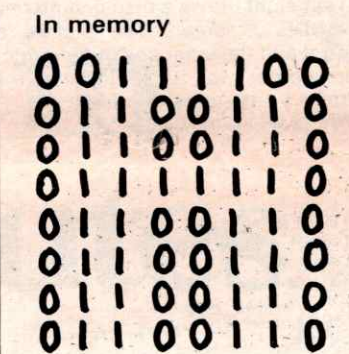
Bit-mapped graphics allow you to draw whatever you like on to the screen though some micros do not have this feature, for example, the ZX-81. Instead, they use a set of pre-defined characters which includes all the standard alphanumeric, punctuation and a few special characters. This method saves on memory but the result is cruder graphics, or low resolution graphics. Bit-mapped displays are associated with high resolution graphics.

I am getting confused. Is there then a difference between computer graphics resolution and screen resolution?

It does get rather confusing when the same terms are applied to different things. In the case of monitors, high and low resolution applies to how much detail the monitor screen is theoretically capable of showing. High resolution screens have lots of pixels or dots and are capable of showing more detail than



Grid of eight by eight blocks makes up the letter 'A' on the display.



This letter 'A' is held in memory as eight bytes. Each byte is made up of eight digits, each of which can be one or zero. A one means a dark block on the display.

low resolution ones.

The problem is that there are no definite standards associated with different resolutions in pixel terms. Some manufacturers will describe a screen as high resolution when it has 580 x 470 pixels, while another manufacturer's high resolution screen will be 895 x 585. You have to look carefully at technical specifications.

Is a monitor a TV without a tuner? What really is the difference?

To some extent this is true: you could modify an ordinary television by taking out the tuner and channel selection mechanism. It is definitely not to be recommended though as there are very high voltages inside any piece of equipment that contains a cathode ray tube. More important, the design of the circuits is different. A television with the tuner removed would not produce a very good monitor.

The reasons for using a colour monitor rather than a colour TV as an output device is that the television will only work with a signal that is overlaid with an ultra-high frequency (UHF) carrier wave. This means that the clean signal generated by the computer has to be encoded, sent down the wire and decoded again. This results in a messy signal that often gives a fuzzy display.

A true monitor does not need the same modulation and demodulation of the signal and so produces a clearer, sharper display. This display is much easier on the eye and of a much higher standard.

What size monitor would be best?

Too small a screen can cause a certain amount of eye strain and too large a display can be overpowering when you consider how near people sit to it. The ideal size for educational use would seem to be 14 inches (36cm). Remember that the screen size is measured

across the diagonal of the tube screen and not necessarily the picture area. This could be up to half an inch less.

Is there an alternative to a purpose made monitor?

Some TVs are being produced or converted to provide ordinary colour television with monitor and RGB facilities. These offer an attractive alternative that may interest schools. They are not brilliant in all aspects but good in most.

Two potential suppliers of this type of set to schools are: Portatel of Sudbury-on-Thames who produces the Luxor 3711, a 14-inch TV/monitor/RGB; and Kingsley Services of Newcastle-upon-Tyne who converts Grundig televisions so that they are switchable between standard TV and monitor, with separate RGB input for analogue and TTL.

What is screen resolution, dot pitch and band width all about?

If anything about monitors is bound to confuse then it is screen resolution. The horizontal width of the tube is broken down into a number of colour stripes, otherwise known as precision in line stripes or PILS.

The number of stripes vertically is defined by the tube manufacturer. This is governed by the dot pitch: 0.60mm can be defined as standard resolution; 0.40mm as medium; and 0.30mm as high resolution.

A 0.40mm dot pitch should be good enough for 80-column text. Unless you are going to use the monitor for very high resolution graphics, 0.30mm is not necessary.

The resolution capability of a monitor is governed primarily by the tube used. But the band width of a monitor must be significant to allow the signal to reach peak brightness whatever the colour portrayed and get back to black level between the dot dimensions. Normally a 7 or 8 MHz band width is adequate providing the rise and fall time is 50 n sec or less.

How do you choose a colour monitor?

One thing we quickly found out was that you cannot easily make a choice based on the figures that manufacturers supply in their specifications. The data given is either too complicated for most people to comprehend or else there is no standard for the measurements. For example, one manufacturer's high-res monitor could be another's low-res.

In fact, to understand and to interpret the figures that manufacturers supply, you need considerable knowledge and understanding. Too often, you are not comparing like with like. However, there is plenty that a normal person can do in the evaluation of a monitor.

Look at the type of power supply used and where it is placed inside the monitor casing. Does the display show any signs of wobble? How crisp are the letters? Test the controls given for setting brightness and switching the monitor on and off.

To help you, we have designed a series of simple programs to test various monitors. The programs have been written by Robert Schifreen specially for this feature.

These tests should help in the clarity of 80 column text, the crispness of the image at the screen edges, colour richness and separation. Try them with the monitor you use now and on the monitor you are considering purchasing for your next micro.

The programs, as printed, have been written for the BBC micro, but can be altered easily for the Spectrum and the 380-Z/480-Z.

MONITOR TEST PROGRAMS

There is no point in using a monitor when you have difficulty reading the text displayed on it. Some monitors will fail to show the full BBC display. Sometimes, characters at the top left will be difficult to read and reading the bottom line could prove impossible. So, we have three tests that explore this aspect.

Test one simply fills a screen with random lower case letters between a and z. The display should be clear and the spaces between the letters should be clear too. Check that the screen of text is centred and that the corners have not been lost from the picture.

```

10REM TEST1
15REM *****
20CLS
30MODE 0
40FOR X=1 TO 2560
50LET R=RND(26)
60VDU R+96;
70NEXT
    
```

Continued on page 28

Test two also fills a MODE 0 screen with text. The top line is filled with alternating Ws and Ms and the next line is filled with the inverse characters. The process is completed to fill the rest of the screen alternating between lines of normal and inverse text. Using VDU23, the characters 240 and 241 are defined as inverted W and M.

A character must be at least seven pixels in width if it is going to be read clearly. But most characters do not need the full width. The characters M and W are the widest ones, so this is a good test to see how legible the screen display is.

On a low resolution monitor with say 450

```
10REM TEST2
15REM *****
20VDU23,240,156,156,148,148,128,136,
156,255
30VDU23,241,255,156,136,128,148,148,
156,156
40CLS
50MODE 0
60FOR P=1 TO 16
70FOR X=1 TO 40:VDU240,241;:NEXT
80FOR X=1 TO 40:VDU27,77;:NEXT
90NEXT P
```

pixels across the screen, you are unlikely to get a very good display when working in the BBC's 80-character mode. You should expect to lose something like 10 percent of the screen width to a border to allow for distortion at the screen edges. This would leave 405 pixels and if we work on a character width of seven pixels, you have only a theoretical maximum of 56 characters.

Test three follows on from test two. In this program, a MODE 0 screen is filled with alternating inverted Ws and Ms. It should be possible to read each letter.

```
10REM TEST3
15REM *****
20VDU23,240,156,156,148,148,128,136,
156,255
30 VDU23,241,255,156,136,128,148,
148,156,156
40CLS
50MODE 0
60FOR P=1 TO 32
70FOR X=1 TO 40
80VDU240,241
90NEXT X
100NEXT P
```

Test four does more than show the screen alternating between white and black; in fact, it is designed to test the ability of the monitor's power supply to source the current needed for the changes of screen colour.

In this program, VDU19 is used to white out the entire screen and to change it to black. The screen then alternates between white and black every few seconds. The program tests if the monitor's power supply can keep up with required changes in colour.

A strain is placed on the power supply and you should notice that the build up of the white screen does not happen instantly. There will normally be some screen collapsing inward effect with each flash too. This can be seen as the edge of the display moves in and out.

```
10REM TEST4
15REM *****
20CLS
25ON ERROR GOTO 100
30MODE 0
40REPEAT
50VDU19,2,0,0,0,0
60FOR I=1 TO 1000:NEXT I
70VDU19,2,7,0,0,0
80FOR I=1 TO 1000:NEXT I
90UNTIL FALSE
100VDU19,2,0,0,0,0
```

Test five prints a series of 16 horizontal bars of white going down the screen alternating with black. Each bar is half the width of the MODE 0 screen. The spaces under the bars should be uniformly black as should the entire

```
10REM TEST5
15REM *****
20CLS
30MODE 0
40VDU23,240,255,255,255,255,255,255,
255,255,
50CLS
60MODE 0
70FOR R=1 TO 16
80FOR C=1 TO 40
90VDU240
100NEXT
110PRINT:PRINT
120NEXT
```

right hand side of the screen. If they are darker than the black on the next line down, this shows the low frequency of the monitor. This is the extent to which the power sags after displaying a solid patch of white.

It is worth checking that the column bars are straight, but check too for patches of white at the right hand ends of the bars.

Test six uses MODE 0 again but this time, we create a chequerboard pattern using VDU23. The program creates 8x8 pixels in white that are separated by a space above and to the side. If the screen is examined carefully, you may be able to see that each white pixel is, in fact, made up of red, green and blue parts.

```
10REM TEST6
15REM *****
20CLS
30MODE 0
40VDU23,240,77,178,77,178,77,178,
77,178
50FOR Y=1 TO 16
60FOR X=1 TO 40
70VDU240;32
80NEXT
90PRINT
100NEXT
```

Test seven draws a thin white border around the screen. A simple but effective test to see if it will all fit on the screen and that the sides are straight. Does the program draw a perfect rectangle?

```
10REM TEST7
20CLS
30MODE 0
40MOVE2,2:DRAW1277,2:DRAW1277,1021:
DRAW2,1021:DRAW2,2
```

Test eight draws a disc in high resolution on a MODE 0 screen. The picture should be central and the inner and outer circle should be true and not oval. Some monitors may clip the bottom off the outer circle.

```
10 REM TEST8
15REM *****
20 CLS
30 MODE 0
40MOVE 740,512
50FOR I=0 TO PI+PI STEP0.01
60DRAW 640+100*COS(I),512+100*SIN(I)
70DRAW 640+500*COS(I),512+500*SIN(I)
80NEXT
```

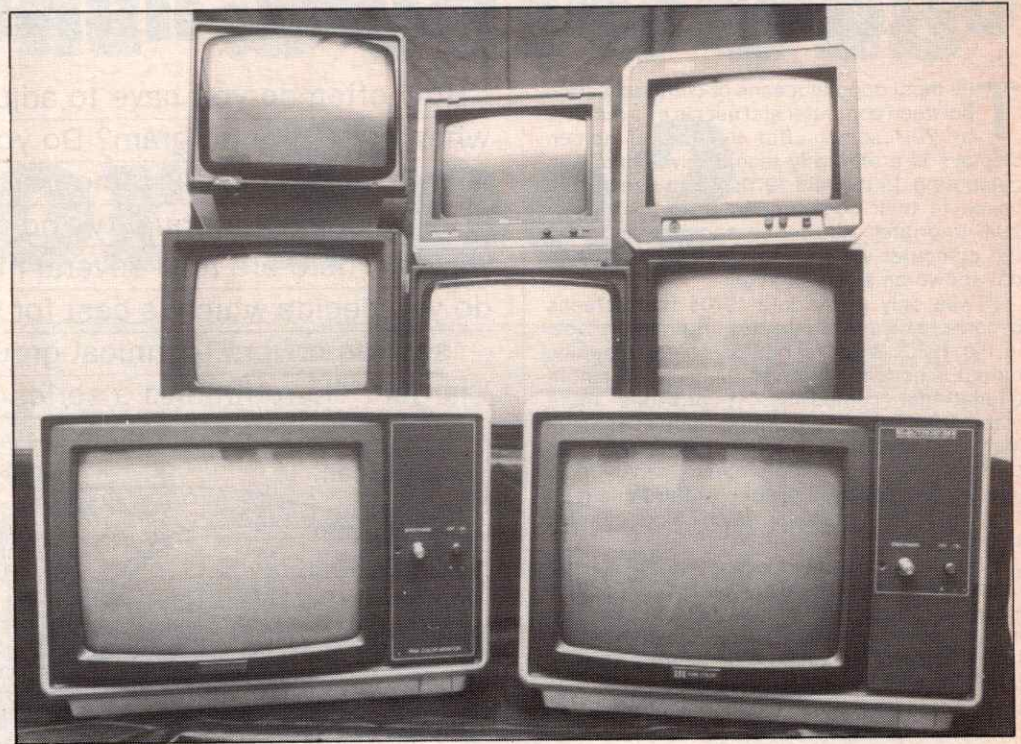
It is important that a monitor is able to display text instantly and able to remove it instantly too, so **test nine** produces flashing text on a MODE 7 screen. The text should appear and disappear instantaneously. No image should remain on the screen while the text is off.

```
10REM TEST9
20CLS
30MODE 7
40T=CHR$(136):*FX229,1
50T=T+"THIS IS A TEST FOR
PERSISTENCE"
60FOR X=1 TO 10
70PRINT T
80PRINT
90NEXT
100A=GET#
110CLS
```

Our **final test** is a colour test. MODE 7 is used again to put all eight BBC colours on the screen at one time. When examining the display, you can judge the clarity of colours, their richness and depth.

```
10REM TEST10
15REM *****
20CLS
30MODE 7
40FOR Z=1 TO 3
50FOR X=129 TO 135
60VDU X;
80FOR Y=1 TO 30
90VDU 255;
100NEXT
110VDU 255
120NEXT
130NEXT
```

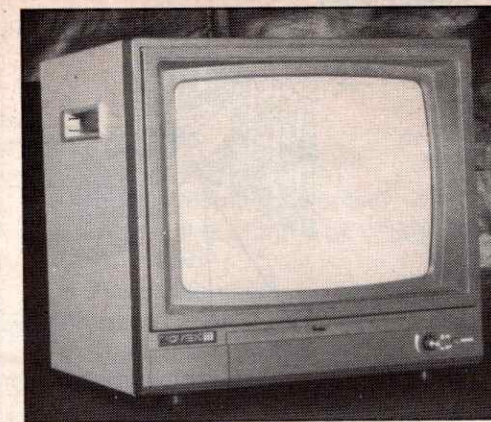
FOCUSING IN ON THE MARKET



There are a number of major suppliers of colour monitors and the market needs careful study. For the last three months, we have had a number of monitors on test in various schools and in our computer room at *Educational Computing*. What follows is, perhaps, an unscrambling of what you can buy.

PRODUCT: Novex 14-inch Colour Monitor
MODEL: 1414
SUPPLIER: Display Distribution Ltd
 25 Grosvenor Road,
 Twickenham, Middlesex.
PRICE: £180 plus VAT and carriage

The Novex monitor is impressive and competitively priced. It comes from a company with a good reputation which has specialised in monitors for a number of years. It has a full range of facilities including some which other monitors do not have. I was particularly impressed with its additional green screen mode.



The monitor is housed in a well styled metal case that is off white in colour with a light brown trim. It is certainly attractive and matches the BBC micro. At first, I was concerned that the unit was too high but after working with it, it seems to be a good viewing height. The actual measurements of the monitor case are 390 x 360 x 370mm.

This 14-inch colour monitor has been designed to display output from micros having either separate RGB and sync signals at TTL level, or a separate composite video signal. The RGB input is an eight-pin DIN socket, located at the rear of the monitor and clearly labelled. The input for composite video is via a phono connector.

Below the screen, at the front of the monitor, are all the necessary controls. On the right is the on/off button which has to be pulled out to its fully extended position for on, indicated by a green LED. The same button doubles for the volume control. Then there is a covered panel giving access to control for brightness, contrast and vertical hold as well as the switch for green screen display.

At the back of the monitor, on the base, is a series of small ventilation holes which should present no problems in school where poking pencils and spilt liquids cannot be avoided. The ventilation holes are certainly necessary as the area around them does get warm.

In all our tests, the Novex performed well. In the one involving an 80-character screen, there was some evidence of a distortion at the ends of lines, but this was only really pronounced at the top of the screen. The manufacturer clearly states, however, that the resolution capabilities are 40 characters per line and 25 lines per screen, so it is a bonus when the display is reasonable in 80-column mode.

The greatest asset of the Novex is its facility

to switch out the red and blue signals, thus enabling the monitor to function as a green screen text handling monitor. Full marks for this clever and useful feature.

Colourwise, the Novex produces good clear crisp graphics in bright colours. Squares are square and rectangles are as they should be. Even circles are nearly right.

The Novex has a safe and reliable power supply which caused no spurious signals. In fact, there was no wobble at all.

We tested the Novex on both the BBC and 480-Z and found it to be compatible with both machines. The Novex comes complete with an instruction manual of six pages covering the setting up and connection procedures. It is clear and easy to follow with several useful diagrams.

Technical specification
 Screen resolution: 452 x 585
 Dot pitch: 0.62m
 Band width: 7MHz

PRODUCT: Opus 13-inch Colour Monitors
MODELS: 1302-1 Medium Resolution
1302-2 High Resolution
SUPPLIER: Opus Supplies Ltd
 158 Camberwell Road,
 London SE5 0EE.
PRICE: £149.95 plus VAT (1302-1)
£229.95 plus VAT (1302-2)

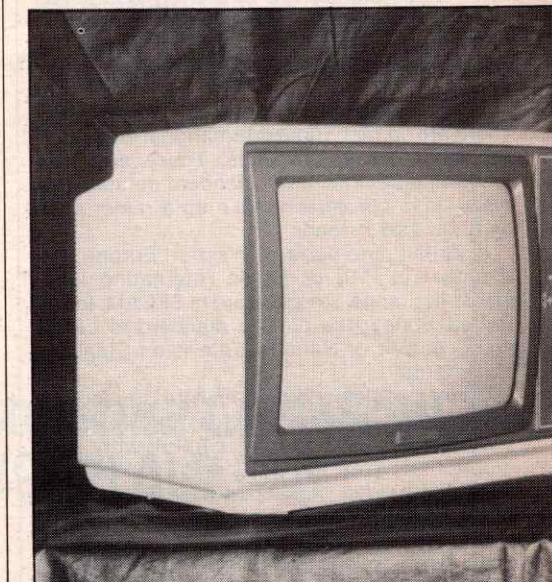
Opus Supplies markets two monitors that will be of interest to educational users. One of them is the cheapest colour RGB monitor on sale in the UK at the present at £149.95. This is the model 1302-1 which is described as medium resolution having 370 x 470 pixels.

The second monitor — the 1302-2 — is termed high resolution with 580 x 470 pixels. At £149.95, the 1302-1 is at a price way below that of other monitors but do look beyond the description of medium resolution.

These monitors seem to have travelled a long way to get to the end of an RGB lead. Although marketed in the UK by Opus, the monitors are manufactured by the Victor Company of Japan (JVC) for a Canadian company called Electrohome Electronics of Ontario. From there, they come to Britain.

Although the North American consumer market is not noted for its high standard of styling and that televisions all seem to have the appearance of those that you expect to find in a cheap motel, the Opus monitors are not bad!

Both monitors are the same size — big, long



and bulky, with measurements of 465 x 415 x 330mm. This does not really fit in with the lines of other monitors or the slim style of new micros. But I suppose it is all a matter of taste. The case is made of solid off white plastic with a grey brown fascia. There is a useful carrying handle recessed into the top of the case.

On the right of the screen are two controls: an on/off button and a brightness control. Next to these is a power on indicator light. Inside the case, and not outside, are adjusting controls for focus and vertical and horizontal hold.

The monitor is connected to the computer by plugs at the rear. Two connections seem to be necessary — a 15-pin D way connector and a 7-pin DIN connector, for an RGB signal at TTL level. Opus supplies this rather special connecting lead for £6 for the BBC micro, Lynx, Oric and Apple computers. During our testing of the two Electrohome monitors, we used the BBC and Lynx micros.

Both monitors come with a three-page customer installation document and a small owner's manual which seemed adequate.

During the three month period of use, both monitors performed well. The only fault was with the high resolution monitor which suddenly went out of tune. It needed simple adjustment to the hold controls. However, as these are located inside the case, and not accessible without removing it, this is more of a problem than it seems.

The shading of the colour in both the monitors was, at times, not all it should have been. The crispness and whiteness of text even in the 40-column mode was more off white than one would expect. But I was impressed with the brightness of most of the colours.

The display of both monitors is reasonable value for money but not suitable for high resolution work in graphics or text. Remember that the quality of the screen display is controlled ultimately by the number of pixels and the more pixels you have, the better picture you will obtain.

If you are looking for a low cost, low resolution monitor, the 1302-1 is perfectly acceptable. You pay your money and get the pixels for the price. At £149.95, you cannot expect that many pixels.

The 1302-2, described as high resolution, is not high-res and not that competitively priced. There are other better designed and more attractive monitors around.

| Technical specification | Model 1302-1 | Model 1302-2 |
|-------------------------|--------------|--------------|
| Screen resolution: | 370 x 470 | 580 x 470 |
| Dot pitch: | 0.63mm | 0.41mm |
| Band width: | 6MHz | 10MHz |

PRODUCT: Kaga RGB 12-inch Colour Monitor
MODEL: Vision III K13R3
DISTRIBUTOR: Data Efficiency Ltd
 Maxted Road,
 Hemel Hempstead,
 Herts. HP2 7LE.
PRICE: £399 (plus VAT)
 less educational discount

You are at once aware of a difference when the Kaga monitor is unpacked and set up. It is certainly more compact than the other monitors reviewed in this feature. This monitor has a 12-inch screen which means a reduction in size of the cabinet — an asset in some locations. In terms of using a screen of this size, it does not seem to alter the quality of the viewing of the display.

The Kaga colour monitor is available in three models, including medium, high and super high resolution. The price range is £239 to £399, less any educational discount.

For the purpose of this review, we used the Vision III model which is described as having "super high resolution, and being a perfect match to the graphics capability of the BBC micro." Once again, we find suppliers using words to describe a product's resolution when a technical specification, such as pixel resolution, would help buyers much more.

The Kaga monitor is certainly a good looking monitor: the slightly sloping front which seems

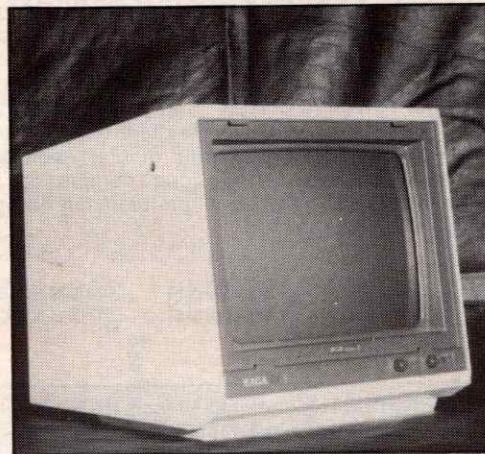
to set the screen back at an angle appealed to me. I found it more relaxing to use for long periods than some of the other monitors on test.

The case measures 320 x 303 x 393mm and is made of plastic in an off white colour. I was a little concerned about the strength of the casing as the plastic seems to be on the thin side. However, it survived the rough handling that teachers invariably give machines in school when moving them around.

The front of the cabinet has good clean and uncluttered lines. The screen is mounted in a light brown surround that looks neat. Built in to the surround are four clips for holding an anti-glare screen, but with the black screen fitted on the Vision III I cannot imagine a great need for this.

Bottom right are two controls — one for brightness, the other a push button on/off switch. On the far right is an LED power indicator light. Unlike some monitors, the Kaga does not have lots of ventilation slots down the side of its cabinet. On the top at the back and the rear of the case are a reasonable number which are small and thin, so should not present too much of a problem in schools.

The Vision III has a special matt black tube for improved colour clarity. In fact, it is tremendous. Schools often have lighting of dubious quality, dim and glaring at the extremes, and this monitor excelled in all locations.



All Kaga monitors have an in-built interface allowing both linear (1 volt) and digital (TTL) inputs. Two external connectors are provided — an 8-pin rectangular linear RGB connector and an 8-pin DIN connector for the two possible TTL formats. The required interface option is selected simply from a three position slide switch on the rear panel. This is a unique feature which turns a Kaga RGB monitor into a simple plug-in display for any computer with a true RGB output.

To ensure that you get the best possible display with the Kaga monitor, an adjusting

tool and a comprehensive manual are supplied with all monitors. In fact, the full range of display attributes can be adjusted without opening the Kaga case. Even the display width and picture deviation can be altered and adjusted.

Needless to say, my monitor did not need any adjustments of this sort when supplied or for the applications we used it for in schools. However, we did try out all the controls and it is amazing what can be done.

When the monitor is used in 80-column mode, the clarity of the characters is extremely impressive. All characters are easily recognisable and readable. The white is really bright, with no watered down effect at all. I am sure the display is enhanced by the matt black of the screen.

My only real criticism of this monitor is when changing screen mode, there is a drift of the picture from the bottom of the screen to the top. This was evident in a number of programs, but most noticeable when using *Wordwise* when previewing text.

When using the monitor under normal classroom conditions, the colours and the quality of the display are marvellous. The boldness of the red and yellow outclasses the other monitors we looked at. The Kaga monitor coped admirably with some high resolution graphics

Continued on page 30

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Continued from page 29

screen displays that we had created with Grafkey from Clares. In fact, it is probably the best monitor we tested for colour display.

Remember that the resolution on the Kaga is really higher than the specification implies, as this is a 12-inch monitor whereas the others are all 14-inch.

Technical specification
Screen resolution: 640 x 512
Dot pitch: 0.38mm
Band width: more than 18MHz



PRODUCT: Cabel 14-inch Colour Monitor
MODEL: CE 370 A
SUPPLIER: Cabel Electronics Ltd
Whitgate Industrial Estate,
Whitgate Road,
Wrexham L11 1AY.
PRICE: £199.50 (plus VAT)

If there is a monitor likely to win a Design Centre award, it will be one in the range from Cabel. However, its style is one you either like or hate. After the biscuit tin approach of Microvitec, the cut away corners and sloping angles of a Cabel monitor take some getting used to. I personally found it a bit of a shock.

The Cabel's moulded plastic case is thick and strong in a colour that matches the BBC computer quite well. The unit measures 340 x 375 x 390mm. In a way, its rather sophisticated style makes it seem rather bigger and bulkier than its actual dimensions.

The monitor screen is quite light in colour but does not cause the reflection problems associated with those monitors whose screens are positioned vertically rather than on an angle.

Following on from the case design, Cabel has used the most modern circuit design inside the case. According to the manufacturer, it is well tried and tested in the television market place. It uses a tube and a coil from the Mullard AX range and a combined power supply and horizontal drive circuit called a single switched power pack. It has a very high proportion of British components.

Throughout its test period of six weeks, it functioned well and proved to be reliable, even though it was in constant use for eight or nine hours a day.

Beneath the actual screen is a panel where all the normal controls are easily available. These include knobs for adjusting brightness and interlacing. On the far right is a square on/off button and on the far left is a red LED to show when power is on. At the rear of the case is the necessary connection for an RGB signal. The monitor comes with a BBC compatible 6-pin DIN lead.

When turning the set on from cold, there is an auto shut off circuit that may trip until the picture stabilises.

As you would expect, all settings and adjustments are made to the set prior to it leaving the factory and under normal circumstances they will not need any further adjustments. Cabel has, at least, provided the option without requiring the removal of the casing. On the bottom of the casing, there is a series of small holes for nine different adjustments, including sensitivity control of the separate red, green and blue inputs.

The Cabel monitor works well with the BBC computer and the display fits onto the screen without any problems. However, you may encounter difficulties if you intend to put a lot of text on the screen in the 80-column mode. It is difficult to read and could lead to eye strain. If you are into *View*, you may be better off with a monochrome monitor to accompany this colour one.

But for normal work — computer assisted learning, simulations and the like — this monitor will serve you well. The colours are average, not as outstanding as say the Kaga, but better than the Opus. They are solid colours that do not drift and overlay into adjoining pixels.

The Cabel monitor is a good reliable monitor that has been designed with care. With its cut-away style, it is rugged and the quality of the casing material will ensure that it transports well. It has a cleverly built-in carrying handle that doubles as an air vent.

There are no fears on safety either, as the

monitor has been designed to comply with BS 415 safety standards, and there are no wide vents in silly positions.

Now fitted as standard on Cabel monitors is a silk anti-glare screen. This is an excellent device which certainly cuts glare down to an absolute minimum. It will quieten worries about eye strain from long periods at a monitor. Cabel is to be congratulated in fitting this extra as standard.

Technical specification
Screen resolution: 430 x 480
Dot pitch: 0.63mm
Band width: 7MHz

PRODUCT: Microvitec 14-inch RGB
Colour Monitor
MODELS: 1431/MS
1431/MZ
1431/APMS
SUPPLIER: Microvitec Ltd
Futures Way, Bolling Road,
Bradford BD4 7TU.
PRICE: £215 (MS)
£249 (MZ)
APMS to be announced

Microvitec manufactures a full range of monitors. These include standard, medium and high resolution. In addition, the company supplies a comprehensive range of cabinets, including a rugged metal cabinet for the Lion range and high density structural foam for the Fox and Wolf range. The Lion can be supplied with or without a plinth whilst the Fox and Wolf have integral plinth. As one would expect, different tube sizes are possible. The range is, again, extensive — 12, 14, 16 and 20 inches.

For the purpose of this feature, we worked with three monitors: Lion Cub 1431/MS, Lion Cub 1431/MZ and Lion Cub 1431/APMS. They are basically the same monitor as far as the casing and screen go and can be considered together. The extra facilities of the MZ and APMS will be highlighted separately at the end of this review.

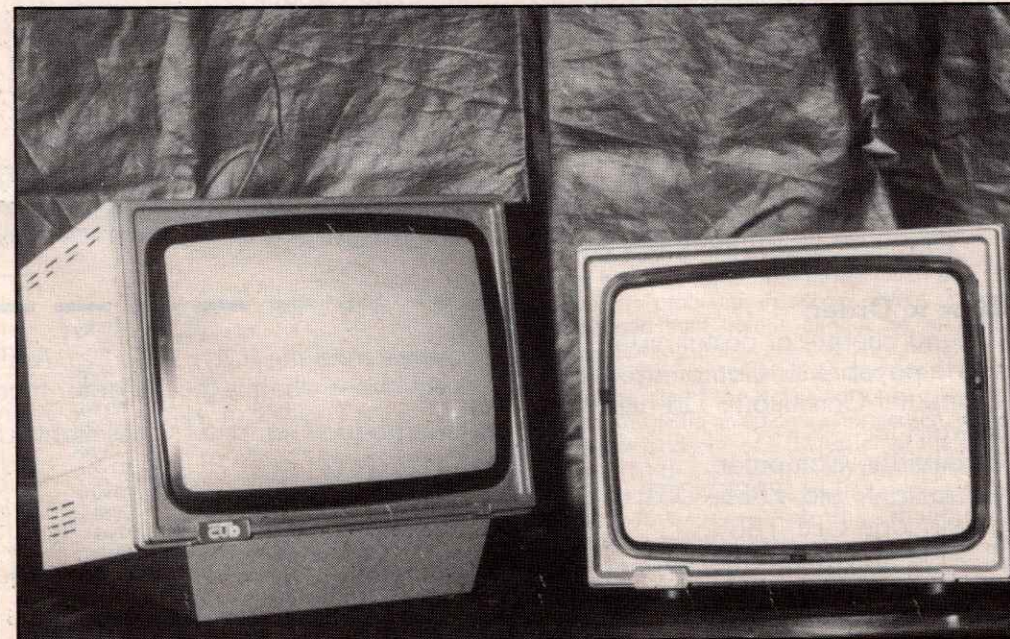
All the monitors from Microvitec are housed in the same square shaped case of metal construction. This is one of the Microvitec's strong points, in more ways than one. Although in design it is not a clear winner, in terms of a sensible housing for school use, it is spot on. No more digs at Microvitec monitors being in biscuit tins! The case is finished in beige with a dark brown screen surround.

The 1431 range is normally positioned behind or to one side of the micro as it is too large (and too heavy) to stand on the top of a micro's case. This can cause sight problems, but Microvitec has an optional mounting plinth available (at extra cost) to raise the front of the monitor above the working surface.

Unlike most of the other monitors on test, the Microvitec has only one user control. This provides brightness adjustment and mains on/off switching and is at the rear of the monitor case. The combination of this on/off switch with the brightness control is not a good idea as it often leads to the brightness being moved out of tune. Teachers would have preferred a separate control for each function.

The 1431/MS monitor is the one supplied as part of the Department of Industry's Micros in Primary Schools scheme. It can be used easily with packages based on the BBC micro or the RML 480-Z. There is a 6-pin DIN socket for connecting the monitor to an RGB TTL signal generated by the computer.

The Microvitec monitors all produced bright clear displays. We noticed how free the displays were from interference in both fine colour graphics displays and over large blocks of colour. Letter quality is good too, but to be fair, the MS is not suited to long term viewing in 80-character text display. The resolution is limited by the tube mask pitch and a medium or high resolution monitor from this company would be better. However, we used it effectively with *View* and *Edword* in the classroom.



One excellent feature of the Microvitec is that it shows the whole of the BBC display without any distortion.

The 1431/MS has BEAB approval, and all monitors in the range meet BS415.

The 1431/MZ colour monitor has been produced specially by Microvitec for use with the Spectrum microcomputer. (It was designed originally for the Dol scheme.)

The signals available at the end of the Spectrum's connector cannot directly drive an RGB TTL monitor and so the 1431/MZ has an additional interface board to process the luminance (Y) and the colour difference (U and V).

To allow for differences in performance between Spectrum models, a signal control is fitted on the rear cover plate which can be adjusted to produce the best picture quality.

The Spectrum is linked to the monitor by a cable with an edge connector at one end and a 5-pin DIN at the other.

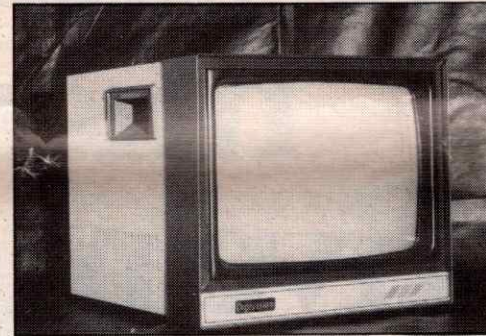
When used with the Spectrum, the monitor performs very well. The display is clear, steady and bright. The resolution is more than adequate for the Spectrum's 32-column text and graphics.

The Spectrum's BRIGHT command that gives two levels of picture brightness when used with a television does not operate with the 1431/MZ due to its TTL operation. However, the BORDER command which sets the colour of the area around the main display works well.

It should be noted that the 1431/MZ will operate with the BBC or the 480-Z as well as the Spectrum as the 6-pin DIN on the MS model is duplicated here. There is a switch for changing between Spectrum and normal mode.

The 1431/APMS colour monitor is a new addition to the range. It is a composite video monitor with audio output. In addition to PAL input, RGB TTL is accepted. As well as being a useful computer-based monitor it could well be used in other audio visual situations linked to a video recorder.

Technical specification
Screen resolution: 452 x 585
Dot pitch: 0.62mm
Band width: 7MHz



PRODUCT: Digivision 14-inch Colour
Monitor CD series
MODEL: CD14/E H4
SUPPLIER: Digivision Ltd
Parker Drive,
Leicester LE4 0JP.
PRICE: £399 (less educational discount)

The Digivision range of colour monitors is packaged in an attractive two-tone grey cabinet, made of steel and aluminium; but instead of the normal spray paint job, Digivision has covered the cabinet in a plastic simulated leather-type material. It gives the monitor an unusual but attractive finish which makes it look most professional. The monitor measures 353 x 312 x 400 mm and stands on four small feet.

Set up with the BBC micro, the monitor has good clean lines but I did not like the rather bright cream front panel with its gaudy red, green and blue strip.

The CRT is held behind a black styrene moulding which enhances the screen.

Compared with other monitors under review, this Digivision model seems to have a lighter screen which, unfortunately, seems to create more reflections than a darker one.

Alongside the side of the casing are two rows of ventilation slits. Whilst they certainly ventilate the monitor well, I was more than a little anxious about what primary children might poke into them. They are certainly wide enough for rulers, and paper clips would easily find their way in.

At the rear of the monitor, but easily accessible, is the necessary input for the RGB TTL signal — a 6-pin DIN is used. A power lead with three sockets is located on the right. At the centre of this panel are controls for contrast and colour balance.

An illuminated rocker switch is used for turning mains power on and off. It is a shame that some manufacturers persist in hiding away the on/off switch.

Throughout the test period, the Digivision monitor worked well and seems to be reliable. Once set up, it needed no adjustment; in fact, for four months, it ran and ran. We used the monitor with both the BBC and Electron computers.

In the tests looking at letter clarity, the Digivision coped well, although there was some minor screen distortion. The monitor produces good colour, too.

I was unhappy with the way this monitor performed on test four. The power supply seemed to be under strain and the collapsing inward effect that the program gives seemed more pronounced. In a number of the tests, I noticed that noise seemed to be generated by the power supply and the display often rippled more than it should. It could be that a poor power supply is spoiling a good monitor.

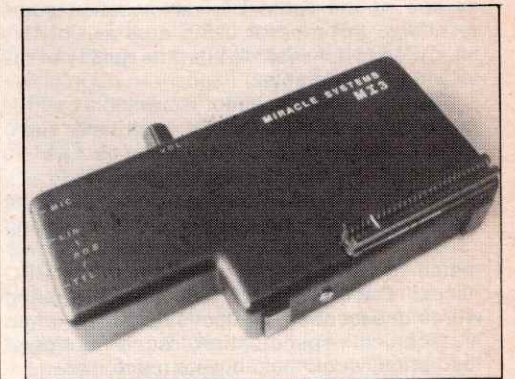
The Digivision monitor seems to be very well constructed. It is designed and manufactured in Leicester by a company set up in 1976 specially to produce video and data display monitors. The company has since built up a reputation for advanced design and manufacturing techniques.

Technical specification
Screen resolution: 653 x 489
Dot pitch: 0.43 mm
Band width: 10MHz

PRODUCT: M13 Spectrum to RGB
Monitor Interface
SUPPLIER: Miracle Systems
6 Armitage Way,
Kings Hedges,
Cambridge CB4 2UE.
PRICE: £74.75

Although the UK domestic colour television gives acceptable results for TV pictures, it is not the best thing as far as a computer display is concerned. The Spectrum cannot drive an RGB monitor so it seemed inevitable that someone would design and manufacture a black box to allow Britain's most popular micro to drive a monitor.

The M13 is a peripheral that plugs into the back of the Spectrum. The edge connector is replicated so that further peripherals may be plugged into the back of the M13. The unit is housed in a tough plastic case and no wiring or adjustments to the computer are necessary.



Inside the box, the M13 has its own internal 8K CMOS static video RAM which allows the bypassing of Spectrum PAL components. Once connected to the Spectrum, the M13 is linked to an RGB colour monitor via a BBC compatible monitor lead.

The M13 actually has two sockets. One is for driving a TTL monitor and the other is for a 1V p-p linear monitor. This makes the M13 compatible with most RGB monitors.

With linear monitors, colours can be displayed in BRIGHT and normal shades. The device allows the display of good clear characters and shapes which should see the end of the Spectrum shimmer. The edges of shapes are much better defined than they could be on a television. In fact, the M13 dramatically improves what can be shown on screen with a Spectrum.

The sound produced by the micro is also amplified by the M13 and fed through a 2.5-inch loudspeaker. There is a volume control included. Also, a special MIC socket allows the user to leave both the MIC and EAR leads plugged in while loading and saving with any cassette recorder.

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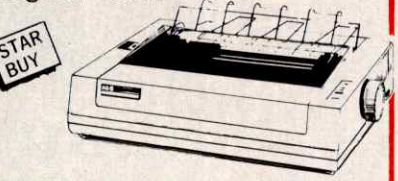


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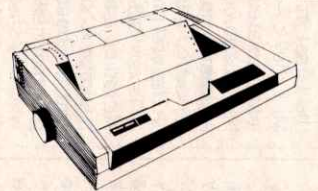
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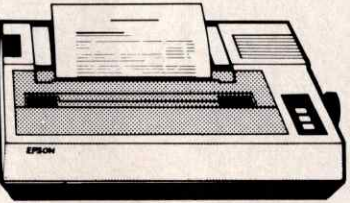
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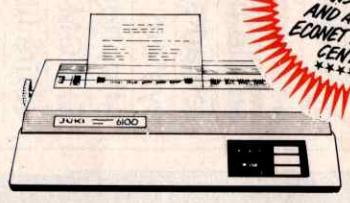
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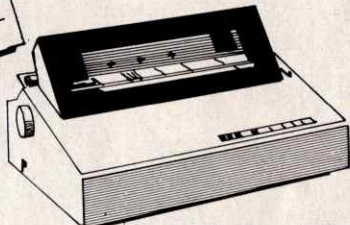
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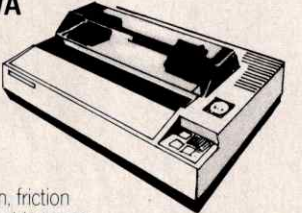


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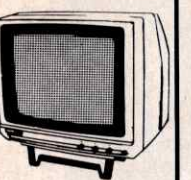
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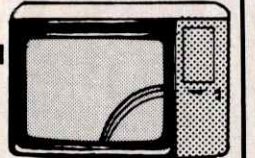
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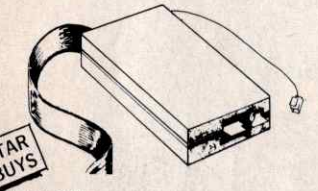
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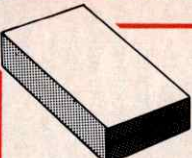
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SPECIAL EDUCATION

The White Lodge Centre has been established for the assessment, treatment and education of cerebral palsied children. We work with the children from the time that they are diagnosed to be spastic until they are eight years old, when they move on to other schools. Over the last 18 months, an Apple computer has been in use in the nursery and school units and despite initial misgivings by the staff is now proclaimed a vital piece of equipment — so much so that another computer is on order.

For physically handicapped children, there is also the obvious problem of limited ability to strike the appropriate key. The attention and effort required for them to do this detracts from the mental task for which pressing the key is the required response. It was decided, therefore, that only in special circumstances would the child be faced with the full keyboard, and a range of other input devices was acquired.

Many topics can be taught effectively using programs requiring only two switches. The switches, suitably labelled, can be used to indicate yes/no, same/different, row/column, etc. By using one switch to progress through a sequence and the second switch to indicate a chosen item, more complex situations can be handled.

From the many on/off switches available, it is always possible to find a design which when mounted in an appropriate location is suited to the needs of the child. Any switches used in the Centre to operate toys, etc., are connected via jack plugs. A small interface enables any of these switches to be connected to the computer via the games paddle port.

A second type of input which has proved particularly useful is the Concept Keyboard, a touch-sensitive flat board of A4 size comprising an array of 8 x 16 switches which can be programmed to act as anything between one large switch to 128 small ones. An overlay featuring sketches, colours, coins, characters, etc., appropriate to the program is placed over the board.

To prevent the child from touching locations by accident, the keyboard and overlay are enclosed in a box with a changeable lid. Each lid has a number of windows appropriate to the program which define the area associated with each switch. The child presses the switches through these windows which are usually between 4 and 10 in number.

With suitable overlays, a limitless number of topics may be taught such as sequencing, money and picture-word relationships. An important facet of this type of keyboard is the direct relationship which exists between the subject matter presented and the object, picture, symbol, etc., touched by the child in answering.

Since wheelchairs are frequently controlled by joysticks, it is useful to introduce this style of switch to the children, although it should be stressed that our joysticks are very robust, providing a large knob to hold on to and are not infinitely variable being based on four micro-switches. Used in conjunction with maze programs, this style of switch can also reinforce direction and body movement knowledge. Joysticks can also provide multi-way answering devices for children with only one useable limb.

While the value of these input devices is fairly obvious for physically handicapped children, their value for any young child, or child with learning difficulty, should not be overlooked. By replacing the writing component of a task with a switch press, little effort or attention is diverted from the main intellectual task. More intellectual tasks are completed, thereby increasing both the likelihood of retention of the concept in memory and the probability that the child will generalise from the specific approach used.

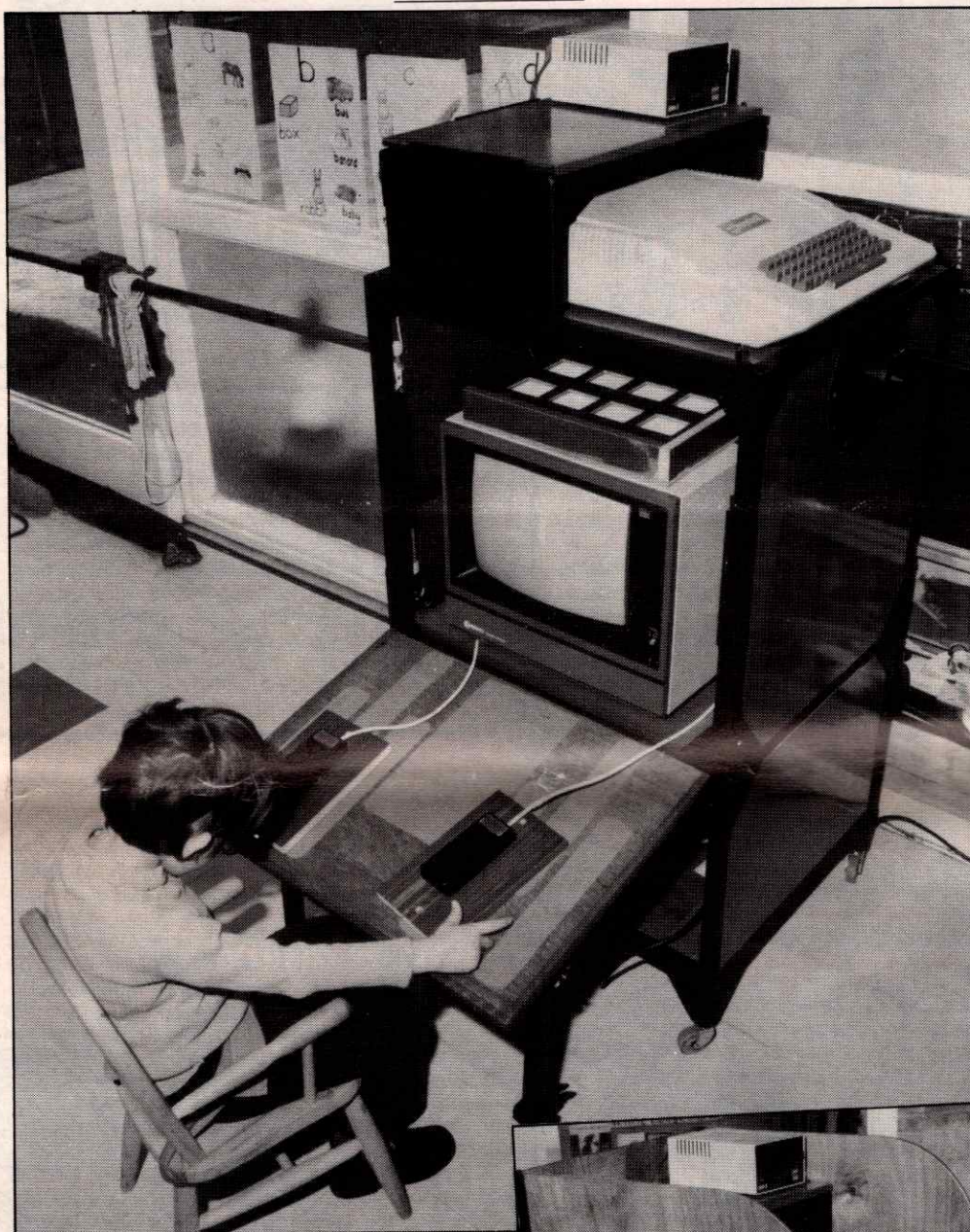
We soon recognised the fact that if the computer is difficult to move, it would not be used fully. A portable computer unit which housed the computer, monitor and all ancillary equipment including switches and software documentation was therefore designed and built by apprentices at a local factory. The unit incorporates a non-slip work top on which each input device may be placed and a platform on which the monitor rests. The height of the work top and monitor platform is adjustable independently to accommodate the varying size of children.

The computer, printer, etc., are screened from the children to minimise distractions. When the unit is moved, the work surface drops down to form the door of a storage cupboard and the unit is wheeled easily to a new location. The use of the computer did not distract other children in the room provided that they could not see the screen.

While the use of the computer as an electronic exercise book is generally decried, its value for physically handicapped children should not be underestimated. A child who has no verbal communication and who cannot hold or control a pencil can still be intellectually able.

"IF ONLY TIME WOULD PASS MORE SLOWLY!"

Dr Janet Larcher is computer development officer at the White Lodge Centre in Chertsey, Surrey. In assessing and helping to develop skills in young children prior to full time education, the use of an Apple computer has become invaluable. She explains what the Centre is doing and what they hope to achieve in the future.



Steven is one of the many children who can cope very successfully with this two-switch arrangement on the Apple. The apparatus is actually used with a frame around the computer (inset) to minimise the distractions to the child.

There are programs, such as MAC APPLE, which enable a child to express himself or herself in print by selecting the required letter from a letter matrix or the required word from a word matrix. Providing a child with such a program opens up a new, much freer, world for them.

With such a system and a little ingenuity on the part of the teacher, the child can complete many of the conventional tasks used by teachers in primary schools — e.g., supplying missing letters or words, labelling, question and answer, jumbled words or sentences, through to creative writing.

Intermediate stages of the work can be stored on disc and added to on a future occasion with no difficulty. Finished work can be printed and stuck in the child's work book as a permanent record of progress which parents are proud to show to others. By utilising large bold lower case fonts, the child is also able to read back his or her work at a future date.

Sequencing by copying or continuing a pattern is an important task in early development. Practice tasks such as threading normally involve eye-hand co-ordination or fine manipulative skills, skills which are unavailable or poorly developed in physically handicapped children. However, brightly coloured patterns composed of vehicles, animals, people, etc., can be produced on the screen which the child can copy or continue by pressing the appropriate matching figure on the overlay on

the concept board. The level of difficulty of the task can be altered in two ways, either by changing the complexity of the pattern presented or by varying the number of figures to be selected from on the concept board.

Because of their dependency on adults, physically handicapped children frequently lack the experience of exploring situations for themselves. The presentation of work on a TV screen and the use of simple input devices encourage confidence and motivation to work alone.

One of the programs which we have developed to explore the value of numbers requires children to attach the appropriate number of balls to numbers from 1 to 5. The child uses two switches, one to throw a ball and the other to move to the next number. Attempts to attach too many balls fail since excess balls always rebound away.

Attempts to move to a subsequent number before attaching a sufficient quantity of balls to the current number elicit a sad face above that number. Only after attaching the correct number of balls to the current number will the movement switch allow progress to the next number leaving a happy face above the completed number.

Different coloured balls are attached to each number and in exploring the value of numbers from 1 to 5 children produce an attractive display suitable for discussing concepts such as one more than/less than.

One way of assessing reading ability as well

as providing an associated practice exercise for the children is to present sentences from their reading scheme on the monitor in the form of a word list or jumbled sentence. The words are written in a large bold lower case font with generous spacings between the words. In response to a question or to being shown the picture normally accompanying the sentence, the child's task is to construct the correct sentence.

This is achieved by a two-switch process. On each press of the first switch, an underline moves to the next word in the list or sentence. When the required word is reached, depressing the second switch causes the word to leave the list or jumbled sentence to take up the next position in the sentence under construction. An immediate re-press of the selection switch causes the word to return to the original list or sentence, thereby enabling the child to recover from any accidental error.

There is no automatic correction facility in this program since we are interested in the sentence that the child will actually produce unaided. The teacher has the choice of checking and discussing the sentences produced one at a time or leaving the child to work through a set of such sentences, printing out at the end of the set the word orders presented and sentences constructed.

We have many more programs in our library than can be described in this article. As well as continuing to expand this library for use in conventional educational fields, we are now exploring the computer's potential with nursery age physically handicapped children who also have expressive language problems. Our aim is to provide new ways to encourage object/picture/symbol/word relationships to support an ongoing BLISS communication programme.

We are also beginning to explore a new idea to encourage the drawing and pattern making skills which are precursors to writing. Our ideas and ingenuity are limitless if only time would pass more slowly! **E**

INTRODUCING THE SPRITE

After 10 years of study of the requirements of those handicapped in spoken communication, Charles Lacey has developed — virtually single handedly — a remarkable speech synthesis system called The Sprite. Allophones are stored on an EPROM chip from which an entire library of different voices can be built up to suit individual users.

Using equipment loaned from Texas Instruments, Charles Lacey has developed a speech synthesis unit. It is the latest in a series of devices developed by Mr Lacey over a period of 10 years to make life less isolated for those people with speech handicaps. The unit, at £250 Mr Lacey estimates, is a quarter of what it would cost if produced commercially.

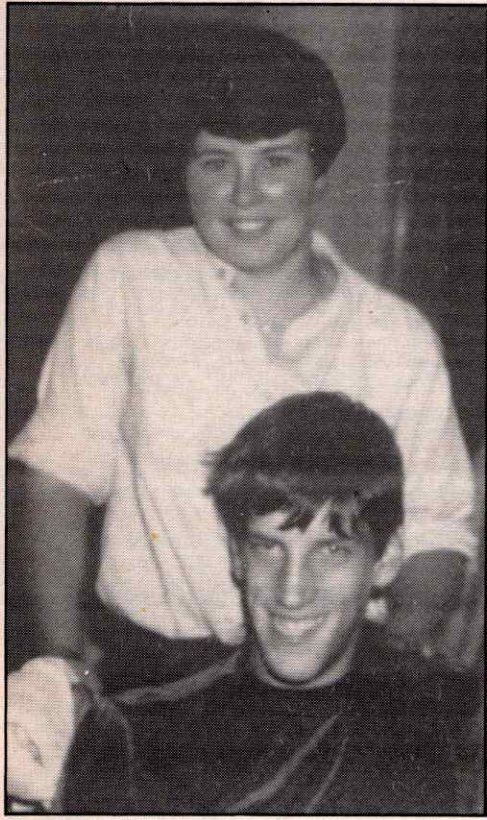
The end product consists of a T199/4A micro, a Texas speech synthesiser and a program stored on a solid state cassette. This complete package is called The Sprite (Speak 'n' Write) and the beauty of it is that voices have been programmed directly onto an EPROM chip which is stored in the speech synthesiser.

127 allophones formed from the voices are stored on the chip, and the program forms the allophones into words, which the user accesses and which form speech in a voice that is as close to the user's as possible. For example, if the user is a 10 year old girl then the voice produced will resemble that of a child of that age and sex.

The attraction of this package (other than its price) is not only is the voice similar to that of the user but the contents of the program (i.e., the in-built words, phrases and sentences) can be varied according to the needs of the user.

The voices are programmed onto an EPROM chip using a Texas Portable Speech Laboratory (PSL) and terminal. The PSL is a self-contained speech analysis system which reproduces sound after a delay of only a few seconds after a person has delivered a sentence, and stores

COMPUTER HOLIDAYS FOR THE HANDICAPPED SCORE SUCCESS



Computers? A piece of cake! There is no such thing as disabled when it comes to using a micro.

When it comes to doing a job using a computer, many handicapped people can legitimately shout: "I can do that. Gis a job!". Dr Lionel Wardle explains his holiday scheme which successfully combined tuition with information on what jobs a disabled person could do with a computer at home.

The world's first computer holiday for the handicapped was held at Southampton this summer. An important motive behind the venture was the idea that when it comes to using a micro many physically handicapped people are no more disabled than anyone else.

Our objectives were to provide the handicapped with a chance to learn how to program a computer, to help them recognise the job opportunities which programming skills and access to a micro can provide and to show how it can be used by those who need help in communicating with society.

Opposite my house stands the University of Southampton's purpose built unit for disabled students erected in 1979 at a cost of some £750,000. Most of the money was provided by charities for the disabled. During previous summers, I stood at the window of my house and grieved to see this unit standing empty and unused.

One day, we had a letter from a care officer who looked after a number of disabled teenagers. She had seen details of the computer holidays which my company arranges for various groups and asked if we catered for wheelchair users. It was just the push that was needed.

Our students formed a lively group. There was Carwyn, a paraplegic who had broken his neck playing rugby. He learnt quickly so I put him with Adrian, a bright lad who could manage the keyboard. Between them, they zipped through projects.

When she booked, Val described herself as having a mild form of cerebral palsy and suggested that in allotting places she should be given a lower priority than the more severely disabled.

Cecil is confined to a wheelchair but to describe anyone as competent as he is as being disabled would be totally misleading. He is very active in helping the handicapped and brought two other people with him to see if they could manage a micro.

Catherine had been working on a PhD in maths when she had been knocked down by a hit and run driver. The resulting brain damage had left her with loss of memory and other problems. She had come on the course hoping it would revive her memory and ability to concentrate.

Mick was in a wheelchair and had speech and hand control difficulties. He was an ex-

Continued on page 35

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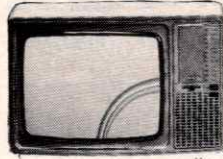
| Reference | Description (BBC Micros) | Ex VAT | Inc VAT |
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| ANA01 | BBC Model A Micro Computer | 256.07 | 293.02 |
| ANA32 | BBC Model A Micro with 32K | 285.47 | 326.83 |
| ANA33 | BBC Model A Micro with 32K and VIA | 290.59 | 332.71 |
| ANB01 | BBC Model B Micro Computer | 313.43 | 359.10 |
| ANB02 | BBC Model B with Econet Interface | 350.23 | 401.40 |
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| PTFX80 | Epson FX80 160cps Printer | 351.12 | 403.79 |
| PTGP100 | Seikosha GP-100A Printer for BBC | 194.08 | 211.69 |
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| PTJP101 | BBC Spark-Jet Printer | 276.58 | 318.06 |
| PTMX100 | Epson MX100 Type 3 Printer | 411.63 | 473.37 |
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• TELEREF 137

Continued from page 33

engineer with the Automobile Association and had been injured in a road accident. He was one of our most determined students. When we put him on a BBC micro, he really began to make progress.

We had three teenagers who were severely handicapped, two of them were able to communicate only by moving their heads to operate suck-blow switches. To look them in the eye was to know indeed that prisons are not made of stone walls.

The emphasis during the week was on learning by doing with the students working through a series of practical projects. They were warned that they would have three things to learn, all at the same time: a new language, how to use a computer and, hardest of all, a new way of thinking.

Thinking through logically from beginning to end what it is we want to do is something that few of us do naturally and it can be quite a strain. With our able bodied groups, the neurosis usually begins to show by about Tuesday. It started a little earlier with our handicapped group but perhaps because of this never quite reached the same pitch.

Working on the principle that two heads are better than one, we put our students to work in pairs and they did well. By the end of day one, most of them had programmed the computer to produce a standard letter. By the end of day two, they were programming the computer to make decisions and on day three, they progressed to computer graphics.

Discovering computer graphics is a revelation to most students. Many have written themselves off as being non-artistic and to discover that with the aid of a computer they too can design, draw and colour and even do animation is a fascination and delight.

The price of the computer holiday to the handicapped was £70 for the week. Since the



The end of a successful week for participants: course organisers were impressed with progress.

university charges for the self-catering accommodation alone was more than £60 per week, it was only possible to provide the course at such a reasonable rate with the help of a subsidy from the Department of Industry's Information Technology Awareness programme.

The Civil Service is often rightly criticised for the time it takes to do things and its bureaucratic methods. It is only right, therefore, to give them credit when they act efficiently and keep the red tape to a minimum. Within three weeks of applying to the DoI, they had given a decision and we were not required to fill in a single form. We had sent them full details and that was enough.

Clive Sinclair and Nigel Searle also acted on the precept that "He gives twice who gives quickly" when, almost by return, they provided half a dozen Spectrums for the course and offered to provide others to be adapted for special needs if required. From Acorn, we had the loan of a BBC Econet system and Texas Instruments offered the loan of a voice synthesiser unit.

Nor was it only the larger firms that offered support. John Piper of Tools for Living loaned several communication devices and also gave up much of his time in installing and demonstrating the equipment. Valence School for the disabled in Kent loaned two computers with large simplified keyboards. These are based on a modified Spectrum and were designed and assembled by pupils in the school. They are intended for the visually handicapped or those with hand tremors and are being marketed by the school on a non profit making basis.

There was keen interest in the session set aside for identifying and assessing the jobs and opportunities available to those with computing skills who own or have access to a computer working from home. The list included such things as producing mailing lists, labelling envelopes, word processing, providing buyer's guide services (e.g., where to find this week's special offers, information on reliable trade services, etc.).

It was suggested that the thing to do was to look for things that people or firms would do for themselves if they had the time or resources — e.g., offering a computerised estimating or book keeping service to local builders or plumbers, providing a customer

reminder and recall service for the local garage telling customers when their next service is due and so on.

The DoI has a scheme for providing computers and other equipment to handicapped people working in paid employment from home. They also provide training and support. The scheme should be attractive not only to the handicapped but also to employers and companies. To the latter, it gives them a chance to establish and try out computer based systems with little or no risk or cost. The evidence from companies who have tried the scheme is that it works very well.

They have found that the work rate of a handicapped person working from home with a computer compares favourably to that of an able bodied employee working from a conventional office — and the company saves on rent, rates and office space.

During the week, the students were given the opportunity to see or use a number of special devices and electronic aids. One of the most innovative was a pressure sensitive tablet called a Multipad demonstrated by John Piper of Tools for Living.

This is a battery operated electronic board which could be used with ordinary A4 sheets of paper for putting drawings or data directly into a computer. The required words or symbols are written on the paper and the form is then placed on the electronic pad. Pressing anywhere on a word or symbol with a pointer is all that is required to enter the data. More than 65,000 different forms can be recognised by the pad whose price starts from around £300.

Ian Andrews of the Queenswood Institute, a firm specialising in electronic sensors and switches, impressed and entertained with a number of displays — e.g., a single switch which could be used to carry out a long sequence of operation (turn on a radio, select one of 12 channels and set the volume level).

The university's electronics department showed some of the devices being developed for the handicapped, including one which produces simultaneous speech transcription for the deaf, the speech being displayed as text on a TV screen. Another is a dynamic braille device to enable a blind person to read from a VDU or TV screen and a word processor using voice input.

The manager for disabled employment services in Hampshire gave a talk as spokesman for the Manpower Services Commission. There are two MSC schemes relevant to handicapped people using computers. One is the Special Aids to Employment scheme which enables the MSC to purchase the equipment needed by a disabled person to do a particular job and the other is the Adaption to Premises and Equipment scheme designed to enable an employer recruit a specific disabled person.

The computer holiday was a pilot scheme and as such provided useful information. It demonstrated that given a practical approach, many handicapped people could compete on equal terms with the able bodied when it came to learning how to use a computer.

For the more severely disabled, it reinforced the view that with the right software and interface devices the mass market home computer could provide at relatively low cost a communication tool that would vastly improve the quality of their lives.

A one-week course could do no more than lay a foundation but for those interested in earning a living with a micro, it provided them with a chance to assess whether or not it was for them. It also enabled us to identify more clearly the kind of training, skills and guidance those who wanted to go further would need.

The most important lesson of the week was written on the faces of the students when they had succeeded with a project. It is nice to achieve, particularly when your opportunities for doing so are usually limited.

In 1984, we are organising a number of one-week computer holidays for the handicapped, their families and friends plus courses for teachers and care assistants in special schools. We hope to run these during the easter and summer holidays at residential schools and colleges for the disabled in different parts of the country.

So far, we have approached two schools, one in Hampshire and one in Kent, and have received very encouraging responses. Depending on the demand in the areas, we would like to establish computer holidays in Wales, the West Country, the Midlands and the North (the Lake District?). We should be very pleased to hear from any schools or colleges prepared to make their facilities available.

We shall try to keep the cost of the holidays to what a disabled person can reasonably afford. In 1983, we obtained financial support from the DoI which allowed us to reduce fees. Hopefully, we might be able to obtain similar support next year.

For further information, please contact Dr Lionel Wardle, Computer Holidays, 37 University Road, Southampton SO2 1TL, enclosing a large SAE or phone 0703 558621. E

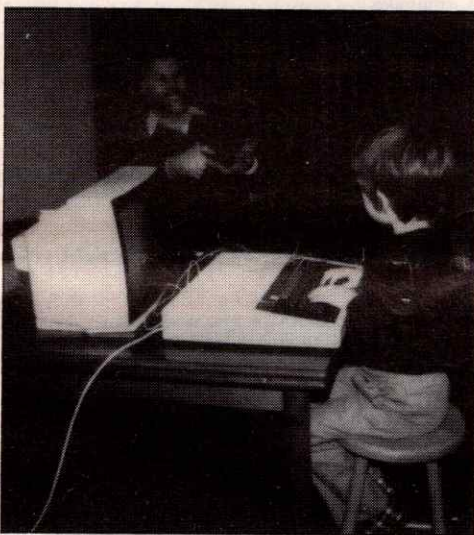
ENHANCING COMMUNICATION FOR DEAF CHILDREN

Frank Maddix of the School of Education Research Unit at the University of Bristol puts forward some very interesting ideas for the use of computers with deaf children and the way in which technology can enhance communication channels.

Deaf children have a particularly difficult time educationally, partly because their disability is not spectacular enough to evoke immediate sympathy and partly because their particular informational needs are not fully understood by teachers. This article attempts to outline the areas in which computers can assist in the learning situation.

First, some provisos. We should make an immediate distinction between those children termed partially hearing and those who are profoundly deaf (that is, who have a hearing loss of greater than 90 decibels). The latter group relies almost totally upon visual information for their human contact and their communication with hearing children and adults is generally poor. Both groups can be helped by computers, although their needs are different, as are the solutions.

The partially hearing child can read and write, probably wears a hearing aid and is likely to be found in a normal classroom, possibly near the front to maximise teacher contact. If the hearing loss is not too great, the innate flexibility of the brain to fill in information from other channels (lip reading, body language, etc.) may compensate.



Frank Maddix (the one with the beard!) has high hopes for the computer's contribution in helping deaf children to communicate.

If, as is likely, the situation is noisier than normal (books being read noisily, model making, etc.) then the hearing aid may even hinder communication. If a traditional hearing aid is worn, it unselectively amplifies the unwanted noise together with the wanted signal. Given that most children have their hearing loss at the higher end of the frequency range, and that a lot of noise occurs at the lower end, then the noise problem is compounded.

We need to boost speech-type noises while suppressing noise-type noises. Various solutions have been tried: if the known frequency range within which speech sounds lie is boosted, then other noises fade. This is satisfactory as long as the child's frequency response matches that of the aid and not too much noise falls in the speech range.

Neither of these situations occurs in real life. Each child has a unique response and it is not practicable to tailor individual hearing aids for every situation once they have been prescribed; and a large number of noises (chairs grinding on the floor) have speech-like characteristics.

The radio hearing aid which takes its signal from an inductive loop fed from a microphone is in widespread use in the United States and to some extent in Britain, but is expensive to install and set up. There is an additional disadvantage that only one source of speech is boosted, with the possible consequence that the partially hearing child is even more cut off from his or her classmates. How can the computer help?

Initially, by improving the hearing aid selection process. The task of administering an audiological test, producing an audiogram and then selecting a hearing aid on the basis of the results is error prone and time consuming. It could be automated and performed on a microcomputer which maintained a database of known hearing aids and their character-

istics. It could even be performed by unskilled personnel, although audiologists will dispute this. Thus, the matching of child to hearing aid would be a far less chancy process and the success of the match could be checked at more regular intervals.

Second, by improving the situation with regard to audio-visual aids. The average video cassette is not noted for the clarity of its audio signal and even hearing people occasionally experience difficulties in following it. A system exists (Timecode) which can stamp each video frame with a number. If the microcomputer tracks these numbers, it can flash up subtitles which it extracts from a database.

I am currently attempting to set up a project which evaluates this method. The advantage of this method is that the video image is obscured only for as long as it takes to read the subtitle: the child can then release a key and view normally. If the child were reading slowly, then the subtitle could be reviewed at will.

One drawback is that a separate screen is required if independent subtitling is to be provided; another is that the initial setting up of the database would be an expensive process, although discs/cassettes could be distributed once this was done.

In the future, even more direct help may be possible. A truly intelligent hearing aid which knows the parameters of its owner could detect adverse conditions and adjust the audio circuits for optimum performance; signal the teacher to remove the source of the offending noise or to speak!

A more advanced device could block non-speech sounds and ensure a clean signal to the child. Furthermore, it could monitor constantly the acoustic ambience and perform an analysis of the types of noise which were commonly present in the child's environment, producing a regular report which would help the audiologist.

When it comes to improving the child's own speech output, there are areas in which the computer can help. Systems exist already which enable, in principle, a power/frequency curve of the child's speech (the audio spectrogram or voiceprint) to be matched against an ideal voiceprint and improvements made. Linked to a game, the child could be introduced to a self-motivating system with rewards presented according to a properly organised schedule.

If this approach gives rise to the disturbing image of a rat running a maze, perhaps we would do well to remember that a child is not a rat and communication and mazes have two things in common — they are difficult to negotiate, but rewarding to learn.

The reality of these ideas depends on the incorporation of existing techniques in speech recognition and signal processing into portable microelectronic devices. It also depends on the hard work of dedicated people, the good offices of the powers that be and an awareness within the deaf teaching community that such things are possible.

When we come to consider profoundly deaf children, we have to face the fact that they do not communicate using the same auditory and vocal apparatus as hearing people (although some teachers of the deaf believe that aural communication is relevant).

With these children, the total communication method would seem to be the most promising. Its philosophy is that if you can find a channel of communication then use it to teach. This is where the computer can help: by virtue of its enormous flexibility in the presentation of visual material, it is capable of entering into almost any scheme designed to improve communication.

Let us look at the problem. We have to introduce the child to the world of information and ideas normally mediated by both auditory and visual means. The processes of concept formation and language development are undoubtedly aided by supplying cross-sensory links (the ability to write the word cat must be to some extent determined by acoustic imagery as well as visual) and yet the deaf child is lacking one of these channels. How do we bootstrap communication skills?

Perhaps, we would profit from challenging one or two assumptions. The hearing child does not learn to write by hearing his or her

Continued on page 37

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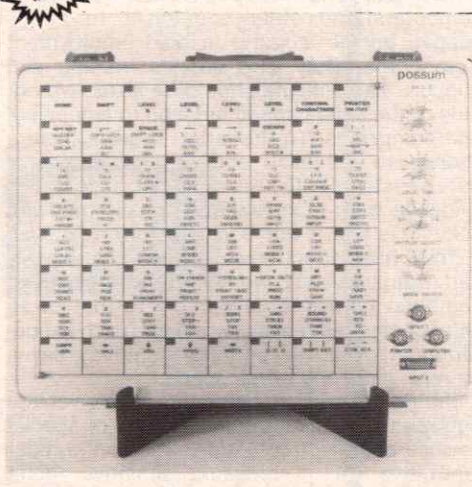
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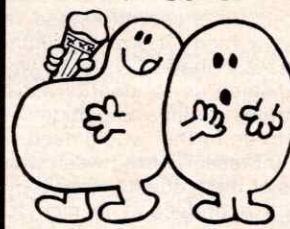
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mother talk, but that child's writing performance can certainly be reinforced by positive verbal feedback. If, for the sake of argument, we wish to improve the deaf child's writing skills, is there some kind of process that would mimic the normal situation? Or should we seek more radical alternatives?

Analysing the problem in more detail, it would seem that what we need is a system for supplying stimuli which are meaningful to the child and which provide motivation to understand the situation and also monitoring the response and taking appropriate action depending on the performance level. At the same time, it must be borne in mind that the child is likely to be of normal intelligence and so any systems designed for a remedial situation are probably inappropriate.

There are wider questions to be asked. How do we want the child to communicate with the world? Should speech skills be emphasised at the expense of written communication? If the child's parents are deaf, it is likely that the child is a fluent signer. Do we discourage this? Or is it more appropriate to stimulate general information-seeking skills which generate, in turn, the motivation to develop additional more conventional modes of communication?

If we adopt this latter approach, we are probably less encumbered by entrenched ideas. Certainly, there are some promising candidates to be investigated. Consider Logo.

This language was developed by Seymour Papert in response to a deep conviction of his that mathematics teaching was on the wrong track. A child is not fundamentally cartesian, that is, he or she encounters difficulty in visualising events occurring in an absolute world of X-Y co-ordinates. He or she is self-centred to the extent that world events are perceived as happening to him or her rather than out there.

Mathematics is essentially a way of viewing the world rather than a set of formulae for describing it; therefore, devise a system which takes advantage of the child's self-centred view. A notional turtle (which the child immediately identifies with) defines shapes and structures under the child's control. Procedures can be built up, modified and structured hierarchically.

The essentially visual world of the deaf child maps easily onto this system. Many deaf children, particularly of deaf parents, are fluent signers and so subtle and complex visual discrimination is their stock in trade.

Logo is more than just Turtle graphics: it is a very high level programming language, capable of manipulating text as well as symbols. It also lends itself naturally to those operations which need to be invoked for the handling of complex problems: iteration, hierarchical (top-down) structuring and recursion (the term used for when a procedure invokes itself).

There is every evidence that children grasp and use these concepts in a way which staggers their teachers. It should not be so staggering: after all, the acquisition of language is one of the most complex activities we can imagine, and yet a child can do it.

It is quite reasonable to suppose that, having acquired a facility for handling Turtle graphics, a deaf child would be adequately motivated to handle the language side. The progression from visual images to linguistic images represented visually (i.e., words) would be natural and might possibly go unnoticed.

Although true speech would be a barrier (at least while we are waiting for intelligent speech synthesisers), the child's communication ability would be enhanced to the extent that, one way or another, he or she would be able to communicate with the world.

Anyone who has seen the play *Children of a Lesser God* will be in no doubt that the inability to communicate with fellow humans is one of the most distressing situations, transcending more debilitating disabilities in its misery power.

Another high level language, Prolog, has been developed to enable computer programs to be written directly in a form of predicate logic (of the 'socrates is a man' type) and for the problems so developed to be stored and solved.

It requires a literate person to use it: but imagine we had a version of Prolog which used pictographic symbols instead of words: the deaf child could, given an incentive in the form of a preprogrammed database, rapidly acquire a facility for the language in parallel with his or her hearing peers and learn to use proper words in a progressive way, as described above for the Logo system.

Indeed, the two languages might be used in a complementary way, with Logo being used to develop the pictograms. Moreover, deaf and hearing children might co-operate in the same work space and gain ideas from one another's systems. Such a modification is not beyond the capabilities of a competent systems programmer who has access to the source code for the particular implementation of the language. **E**

EXTERMINATE VDUs!

David Calderwood is an OU technology student and involved in an exciting project under the auspices of Dr Tom Vincent. The talking word processor has allowed David to write his first letter in print for 11 years. He describes how he made the chip work for him and how it can help other people in his position.

No, this article is not an appeal by a computer liberation movement for you to burn your DERs, but to bring to your notice the ever growing number of enthusiasts who, like myself, are blind. This has all been made possible by the phenomenal increase in devices which give home micros a synthesised speech output with programs varying from pinball games to scientific calculators.

It was just such a calculator that I badly needed some 18 months ago. Believe it or not, there was no such thing at that time and my only ready-made option was to wrestle with braille four-figure mathematical tables that dwarfed books like *The Complete Works of Shakespeare* or to tackle the problem in a different direction. I decided to see if I could make the legendary microchip work for me.

I bought a VIC-20 with its excellent keyboard and reliable, if over-priced, compatible tape recorder. It was a combination that allowed me to smile when my wife read me angry letters about loading and saving problems on other micros in the computer press.

I chose the low-priced Vox Box from Mutek as the speech synthesiser — a neat little device which delivered a clear phoneme when a number was poked out to it via the VIC's user port. Each phoneme was, so to speak, a building block and whole words could be constructed from strings of phoneme numbers.

My first job was to build up a vocabulary of

calculation in braille. With the addition of a printer and a little more jiggery-pokery, I produced a talking typewriter. I then progressed to start writing games; for now each line of programming could be checked using the reading routine and the reading routine could be used to give the output for, say, a hangman game.

Although my crude method did the job it was designed to do, it was rather slow, so you can imagine my delight when I found out that Dr Tom Vincent and his staff of the Open University, Manchester, had designed a powerful software package which would make the BBC micro and a Votrax speech synthesiser do just about anything.

All the hardware is completely standard (apart from a lump of bluetac on the 9 and h keys to help you position your fingers on the keyboard) and the machine code program is popped into the top of memory leaving the user well over 20K to program with in MODE 7.

It is also possible to use a modified Perkins brailler as an input device giving the blind user an additional advantage of having a braille hard copy. With the addition of a dot matrix printer and a word processor program, a hard copy for sighted readers can be produced — ideal for writing essays, etc. Such essays can be stored on disc using a filing program.

Once the Votrax interpreter has been loaded, every time a key is depressed the character it represents is announced, so an error may be corrected immediately by using the delete key — which, incidentally, announces the letter it has deleted. On hitting return, the entire line is spoken.

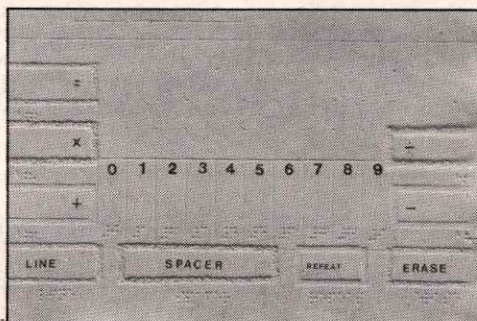
I must say that the excellent quality of the pronunciation quite surprised me, even with rather obscure English words. It certainly announced my address in North Wales much more clearly than the average summer-time tourist! A clever touch is that letters like CLS and ASC are pronounced CLEAR SCREEN and ASCII value. Editing is also possible using the cursor keys — a great time saver.

I was fortunate enough to be asked if I would evaluate the Votrax Interpreter package and immediately started to think in terms of devising a few games suitable for blind players and because when a program is run every PRINT statement is spoken, an Adventure game seemed the best program to start with. It was a most interesting project to work on and it was my first long program and could be played by either blind or sighted players. I had to incorporate a LOOK command so that blind players could remind themselves from time to time whereabouts they were.

Designing a reaction game for blind players was quite a challenge. I started with the relatively simple fruit machine which had a



Above: the Computing and the Blind project at the Open University has made tremendous progress; people like David can use this workstation to produce normal and braille hard copy. The system includes BBC micro, Perkins Brailler and an embossed overlay which (right) is used with a concept keyboard to provide, in this case, talking arithmetic for young visually handicapped pupils.



words each of which described a character in the VIC character set from @ up to the start of the graphics characters. I had to be careful to differentiate between M and N as well as b, p and t. These strings of numbers were then placed into an array so that the array numbering coincided with the VIC character set numbering; i.e., 0 for @, 1 for A, etc.

It was now a simple matter to examine the contents of the screen starting at the top left hand corner and ending at the bottom right hand corner by peeking into each location on the screen memory map. The array element whose number was identified in each location was then poked out to the Vox Box which announced the character in English. When this program was run, it would read (or strictly speaking) spell out to the listener the content on the screen.

The applications for such a program are legion. I started by using the VIC as a scientific calculator and then running the program so that I could take down the answer to a

nudge facility. I brought in as many of the BBC sonics as I could to make the game more exciting and although I say it myself, it was quite a thrill to hear the word plum being spoken three times one after another! I produced a number of other reaction games, but I think Pinball Wizard is my favourite. It uses both sound pitch and spoken word clues as to the ball's position on the pinball table and I found a child-like delight in getting bonus scores when the buzzer was going.

I am at present working on a number of tactical board games which a blind person could play against the computer, with the help of one of the many tactile games boards produced by the Royal National Institute for the Blind. I feel that I am beginning to get somewhere with Ludo and maybe even Backgammon, but someone else will have to come up with a Chess program for the blind! **E**

THE MICRO AND SPECIAL NEEDS

Members of the Rotherham Special Education Computer Users Group describe software development projects including a creative story program by Gill Duffy, a reading development and resources program by Gill Armstrong and a route finding program by Margaret Matthews.

The curricular framework within which all schools operate should determine the contribution of the micro rather than the reverse. Programs should relate directly to methods of teaching for which it is the best tool available, and not be involved in repetitive basic skills practice alone, which is often better done in more traditional ways.

Development of computer-based aids for those with physical and sensor handicaps is well advanced. The aim of the Rotherham group is to produce context-free programs which will be of use to both teacher and pupil across a broad spectrum of ability.

Three programs have been developed in the past year. The first is designed to stimulate interest in imaginative writing by using the micro's facility to motivate a small group of children to discuss the story's progress and by their interaction decide its conclusion. The same interaction is not achieved by the use of a book.

The second program gives a teacher an instantly available reference system for the reading materials in the school, thus saving time in cataloguing and filing, with all the updating that this implies.

The third program uses a simple map to teach route-finding skills and has in-built possibilities for a network of subroutines for teaching social skills.

The initial purpose of the creative story program is to provide pupils of any reading ability with a readily available facility for rehearsal, consolidation and stimulation. The format allows a maximum of five lines of text per screen and a total maximum of three screens (15 lines) before a two option choice is offered.

Teachers will be able to create their own stories which the micro will formulate automatically on the basic pattern of the program and give an approximate reading age for the story based on the Havering index. These stories can be geared to the readability and social level of the individual or group and linked to their specific interests, thus creating a climate in which their confidence can be increased and the motivation to improve reading skills is stimulated.

Because of the in-built flexibility of the program, the stories can be incorporated into on-going classroom activities, topic work or areas covered by specialist subject teachers. The children can decide which way the story will go and there is a facility for them to type in their own imaginative ending.

Finally, if the hardware is available, a printout will provide a satisfying end for the individual or group, especially for those who have difficulty with writing skills. Expansion of the program to include visual clues from slides, photographs, videos, etc., will allow further stimulation for those with special needs.

In trials, the program has been seen to promote skills in decision making, group interaction, language, imagination, free writing and thinking. The micro is the ideal tool for this exercise because of the immediate motivation for children to use it. The flexibility of the program could not be achieved in conventional print, as the information retrieval would be cumbersome and complicated, requiring teacher involvement at every step.

The pupil centred control of the program means that those involved are allowed to proceed on the basis of their own decisions, with minimum teacher influence.

There are at present about 10 stories available already. It is planned to retain a library of all the stories, each graded and coded for reading and interest levels.

Teachers who were interested in writing

Continued on page 39

Continued from page 37

stories for the program were given a list of the program development criteria, an example of a branching story, banda sheets explaining the various types of branching they could use and a diagram of the computer screen showing the number of columns available for each character (36), and where the text and options would be placed on the screen.

At the moment, five stories are on tape and five more are to be completed: total 10. Some of these have been used in schools: a class of five to six year olds in an infant school; 14 to 16 year olds in an ESN(M) school; third years in a junior school; and first and second years in a comprehensive school. The size of group using the programs was varied to find the optimum number, this is approximately a group of three to four.

With a larger group, one tends to get a nucleus of children actually involved in making the decisions and the rest merely looking on. With a smaller group, there is little discussion, not enough ideas or comments flowing.

Teachers have commented on the lack of instructions actually on the screen for the children. This was deliberate. We did not wish to clutter the screen. Also, because of the wide range of readability, not all the children using the program would be able to read them. With this in mind, we have tried to keep the operation of the program as simple as possible. So far, the children have had no problem in understanding the use of it, once told.

The main problem has been with the hardware. Loading the program using a different tape recorder than the one used to save the program has proved virtually impossible. In comprehensive schools, where a timetable has to be followed and where lessons are sometimes only 35 minutes long, this has been a major problem. Those schools with a disc drive will, of course, have no problems.

The program is now going to be piloted by the MEP throughout the region and teachers

will be asked to fill in a package evaluation sheet.

The idea for the reading development and resources program came about because it was felt that the need for a school to organise and manage its resources effectively is probably greater than it has been for a long time.

Cuts in capitation mean it is impractical for classes to duplicate resources. Staff cuts mean primary schools are often left without any remedial help. Many schools are now in a position where they have to provide for the educational needs of children who in the past may have attended a special school (Warnock).

It is hoped that the careful structuring of skills and selection of appropriate resources to match this development, which the program illustrates, will be useful for schools and teachers who find themselves affected by any of these things.

Quick and easy retrieval of information can save the teacher a great deal of time. The programmer's biggest problem was finding ways of using as little memory as possible. Because of the amount of information stored, it is easier to write the program for disc than cassette.

The teacher's task is to sort information about the development of reading skills into a logical order; select resources which would help the child acquire these skills; decide the best way to present the information on the screen; and to think about ways of making it as widely applicable as possible.

Obviously, not all resources can be listed. The resources chosen are what I personally have seen to work and those of which other teachers have given me enthusiastic reports. The program covers a reading age from 5.7 to 12 plus, based on the Daniels and Diack Reading Assessment.

By typing in a reading age, the computer automatically fits a child into a level. The information required can be obtained literally at the push of a button.

It is hoped that many of the resources listed can already be found in schools, in which case

it is relatively easy for a teacher to select a resource with a specific purpose in mind. There is a facility in the program for a teacher to star items which exist already in their school.

It is also possible for a school to enter its own resources by typing them in and to delete anything which is not useful to them, if they so wish. This makes the information on the computer immediately useful to a member of staff who is unsure of what is available in the school.

To summarise, the program attempts to help a school organise its reading resources and select work to fit the specific needs of children. In doing this, it is hoped that in financially difficult times the children's needs are being thoughtfully and precisely met.

In his recent report on the work of the Newcastle SEMERC, Colin Richards suggested that much of the quality of special education is determined by the accessibility of the curriculum. Independent mobility is of prime importance in bringing into being this accessibility within the school life of the child and becomes crucial at the time of entry into the adult world.

Many children have as part of their special needs the requirement to nurture confidence in finding their way about independently and, in order to achieve this, they require appropriate language and mobility skills.

The route-finding program aims to develop familiarity with the immediate environment going on to include less familiar territory. The program can be broadened until users can find their way in a totally unknown place, using public transport, timetables, etc.

The microcomputer's role in teaching these skills may be valuable, particularly in the early stages. Using visual aids, for example, photographs or slides of a venue, the pupil can be made aware of the actuality and can then be presented with a simple line map to trace a route from A to B. This presents problems however to the pupil with, for example, poor co-ordination, minor visual impairment, poor recording skills or lack of literacy skills.

Once the route is completed, the teacher's time will be necessary to outline the next stage of the exercise, to dispense reward for success or correction for the wrong route.

In using a micro, the teacher immediately increases the motivation of the pupil to strive for success, as the format of the program can have similarities to that of computer games. The minimal co-ordination skills required to manipulate the computer keys means that access to the program is denied only to those with gross motor handicap, who are unlikely to achieve total independent mobility.

The presentation of a map on a screen, with a figure to manoeuvre between named venues, allows the child to work out a route and on arrival at the correct destination, to receive instant reward from the micro. Immediately, the teacher is alerted to the next stage — questions concerning the venue — and the pupil may continue independently. This frees the teacher for other tasks, or permits the development of language and communication skills in discussion of the venue, either with the teacher or with other pupils.

The child is now familiar with the venue and its function and is ready to attempt the transfer of route-finding skills to the real world. Additional exercises should include excursions to cover the venues described. These can be accompanied in the first instance, working towards total independent travel on the route described, with successful arrival at the chosen destination. Ancillary tasks may include specific shopping or information-finding exercises at the destination before retracing the route back to base.

Successful integration into adult society depends crucially on the ability to travel from the home base. Only with this skill can all the facilities of urban life be discovered. Denial of the use of these facilities condemns an individual to a confined stagnating existence.

A program teaching the rudiments of independent travel should, therefore, be part of the curriculum of every school concerned with the special needs of its pupils: and the micro has an invaluable part to play in this. **E**

A SELECTION OF SPECIAL HARDWARE DEVELOPMENTS

Here are brief details of various devices currently available from both major manufacturers and much smaller concerns, including help for very young children as well as aids for adults. In our next issue of *Learning To Cope*, we will give you a much fuller account of what is on the market.

Micromate

Based on research work by Dr Alastair Ager, Micromate offers a mentally or physically handicapped child the opportunity of learning through play. The system can be adapted easily to meet individual needs and levels and aims to provide access to a variety of games and educational programs as well as capitalising on research findings concerning the appropriate structuring of different tasks.

Micromate consists of two input devices which can be connected to the Spectrum or BBC micro. One is a solid wooden box with three knobs which control the program in use; and the other is a touch sensitive screen which attaches to a normal TV set and which allows the child to select and manipulate images presented on the screen.

On the software side, a starter pack includes an introduction to Micromate (explaining the operation of the system with guidelines for use), Little and Large (teaching the concept of size) and Space Wars (a special version of this classic arcade action program). Other packages include Grand Prix, Odd Man Out, Snap and an activity program. All the programs can be operated via a normal keyboard, too.

For further details, contact Toys for the Handicapped (which is producing Micromate commercially), c/o Tube Plastics Ltd, Severn Road, Stourport-on-Severn, Worcs. DY10 9EX.

Viewscan Text System

Wormald's Viewscan Text System (VTS) enables partially sighted people to access and input information in the same form as used by those with normal vision. The VTS incorporates the microprocessor based Viewscan reading aid and the Epson HX-20 micro. A large print flat panel display generates large characters and an optional hand-held camera can be used which, when scanned over any printed material, generates an image enlarged from

four to 64 times as required.

For typing work, the system can be linked directly to various printers: there is a miniature built in printer for labels and so on. There is an in-built microcassette too.

Software comprises some 16K of instructions and data along with an extensive file of HELP messages. A modem can be used allowing access to various viewdata systems.

As the system progresses, Wormald says it will upgrade existing users' ROM cartridges containing the operating software to the latest standard free of charge. For more information, contact Wormald International Sensory Aids, 7 Musters Road, West Bridgford, Nottingham. Tel: 0602 820600.

Key guards

Hallam Industries, a training workshop under the Youth Training Scheme in Sheffield, is producing a key guard for the BBC micro. The original prototype was made for use in Oakes Park School by the medical physics workshop at Western Park Hospital. When Roger Jefcoate visited Sheffield in April, he suggested the youth training scheme might be interested in manufacturing the device.

The guard has undergone considerable evolution. It is now made of duralumin and epoxy coated in cream, looking very much part of the micro, and better than its perspex prototype. The recessed holes above the keys are positioned for optimum visualisation of the keys below. The guard is secured to the micro by two toggle clamps: it is thus easy for teachers of pupils with differing physical abilities to attach or remove.

The guards are available from Hallam Industries for £17 including post and packing (plus VAT where applicable). Versions for other micros are planned.

The strength of this guard has led to a modified version being designed into which up

to 10 specially made one and a half inch diameter buttons may be plugged above keys chosen by the teacher. This provides a very simple mechanical alternative to the concept keyboard, as any design may be drawn on to the buttons. Existing software already using single key entry can be used with minimal or no changes. It also affords the possibility of converting the keyboard to use as simple switches for the child with more severe physical disabilities or learning difficulties. The cost is about £25 including four buttons.

Further information, key guards and VAT exemption forms from A E Oliver, Hallam Industries, 272 Attercliffe Common, Sheffield S9 2BR.

Possum

Possum Controls Ltd is a well established company in the field of special aids for

handicapped people and has recently expanded its range to accommodate computer technology. Scanning and expanded keyboards are now available for the BBC micro, Spectrum and Apple II.

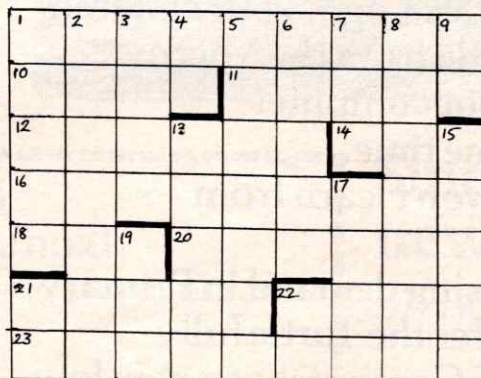
When using the scanning version, a light is moved around an indicator board to select the computer function required. All Possum input devices can be used including single and double switches and an eight-way input with either joystick or footskate.

The expanded keyboards have large spaced out keys with a delay device — all housed in a tough case, so that people can use a computer who do not have the control to operate a normal keyboard.

Other equipment includes a text processor and a synthesised speech unit. For further details, contact Possum Controls Ltd, Middlegreen Road, Langley, Berks. SL3 6DF. Tel. 0753 79234. **E**

CROSSNUMBER PUZZLE

Complete the crossnumber puzzle below and send it to us before December 23rd to win £5 and a binder for your copies of *Educational Computing*. The first correct solution we receive will win the prize. All the answers are integers (base 10) where no two are the same and none begins with a zero.



ACROSS

- $(2n + 2)^n$
- 15 down/p
- 21 across — 12741
- Six consecutive digits in order
- $n \times r$
- $(2n)^n$
- The smaller of two primes which could fit
- $20 \ 73440 \times q$

- Five consecutive digits in reverse order
- See 18 across
- $(2n + 1)^n$

DOWN

- The largest of three primes which would fit
- A prime number
- Rearrangement of 17 down's digits
- Two consecutive digits
- Rearrangement of 8 down's digits
- $13 \text{ down} + 9779$
- $n \times s$
- 'Anagram' of 5 down
- $(n \times p)$
- $4078 \times q$
- Palindromic number
- See 3 down
- $18 \text{ across} + 41$
- $21 \ p^2$
- $(p \times q)$

(NB $n = 7, p = 9, q = 11, r = 105, s = 71$)

Name

School

Address

Send your entries to Educational Computing Crossword, 8 Herbal Hill, London EC1R 5EJ.

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| Disc Interface | £ 84.35* |
| Econet Interface | £ 60.87* |
| Speech Interface | £ 47.83* |

*This price includes fitting

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| | |
|-------------------------|---------|
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| RX80 dot matrix | £226.05 |
| RX80 F/T dot matrix | £260.83 |
| FX100 dot matrix | £474.74 |
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| CP80 dot matrix | £249.00 |
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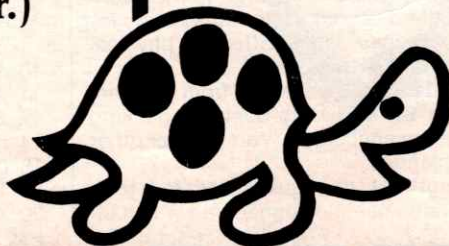
The Edinburgh Turtle

Name _____

School _____

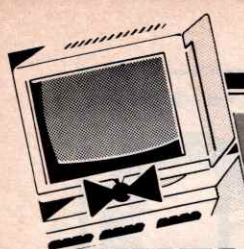
Address _____

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*Please add £3.50 for P&P and £22.28 VAT.

• TELEREF 146



MACHINE REVIEW

WHEN IS A TOY NOT A TOY? WHEN IT'S A ROBOT

Something which will appear in many children's bedrooms on Christmas morning is the Robo 1. Astute teachers will see that this is far more than a toy and could provide a tremendous opportunity for primary children to grasp the fundamentals of robot movement and control. Dave Futcher investigates and describes the reaction he encountered when using the device.

PRODUCT: *Armatron Robo 1*
SUPPLIER: Tomy UK Ltd
Wells House, 231 High Street,
Sutton, Surrey SM1 1LD.
PRICE: £29.95 (inc. VAT)

Schools have moved already into the area of floor crawling robots with devices like the Edinburgh Turtle, the Zeaker and the BBC Buggy. The next stage will surely be robotic arms. Colne Robotics markets the Armdroid 1, a relatively expensive robotic arm device, which works under computer or manual control. Its customers have been some schools, many colleges and universities. But there is a need for schools to have some sort of device that is a lot cheaper which they can use as an introduction to robotics.

One device which could fill that need is the Armatron Robo 1, manufactured by the Japanese toy giant Tomy. Robo 1 is being marketed as a toy and a game. However, do not write it off because of this.

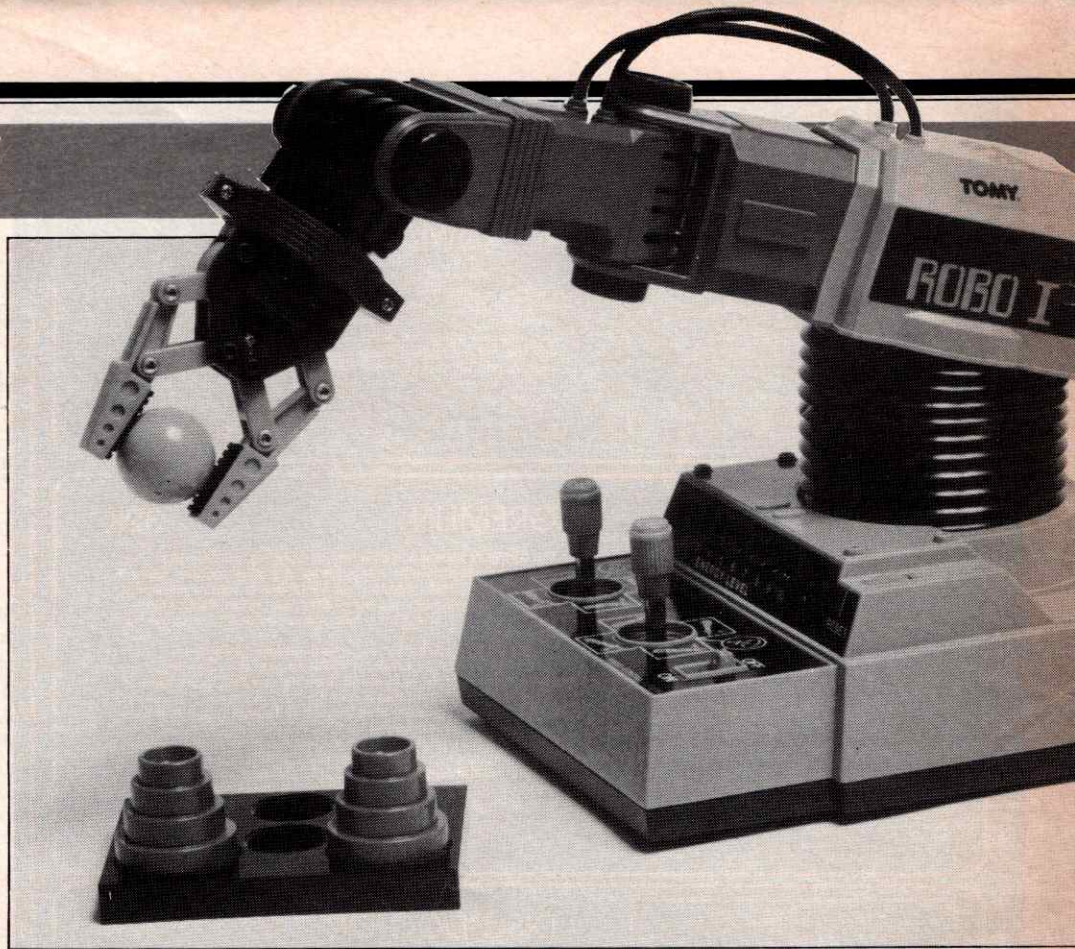
It is a beautifully engineered plastic construction that is a faithful reproduction of an industrial robot arm. It comes on a solid base measuring 220 x 150 x 40mm. The robot arm itself is 370mm in length from the shoulder to the tip of its claw arm. The distance from the centre of the wrist joint to the tip of the claw hand is 125mm. So, it is not small in size. It is

powered by batteries, using two HP types. The Robo 1 has full horizontal traverse through 360 degrees and a side to side movement through 180 degrees. The wrist that holds the claw can be rotated in almost any direction. The claw hand can pick up, grip, rotate, move and, of course, release objects.

The robotic arm is controlled by two levers — a bit like joysticks. Each of these has four positions. The left control lever controls the movement of the hand and the elbow joint. For example, if you want to move the hand up, you push the lever forward. If you want to move the hand down, you pull the lever backwards away from the console. To move the arm from the elbow joint, you push the lever right for clockwise movement and left for counter-clockwise movement.

The right control lever controls the entire arm. For example, to move the entire arm in a clockwise direction, you push the lever to the right. To move the arm in a counter-clockwise direction, you push the lever to the left. To move the arm up, you pull the lever backwards from the console and to move it down, you push the lever towards the console.

The speed of the above movements is determined by the position of the control lever. If it is pushed hard into the side of its mounting, movement will be fast and if it is moved only half the possible distance,



Above — Tomy's Robo 1 comes with a selection of canisters, globes and cones that can be used for mounting on the base console together with the on/off switch: below centre — fully extended the arm up, grip, rotate, move and release objects with a maximum span of about 5cm.



A COMPUTERISED SKETCH PAD FOR THE BBC MICRO

Derek Hayes brought more back from his holiday in Wales than he bargained for when he found the Tarren DigiGraph. Essentially a sketch pad, the device allows a variety of graphics to be produced, though not quite as easily as you might imagine. For its price, however, it offers some valuable features.

PRODUCT: *The Tarren DigiGraph*
SUPPLIER: Tarren Products Ltd
Factory D1, Treforest Industrial Estate,
Pontypridd,
Mid Glamorgan.
MACHINE: BBC micro
PRICE: £63-£67

I spotted an interesting device in the window of a Welsh computer shop while on holiday there (Wales, that is, not the computer shop!) which appeared to be a digitiser of some sort. The price certainly seemed to offer good value so I went inside to have a look.

The manual tells us that: "The DigiGraph is a complete package for use with the BBC micro-computer (Model B). It consists of a sketching pad, arm and software on cassette. The purpose of the DigiGraph is to permit the accurate tracing or sketching of pictures onto the BBC micro's screen. The type and size of the picture is limited only by the dimensional capabilities of the arm."

The pad is made of strong 1cm plywood covered in white melamine. The corners have been mitred to protect them from damage and the board has four non-slip rubber feet. The working area is effectively 32cms x 39cms, this being the area covered by a 1cm square graph etched in red.

This working area is altered, rather strangely

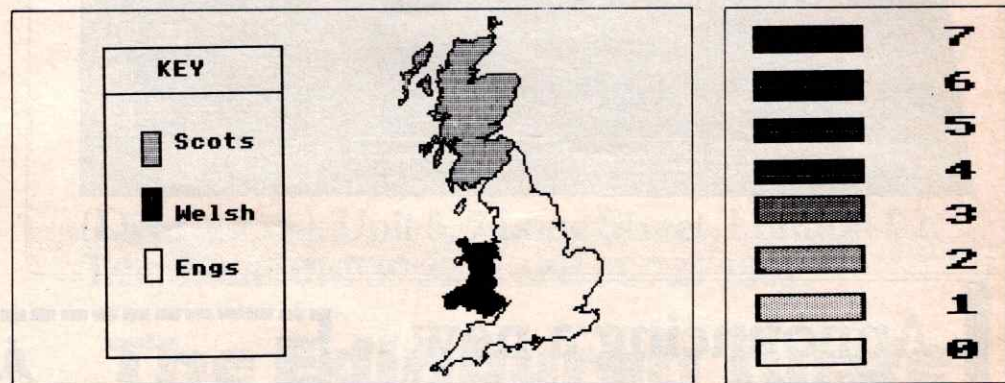
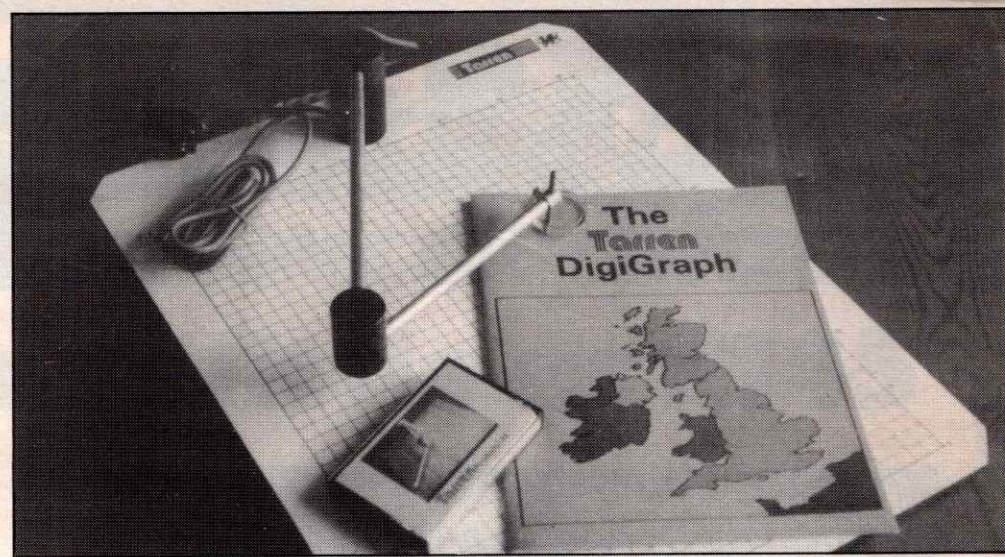
I thought, depending on the mode in which you are working. In MODE 1 for example, the working height is reduced to 27cms whilst the width extends off both sides of the board by nearly 5cms. This problem occurs in all modes.

The nib has obviously received a great deal of thought. It consists of a piece of perspex with a central dot encompassed by two concentric circles so that the business-end is always visible. The circular piece of perspex can be raised or lowered by a screw clamp, thus allowing anything from a single sheet to a 2cm thick book to be traced. This may not be large enough for some users, although an initial photocopy would alleviate this problem.

The arm itself appears to be well constructed, but I would be unhappy for the lower-fourth to get their hands on it. Indeed, we are warned on page two of the manual not to "physically stress the arm or permanent damage may result".

After a two-minute loading process of the software, the setting-up procedure is a little fraught. The nib must be placed on three different marked points on the board. Experience has shown that these points are not accurate, and trial and error has still not enabled me to replace them exactly as I feel they should be.

The main difficulty is that the keyboard buffer is not emptied, so that if you keep your finger on the space bar for more than a moment after placing the nib, POINTS 1, 2 and 3 occur on the same spot. This is a crash: the



Top — the package includes pad, arm and software: above — example output.

poor little cursor goes flying round and round the screen not knowing where it should be and the only solution is to BREAK and re-load! I found this tedious, especially when trying to redefine the set-up points. One of the few flaws I found in the software.

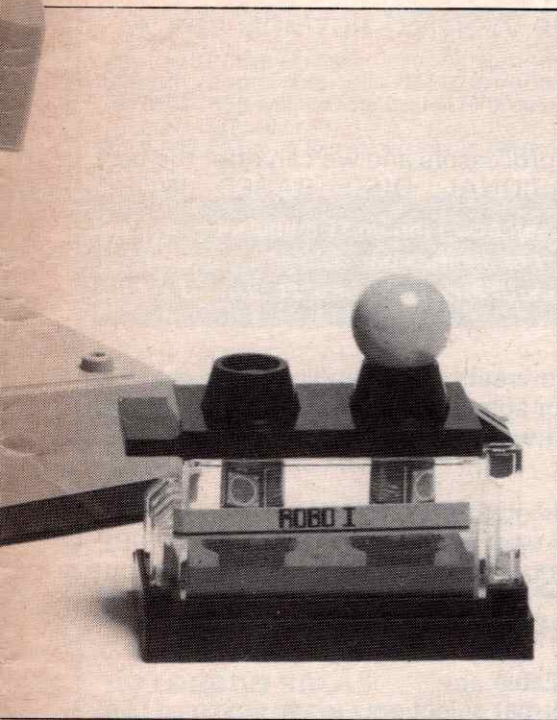
Page three of the manual gives general instructions on how to enter a command and page four gives the only example in the entire booklet. This really needs to be replaced with back-up examples if it is not to cause problems with less experienced users — for whom this type of equipment is designed.

The only unnecessary piece of jargon is MCP or Memorised Cursor Position. This means a

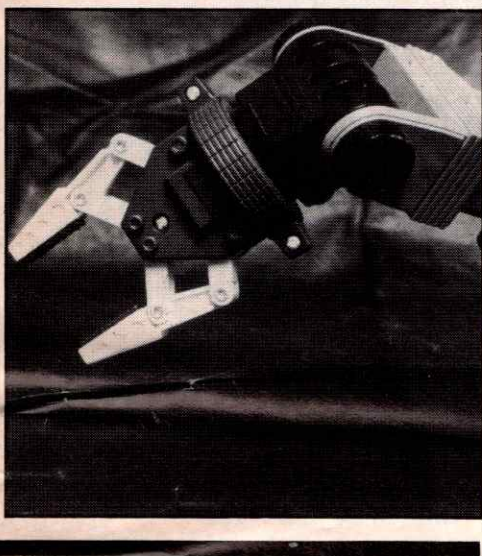
point on the pad (and associated point on the screen) which the user defines as their starting point of, say, a map. The word HOME would surely have sufficed.

After loading the software, the initial background colour is black (logical colour zero) and the foreground colour will be white (logical colour 1, 3 or 7 — depending on what graphics mode you are in). The type of plot is set to zero. The colour of each logical colour will be set to the values which would accompany them on changing mode. The SHIFT Q option (enabling keyboard characters to be plotted in the nearest character cells or exact positions) is set to one and the SHIFT K option defining the

MACHINE REVIEW



ing around: below left — the control levers are
claw measure 37cm: below right — the claw can pick



pad working area is reset to zero.

These six options are displayed continually at the bottom of the screen. The background's logical colour is the first number on this line which is not preceded by any characters.

Problems I encountered were few. There is no official way of removing erroneous lines though I did discover that by block copying a blank area, one could overlay the offending region and hence remove it. Why no UNDO facility?

Whilst MODE 0 is excellent on the screen, using the screen dump provided, the printout is squashed and distorted. This will presumably require only a simple addition to the dump routine. Indeed, instructions are given on how to use your own dump.

Care must be taken when filling areas with colour that the area is closed otherwise the colour leaks to the rest of your beautifully prepared drawing.

It appears impossible to change modes during use and thus, one is forced to reload the whole suite of programs again to continue on a new picture, or if a mistake is made when choosing the mode to be used. This will not cause any problems for disc users but it is a pain for cassette users.

As yet though, the software is not available on disc. The author however gives clear instructions on how to produce a disc copy. Other authors take note!

If you were to compare this package with others, you might complain that there is no revolving 3D capability, no mirror images, etc., and that no facility is provided for copying thick books. Also, the screen drawn horizontal and vertical lines do not follow the pad lines exactly. This appears to be a function of the set-up procedure, I mentioned earlier.

I would suggest that these are very small complaints considering that the Digigraph is about half the price of comparable equipment.

If you have use for this type of equipment, I can recommend this package as reasonably priced, well written and quite powerful.

Uses, as with all computer equipment, tend to follow after rather than before acquisition but the author, Rhys Davies, is currently producing additional software packages. One that should be available is a geography/ballard test. Here, the teacher draws and saves a picture and a program then dictates how to choose and assign names to up to 20 points. 30 pupils may then be tested whilst their names and scores are saved.

movement will be slow.

These two levers have the additional function of controlling the claw hand. The left lever controls the opening and closing of the claw. It is opened by turning the lever in a counter-clockwise direction and closed by turning the lever in a clockwise direction. This is done until it clicks, which ensures that it gets a good grip.

The right lever controls the revolving of the claw hand. To revolve clockwise, you turn the lever clockwise and to revolve it counter-clockwise, you turn the lever thus.

The control levers for Robo 1 are mounted on a console together with an on/off switch. The panel has clear diagrams indicating the movements possible from each of the levers. Those available for opening/closing and revolving the hand are less clearly marked, however.

With a device like this in a classroom, children quickly come to understand the essentials of robot movement under control in a practical way. Very quickly, they are able to use the robot arm for picking, moving and dropping objects at differing speed. Some children set themselves highly structured

tasks using the Robo 1.

These required considerable skill and coordination. The planning and recording of their tasks too was really useful for both the child and the teacher. It was pleasing that they often presented these in the form of simple flow charts.

The Robo 1 actually comes equipped with a series of canisters, globes and cones that can be used for moving around. These are ideal for the purpose and children very soon had the robot arm transferring cones and canisters to and from boxes. They even had the arm opening and moving lids.

We used the Robo 1 across the junior school age range and no trouble was experienced in the manipulation of the device. It also stood up to some pretty tough handling. The batteries gave a good life — you can rely on a couple of solid afternoons' use, at least. We then swapped for re-chargeables.

So, if you want a classroom device that will really give the beginnings of what automation and robot handling is all about, the Robo 1 represents the best buy from a market that schools rarely find the cash to enter.

But what of the future? The Robo 1's

durability is an encouraging sign. What is far more important, however, is the adaptation of this device so that it could function under microprocessor control. This is certainly feasible and I believe that for little more than the cost of the current machine, the engineers at Tomy could produce such a device especially with a Z80 chip. It would take very little in the way of imagination and in electronics to make the Robo programmable.

Already, Tomy has been approached by a number of educational authorities who are interested to link up the Robo 1 — which at the moment relies on electromechanical components — to make it work from a computer.

The Robo 1 is a sophisticated little robot. The control available from its levers, of its arm, wrist and claw grip, will certainly provide children in primary schools with the type of experiences that we should be introducing them to.

The price of the Robo 1 is really amazing. There is nothing else even remotely in its price range. At less than £30, it is so well constructed: it is certainly an attractive toy, but as an educational device, it has tremendous potential.

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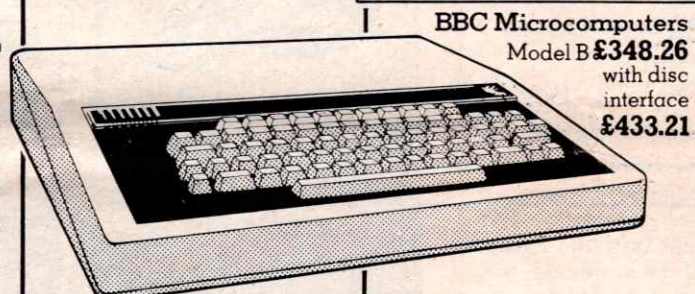
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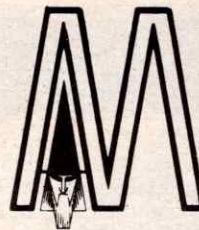
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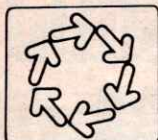
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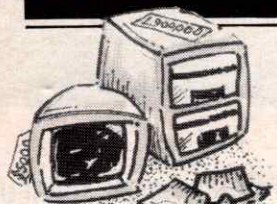


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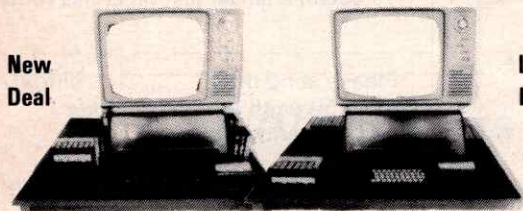
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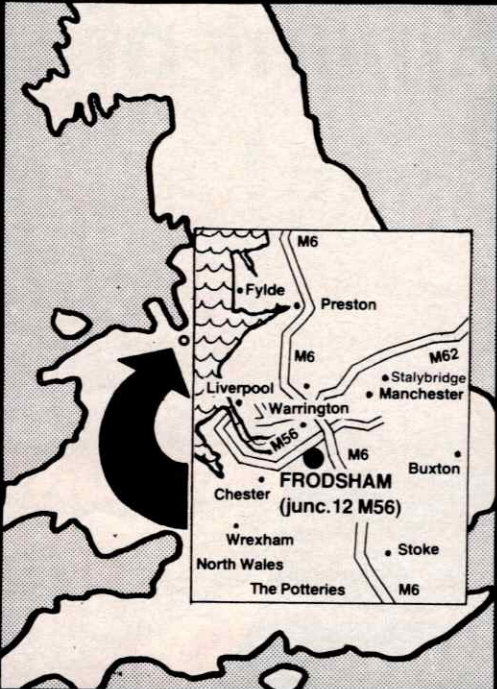
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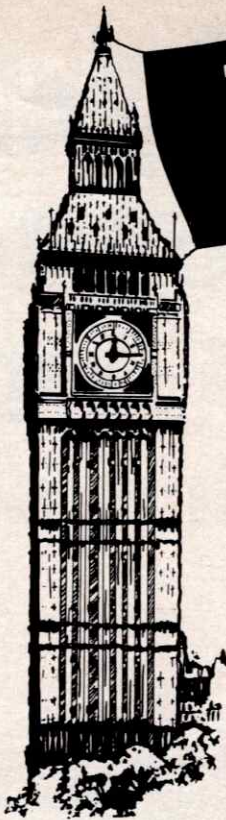
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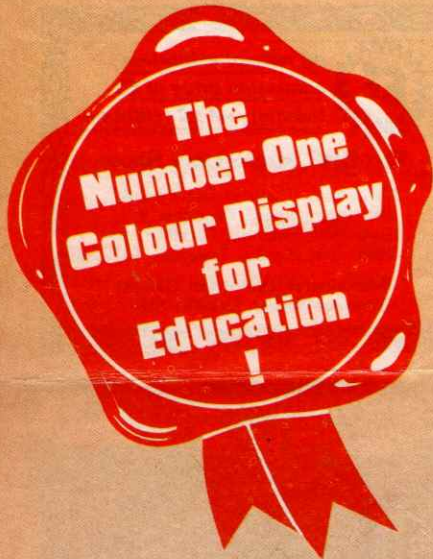
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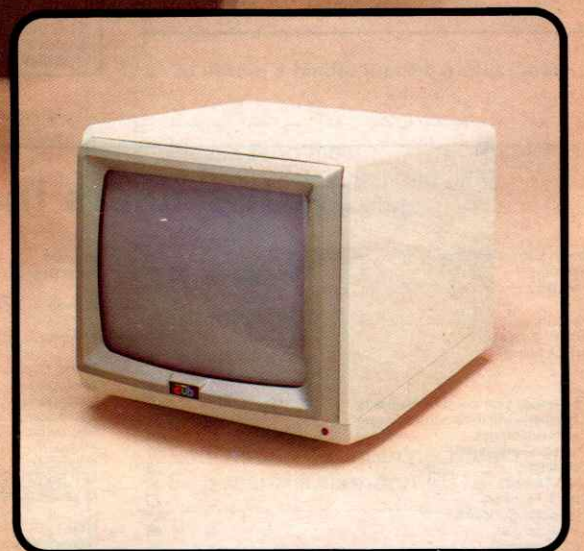
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