September 1982

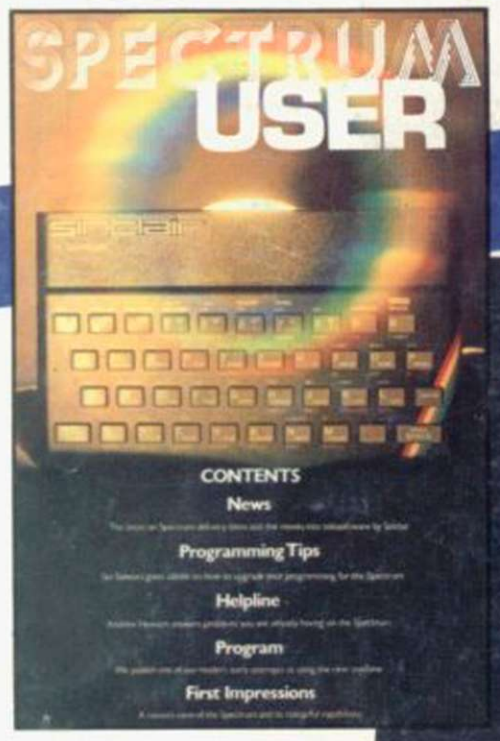
The independent magazine for the independent user

sinclair user

60p

Issue No 6

FREE INSIDE: SPECTRUM USER





Getting to grips with Spectrum programs

We profile Eric Deeson of EZUG

Prestel adaptor to be launched

Schools software reviewed

ZX-81 sails to the South Atlantic

Spectrum anger grows.

Plus: Eight pages of programs, your letters, helpline, mindgames

MICHAEL ORWIN'S ZX81 CASSETTES

THE BEST SOFTWARE (BY VARIOUS AUTHORS) AT LOW PRICES

QUOTES

"Michael Orwin's £5 Cassette Two is very good value. It contains 10 stolid well designed games which work, offer plenty of variety and choice, and are fun."

From the ZX Software review in
Your Computer, May '82 issue.

"I had your Invaders/React cassette . . . I was delighted with this first cassette."

P. Rubython, London NW10

"I have been intending to write to you for some days to say how much I enjoy the games on 'Cassette One' which you supplied me with earlier this month."

E.H., London SW4

". . . I previously bought your Cassette One and consider it to be good value for money!"

Richard Ross-Langley
Managing Director
Mine of Information Ltd.

CASSETTE 1
(eleven 1k programs)

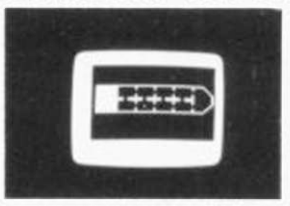
machine code:
React, Invaders, Phantom aliens, Maze of death, Planet lander, Bouncing letters, Bug splat.
Basic:
I Ching, Mastermind, Robots, Basic Hangman. PLUS Large screen versions of Invaders and Maze of Death, Ready for when you get 16k.
Cassette One costs £3.80

CASSETTE 2
Ten games in Basic for 16k ZX81

Cassette Two contains Reversi, Awari, Laser Bases, Word Mastermind, Rectangles, Crash, Roulette, Pontoon, Penny Shoot and Gun Command.
Cassette Two costs £5.

CASSETTE 3
8 programs for 16k ZX81

STARSHIP TROJAN

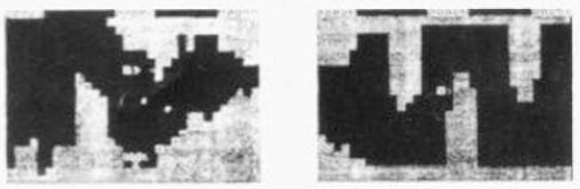


Repair your Starship before disaster strikes. Hazards include asphyxiation, radiation, escaped biological specimens and plunging into a Supernova.

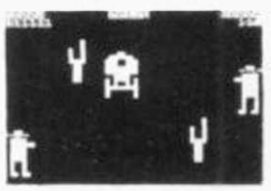
STARTREK This version of the well known space adventure game features variable Klingon mobillity, and graphic photon torpedo tracking.
PRINCESS OF KRAAL An adventure game.
BATTLE Strategy game for 1 to 4 players.
KALABRIASZ World's silliest card game, full of pointless complicated rules.
CUBE Rubik Cube simulator, with lots of functions including 'Backstep'.
SECRET MESSAGES This message coding program is very txlp qexi jf.
MARTIAN CRICKET A simple but addictive game (totally unlike Earth cricket) in machine code. The speed is variable, and its top speed is very fast.
Cassette 3 costs £5.

CASSETTE 4 **8 games for 16k ZX81**

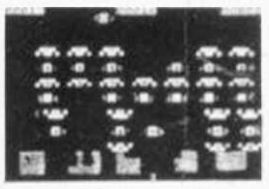
ZX-SCRAMBLE (machine code) with 3 stages.
Bomb and shoot your way through the fortified caves.

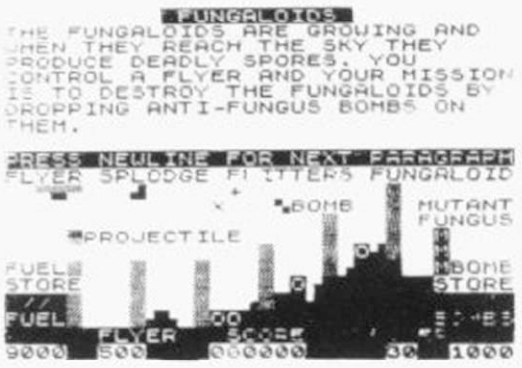


GUNFIGHT
(machine code)



INVADERS
(machine code)





GALAXY INVADERS (machine code)
Fleets of swooping and diving alien craft to fight off.
SNAKEBITE (machine code)
Eat the snake before it eats you. Variable speed. (very fast at top speed).
LIFE (machine code)
A ZX81 version of the well known game.
3D TIC-TAC-TOE (Basic)
Played on a $4 \times 4 \times 4$ board, this is a game for the brain. it is very hard to beat the computer at it.

7 of the 8 games are in machine code, because this is much faster than Basic. (Some of these games were previously available from J. Steadman). Cassette 4 costs £5.

Recorded on quality cassettes, sent by first class post, from:
Michael Orwin, 26 Brownlow Rd., Willesden, London NW10 9QL (mail order only please)

sinclair user



Editor
Nigel Clark

Consultant editor
Mike Johnston

Production editor
Harold Mayes MBE

Design
William Scolding

Editorial director
John Sterlicchi

Advertisement director
Simon Horgan

Advertisement manager
John Ross

Editorial/production assistant
Margaret Hawkins

Managing director
Terry Cartwright

Chairman
Richard Hease

Sinclair User is published monthly by ECC Publications Ltd. It is not in any way connected with Sinclair Research Ltd.

Telephone
All departments
01-359 7481

If you would like to contribute to Sinclair User, please send typed (or beautifully hand-written) articles or programs to:
Sinclair User
ECC Publications,
30-31 Islington Green,
London N1 8BJ

We will pay £10 for each program printed and £50 for each article, which should be approximately 1,000 words long.

©Copyright 1982
Sinclair User
ISSN No. 0262-5458
Origination by
Outline Graphics.
Printed by
Eden Fisher (Southend) Ltd

Distributed by
Spotlight Magazine Distribution Ltd,
1 Benwell Road,
Holloway,
London N7
01-607 6411



5 SINCLAIRVOYANCE Schools could soon be a thing of the past. We consider the dangers of this idea.

6 PROFILE We speak to Eric Deeson, who has firm views on the future of computers in education.

9 EDUCATION USES Keith Jammer looks at the advantages of the ZX-81 compared to other computers in education.

12 TEACHING HARDWARE A number of add-ons have been produced for the schools market. Tony Dutton investigates.

15 SCHOOLS SOFTWARE Dave Sayers reports on how commercial software is helping to teach traditional subjects.

19 NEWS Clive Sinclair runs in the Cambridge half-marathon; price cut for the ZX-81 and much more.

21 YOUR LETTERS You keep us in touch with your thoughts on the world of Sinclair.

23 STARTING FROM SCRATCH Our guide on how to learn to use your ZX-81.

27 PROGRAM PRINTOUT Eight more pages of our popular programs.

37 HARDWARE WORLD Our reviewers look at what is new in add-ons.

41 HELPLINE Andrew Hewson looks at a variety of problems facing readers.

45 SOFTWARE SCENE Pac-man games have been produced for the ZX-81 in large numbers. We assess some of the earliest attempts.

47 SINCLAIR USER CLUB More news from our rapidly-expanding club and a new offer to members.

51 COMPETITION Another of our great competitions in which we offer a ZX-99.

53 MIND GAMES Anagrams and crosswords are considered by Philip Joy.

56 SPECIAL OFFER We repeat our amazing offer of £20 off the cost of the kit for the ZX-81.

FREE INSIDE — the first edition of our new *Spectrum User* section, devoted to news about the Spectrum, its uses and problems.

NEXT MONTH

- **We look into the future and how microcomputers are likely to play a big part in our lives.**

MELBOURNE HOUSE • ZX81 • SPECTRUM

Why is this man smiling?

You'd be smiling too if you were Dr. Ian Logan.

Dr. Logan is shown receiving the Rosetta Stone Award for his perceptive insights into the way the ZX81 ROM operates. Melbourne House are proud to be the publishers of Dr. Logan's books.

Melbourne House are Sinclair specialists, publishing books that are winners in every category. Whether you are a beginner or an experienced programmer, you'll need Melbourne House books.

If you've got a Spectrum on order (or better yet, if you've already got your Spectrum), then you'll be glad to know that Dr. Logan is working on **Understanding Your Spectrum**, sure to become the definitive book on the Spectrum.

So if you want to smile like Dr. Logan, you can do one of two things: Order one of our books from your bookseller or fill in the coupon and really understand your Sinclair, or you can write a great book or program and send it to us. Who knows? Your smile may be in this ad. next year!



- o **Machine Language Made Simple For Your Sinclair**, £8.95
- o **Understanding Your ZX81 ROM**, by Dr. Ian Logan, £8.95
- o **ZX81 ROM Disassembly Part A**, by Dr. Ian Logan, £7.00
- o **ZX81 ROM Disassembly Part B**, by Dr. Ian Logan and Dr. Frank O'Hara, £8.00
- o **Not only 30 Programs for the ZX81: 1K,** £6.95
- o **The Complete Sinclair ZX81 Basic Course,** £17.50

Orders to
Melbourne House Publishers,
131 Trafalgar Road,
Greenwich
London SE10

Correspondence to Glebe Cottage,
Station Road, Cheddington,
Leighton Buzzard,
BEDS LU7 7NA

☐ Please rush me your new Spectrum/ZX81 catalogue. (Please specify.)
☐ Please send me books as marked above. Note: Please add 80p for post, pack & VAT.

Name .....

Address ..... Postcode .....

MELBOURNE HOUSE • ZX81 • SPECTRUM



Home schooling is a dangerous dream

IN A RECENT interview Clive Sinclair said that the day would come when the computer replaced the school. He did not elaborate but said that computers would eventually become better teachers than human beings.

That conjures images of a special room in the home with a system permanently set up with a set of cassettes which have to be worked through. There would be examination cassettes which have to be completed in a set time for a qualification to be obtained.

With even Sinclair having sold into only two percent of the homes in Britain, it will be a long time before computerised home education is the most usual system throughout the country. It is, however, something which can be introduced gradually, with parents being offered the option of choosing traditional schooling or learning at home.

In the initial stages that could be expensive, as Government help to buy the necessary hardware would be needed, together with an investment in the cassettes. The cost would be on top of normal educational costs.

Once the home schooling idea was accepted, however, the costs of providing education would fall dramatically. Almost the whole of the present system would no longer be needed, with consequent savings in wages and building and maintenance costs. Teachers would be replaced by a handful of people responsible for setting and updating the cassettes and marking the examination cassettes. None of the thousands of anciliary staff — caretakers, cleaners and cooks — would be needed. School transport would become a thing of the past and crossing patrols would no longer halt traffic at the busy times of the day. Additionally, vast areas of land would become available for development.

Clive presumably visualises Sinclair Research playing a leading role in those developments. The ZX-81 has long been a favourite machine for introducing children to computers and their educational possibilities. The Spectrum has now received Government blessing by being placed on the Department of Industry Micros in Schools Scheme for primary schools.

Sinclair already provides a package of educational software and the moves into telesoftware will make the transmission of courses much easier. In addition, Sinclair has long had the declared intention of developing the educational side of its business.

With the first clues to the ZX-83 being that it will take Sinclair further up-market, that could be the one which will begin the move to home schooling. The only hints available so far are that it will have its own screen, using the flat screen developed for



the television set, use two of the forthcoming Microdrives, and be easily portable.

With the cost of hardware falling steadily, it would allow everyone at last to enjoy cheap, high-quality education in a form which is already achieving good results.

It all sounds too good to be true. It is.

Schools are much more than places for learning the subjects which appear in the curriculum. They are a major stage in learning social skills. All children make friends in their neighbourhood but most friends are made at school. They also gain by having contact with others from different backgrounds. There are sufficient problems in the world caused by a lack of understanding between groups of people without increasing the divisions by removing an effective way of bringing people together.

Human beings have achieved their development through being able to co-operate with each other, to do things which would have been impossible individually. Anything which reduces the ability to work together will work against that continued development.

With the swift advances which have already been made in computer-aided education, it is unlikely that the development will not continue. At the moment, however, the problems of transferring learning to the home seem too great to be surmounted.



In a rare spare moment, Eric Deeson speaks to Claudia Cooke.

The best man for the jobs

ERIC DEESON fixes you with a convincingly authoritative glare and announces: "In 10 years everyone will have a £10 computer and in 50 years there will be no need for schools". Such, he believes, will be the impact of computers on our lives and he finds the whole prospect exciting.

The 40-year-old science teacher, who happens to have written some 30 books and to be studying for his PhD, is forceful in his views — so forceful that my initial reaction was to wonder whether he might be an egomaniac.

He lives and breathes work and lets you know that he has a finger in almost every pie — because his fingers are the best for the job. The trouble was that after 90 minutes I believed him. I, too, was convinced there was no better person to fill the role of head of science and computing at Highgate School, Birmingham.

No better person to hold the five-year honorary post of editor of *Physics Education;* mind you, even Deeson admits that is "the biggest honour I have had in my life".

No better person to head the Educational ZX Users' Group, with its 1,500 members world-wide and its boast of having the largest Sinclair software library in the world.

No better person to act as consultant to so many people in the field of computing, or to lecture at their conferences, or to squeeze time for his own PhD on the side.

Certainly he is justified in having six computers in his home, although his three school-age children can be a problem when they are programming with a vengeance when he needs to use the machines.

Deeson is puzzled by the concept of holidays, free evenings and spare time; it is one of the few things he admits is not his forte.

"I don't think I'm in danger of having a nervous breakdown or anything; I have the right personality to cope with all that I do; but I admit that my family suffers; I don't give them enough time.

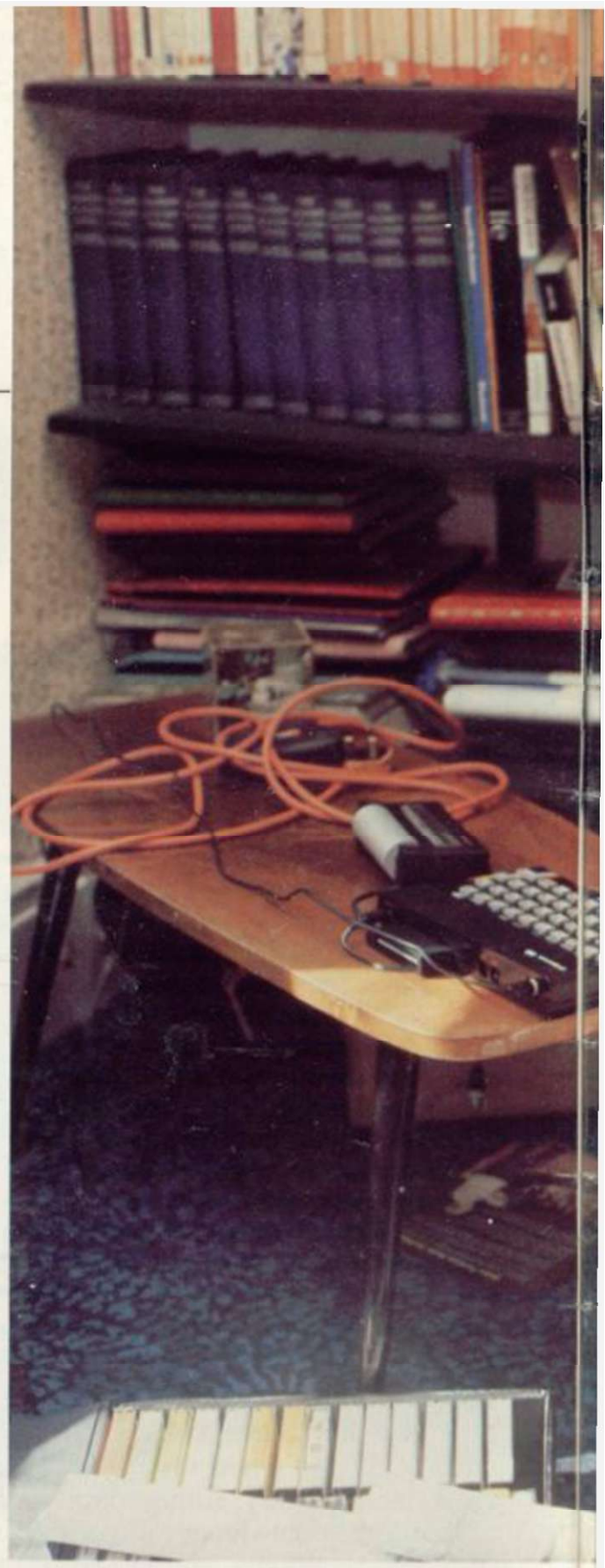
"Yet we have a really big, super-expensive family holiday about once every 18 months. Last time we went to the States and I thought I would hate it, taking no work with me, but I found I could still switch-off and I wasn't bored at all. I loved it.

"I never take a day off, even at weekends; there is just so much to do. I read computing books instead of novels and I rarely watch television — perhaps occasionally the news".

Deeson lives with his wife, a maths teacher, their children and a dog and a cat in a large, comfortable house in a leafy suburb of Birmingham. We know now about many of the things he does, but why does he do them all?

It all began in 1968. Deeson a graduate of Keele University in physics and economics, had trained as a teacher and was by then working as a teacher-trainer, a job to which he hopes to return one day.

"People did not see the applications for computers in education at that time but I could see they were beginning to influence



our lives", he says. It was computer awareness which he found important, far more so than a grasp of the technical side.

By the late '60s, terminals were entering some schools and in 1969 Deeson wrote an article on the impact of computers in the next decade. He describes it as more of a sci-fi piece than anything else and even he could not have foreseen the microchip; but the potential even then was exciting, and it is the potential which still intrigues him.

"I much prefer teaching computer awareness courses. The examinations try to include technical facts as well as concepts but it becomes very difficult, because those facts are changing all the time.



"When the Sinclair ZX-80 emerged it was very exciting because at last schools could have computers in sufficient quantity for them to explore. It was a very crude computer but it had advantages over the ZX-81 and the Spectrum because of its very simple range of facilities.

"The other two are very sophisticated but, particularly in junior schools, the keyboard is a problem. I believe Sinclair greatness lies in the fact that one key has so many functions".

Deeson owns all three Sinclair models, as well as a BBC home education machine and an Acorn Atom. They are indispensible to him for his work, enabling him to develop programs, write reviews and produce books. "It is really encouraging to find that my children and all their friends love playing with the computers. When the Spectrum arrived, I could not get my hands on it for two days.

"I find in school that most of the children are interested in the concept of computers, if not the technical side. It is the girls as well as the boys, although it is important to make sure the girls do not feel shy at the beginning because they feel the boys will know automatically what to do with a computer".

For three years, from 1975 to 1978, Deeson took his family when he went to Nigeria as principal of a teacher training college. There was no electricity, hence no computers, but surprisingly he loved every minute of it.

"I enjoy responsibility and I like administration, too. I was in charge of hiring and firing, selecting pupils, arranging accommodation and all kinds of tasks. The beauty of it was that my bosses were thousands of miles away".

He enjoys the challenge of the classroom, too, and feels he has sufficient experience to be in control of almost any situation which might arise but he also knows that the traditional classroom scene may not be with us much longer.

"I am sure that within the next 50 years, perhaps less, schools will no longer be required. We will get away from the classroom with its one teacher and 30 children and find real freedom. I call it computer-assisted freedom".

"Obviously I do not want to see a police state but I think with computers that all the problems of discipline will disappear. I want the children to wander round the room, playing and talking to each other and enjoying their discoveries. It is all part of the learning experience".

Deeson is touching on the future of our educational system in his PhD but he is aware that, for the majority of teachers, projections even a decade ahead can seem little more than suspect and disruptive.

"The majority of teachers, like the majority of people, still have no contact with computers. They do not think about the long-term implications; I do not think they want to but I don't think computers will go away".

Deeson, who is chairman of the West Midlands committee of the Association for Science in Education, has so much work outside his school job that it would be fair to assume he was p. .nning to cease being a teacher soon. That is not so.

"Apart from the fact that I love teaching, there are all these changes on the horizon which will affect schools as much as anything else. The best part of it all is that I shall still be around to see them".

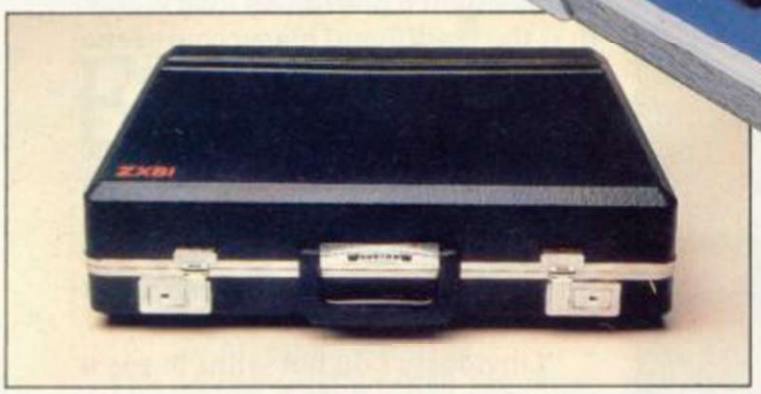
Use your computer in the case...
Foam rubber gives complete protection...
Purpose-built for the ZX system...

ZX81 & Spectrum Custom Cases.

Just £34·95 (+ P&P) each.







Turn your ZX system into a portable computing centre!

Your ZX hardware – ZX81 or Spectrum – is designed to work together as a system.

And now there's a simple way to make the most of the fact.

The portable computing centre in a briefcase.

A ZX Custom Case holds all your hardware in the most ergonomically sensible positions for easy operation. Each piece of equipment is gripped securely by shock-absorbing foam. Each connecting lead fits under the foam, so there's no chance of tangles. And as each piece is held firmly, connections are excellent.

You can forget wasted time setting up or unhooking the system, too. When you've finished, simply tuck in the mains and TV leads and replace the hinged, lift-off lid. And of course, if you're taking your ZX system to college or the office, ZX Custom Cases are a lot less cumbersome than a bag or rucksack. And a lot more protective and professional.

Designed by ZX enthusiasts – for ZX enthusiasts.

Both the ZX81 and Spectrum Custom Cases were designed by a group of ZX system users and manufactured by Britain's leading case makers. Made from impact-resistant ABS, each case holds every piece of Sinclair hardware available for the respective computers – plus Learning Lab, manual, software cassettes and any cassette player up to 10½" x 5½". If you haven't all the hardware, simply leave the pre-cut foam in position, then remove it as you get extra pieces of equipment.

And when brand new hardware is introduced, or you upgrade from ZX81 to Spectrum, simply contact us for a replacement foam insert for just £4.95 (+p&p).

ZX Spectrum Custom Case now available!



Send for your ZX Custom Case – now!

ZX81 and Spectrum Custom Cases are guaranteed for two years, and cost just £34.95 (+p&p) each. Remember you could pay more for an ordinary briefcase.

To order, simply use the FREEPOST coupon. Or if you have a credit card, telephone 0276 62155, Mon-Fri, 9.30-5.30.

COMPUTEX CASES

Computex Cases (JBS), Stanhope Road, Camberley, Surrey, GU15 3PS.

Please allow 28 days for delivery. 14-day money-back undertaking.

To: Computex Cases (JBS), FREEPOST, Camberley, Surrey, GU15 3BR.

Please send me _____ (qty) ZX81 Custom Case(s) at £36.95 (inc. £2.00 post, packing, insurance) each. **01.**

Please send me _____ (qty) Spectrum Custom Case(s) at £36.95 (inc. £2.00 post, packing, insurance) each. **02.**

*I enclose a cheque/P.O. for £ _____ made payable to Computex Cases.

Please debit my Access/Visa* account no. _____

*Please delete as appropriate. PLEASE PRINT.

Signature _____

Name: Mr/Mrs/Miss _____

Address _____

_____

_____

Reg. in England no: 991288. SUS 208



Although omitted from the Government support scheme, Sinclair is making an impact in schools. Keith Jammer investigates.

Cost boosts the use of ZX-81 in education



REPORTS are appearing that Sinclair Research has succeeded in its campaign for inclusion in the Micros in Schools Scheme.

The MIS scheme has always had its critics, among whom are, of course, Sinclair users. It has been claimed frequently by teachers that, despite the exclusion of Sinclair from the original scheme, there are more ZX-81s in use in schools than all other micros combined.

Cost is the reason as much as anything else; one can buy six ZXs for the price of the cheapest version of the machines in the scheme.

The inclusion of the Spectrum in the Government list of machines approved for support in primary schools is, of course, a victory for Sinclair and a recognition of commonsense arguments. Does it imply that Sinclair micros are not suited to work at secondary level and above?

I would like to reject that implication by looking at the educational uses of micros at all levels. The question to air must simply be whether the ZX range can cope with educational needs. If the machines can, their remarkable cheapness is an added bonus, in that several can be used instead of one larger machine.

Educational uses can be broken.-down into a number of categories:

- **Computer awareness** — the aim being to maximise familiarity with computers, their use, their uses and their abuses. Many schools include at least a few hours of such work in general courses followed by all pupils.
- **Computer studies** — the use of computer hardware as the apparatus of the formal examination-orientated computer science teaching.
- **Computer-assisted learning** — in which computer power is one of the many resources available for maximally-effective teaching in most subjects.
- **Administration** — with the computer aiding the general running of a school, as in the case of any other business.
- **Data capture and process control** — again helping, as in any other relevant business, with equipment interfacing.

Computer awareness concerns the provision of courses and experience designed to make all future citizens familiar with computers and their strengths and weaknesses. It is surely potentially the most important aspect of work in primary schools as well as at secondary level; all other applications affect only the minority of pupils but this is essential for every one.

It is also important in the sense that it can, and must, involve a large proportion of the staff of a school; at the moment there are surprisingly few teachers who know much about computers.

Computer awareness almost explicitly excludes hands-on experience and programming skills. Many schools with no computer power available have developed successful schemes of this nature in the last few years. It is a pity that happens and now there is no need to teach about computers without showing one in use.

continued on page 10



continued from page 9

Which one to show in use? The 1K ZX-81 may be programmed to emulate every aspect of computing one may wish to discuss in awareness classes. The 16K ZX-81 or Spectrum, with printer, can do so even better and at more depth but the programs need more effort to write.

Courses of that level need to deal with such things as the principles of data processing, the databank, number-crunching, interfacing. Computing in situations such as hotel booking, banking, office work and the laboratory can all be modelled adequately and cheaply by the ZX micros.

Some computer awareness courses introduce programming, both as a logical concept and to provide the basis for voluntary computer club activities. The Sinclairs are peculiarly suitable for such work, being surely by far the best beginners' machines available. I am not certain if that applies to the Spectrum; the exceptional features of single key-word entry and syntax-checking mean that even seven-year-olds can quickly produce pleasing routines.

I still bemoan the demise of the ZX-80, in fact; it was remarkably effective even for advanced work and, of course, involved a less daunting task of keyboard familiarisation.

Having introduced the subject of computer club work, i.e., the unstructured playing with micros, I can note yet another area in which Sinclairs deservedly reign supreme. There is the added advantage that probably all schools have at least a few pupils by now with Sinclairs at home. The resulting facility of enabling school ideas to be developed at home is of great value. So too, conversely, is the possibility of upgrading school facilities with privately-owned equipment on loan.

Perhaps the best way of consolidating computer awareness is for the majority of teachers to use computers as a resource in their teaching.

That takes us to the broad important area of computer-assisted learning. The success and significance of Sinclair micros may be gauged from the facts:

- There are about 25 software houses specialising in ZX learning products; two of them, AVC Software and Rose Cassettes, are well-established and successful.
- The educational MUSE software Library — administered by EZUG — contains some 50 ZX cassettes, after only six months more than are available for any other micro.
- The first software and the first publication in the Spectrum market were both for education, both from AVC Software.

The majority of all those products can be classified as computer-aided learning material; between them they offer assistance in 12 school subjects. Eric Deeson of EZUG has estimated that a complete library of CAL programs covering the needs of children aged from five to 16 would need to contain upwards of 5,000 titles.

Any assessment of the validity of a given micro for education must rest in particular on its ability to cope with the formal needs of formal computing courses at CSE level and above.

Those needs are two-fold. First, the students have to undertake a fairly lengthy programming project, assessed as up to one-quarter of the marks for the examination. Second, they must have equipment available with which they can practise and explore the various concepts studied.

There is little difficulty with the project; the student must demonstrate his programming ability and that will be restricted to some extent, whatever machine he uses. This year, for the first time, ZX-81s have been used for computing projects even at advanced level.

> 'It has been claimed by teachers that there are more ZX-81s in use in schools than all other micros combined.'



By kind permission of Griffin and George

The equipment involved needs to be easy to use and readily available and must include a printer. The ZX is by far the best in that context as it meets the requirements so cheaply that schools can readily have a fair number of keyboards available. The aim must be at least one between each two students.

If one spends money on ZXs for formal school projects, one must be sure that they also meet the needs of the theoretical components of the course.

The ZX-81 is only just about suitable there. Its major lack is the ability to handle files meaningfully but its omission of direct READ . . . DATA, arguably unnecessary in real life but part of school syllabuses, and easy entry at machine-code level have also been quoted as precluding its effective use.

I would not go so far; with the ZX-81 one can emulate those facilities adequately enough to allow the necessary demonstration and exploration. Certainly many schools had no choice but to use this micro as the basis of much, if not all, of their practical work.

Still, we now have the Spectrum, easier to use and more versatile and reliable — and not much more costly. That is indubitably able to meet all formal school needs to advanced level and, once the Microdrive and network interfaces are available, is almost certain to become the main micro for everyday use in British schools.

dk'tronics ZX 80/81 SPECTRUM Hardware Software

KEYBOARD



Fully cased with numeric pad £45
Uncased with numeric pad £30
Case £15

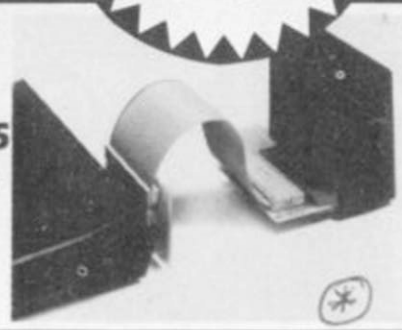
SPECTRUM MEMORY UPGRADE TO 48K **£39.95**

NEW FROM dk TRONICS

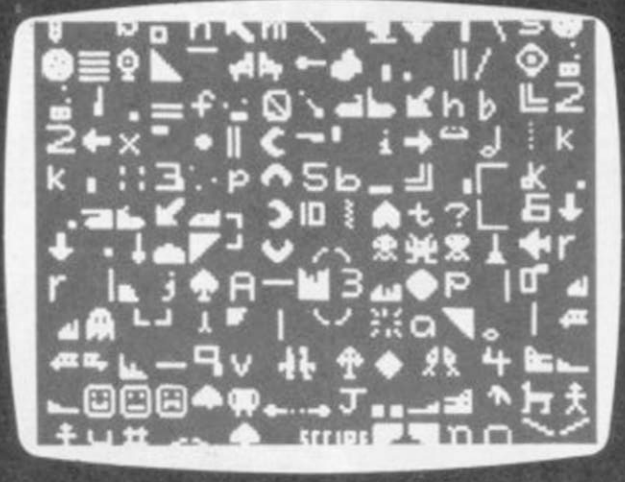
(A) 16K RAM MASSIVE ADD ON MEMORY
FULLY ASSEMBLED AND TESTED **£19.95**
64 K MEMORY EXPANSION £49-95

(B) 4K TOOL KIT FULL OF UTILITIES TO AID THE PROGRAMMER IN CONSTRUCTING AND DE-BUGGING E. PROM VERSION FOR USE WITH GRAPHICS ROM **£9.96**
CASSETTE VERSION **£6.95**

(C) FLEXIBLE RIBBON CONNECTOR (AS ILLUSTRATED) **£10**



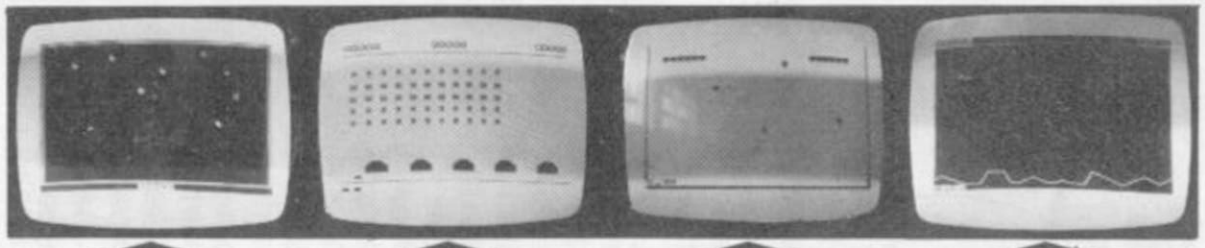
4K Graphics rom



SOME OF THE GRAPHICS NOW POSSIBLE ON THE ZX81

The DK Graphic module is our latest ZX81 accessory. This module, unlike most other accessories fits neatly inside your computer under the keyboard. The module comes ready built, fully tested and complete with a 4K graphic ROM. This will give you an unbelievable 448 extra pre-programmed graphics, your normal graphic set contains only 64. This means that you now have 512 graphics and with their inverse 1024. This now turns the 81 into a very powerful computer, with a graphic set rarely found on larger more expensive machines. In the ROM are lower case letters, bombs, bullets, rockets, tanks, a complete set of invaders graphics and that only accounts for about 50 of them, there are still about 400 left (that may give you an idea as to the scope of the new ROM). However, the module does not finish there; it also has a spare holder on the board which will accept a further 4K of ROM/RAM. This holder can be fitted with a 1K/2K/RAM and can be used for user definable graphics so you can create your own custom character sets.

£29.95



★ASTEROIDS ★SPACE INVADERS ★CENTIPEDE ★DEFENDER

16K GRAPHICS ROM SOFTWARE

dk'tronics

23 Sussex Road,
Gorleston,
GREAT YARMOUTH,
Norfolk.
Tel: 0493 602453

Send off the coupon today or telephone Gt. Yarmouth for our answering service (available 24 hrs. a day, 7 days a week) quoting Barclaycard or Access number.
(Please add on £1 for P/P).

Access BARCLAYCARD VISA

...ternal connections, output, are via 2mm.

...n the range is an ...ck. Again it plugs ...e rear of the RAM-I/O ...it will convert an ...

teaching hardware





continued from page 9

Which one to show i
ZX-81 may be pro
emulate every aspect
one may wish to
awareness classes. T
or Spectrum, with pri
even better and at m
the ease of use and

Tony Dutton looks at the expanding market for hardware add-ons available for primary and secondary schools.

Peripherals can boost uses in education

EASE OF USE and economic prices have put the ZX-81 at the top of the class, according to informed sources in the field of education. Reasonably-priced hardware must be the criterion when an education authority or buyer in the profession is buying a system. It must also be versatile and easy enough, too, for primary school and senior school use.

That permits more children to benefit from a number of economically-priced machines than only one more expensive type serving fewer students. Also the lower-priced systems release more money for peripherals, such as VDUs and printers. From the summer of 1981, just a few months after the introduction of the ZX-81, Sinclair had already planned to chalk-up the education market on its blackboard of success. Following that line of thought, it mounted a highly-successful subsidised computer purchase scheme for U.K. secondary schools. The result was that more than 2,300 schools took advantage of the offer to buy one ZX-81 and 16K RAM pack, each at half-price.

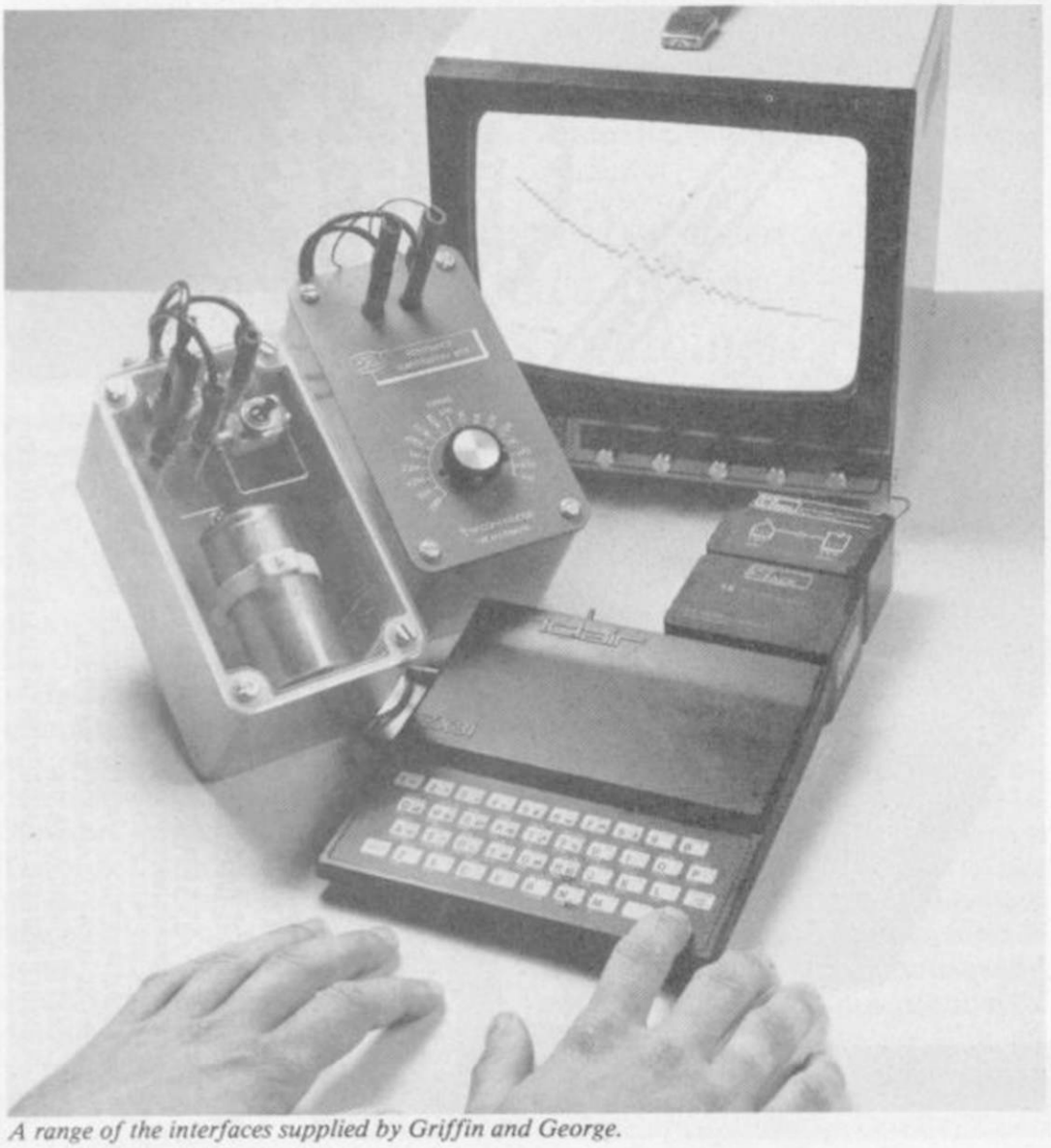
"In all, approaching 20,000 ZX-81s have been sold to schools, at normal and subsidised prices, making it the most widely-used computer in U.K. education. The company developed its commitment to the schools sector in November by sponsoring a special award scheme for ZX educational software," Sinclair said.

The company has also not been slow in developing, of all places, the Japanese educational computer hardware market. The ZX-81 is selling by mail order from Mitsui and through selected dealers to the key student market. The company projects sales of 20,000 units in the first full year and 50,000 in the second.

Peripherals for the ZX-81 for the educational market are limited and few, with the majority of the few being adequate for tutorial purposes. That is with the exception of the ZX printer offering full alpha-numerics across 32 columns and sophisticated graphics, if used by commerce students for operations such as printing ready-gummed labels.

The fault lies with the special aluminium-coated paper supplied with the unit. This situation, however, can easily be overcome by attaching a printer interface, allowing the system to operate a conventional printer. Nevertheless, that limitation does not outweigh a reasonable price of £59.95 inc VAT.

A very useful feature is the 8K basic ROM allowing flicker-free graphics. Although it is generally accepted that graphics play a small



A range of the interfaces supplied by Griffin and George.



part, if any, in school computer use, it is worthwhile to have available. Also for any ZX-80 systems in the classroom it is equally expedient, as a drop-in replacement chip. It is supplied with new keyboard template and operating manual. At £19.95 the chip provides all the features of the ZX-81 except graphics. If, however, a graphics facility is required on the ZX-81, the graphics mode function on the 40-key keyboard allows 20 graphical and 54 inverse video characters to be entered directly.

Recently Griffin & George introduced two new interfaces for the ZX-81. They interface the computer to external peripherals so that the system can talk to the outside world. Simple programs permit control of equipment, such as motors, lights and buzzers. Even conventional laboratory experiments can be monitored, data collected and manipulated by the ZX-81. Results can then be displayed in graphic or numeric form on the TV screen or printed-out permanently using the ZX printer.

Three interfaces are available. The first, the RAM-I/O Pack, plugs straight into the expansion port on the back of the ZX-81. It contains 4KB, so reasonably complex programs can be written without running out of memory space. In addition to that memory, the unit has a separate 8-bit input and 8-bit output port.

That port can be accessed directly from the ZX-81 Basic without the need to use the machine code routines to input and output information. The eight input and output lines, along with a + 5V and ground line, are taken to two independent 10-pin connectors on the rear of the module.

The output lines are capable of driving LEDs directly, so using the RAM-I/O enables traffic-light sequences to be produced with LED switches to be monitored and other electrical items to be controlled. The opportunity for experiments is enormous.

A second unit, called the Control Pack, contains eight relays each capable of switching 1A at up to 30V. The Control Pack uses mechanical relays, so the external circuitry is isolated from the ZX-81, with a high degree of protection provided for the computer. The unit plugs directly into the rear of the RAM-I/O Pack, from which it draws its power supply. All external connections, both input and output, are via 2mm. sockets.

The third in the range is an Analogue Pack. Again it plugs directly into the rear of the RAM-I/O Pack. The unit will convert an analogue input voltage in the range 0 to 2.55V to a digital signal to feed to the computer.

When outputting from the computer, it will convert a digital value from 0 to 255 to an analgue output in the range 0 to 2.55V. External connections to the Analogue Pack are via 2mm. sockets.

All three packs are housed in a robust plastic case. The Control Pack and Analogue Pack are used in conjunction with the RAM-I/O Pack and not on their own. Full operating instructions are supplied with each pack. Prices are CRA-720-H ZX-81 RAM-I/O Pack, £35-54; CRA-724-520D Analogue Pack, £18.69; CRA-724-54OU Control Pack, £28.05.

To keep together all ZX equipment in a neat working package, a desk console is supplied by G&G. It provides security, as all the pieces are stuck on the console, so that they



Desk console.

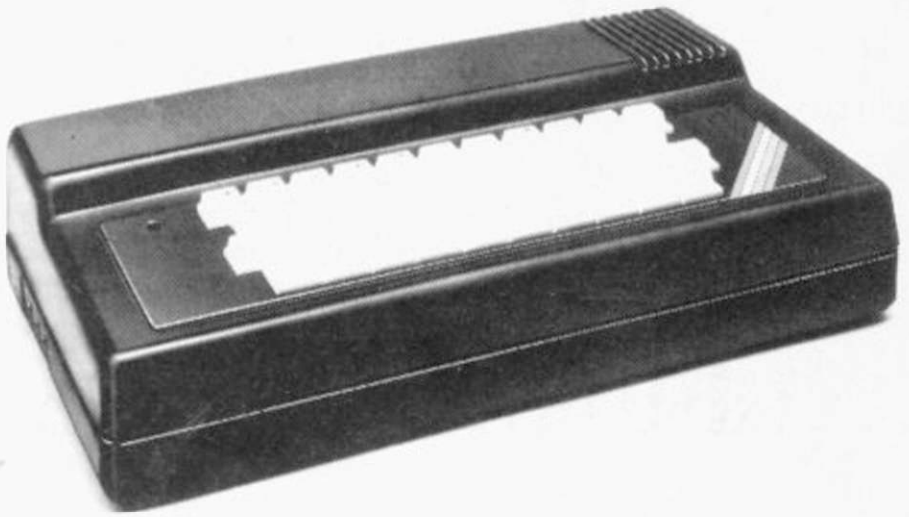
are difficult to remove, and it can be seen at a glance that all equipment is present.

All pieces are stuck with double-sided tape, which prevents bad connections and prevents the equipment moving. The unit can also be transported easily between classrooms. The console accommodates a ZX-81 computer, 16K memory expansion unit, ZX printer, power supply, cassette recorder, cassettes, and pens and pencils. Electrical connections are made through the console via 3.5mm. jacks.

New From Fuller

FD System for the

ZX SPECTRUM



£39.95

+ £2.50 p & p.

Professional Keyboard & Case —

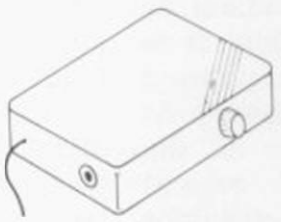
This unit has the same high standard as our ZX81 unit.
Tough A.B.S. Plastic case encloses our Keyboard, the Spectrum Printed Circuit Board and the Power Supply.
Our own Power supply is available:- 9 volts DC at 2 amps.
Mains either 110v or 240v AC at £5.95 + 80p. p & p.

The Keyboard has 42 keys with all the spectrum functions printed onto them, the full travel key switches have gold plated contacts and a guaranteed life of 10^6 operations.
INSTALLATION - Simply unscrew the ZX printed circuit board from its case and screw it into the FD case, plug in the keyboard and that's it. No technical know how or soldering required, the built unit is tested and comes with a money back guarantee.
Spectrum Keyboard and Case Kit £33.95

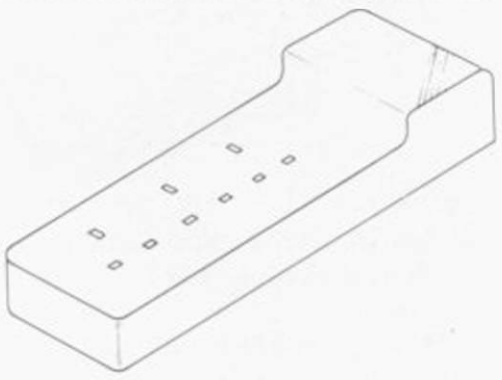
Our Mother Board for the spectrum has 2 slots at £15.95 or 3 slots at £19.95, this unit also fixes inside the case. p & p 80p.

SPECTRUM SOUND AMPLIFIER £5.95 + 80p p & p.

Complete with leads, volume control and loud speaker in tough ABS Plastic case measuring 5" x 3" x 1" just plugs into your spectrum MIC input.



SPECTRUM PLUG PLANNER — £18.95 + £1.00 p & p



Complete with 3 metres of cable, three 13 amp sockets for TV, Tape etc AND 9 volt at 2 amp power supply with power jack to fit Spectrum or ZX81

The ever popular FD42 Keyboard and case for ZX81 **£39.93** including VAT & Post
FD42 as a kit **£33.95** including VAT & Post
FD42 Built only **£24.95** including VAT & Post
FD42 Keyboard Kit **£18.95** including VAT & Post

GUARANTEED 14 DAYS DELIVERY FROM RECEIPT OF ORDER, OR CALL TO THE ZX CENTRE.

Mail to **FULLER MICRO SYSTEMS,**
The ZX Centre, Sweeting Street, Liverpool 2. England, U.K.

AD Code	

Please Supply:-

Name .....

Address .....

SAE for more details — Enquiries: Tel. 051-236 6109

FULLER FD SYSTEM



As the ZX-81 becomes more popular in education, more software is being written. Dave Sayers tests a sample.

Programs can help to brighten school-days



THE NUMBER of micro-computers in schools is growing rapidly in both the secondary and primary sectors. The increase in the use of micros in education has been stimulated by two things — the part funding of the purchase of computers by the Department of Education and Science and the many keen and interested heads of school and teachers who have introduced computing into their classrooms, often using their own machines and programs.

Yet there lies the irony; while machines were being bought there was little or no software available commercially which was written specifically for school use. The programs reviewed show that the need for software has been recognised and is being filled.

There are several points which have to be borne in mind; loading the programs has to be made as simple as possible and instructions should be clear and concise, in booklet form where necessary, with an explanation of what the program does and how it is operated, since instructions included as text are often sparse and uninformative.

The programs should run without bugs, use graphics if possible, and have interesting content together with excellent error-trapping.

Rose Cassettes sent six tapes for review, **Junior Maths 1 and 2, Junior English 1 and 2, Champion Quiz** and **Arithmetic** for the under-eights. Junior English 1 and 2 and Champion Quiz are all quiz type programs and as such, because of the limited content and vocabulary, largely unsuitable for regular classroom use.

Champion Quiz, however, is better than most of its type. Junior Maths 1 includes long multiplication and division, fractions 1 and 2 and two other programs. The level set is difficult but the children are taken through each stage of working the answer.

Junior Maths 2 includes areas, perimeters, sets and Venn diagrams, as well as two other programs. The standard of the tape is really very high, with good diagrams and instructions. It was, moreover, a winner with the children.

Arithmetic for the under-eights is a superb cassette, dealing with addition, subtraction, multiplication and division. The level can be set at units; tens and units; or hundreds, tens and units. The numbers are shown in large characters, well-suited to a classroom monitor, and carrying is illustrated on screen, in stages. A really good, worthwhile tape for classroom use, well put together and, like all the Rose software, properly error-trapped.

Junior Maths 1 and 2 and Arithmetic for the under-eights look like essential buys for any school using the ZX-81 in the classroom. I hope they will also be available for the Spectrum, too. The tapes cost £4.50 each and each cassette runs itself from loading.

The Fun to Learn cassettes, available from W H Smith and direct from Sinclair by post at £6.95 per cassette were the next to be examined. Eight titles were reviewed,

continued on page 16



continued from page 15

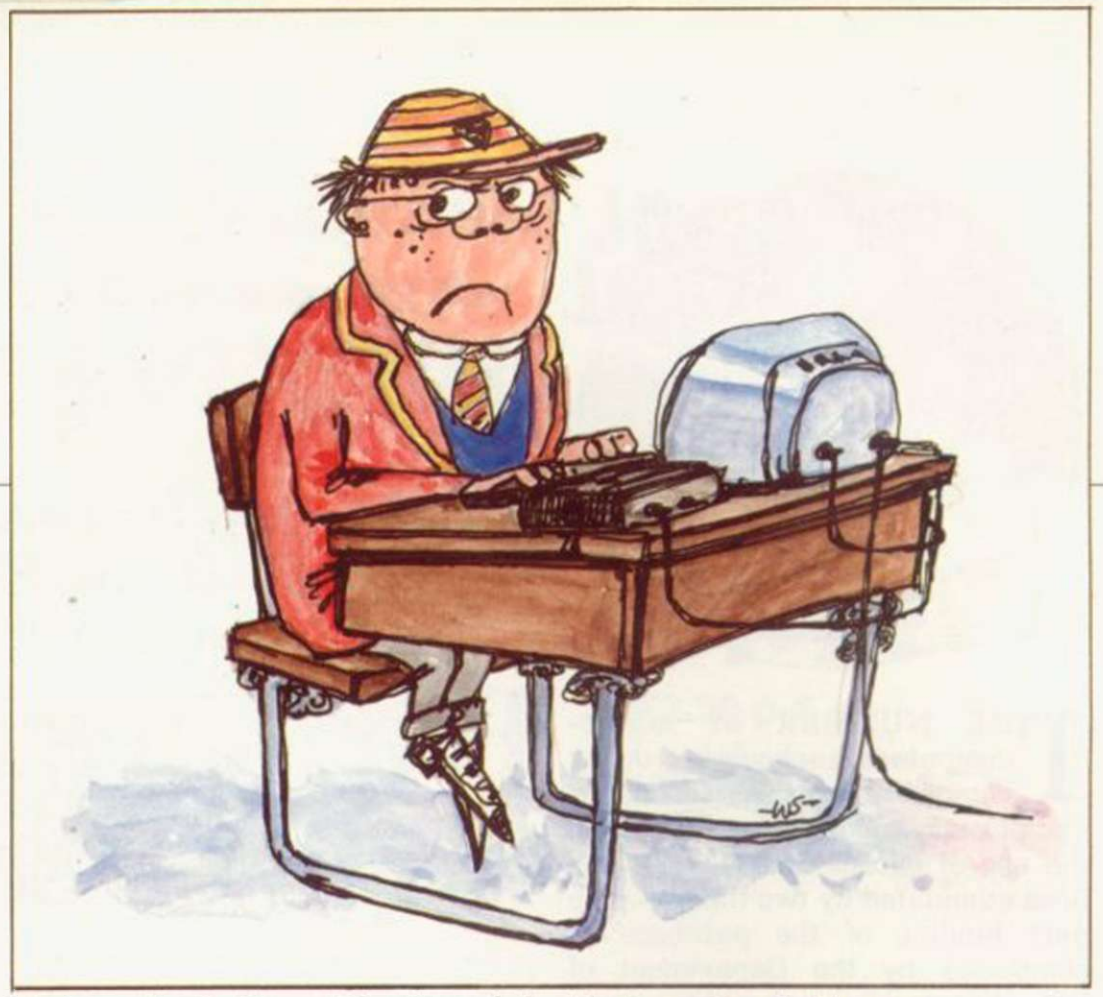
English literature 1 and 2, History 1, Mathematics 1, Music 1, Inventions 1, Spelling 1 and **Geography 1.**

Spelling 1 is an interesting idea which unfortunately is not suitable for school use. Words are played from tape, listened to by the child and the child's spelling of the word is checked by the computer. The only trouble is that there are too many sets of words on each side of the cassette, 15 to be precise, and the time involved in searching for sets, as well as the fixed nature of the words, renders it unsuitable for schools. Nevertheless, any parent interested in helping a child with spelling should consider it.

Geography 1 is very good indeed, with two programs — cities and countries in Europe and towns in England and Wales. When run, the relevant maps appear, although borders in Europe are not marked. An atlas would help. The children enjoyed it and I felt it was useful to them, as it can teach them as well as quiz them. A good buy.

Mathematics 1 is a fairly ordinary mathematics tester. The Rose cassettes do the same job better, I feel, although this one deals with decimals as well.

Apart from Spelling 1, Geography 1 and Maths 1, the other programs are simple quizzes. That again renders them, on account of content and age level, unsuitable for schools. Geography 1 is very good value for money and highly recommended. All the programs were well error-trapped, although they did not run themselves from loading.



ZX-81 Software, published by Brian Negus of 19 Westfield Drive, Loughborough, Leics, LEll 3QJ, has three music teaching cassettes on offer.

These cassettes were well error-trapped, two of them dealing with the various clefs and the third with beats and note times. The four clef programs cover alto and tenor/bass and treble. When run, notes appear one at a time on a short bar, which is suitably large for use on a classroom monitor; the graphics are very good. The children are then quizzed on the notes shown. A help facility is included.

Beats aims to teach children rhythm by having them follow moving graphics. In mystery beats the graphics are static and the children have to discover the beat for themselves.

As in Arithmetic for the under-eights the large graphics fit these programs well for use in front of a class. At £12 for three they must rank as good value, essential for music teachers. They also run themselves from loading, a good feature. Negus informs us that these programs will soon be available for the Spectrum.

> 'Instructions were poor. Educational software should be supported by comprehensive instructions'.

AVC Software of PO Box 415, Harborne, Birmingham, B17 9TT submitted two programs for review, **Tables Countdown** and **Geography Hangperson,** at £3 per program. The programs are claimed to be completely error-trapped but one girl still managed to crash one when she typed RUN NEWLINE instead of GOTO 50. That was because, in using RUN, she cleared the variables loaded from the tape. I feel that AVC should reconsider that part of its programming policy,as one has to re-load the program to re-start it.

Tables Countdown is slightly expensive for what it does, as the Rose cassette arithmetic for the under-eights offers four programs of better presentation for £4.50, although a simple graphics reward is included. It tests the four rules, without help, at four levels of difficulty.

Geography Hangperson tests knowledge of locations in the British Isles with the aid of graphics clues. The locations are not well-thought-out and the contents of the program are limited but the clues are amazing — "Is there a town that makes frisbees, Sir? It looks like a man with his head on the wrong way round".

I cannot recommend either of those two programs for school use. There are better programs available and at lower cost. Although the AVC programs can produce a printout of scores, so can the Rose software, of which the children thought very highly, and so did I.

They were better thought-out and far more comprehensive than other products, with the exception of the Negus cassettes, which were also very good.

Loading in all cases was first-class and only proves that good cassettes are vital for easy loading. Cheap tapes just will not suffice.

Instructions were poor for all the programs reviewed; educational software really should be supported by comprehensive instructions in booklet form.

ZX99

AUTOMATIC TAPE CONTROLLER FOR THE SINCLAIR ZX81

● DATA PROCESSING

The ZX99 gives you software control of up to four tape drives (two for reading, two for writing) allowing merging of data files. This is achieved by using the remote sockets of the tape drives, controlled by USR statements or commands.

● RS232C INTERFACE

The ZX99 has an RS232C output allowing connecting with any such printer using the full ASCII character code (you can now print on plain paper in upper or lower case, and up to 132 characters per line) at a variable band rate up to 9,600.

● SPECIAL FEATURES

There are so many special features it is difficult to list them all, for example:

AUTOMATIC TAPE COPY: You can copy a data file regardless of your memory capacity as it is processed through the Sinclair block by block.
TAPE BLOCK SKIP: Without destroying the contents of RAM
DIAGNOSTIC INFORMATION: To assist in achieving the best recording settings.

The ZX99 contains a 2K ROM which acts as an extension to the firmware in the Sinclair ROM. The ZX99's ROM contains the tape drive operating system and the conversion to ASCII for the RS232C output.

There is an extension board on the rear to plug in your RAM pack (larger than 16K if required). The unit is supplied with one special tape drive lead, more are available at £1 each.

£59·95
plus
£2·95p+p



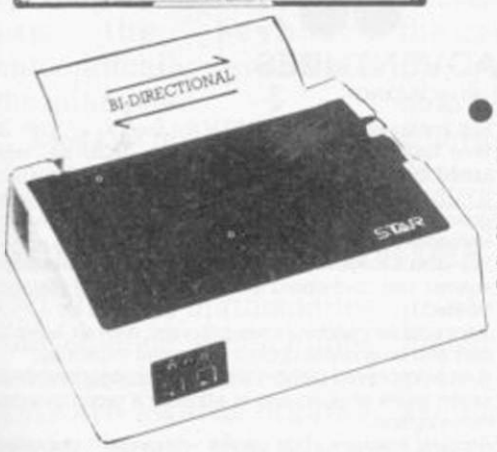
● ZX99 SOFTWARE

We now have available "Editor 99", a quality word processing program including mail-merge, supplied on cassette for £9.95. Also following soon:

- *** Stock Control**
- *** Sales Ledger**
- *** Business Accounts**
- *** Order Processing**
- *** Debtors Ledger**
- *** Tax Accounting**

Dept. SU5 Data – Assette, 44 Shroton Street,
London NW1 6UG. 01-258 0409

data-assette®
44, Shroton Street
London NW1
Tel 01-258 0409



● STAR DP8480S

£299 – plus £6 Securicor delivery

RS232C interface, bi-directional, 80 CPS, 80 column printer. Works with ZX81 and ZX99 also BBC, Atom, Tandy and most other major computers.

● E399 CASSETTE RECORDER

£25 inc. P & P.

Tested with ZX81 and Acorn. Ideal for recording and loading your programs. Features: Cue and Review, Din socket, tape counter, tone control, *built-in mic, autostop, mains/battery operation*, auto-record level. 12 month guarantee.

Please enquire about our BBC recorders.



● E690 REVOLVING CASSETTE RACK



Single – **£2.99** (holds 32 tapes or 20 in cases)
Double – **£5.99** (holds 64 tapes or 40 in cases)
Treble – **£8.99** (holds 96 tapes or 60 in cases)
Quad – **£11.99** (holds 128 tapes or 80 in cases)

● BBC CASSETTE LEAD

7 pin plug to two 3.5mm plugs and one 2.5mm plug. Only **£2** inc. P & P.

COMPUTER CASSETTES

High quality, screw assembled cassettes supplied with library boxes. Any lengths available.

C5 – 35p	**C10 – 37p**	**C12 – 38p**
C15 – 39p	**C20 – 41p**	**C25 – 45p**
	C30 – 44p	

ORDER FORM

Dept. SU5 Data – Assette, 44 Shroton Street,
London NW1 6UG. 01-258 0409

Item/Code	No.	Price inc. P & P	Total

Cassettes: Add min £1.50 or 10% P & P.

Cheques/PO made payable to Storkrose Ltd.

Charge my Access/Visa No. .....

Signed _____ Name _____

Address _____

ZX81 GAMES

from

J.K. GREYE SOFTWARE LTD

THE NEW GENERATION SOFTWARE HOUSE

"Without question the finest machine code games available today!".....J.N. ROWLAND Product Manager for W.H. SMITH.

GAMESTAPE 1 for 1K _____ **only £3.95**
10 Games incl. ASTEROIDS, UFO, CODE, BOMBER, GUILLOTINE, KALEIDESCOPE, etc.
PROBABLY THE BEST VALUE 1k TAPE AVAILABLE.

We've done in 1k, games which some of our competitors require 16k to do!





GAMESTAPE 2 for 16K _____ **only £3.95**
***STARFIGHTER** Superb machine code Space Battle. Set against a background of twinkling stars, with stunning explosions — if you can hit the enemy!
PYRAMID Can you move the Pyramid? Make a mistake and it will collapse! A Thinkers game.
ARTIST The ultimate Graphic Designers aid. 8 Directions, 10 Memories, SAVE, COPY, RUBOUT, CLS, etc.

GAMESTAPE 3 for 16K _____ **only £4.95**
***CATACOMBS** A Multi-Level Graphics Adventure. Each level can contain up to 9 Rooms, 8 Passages, 7 Monsters, Food, Gold, Traps, Phantoms, an Exit (to the next level), and there's an infinite number of levels.
NOTE. . . . This is NOT one of the necessarily limited text Adventures as sold elsewhere.
"An excellent addictive game which will keep you amused for hours." . . . . *COMPUTER & VIDEO GAMES.*





GAMESTAPE 4 for 16K _____ **only £4.95**
***3D MONSTER MAZE** The Game to Top All Others. Unbelievable Graphics! Can you find your way through the Maze? The EXIT is there somewhere, but then so is a T.REX, and its after YOU! All in 3D (the T.REX will actually run towards you in full perspective!), you've never seen anything like this before!
"3D MONSTER MAZE is the best game I have seen for the ZX81" . . . COMPUTER & VIDEO GAMES

"If I had to choose just one programme to impress an audience with the capabilities of the ZX81, then J.K. Greye's 3D MONSTER MAZE would be the one without doubt" . . . . ZX COMPUTING. *"Brilliant, brilliant, brilliant!"*.....*POPULAR COMPUTING WEEKLY*

GAMESTAPE 5 for 16K _____ **only £4.95**
***3D DEFENDER** The Ultimate Space Game. Super fast Machine Code 3D version of the Arcade favourite. You have to save your home planet from the marauding Alien Spacecraft. This is all in 3D, your viewscreen shows you the view out of your fighters cockpit window. The backdrop moves when you turn, or fly up or down (8 flight directions), just as if you were really flying it! But then YOU ARE! The Enemy Saucers will actually zoom towards you in 3D, and shoot you if you let them! Your display includes Score, Shield Strength, Altitude, Proximity, Forward Radar and your viewscreen, which shows your rotating home planet, backdrop of Stars, Meteors, Explosions, Plasma Blasts, your Photon Beams, up to 4 Enemy Saucers and of course its all in full 3D!
A SMASH HIT at the ZX Microfair (most of the other software houses wanted a copy), a game not to be missed!





GAMESTAPE 6 for 1K _____ **only £1.95**
***BREAKOUT** Super Fast Full Screen Display Game. Your all time favourite with an added twist. See how much Money you can win and watch the pounds convert to Dollars. All in Machine Code for Fast Action with 3 Speeds, 2 Bat Sizes and three angles of rebound! The best BREAKOUT around and at this price you can't go wrong!

GAMES MARKED * INCL. MACHINE CODE.
Prices include VAT and U.K. P. & P.
(Add appropriate Postage on Foreign Orders). Cheques/P.O.s to

J.K. GREYE SOFTWARE LTD

16 Brendon Close, Oldland Common, Bristol BS15 6OE
CREDIT CARD SALES: Phone: 01 - 930 - 9232 (9 a.m. - 7 p.m.)
FOR INSTANT DESPATCH

If you prefer to see before buying, our range of **GAMESTAPES** are stocked by the following stores.

BUFFER MICROSHOP	374A Streatham High Rd., London SW16:
GAMER	24 Gloucester Rd., Brighton;
GEORGES	89 Park St., Bristol, Avon;
MICROSTYLE	29 Belvedere, Lansdown Rd., Bath, Avon;
MICROWARE	131 Melton Rd., Leicester;
SCREEN SCENE	144 St. Georges Rd., Cheltenham, Glos;
W.H. SMITH	Over 200 Computer Branches;
ZEDXTRA	5 School Lane, Kinson, Bournemouth, Dorset:

TRADE & EXPORT ENQUIRIES WELCOME

THE BUFFER MICRO SHOP

(NEXT TO STREATHAM STATION)

★ ★ ★

NEW SOFTWARE SHOP EXCLUSIVELY FOR

ZX81

PROGRAMS, GAMES, "ADD/ONS"

★ ★ ★

MOST OF THE MAIL ORDER ITEMS ADVERTISED IN THIS MAGAZINE AVAILABLE OVER THE COUNTER

★ ★ ★

LOADING PROBLEMS? TRY OUR INTERFACE
BUSINESS & TECHNICAL DATA HANDLING PROGS.
PROPER KEYBOARDS; CONSOLES; VDUS

★ ★ ★

374A STREATHAM HIGH ROAD,
LONDON SW16
Tel: 01- 769 2887
S.A.E. APPRECIATED FOR CATALOGUE

ARTIC

MOVING AHEAD WITH ZX SOFTWARE

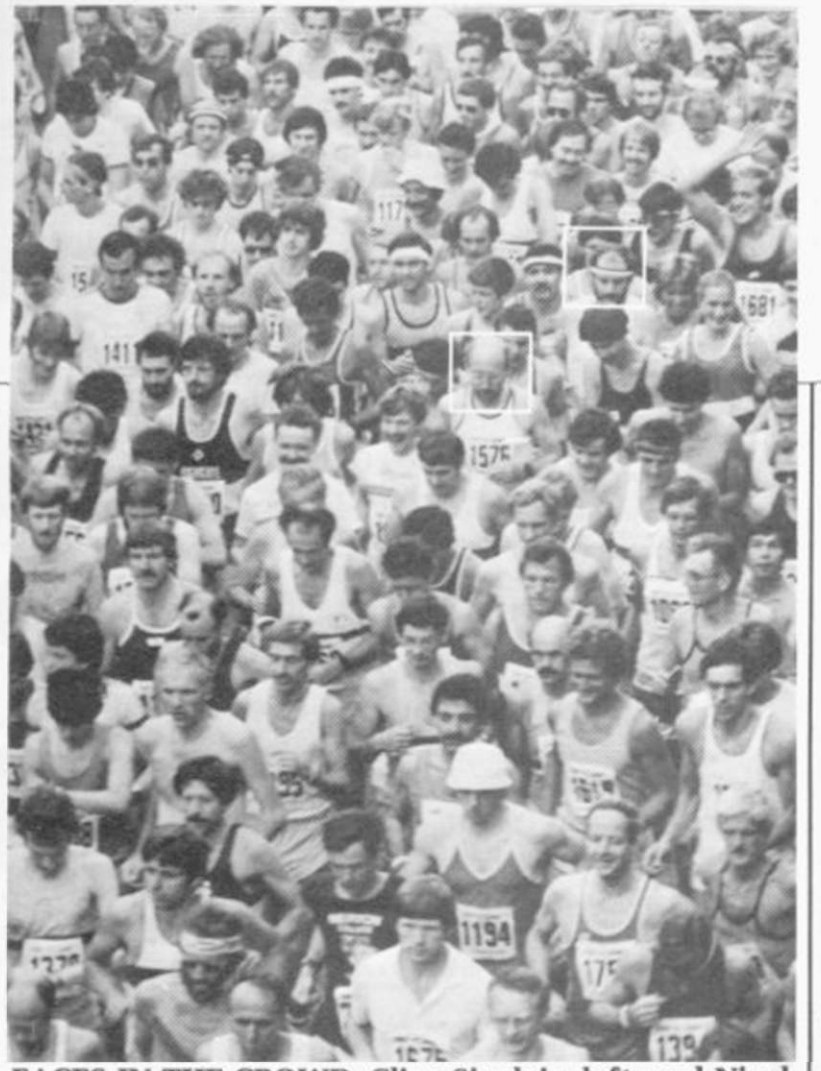
ZX CHESS & ADVENTURES

PROGRAMS FOR THE ZX81/80 INCLUDING –

NEW ZX-FORTH	Full implementation of FORTH for the ZX — 10 — 26 time faster than BASIC. 'Simplicity of BASIC with speed & machine code.'
16K RAM PACKS NEW £29.50	BYGBYTE RAM PACKS, no wobble problems. 1 year guarantee on each RAM PACK. The best you can buy. Immediate delivery.
1K ZX-CHESS!! NEW £2.95	We didn't think it was possible, but the game plays against you, two opening moves, only 1K of memory needed.
ZX CHESS I reduced to £6.50	Very popular machine code program, with six levels of play and an analysis option. Unbeaten except by:
ZX CHESS II now only £9.95	A new improved version with a faster response time, seven levels of play, and in addition a recommended move option.
ADVENTURES	Exciting machine code games with instant response, choose from the range below. You find yourself stranded on an alien planet. Can you reach your ship and escape?
ADVENTURE 'A' £6.00	In a jungle clearing you come across an Inca temple. You must break in, collect treasure and escape alive. Beware. Includes a cassette save routine.
ADVENTURE 'B' £7.00	You are unfortunate enough to be drawn to an alien cruiser. Can you reach the control room and free yourself or will they get you first? Includes a cassette save routine.
ADVENTURE 'C' £8.00	All the features of the acarde game in a fast machine code program. Swooping attackers, explosions and personalised scoring.
GALAXIANS £3.95	A 30 in 1 machine code tool and disassembler, allows access to all registers and to search through, and modify memory; with cassette routines.
ZX BUG £7.00	

and many more. For a catalogue giving full details, please send a S.A.E to

Artic Computing
Dept. EE
396 James Reckitt Avenue
Hull HU8 0JA.



FACES IN THE CROWD: Clive Sinclair, left, and Nigel Searle, head of Sinclair Research computer division, in the crowd of runners at the start of the Cambridge Festival half marathon. The men's race was won by Ian Thompson with Carol Gould coming first in the women's section.

ZX-81 price cut to keep sales

THE PRICE of the ZX-81 has been reduced to £49.95. It is believed that the move was prompted by the need to keep sales moving in Britain, since there has been a big fall in the number of orders since the announcement of the Spectrum.

It was felt that the gap between the prices of the ZX-81 and the Spectrum was not big enough. Sinclair Research has always maintained that there was a market for both machines.

It is also thought it is a reaction to the announcement by Binatone that it will be selling a micro costing less than £50. The machine is being imported from the Far East and the launch date depends on tests of the machine proving satisfactory. It is hoped to have it on sale before Christmas.

The ZX-81 will soon be available through more retail outlets. This follows the signing of an agreement with Prism Microproducts for sole distribution rights for the machine in Britain to small retail organisations with fewer than 20 outlets.

Prism is a sister company to ECC Publications which publishes *Sinclair User*. Its future plans include increasing its distribution of hardware and software items in the Sinclair market.

Add-on guarantee gamble

ANYONE attaching add-ons to their Sinclair machines which require opening the case or removing the keyboard automatically invalidates the guarantee.

That means that Sinclair is not obliged to repair the machine should anything go wrong. A spokesman for Sinclair Research said that once the case had been opened the guarantee no longer obtains but in some cases, where nothing had been disturbed inside, the repairs might still be free.

That came to light after a reader wrote to *Sinclair User* of his experience. PJ Shaw of Basingstoke Road, Reading wrote that, like many other ZX-81 owners, he had bought a full-size keyboard. The model required the removal of the computer board from its casing and fixing it into the new keyboard. It was a great improvement and Shaw was very happy with his machine.

"Then, one day, my ZX-81 developed a fault. Not to worry, it was fully guaranteed, or so I thought.

"According to Sinclair Research I had invalidated my guarantee by opening and removing the computer board from its casing," he said.

The necessary repair work will cost him a minimum of £20.

Science dominates contest

ENTRIES for mathematics and science applications dominated the educational software awards organised by Muse, the educational computing association. There were more than 100 entries but the science bias resulted in prizes being awarded in only five of the six categories.

Many of the entries have now been accepted into the ZX-81 section of the Muse library which, with nearly 50 programs, is now the biggest section.

Prizes of Sinclair printers went to Dave Fisher of Coventry in the primary maths/science section for **Bomber;** to Charles Rowbotham of Manchester under other primary for **Forensic;** under secondary maths/science to John McMullan of Stechford for **Forensic;** under other secondary to Richard Mariot of Kenilworth for **Bigspell;** and under other to Ian Souter of Tunbridge Wells for **TLOG.**

No award was made in the administration category.

Winner of the Spectrum is announced

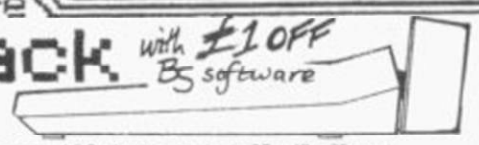
THE WINNER of the Spectrum and printer we offered in our June competition is S J Churchman of Blandford Camp, Dorset. From a high-quality entry the judges decided that his version of an EPROM blower was the best.

We will print an outline of the hardware and a review of its capabilities in our next issue.

Bridge Software

RAM Pack with £1 OFF BS software

FOR THE ZX81



Both RAM packs use same neat ABS plastic case (only 27 × 47 × 76 mm).
Supplied with foam strip connector to improve mechanical stability.
Fully guaranteed. Fully compatible with ZX Printer.

16k RAM £26-95 64k RAM £59-95

All-inclusive prices. When ordering, deduct £1 from price of any item of software.

NOTE
56k of the 64k RAM is user-addressable: memory is in 4 areas:
0-8k Sinclair BASIC ROM (read only)
8-16k Machine code area unaffected by CLEAR, NEW, LOAD, SAVE
16-32k BASIC program area
32-64k BASIC variables & arrays and/or machine code

BS

NEW!

Quality Software FOR THE ZX81

SUPER INVADERS cassette (16k RAM needed) £4.95
An enhanced version of our top-scoring GALAXY INVADERS PROGRAM. Now incorporates improved invader shapes, animated on-screen instructions and league tables of the six highest scores obtained at each of 3 difficulty levels.

GALAXY INVADERS cassette and instructions (minimum 4k RAM) Still available at only £3.00
Machine code for 10 difficulty levels, 20 invaders in 4 rows of 5.

LYNCHMOB (Family Fun No.2) cassette and instructions (16k RAM) £4.95
A competitive game for 2 to 6 people. The ZX81 picks turns, keeps the score and lynches the losers in animated graphics! Great fun. Educational too.

FAMILY FUN No. 1 (1k RAM only £3.95
Five family fun games. Cassette and Manual with intructions, listings, program notes.

MULTIGRAPHICS 2.3 (16k RAM needed) £6.90
A friendly menu-driven package of procedures giving you full control of the ZX81 graphics. Supplied with 20 page illustrated manual.

GRAPHICS STARTER PACK (Four 1k Graphics programs) £4.50
Cassette and 12 page illustrated booklet with listings, detailed technical notes on the programs explaining the use of PLOT, UNPLOT, PRINT SPACE AT, INKEY$, GOSUB, PEEK, The ZX81 character tables etc.

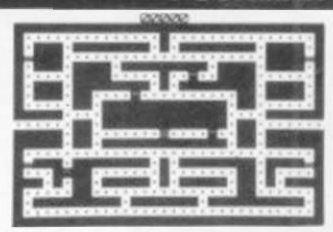
STATISTICS PACKAGE (Foru 1k Statistics programs) £4.00
Cassette and 8 page booklet containing listings, instructions for use, sample data and results. Computer means, SDs, variance, regression, t and f tests etc.

Send s.a.e. for further details. Prices all-inclusive in British Isles
European customers please add 30p per software item; worldwide 70p.
Overseas customers write for details of hardware mailing charges.

BRIDGE SOFTWARE (SU)
36 FERNWOOD, MARPLE BRIDGE, STOCKPORT, CHES. SK6 5BE
Available by mail order or from leading computer stores
Trade enquiries welcomed.

SF GOBBLERS

PUCKMAN FOR 16K ZX81



BEAT THAT HIGH SCORE!
GOBBLE THOSE DOTS BEFORE THOSE MEANIES GOBBLE YOU! YOUR ONLY AIDES ARE FOUR "POWER PILLS" WHICH MAKE THE MEANIES EDIBLE. BUT NOT FOR LONG!

- MACHINE CODED FOR FAST ACTION
- EXTRA "GOBBLER" FOR 10,000 POINTS
- ON SCREEN SCORING
- HIGH SCORE WITH "ENTER NAME" FACILITY
- UP TO 4 PLAYERS

AN ANNOYINGLY FRUSTRATING GAME FOR ONLY £5.95

SF ASTEROIDS FOR 16K ZX81

STAY ALIVE AS LONG AS POSSIBLE IN OPEN SPACE FILLED WITH FLYING ROCKS. SCORE BY SHOOTING THEM – WHICH ALSO CAUSES THEM TO BREAK INTO LOTS OF LITTLE BITS AND MAKES LIFE EVEN WORSE!

- MACHINE CODED FOR FAST ACTION
- ON SCREEN SCORING
- HIGH SCORE WITH 'ENTER NAME' FACILITY
- UP TO 4 PLAYERS
- EXTRA SHIP FOR 1,000 PTS (NOT AS EASY AS IT SOUNDS!)
- SHIP MOVES JUST LIKE ARCADE VERSION
- ROTATE LEFT/ROTATE RIGHT/THRUST
- FIRES IN ALL 8 DIRECTIONS
- INCREASING NUMBER OF ASTEROIDS
- THREE ASTEROID SIZES
- 'NASTY' ALIEN SPACE-SHIP (FIRES BACK!)

THIS GAME IS JUST AS BAD – AND ONLY £5.95
AN OFFER FOR REAL MASOCHISTS – BOTH TAPES FOR £9.95

MAIL ORDER ONLY-PLEASE MAKE CHEQUE/PO PAYABLE TO
THE SOFTWARE FARM
SF CRAIGO FARM, BOTANY BAY, TINTERN, GWENT SF

ZX81



the BEST yet from M.C. Associates

PELOPONNESIAN WAR

— a brand new 16K game

Your ultimate goal is a final victory over the Spartans but you will need to deploy all your skill in a combination of diplomacy and military force before you even stand a chance!

Price £5.95

also

TYRANT OF ATHENS Price £4.95
ROMAN EMPIRE Price £5.95

Buy more than one cassette and deduct 50p from the price of each.

Cheques or POs please — made payable to:
M.C. ASSOCIATES
4 GRANBY ROAD, CHEADLE HULME
CHESHIRE SK8 6LS



ZX81 16K



LOTHLORIEN
COMPUTER GAMES

New release "Warlord" £4.95
A16K game set in 13th Century Japan

- Can you rule a warring village to survive for 30 years?
- Can you defeat the armies and samurai of other warlords?
- A challenging game where all results are dictated by your own decision.

"SAMURAI WARRIOR"

Could you survive in 13th century Japan?

- In combat with other Samurai
- Fighting bandit groups
- Assisting villages

or will you commit ritual suicide?

Become engrossed in this game of skill for only **£5.95**

Cheques or POs please, payable to:

LOTHLORIEN COMPUTER GAMES
94 Flixton Road, Urmston,
Manchester M31 34D



Over-heating stops printer

MY ZX-81 with 16K and printer arrived in mid-May from Sinclair. After two days I stopped 16K RAM wobble by putting a large tea-tray into an old cushion cover. The ZX-81, RAM and printer live permanently on the tray and there has never been any further trouble with wobble.

Nearly every time I try to LLIST a long program, however, the power supply pack becomes very hot and eventually the printer goes dead, with white-out on screen. Moreover, it does not come alive again for several hours, i.e., until the power pack has cooled. This is no glitch or mains fluctuation. It happens at any time of day or night including 3 am — no K-cursor and no printer for several hours.

Since my RAM pack is now free from wobble — and anyway, without touching anything except to unplug from the wall socket, a memory test shows 16K available when switched on again after the cooling period — the fault can be ascribed only to the power pack, which seems unable to cope with the printer for LLIST of more than 1K programs.

My only solution at present is to copy long programs, screen by screen, with a long cooling period between each screen copy.

Marion Stubbs, Southampton.

●*Sinclair Research says that it has never met this problem previously but thinks it might be due to a heat-sensitive component in either the mains adaptor or the computer. Do readers have other suggestions?*

Contact made with flicker

THANK YOU for the machine code survey but I make two points:

A tip? When typing-in programs if the machine is in FAST mode, the screen flicker tells one if a key has made "contact" more cheaply than buying beep systems — and just as effectively. The only thing is not to forget to revert to SLOW before SAVING, or you might produce a blank screen when the program is RUN.

I want to know more about what machine code does. I want a better feel of what an address means — not just jargon by way of definition. I want to get behind the feel of hex and the mnemonics so that I can understand what I am doing.

So how about some articles from people who can communicate their knowledge before I go out and buy another book? I want to be sure of understanding what I read.

Rev R J Redrup, Truro, Cornwall.

●*Thank you for your comments on machine code and we will be trying to deal with the points you make in future editions.*

Better munch saves battles

MY SONS and myself enjoy *Sinclair User* both for articles and programs — which I input and they use. The **Monster Munch** by Tim Hartnell — May, 1982 — however, almost resulted in a full-scale war when one of them discovered how to escape from the maze.

If you are at either side of the board, you can escape using a two-part instruction, i.e., "NW". That transfers the 'H' to the E side of the board but the monster cannot follow. He is therefore safe so long as he travels "N" or "S". By adding the following, I cut off that escape route:

```
217 LET B$ = B$ +
  "(SPACE)"
218 IF B$ (2) = "E" AND
P>9 OR B$(2) = "W"
AND P<2 THEN GOTO 215
```

Now the monster always munches.

Harold Cather, Yate, Bristol.

Appeal for pen-friend

I WOULD like a pen-friend who has a ZX-81 with whom I can exchange programs and other things. I can be contacted at Mollagatan 16, 50246 Boras, Sweden.

Magnus Nygren,

Mains filter advisers

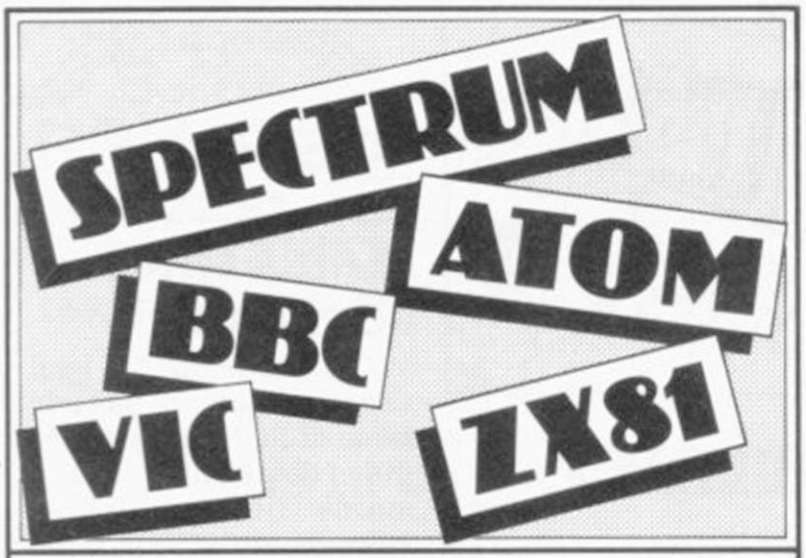
WITH REGARD to Paul Coker's letter in the July issue of *Sinclair User*, Display Electronics has a mains filter which it recommends for computers. Further details obtainable from 64-66 Melfort Road, Thornton Heath, Croydon, Surrey. Tel. 01-689 7702.

T Dawson Prestwick, Ayrshire.

WITH REFERENCE to the letter from Paul Coker on mains spike suppression, in July, what is required is a transient suppressor. They can be obtained from a radio dealer and are supplied by Radiospares; the mains version is code 238-457. It is a small component which requires soldering across the mains at the input to the transformer in the power supply unit, which must, of course, be disconnected from the mains before dismantling.

Although the loading of the Spectrum is far superior to the ZX-81, the Spectrum has a slight idiosyncrasy. You can have saved your programs on tape and loaded successfully many times when it apparently refuses to do so. The remedy is to ensure that your batteries are at full voltage; apparently when the voltage drops below the control voltage for the tape recorder motor stabilisation circuit, the speed of loading drops and the Spectrum notifies a tape loading fault. Replacing the batteries will cure the fault.

F Harrop, Hollingbury, Brighton.



MAKE THE MOST OF YOUR MICROCOMPUTER WITH OUR POPULAR RANGE OF PROVEN BOOKS:—

☐ **GETTING ACQUAINTED WITH YOUR ZX81**, by Tim Hartnell. Eighty plus programs in this 128-page book, including draughts. **£5.95**

☐ **20 SIMPLE ELECTRONIC PROJECTS FOR THE ZX81 and other computers** by Stephen Adams **£6.45**

☐ **MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80,** by Toni Baker. 180 pages, teaches machine code from first principles. **£7.50**

☐ **49 EXPLOSIVE GAMES FOR THE ZX81,** edited by Tim Hartnell. **£5.95**

☐ **34 AMAZING GAMES FOR THE 1K ZX81** by Alastair Gourlay. **£4.95**

☐ **THE GATEWAY GUIDE TO THE ZX81 AND ZX80,** by Mark Charlton. Over 60 programs and routines, ZX BASIC explained in detail. **£6.45**

☐ **LEARN PASCAL ON ZX81 ZX SPECTRUM OR BBC MICRO-COMPUTER WITH 'PASCAL FOR HUMAN BEINGS',** by Jeremy Ruston, which contains a 12K compiler so you can run a limited version of Pascal on your ZX81, ZX Spectrum or BBC Microcomputer. Book, plus compiler listing. **£4.95**

☐ **LET YOUR BBC MICRO TEACH YOU TO PROGRAM,** by Tim Hartnell, over 40 programs, BBC BASIC from first principles **£6.45**

☐ **THE BBC MICRO REVEALED,** by Jeremy Ruston. The full story on the BBC Microcomputer for the serious user. **£9.95**

☐ **GETTING ACQUAINTED WITH YOUR VIC 20,** by Tim Hartnell, with over 60 programs to get your VIC up and running from day one. **£6.95**

☐ **SYMPHONY FOR A MELANCHOLY COMPUTER** by Tim Hartnell. 24 great Vic games. **£6.95**

☐ **39 TESTED PROGRAMS FOR THE ACORN ATOM** Best of Interface edited by Tim Hartnell **£6.45**

☐ **GETTING ACQUAINTED WITH YOUR ACORN ATOM,** by Trevor Sharples and Tim Hartnell. 184 pages, 80 programs, including draughts. **£7.95**

☐ **INTERFACE,** the monthly magazine published by the **NATIONAL ZX USERS' CLUB** is just £9.50 (U.K.), £12.50 (Europe) for 12 issues. **Sample copy,** with many programs for your ZX computer, book, software and hardware reviews, education, contact addresses, **just £1.**

**All ZX81 books now contain Spectrum supplement, not available separately. All our ZX81 programs will run on your ZX Spectrum.*

Please send me the items marked. I enclose £ .....

Name: .....

Address: .....

.....

.....

Please make cheques payable to **INTERFACE** and send the above form, or a copy, to: **INTERFACE, Dept. SC, 44-46 Earls Court Road, London W8 6EJ**

Please allow up to 28 days for delivery.

NOW FROM AFDEC

ZX81
RAMPACKS
16K
£25.00

Inclusive and post free.

Well proven design. Simplicity itself — Just plug in and go. Power derived from ZX81 without additional connections.

Ingenious flush mounting design eliminates 'Wobble' and accidental memory loss.

Special feature — LED On/Off indicator.

Coming soon — A professional keyboard at an affordable price.

Send the coupon TODAY for your Rampack. Allow 14-21 days for delivery.

AFDEC ELECTRONICS LTD, 318 Kempshott Lane Basingstoke, Hants.

Please supply . . . . 16K Rampacks at £25.00 inclusive.
Cheque/P.O./Money Order enclosed £. . . .

Please Print Clearly.

Name .....
Address .....
.....
.....

ZX SAS

Serious Application Software for your 16K ZX-81/SPECTRUM

(Please specify)

INCOME TAX

Checks PAYE coding by offering you all likely allowances — displays and prints your coding and its make-up, then powerful facilities automatically calculate NI and PAYE deductions to five years net pay for next week or month. Options for overtime, salary increases, etc. Plan your income for £6.50.

BRIDGE

Ideal for all bridge players. Enter contract bid and made, BRIDGE does the rest for you. All over — trick, slam, doubled points etc. Displays and prints scorecard, totals for 5 rubbers and all hands played. A high-class program excellent value at £6.50.

SALES LEDGER

Excellent small business system, prints cash received/sales day books on monthly basis, maintains ledger for 50+ accounts, prints statements, names and addresses, etc. Only £10.

Also RETAIL ACCOUNTING (£8). INDEX/RETRIEVAL SYSTEM (£6.50)

** £2 off any 2 ** £5 off any 4 **

***Tailor-made software developed — please contact us for a prompt quotation**

ZX SAS 42/45 New Broad St, London EC2M 1QY (sae for more details)



Come to the ZX-81 with a clear mind to make the best use of your new machine.

Lifetime's obsession can easily be acquired

BUYING a ZX-81 can be the start of a lifetime obsession with home computing. It is easy,however, to become discouraged if everything does not go to plan from the beginning.

For those with only a little knowledge of computers and their capabilities, the best way to approach the ZX-81 is to abandon any ideas for special uses. While the basic machine is ideal for learning how to use computers, it is too small for any major uses. It is better to become accustomed to the many facilities and then decide how you wish to ue them.

Begin by unpacking the machine, overcoming your surprise at its size and weight and, following the manual, set up the system. If you cannot get the K on the screen, check that everything is plugged into its correct socket and re-set the machine by pulling-out the power plug for a second and try tuning-in again. If still nothing appears, check the power supply unit by shaking it. If it rattles, return it. If it is satisfactory, check your system with that of a friend.

Once the K appears you are ready to begin learning about the ZX-81. It can save family arguments if you can afford a separate television set for your system. It also makes life easier if you can find somewhere to leave your equipment set up permanently. You will find that a few power sockets are needed and a four-way block connector on a short length of extension cable will help to tidy trailing leads.

The manual is written in great detail and is reasonably easy to follow. Some of the chapters may not seem immediately relevant but it is worthwhile reading them as you might miss something which is important.

Patience is needed at that stage to learn the ways in which the computer will accept information. It is tempting to try to enter programs before you are really ready but that is likely to lead to errors. For example, words like AND, THEN, and AT should not be typed-in letter by letter. By the time you have reached chapter 11, you should have accumulated sufficient knowledge to be able to type-in other people's programs, such as those in *Sinclair User* and *Sinclair Programs*, without too much difficulty.

It is important that when using the machine it is not jolted. Some of the connections can easily work loose and everything which has been put in will be lost.

The manual is not to everyone's taste and if you find it difficult to follow, a number of books on the market can help you. Find the one which suits you best.

As a way of relaxing, you can buy some of the growing range of commercially-produced software. That can be loaded directly from cassette but make sure that your machine is big enough to take the tapes you buy. There are some programs for the unexpanded 1K machine but most of them require a 16K RAM pack. The tapes vary in quality. It is advisable to read the reviews in *Sinclair User* and use your judgment to find the best.

An alternative method to learn about the ZX-81 is to plunge in at the deep end and see what the computer will do. Refer to the manual when you have difficulties. You can ignore the functions and calculations initially and experiment with PRINT statements to obtain the feel of the machine.

You may have heard already about the problem involved in SAVEing and LOADing your own cassettes. The manual again gives detailed instructions but many of the early machines would not accept tapes from some recorders. That problem is said to have been overcome but there can still be difficulties.

They usually occur when LOADing tapes recorded by other people. One simple method to overcome this is to wind the tape to the middle of the program and type LOAD" " followed by NEWLINE; then slowly increase the volume of the recorder with the tape running until the television screen shows four or five thick horizontal black bands. If you then re-wind the tape, the program should LOAD normally.

Finally, a health warning. Apart from any practical uses, computing with your ZX-81 can be a very entertaining hobby and is almost certainly habit-forming. You may easily find yourself crouched over your machine, red-eyed, in the early hours of the morning, thinking that in another five minutes you will sort out the problem.

Try to break that habit by getting into the fresh air and meeting other Sinclair users.

By obtaining a ZX-81 you find that you have joined a not very exclusive club with many thousands of members, many of whom would be only too happy to advise you if you have difficulties.

Make sure of your regular copies of *Sinclair User* and *Sinclair Programs* and you can be guaranteed many happy hours with your Sinclair machine.

TURN YOUR ZX81 INTO CASH!

Send details of your equipment with S.A.E. for latest prices

why start with 1k?

Buy secondhand and get more for your money

ZX81s RAM packs etc. S.A.E. for prices list

SECONDHAND SINCLAIRS
23 The Bourne, Brimscombe, Stroud, Glos. GL5 2RP

ZX81 SOFTWARE

NIGHT GUNNER

Enemy aircraft approaching from the rear!! Can you defend your plane against enemy attack? Beware, the more you shoot down, the faster they get.

An exciting machine code video game with impressive graphics. Features include: best score of the day, auto-repeat on the control keys, auto-return to the self demonstrating title page.

Requires 16k RAM. Supplied on tape, with instructions.

Action packed fun for only £4-45

FIGHTER PILOT

15 feet.... 7 feet.... Touchdown!

Another successful instrument landing Appoaching at 150 knots is not always as easy as this. You are in full control from take-off to landing during this real-time flight simulation of a jet fighter. The sky is the limit! Fly a different mission every time. Endless scope for improving your instrument flying skills

16k RAM Required. Suppied on tape, with full instructions.

Supervalue at £4-45

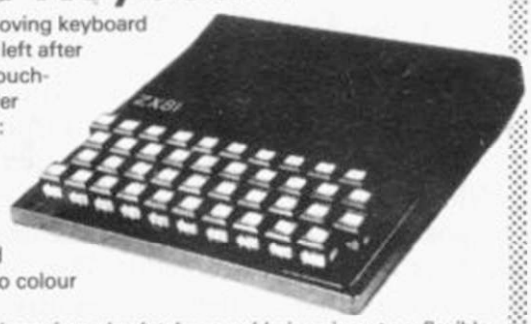
All prices inclusive (Overseas add £0·55 p&p per tape)
All products guaranteed, refund if not satisified

Digital Integration.
22, Ash Church Road,
Ash, Aldershot,
Hants, GU12 6LX.

MAIL ORDER ONLY

KEMPSTON (Micro) ELECTRONICS

ZX81 Klik-Keyboard



This is a full, forty key, moving keyboard which fits into the recess left after peeling off the existing 'touch-sensitive' keypad. Consider the following advantages:

- Positive feedback from keys
- Fits onto the ZX81
- No trailing wires
- No special case needed
- Elegant design with two colour legends.

The fully built keyboard requires *absolutely no soldering* since two flexible connectors plug into the ZX81 sockets. Alternatively, the keyboard is available as an easy build kit at a considerable saving.

Now available with 41 keys, the extra key can be used to give a repeat facility.

	£22.50 (kit)	**£26.00** (built)
41 key version:	**£26.50** (built)	**£23.00** (kit)

All prices inclusive of VAT, but postage must be added at 70 pence for a single item, 100 pence for 2 or more items. Payment by cheque or P.O.

Available by mail order from:

KEMPSTON (Micro) ELECTRONICS
60 Adamson Court, Hillgrounds Road, Kempston, Bedford MK42 8QZ

Please allow 21 days for delivery. S.A.E. in all correspondence.

See us at the PCW Show (also ZX Microfair)

Your Name and Address_____ SU6

Quantity	Description	Unit Price	Amount
	ZX81 Klik Keyboard kit (40 keys)		
	ZX81 Klik-Keyboard built (40 keys)		
	ZX81		

Date_____ Postage _____ Total _____

Northern Premier Exhibitions

DEALERS — WE HAVE A FEW TABLES LEFT
Contact:
MIKE DONNACHIE

16 SOUTH PARADE, PUDSEY, WEST YORKSHIRE LS28 6NZ

Northern Premier Exhibitions

proudly announce their 1st

ZX fair

on
Saturday, 2nd October
10 a.m. till 5 p.m.

Admission: Adults 75p.
Children under 14 50p.

PUDSEY CIVIC CENTRE,
DAWSONS CORNER, STANNINGLEY,
NR. LEEDS.
(midway between Leeds & Bradford)

Hardware, Software, Books and Magazines — everything for the ZX User.
This Fair is exclusively for ZX Computers, so come and enjoy A DAY OUT among friends.

Great games packs for 16K ZX81 . . .

PACK 1

ASTRO-INVADERS

Just look at these features . . .
. . . then look at the price!

- Superior machine code programming
- Rapid-firing with explosive on-screen kill effect
- High-scoring saucers • 54 aliens • accelerating attack
- Destructable defence shields • On-screen kill count
- High score update
- Fast action space graphics

— a new dimension in ZX81 value

Astro-Invaders is yours on cassette for **ONLY £3.65** with
FOUR BONUS GAMES:
ARCADE GRAND—PRIX — drive four levels of machine code skill
PENALTY — defend your goal against the sharp-shooting ZX81
GOLF — judge your shot-strength, angles, bunkers . . .
plus machine code insect fun with **SWAT**

PACK 2

PLANET DEFENDER

— blast aliens in planet orbit . . .

- ultra-dynamic machine code action • hostile alien-waves
- fast responsive controls; ship up/down, thrust, laser-bolt, and smart bomb
- comprehensive scoring
- explosive graphics . . . . . explosive price!

Planet Defender comes on cassettes for **ONLY £3.65** with machine code **STORM—FIGHTERS** — combat 5 fleets of swooping aliens as you blast through space, **BREAKOUT** (machine code) — race against the clock, plus **GRAPHIC HANGMAN.**

16K ZX81 cassette packs 1 and 2 are £3.65 each (post free in U.K.). Fast despatch from

John Prince
29 Brook Avenue, Levenshulme,
Manchester M19

S C I S O F T

EDUCATIONAL SOFTWARE for ZX 81

: STUDY PACKS :

Taking Exams next year? . . . . .

1. Superb book of Revision Notes
2. Programs of problems using random data – different each time! Answers given
3. Program – Hints on "How to Revise"
4. Programs of Multiple choice questions

"Most original and useful" . . . . . **J. R. DERBYS.**

"Very pleased with 'Physics', please send 'Chemistry A.S.A.P." . . . . . **A. A. SUSSEX.**

Physics "O", Chemistry "O/C", Biology "O"
£7.50 + 50p p&p
Maths "O" Part I £5.50 + 50p p&p

: JUNIOR SCHOOL PACK :

£10.00 + 50p p&p

Contains . . . . . .

1. Teachers **"MARKBOOK"** (also suitable for sec. schools) £4.50
2. New improved version of **"JUNGLE MATHS"**

"One of the best Junior programmes available . . . **B. J. Lancaster** (£4.50)

3. **"MAGIC SPELL".** A versatile spelling test program . . . . (£4.50)

5, Minster Gardens, Newthorpe, Eastwood, Notts.

NEW VERSION Jungle Maths Now available for BBC!

Also available from "MICROWARE" LEICESTER

soon for B.B.C. + SPECTRUM!

The ultimate
SINCLAIR ZX 81 (16K)
DATABASE FILING SYSTEM

by DALE HUBBARD

Fed up with boring games — make your ZX81 work for you!
The one you've been waiting for!!

Cassette based
Clear "menu" operation
Facilities include sort, search, list, delete, change, total numeric field, save and load file, line print, etc.
Complete with demonstration file and full instruction/application leaflet.
Requires 16K Ram pack.
Applications: Recipe file
Stamp/coin collections
Inventory Control
Employee Data
Record Collections
Magazine article catalogue
May be used for any application where fast access is required to stored information

Access accepted
Send cheque or P.O. or credit card number to:
GEMINI MARKETING LTD.
9 Solartron Road, Exmouth, Devon EX8 2BR.
OR telephone us with your credit card order
on Exmouth (03952) 5832

DESPATCH BY RETURN

ONLY
£5.95 FULLY INCLUSIVE!

SPECIAL OFFER
FREE
computerised decision-making program

MICROWARE

MICROWARE

Retail Shop In LEICESTER for SINCLAIR Computers

Keyboards/Ram Packs, 1/0 Ports, Monitors, G/Roms; Games, Serious, Home/Business, Education Programs; Books & Magazines.

Also — Now stocking Books and Software for SPECTRUM, BBC and VIC 20.

MICROWARE

	131 Melton Road	Open
Closed	**Leicester**	9.30
Thursday	**Tel: 0533 681812**	5.30

MICROWARE

MICROWARE

ZX HARDWARE....

PROFESSIONAL 40 KEY KEYBOARD

- All legends and graphics in 2 colours
- No soldering to ZX81, just plug in
- Proper typewriter keys
- RAM/Printer compatable.

Kit £19.95 Built £24.95 Case £10.20
Repeat key add on TBA.

Range of in/out ports, music boards, motherboards, D to A converter boards write for catalogue.

23 Way double sided, gold female edge connector, wirewrap type £2.95

Male connector £1.25
Ribbon cable £1.40 per metre

Mastering Machine code book £5.50
Programming for real application £6.50
Tape for real applications £11.25

HARRIS & LOCKYER ASSOCIATES
(Sole distributors for Redditch Electronics)
Dept YC, 33 Pedmore Close,
Woodrow South, Redditch, Worcs.
Tel (0527) 24452

Prices included VAT + P+P. Overseas add £1.80 postage.
Delivery 3 days for in stock items else allow 28 days.
Official orders welcome. Send sae for FREE catalogue.

ZETA TEACHING PROGRAMS

ZX81 16K

A Range of Professionally Produced Programs for Junior & Middle Schools Ages: 8–12

ZES1	SPELL INVADERS	: based on the Space Invaders theme, this encourages children to improve their spelling.
ZSK1	REACTION TEST	: improves key board familiarity.
ZMG1	GRAPHS	: used as an electronic blackboard to draw bar charts (level 1 S.M.P.).
ZMC1	DEPTH CHARGE	: practice in ordered triple co-ordinates in 3 dimensions while hunting enemy submarines.
ZMC2	ZIGOL	: practice in ordered pair co-ordinates in 2 dimensions on a space-ship theme.
ZMA1	OXO +	: addition test.
ZMA2	OXO –	: subtraction test.
ZMA3	OXO ×	: multiplication test.

Price Each Tape £5.75 incl. VAT
Full Set £42.00 incl. VAT
Please add £1 for post & packing

Please tick which cassette required:

ZES1	SPELL INVADERS		ZMC2	ZIGOL	
ZSK1	REACTION TEST		ZMA1	OXO +	
ZMG1	GRAPHS		ZMA2	OXO –	
ZMC1	DEPTH CHARGE		ZMA3	OXO *	

Name.....

Address.....

.....

Please make cheque/PO payable to Solent Software Engineering Ltd. and post to: SSEL, Brookvale, Waterworks Road, Otterbourne, Winchester SO21 2DP.

ZX81 and SPECTRUM Top Quality Software from

CAMPBELL SYSTEMS

ZX81 16K GULP II "The best computer game I have ever played . . . it beats many actual arcade games! BRILLIANT." says John Fox of Osset, Yorkshire. Endless fun even just in demo mode, and huge numbers of variations. **£4.75**

ZX81 16K-64K THE FAST ONE the best general-purpose business filing system around. Includes sorting, totalling, fully user-definable data and reports. All m/c, comes with 11-page manual. **£15.00**

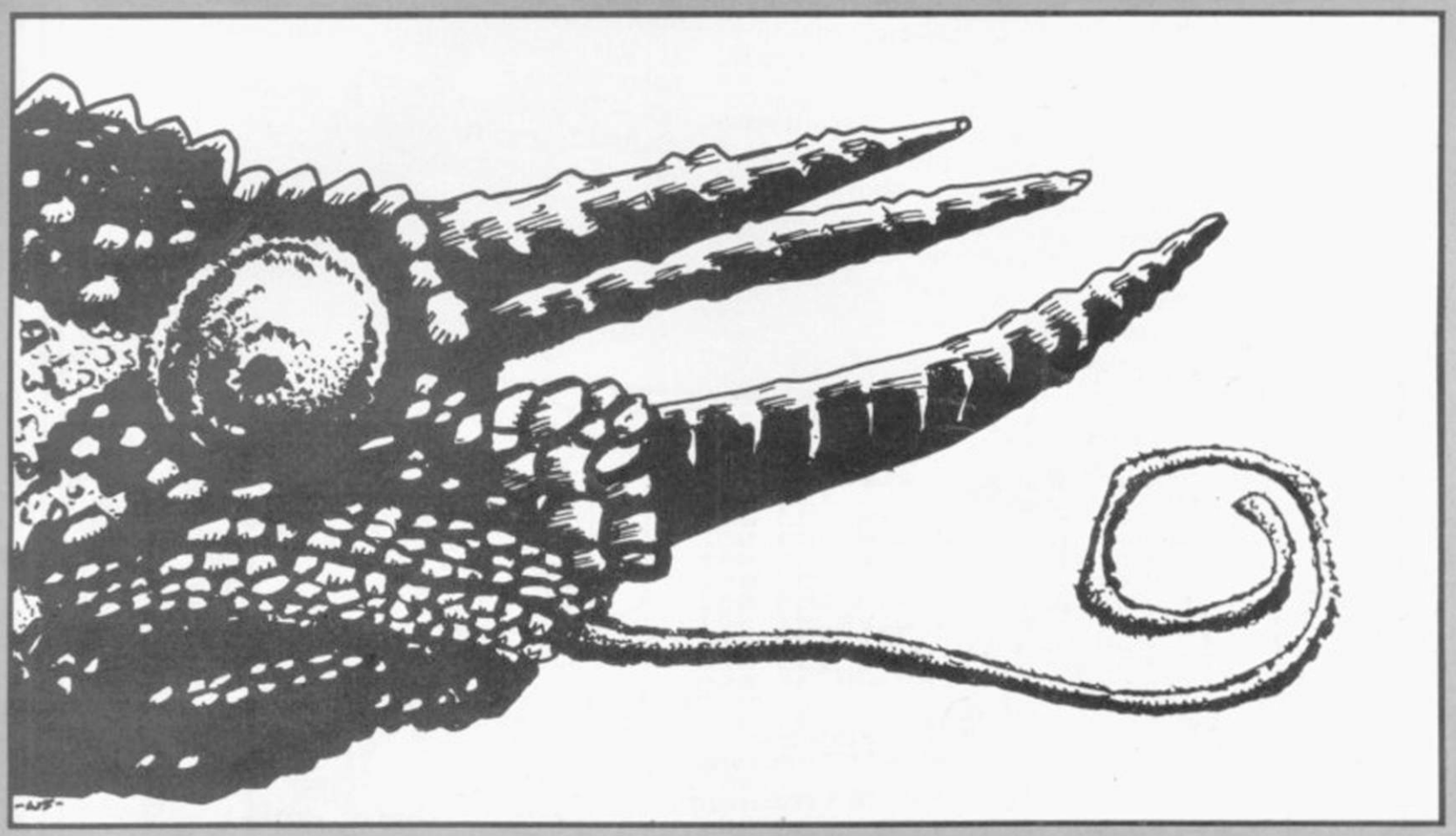
SPECTRUM SPDE self-relocating machine code Disassembler and Editor, shows all Z80 ops and operands, helps you develop your own m/c — Dr Ian Logan uses it. **£5.95**

SPECTRUM GULPMAN This is GULP II plus colour and sound, and has to be seen and heard to be believed. Totally machine coded, and with scope to POKE your own joystick control. **£5.95**

All programs are supplied double-recorded on cassette, sped 1st class return post. Prices include VAT. Dealer enquiries welcome. Sae for full catalogue.

CAMPBELL SYSTEMS, Dept SU, 15 Rous Rd, Buckhurst Hill, Essex IG9 6BL, England.

PROGRAM PRINTOUT



FLYCATCHER

IF YOU like creepy-crawlies you will like **Flycatcher**. A bug-eating reptile squats at the top of the screen, hungry for the flies which buzz past below it. Pressing P causes its long, dripping tongue to slide out and if a fly is caught on its tip, the tongue is retracted and the player scores 10 points.

There are two snags. One is that the flies reduce speed when they see the tongue moving in their direction. The other is that the tongue cannot be retracted until it bags the bluebottle; missing causes it to hang helplessly until another victim strays into its clutches.

You lose one point for every fly which starts and the game ends when the tongue touches line 16 without catching anything. Graphics notes:

60 — Graphic W, graphic 6, graphic 5.

70 — Graphic Q, graphic R, graphic 4.

130 — Space, shifted N, shifted M.

190 — Graphic 5.

```
 10 LET S=0
 20 GOTO 50
 30 CLS
 40 LET S=S+10
 50 LET A=2
 60 PRINT AT 0,10;"▚▞"
 70 PRINT AT 1,10;"▞▚"
 80 LET C=INT (RND*15)
 90 IF C<3 THEN GOTO 80
100 PRINT AT 0,18;S
110 LET S=S-1
120 LET D=0
130 PRINT AT C,D;" ><"
140 LET D=D+1
150 IF D=18 THEN GOTO 30
160 IF INKEY$="P" THEN GOTO 180
170 GOTO 130
180 LET T=2
190 PRINT AT A,11;"▌"
200 LET T=T-1
210 LET A=A+1
220 IF T=0 THEN GOTO 130
230 IF C<>A THEN GOTO 250
240 IF D>8 AND D<14 THEN GOTO 3
0
250 IF A>16 THEN STOP
260 GOTO 190
```

WINDOW CLEANER

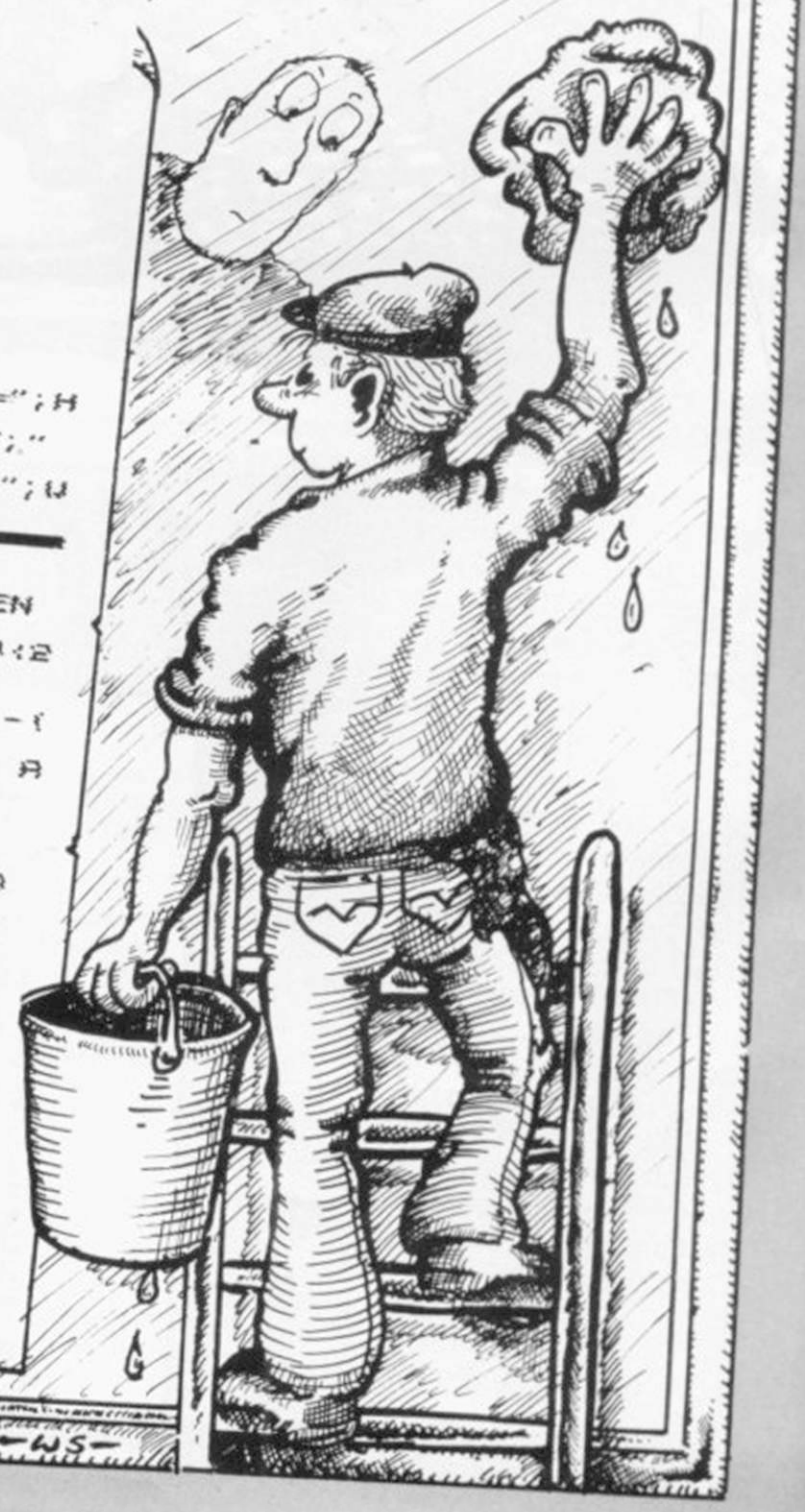
CLIMB the ladder to success in our **Window Cleaner** game from Niel Fleming Smith of Brampton Bierlow, South Yorkshire. Niel explains the idea:

"It involves manoeuvring a rung to the top of a ladder in the hope of reaching a window above. Keys M and N are used for right and left and the full stop moves it up. Hitting a part of the ladder kills you and after three lives, or running out of time, the game ends.

Once the window is reached, a new ladder is started with less time than at first. An extra 'man' is given at the third window." Graphics notes:

40 — Graphic shifted E, graphic shifted 7, graphic shifted R.
60 — Graphic shifted 5.
70 — Graphic shifted 5.
80 — Graphic shifted 5, space; two spaces; graphic shifted 5.
90 — Graphic shifted W; 12 graphic shifted 6s; graphic shifted 5.

```
  1 REM "WINDOW CLEANER"
  2 LET HS=0
  5 LET V=3
  6 LET S=0
  7 LET X=5
 10 LET W=0
 15 LET C=21
 20 LET D=15
 25 LET T=X
 30 LET A=5
 35 LET B=5
 40 PRINT AT 21,14;"
 45 FOR N=0 TO 6
 46 PRINT AT 21,N;"X"
 47 NEXT N
 48 PRINT AT 21,W;" "
 50 PRINT AT 0,0;"SCORE=";S
 60 PRINT AT 0,9;" HI-SCORE=";H
S;
 70 PRINT AT 0,22;" TIME=";T;"
"
 80 PRINT AT 1,9;" WINDOWS=";W
;"
 90 PRINT AT 2,9;"
100 PRINT AT A,B-1;"  "
110 IF INKEY$="." AND A>3 THEN
LET A=A-2
120 LET B=B+(INKEY$="M" AND B<2
8)-(INKEY$="N" AND B>2)
130 IF A<20 THEN LET A=A+1
140 LET B=B+(RND>.5 AND B<28)-(
RND<.6 AND B>2)
150 IF A>=C AND B=D-1 OR A>=C A
ND B=D+1 OR T=0 THEN GOTO 300
160 PRINT AT A,B-1;"
170 LET T=T-1
180 PRINT AT 0,28;T
190 IF A=C-1 AND B=D THEN GOTO
200
195 GOTO 100
200 LET S=S+1
210 LET C=C-1
220 IF C>4 THEN GOTO 30
230 CLS
240 LET C=21
250 LET W=W+1
260 LET X=X-25
270 IF W=3 THEN LET V=V+1
280 GOTO 25
300 LET V=V-1
310 IF V>0 THEN GOTO 25
320 LET S=S+(W*2)
330 IF HS<S THEN LET HS=S
340 INPUT A$
350 IF A$="N" THEN STOP
360 CLS
370 GOTO 5
```



ODDS & EVENS

A READER from Sleaford, Lincolnshire writes: "I am always frustrated to find that programs in magazines are generally emulations of arcade space games. I am sure there must be many readers who enjoy tackling a mind-bender."

Further to his policy, B McIntosh has sent a puzzle which depends more on tactical thinking than on quick work with the cursor finger.

You are given a column of numbers from 1 to 9 and are required to separate the odd and even numbers and place them in order of value on a second and third column.

You have two other columns to give you room to manoeuvre; moves are input by typing the column on which your number appears, then the destination column and then hitting the NewLine key.

The computer will count the number of moves taken and inform you of your score at the end of the game. The snags are that a greater number may not be placed on a smaller one; an even number may not be placed on an odd one and vice versa; once a number has left the first column, it may not return.

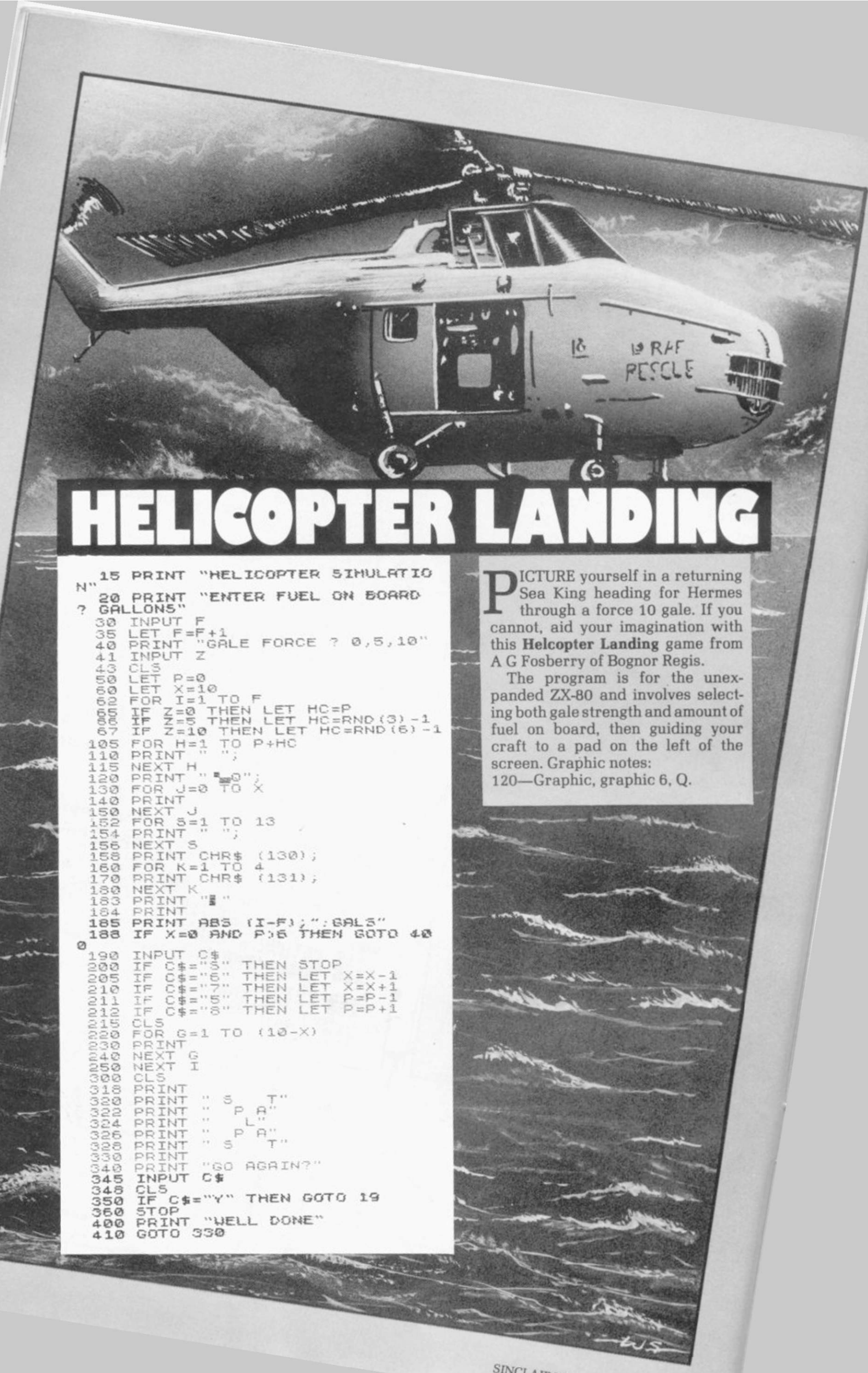
10 — All entries are separated by two spaces.

60 — Five graphic As, inverse space, two graphic spaces, inverse space, eight graphic As.

105 — Eleven spaces.

400 — See 10.

```
  1 LET A=0
  5 CLS
 10 LET A$="1  .  .  .  .  .  2  .
  .  .  .  3  .  .  .  .  .  4  .
.  .  .  .  5  .  .  .  .  .  6  .  .
.  .  .  7  .  .  .  .  .  .  8  .  .  .
.  .  9  .  .  .  .  .  "
 15 PRINT
 20 FOR N=1 TO 8
 30 LET S=N*15-14
 40 PRINT TAB 5;A$(S TO S+12)
 50 NEXT N
 60 PRINT TAB 6;"AAAAA  AA  AAAAAAAA
AAAAA"
 70 GOSUB 400
100 INPUT M$
102 IF M$="A" THEN RUN
105 PRINT AT 12,5;"
"
110 IF LEN M$<>2 THEN GOTO 100
115 LET A=A+1
120 IF M$(2)="1" THEN GOTO 310
130 LET G=VAL M$(1)*3-2
140 LET H=VAL M$(2)*3-2
150 FOR N=G TO G+105 STEP 15
160 IF A$(N)="." THEN NEXT N
170 LET G=N
180 FOR N=H TO H+105 STEP 15
190 IF A$(N)="." THEN NEXT N
200 LET H=N
210 LET H=H-15
220 IF VAL A$(G)>VAL A$(H+15) A
ND VAL A$(H+15)<>0 THEN GOTO 300
230 LET K=VAL A$(H+15)-VAL A$(G
)
250 IF K/2-INT (K/2)<>0 THEN GOT
O 300
255 LET A$(H)=A$(G)
260 LET A$(G)="."
270 PRINT AT 0,0
280 GOTO 20
300 IF VAL A$(H+15)=0 THEN GOTO
255
310 PRINT AT 12,5;"ILLEGAL MOVE
"
320 GOTO 100
400 IF A$(51 TO 120)="  1  2
.  .  .  3  4  .  .  .  5  6  .
.  .  .  7  8  .  .  .  " THEN GOTO 4
20
410 RETURN
420 PRINT
430 PRINT TAB 6;"***WELL DONE***
*"
440 PRINT
450 PRINT TAB 4;"THAT TOOK YOU
";A;"  MOVES"
460 INPUT Z$
470 RUN
```



HELICOPTER LANDING

```
  15 PRINT "HELICOPTER SIMULATIO
N"
  20 PRINT "ENTER FUEL ON BOARD
? GALLONS"
  30 INPUT F
  35 LET F=F+1
  40 PRINT "GALE FORCE ? 0,5,10"
  41 INPUT Z
  43 CLS
  50 LET P=0
  60 LET X=10
  62 FOR I=1 TO F
  65 IF Z=0 THEN LET HC=P
  66 IF Z=5 THEN LET HC=RND(3)-1
  67 IF Z=10 THEN LET HC=RND(6)-1
 105 FOR H=1 TO P+HC
 110 PRINT " ";
 115 NEXT H
 120 PRINT "▀▄0";
 130 FOR J=0 TO X
 140 PRINT
 150 NEXT J
 152 FOR S=1 TO 13
 154 PRINT " ";
 156 NEXT S
 158 PRINT CHR$ (130);
 160 FOR K=1 TO 4
 170 PRINT CHR$ (131);
 180 NEXT K
 183 PRINT "▀"
 184 PRINT
 185 PRINT ABS (I-F);";GALS"
 188 IF X=0 AND P>6 THEN GOTO 40
0
 190 INPUT C$
 200 IF C$="5" THEN STOP
 205 IF C$="6" THEN LET X=X-1
 210 IF C$="7" THEN LET X=X+1
 211 IF C$="5" THEN LET P=P-1
 212 IF C$="8" THEN LET P=P+1
 215 CLS
 220 FOR G=1 TO (10-X)
 230 PRINT
 240 NEXT G
 250 NEXT I
 300 CLS
 318 PRINT
 320 PRINT "  S    T"
 322 PRINT "   P  A"
 324 PRINT "     L"
 326 PRINT "   P  A"
 328 PRINT "  S    T"
 330 PRINT
 340 PRINT "GO AGAIN?"
 345 INPUT C$
 348 CLS
 350 IF C$="Y" THEN GOTO 19
 360 STOP
 400 PRINT "WELL DONE"
 410 GOTO 330
```

PICTURE yourself in a returning Sea King heading for Hermes through a force 10 gale. If you cannot, aid your imagination with this **Helcopter Landing** game from A G Fosberry of Bognor Regis.

The program is for the unexpanded ZX-80 and involves selecting both gale strength and amount of fuel on board, then guiding your craft to a pad on the left of the screen. Graphic notes:
120—Graphic, graphic 6, Q.

AMMETER & VOLTMETER CONVERSION

AMMETER and Voltmeter Conversion isa program for the1K ZX-81 which calculates the value of a resistor required to convert any meter to a voltmeter or ammeter of known range.

The program will first ask if you require conversion to voltmeter or ammeter — you need type-in only V or A. It then asks for the resistance of the meter and the Full Scale Deflection current and then, depending on whether you entered V or A, will ask either for the maximum reading of the converted meter.

```
  10 PRINT "VOLTMETER OR AMMETER
? ";
  20 INPUT A$
  30 PRINT A$,"RESISTANCE OF MET
ER? ";
  40 INPUT R
  50 PRINT R,"FSD CURRENT? ";
  60 INPUT F
  70 IF A$(1)="V" THEN GOTO 300
  80 PRINT F,"REQUIRED FSD CURRE
NT? ";
  90 INPUT S
 100 PRINT S
 105 LET R=(R*F)/(S-F)
 110 LET B$="SHUNT"
 120 LET C$="ACROSS"
 130 PRINT '''
 140 PRINT "CONNECT A ";B$
 150 PRINT "OF ";R;" OHMS"
 160 PRINT C$;" THE METER"
 170 PRINT '''"PRESS ANY KEY"
 180 PAUSE 4E4
 190 CLS
 200 RUN
 300 PRINT F,"MAXIMUM READING? "

 310 INPUT M
 320 PRINT M
 330 LET R=(M-(R*F))/F
 340 LET B$="MULTIPLIER"
 350 LET C$="IN SERIES WITH"
 360 GOTO 130
```



RIFLE RANGE

RIFLE RANGE is a straightforward but entertaining game, submitted by Eve Gorton of Stockport. It involves blasting at a moving row of ducks, fairground style.

You have 16 ducks to kill and an unlimited number of bullets. Once you have run out of ducks, you can press S for your score and sharpshooter rating.

"To date," she reports, "no-one has managed to shoot all 16 targets in only 16 shots." Graphics notes:
85 — Graphic shifted A.
90 — Alternate spaces and graphic shifted Ys, 16 of each.

```
  20 PRINT TAB 10;"RIFLE RANGE"
  25 PRINT AT 5,0;"YOU MUST HIT
ALL THE TARGETS TO LEARN YOUR SH
ARPSHOOTER RATING."
  30 PRINT AT 10,0;"PRESS THE F
KEY TO FIRE.  PRESS 0 TO START"
  35 IF INKEY$<>"0" THEN GOTO 35
  40 CLS
  75 LET S=0
  80 LET D=0
  85 PRINT AT 20,15;"▒ RIFLE"
  90 LET A$="▚ ▚ ▚ ▚ ▚ ▚ ▚ ▚ ▚ ▚ ▚ ▚
 ▚ ▚ ▚ ▚ ▚ ▚ "
  92 PRINT AT 8,15;"FIRE"
  95 PRINT AT 10,0;A$
 100 IF INKEY$="F" THEN GOSUB 12
0
 105 LET A$=A$(2 TO )+A$(1)
 106 IF A$="
          " THEN GOTO 200
 110 GOTO 95
 120 IF A$(16)<>" " THEN LET D=1
 125 IF D=1 THEN LET A$(16)="*"
 130 PRINT AT 10,0;A$
 135 IF D=1 THEN PRINT AT 8,15;"
GOOD SHOT"
 140 IF D=0 THEN PRINT AT 8,15;"
MISSED"
 145 FOR J=0 TO 10
 146 NEXT J
 150 IF D=1 THEN LET A$(16)=" "
 155 PRINT AT 10,0;A$
 160 IF INKEY$="F" THEN GOTO 160
 165 PRINT AT 8,15;"PRIMING    "
 170 FOR Y=1 TO 15
 175 NEXT Y
 180 PRINT AT 8,15;"FIRE         "
 185 LET D=0
 190 LET S=S+1
 195 RETURN
 200 CLS
 205 LET A$=" ALL GONE-PRESS S F
OR YOUR SCORE"
 210 PRINT AT 10,0;A$
 215 IF INKEY$<>"S" THEN GOTO 21
5
 220 CLS
 225 PRINT AT 10,0;"16 TARGETS H
IT WITH ";S;" SHOTS"
 230 IF S>=36 THEN LET R$="OH DE
AR. WHY NOT TRY AGAIN?"
 235 IF S>=21 AND S<=35 THEN LET
 R$="*SECOND CLASS*"
 240 IF S<=20 THEN LET R$="***FI
RST CLASS***"
 250 PRINT AT 12,0;"SHARPSHOOTER
 RATING:-";,R$
 260 STOP
```

TOWNS, is one of the best programs we have received. It is an aid to teaching geography, with vivid flashing displays and a neat map.

The program was sent by T E Newham of Worcester Park, Surrey, and we cannot better his description:

"The program is designed to teach, or test knowledge of, the location of towns and the spelling of place names. It can run in two modes — Easy, in which town names are listed on the screen and, when a map location flashes, are identified by number; or Hard, in which only the map appears and the name of the flashing town must be entered, and spelt correctly without help.

"If two successive incorrect guesses are made, in either mode, the computer gives the correct answer. There is a scoring system to record performance." Graphics notes — all entries are for graphic shifted keys, except spaces which are inverse:

100 — Q; Q, space, 5; three spaces, W; 8, three spaces, Q; 8, four spaces, W, 6; 2, 8 five spaces, W; Q, four spaces, R, space; 6, two spaces, E, two spaces, W, 4; 2, 8, five spaces, W; Q, four spaces, R, space; 6, two spaces, E, two spaces, W, 4; R, seven spaces; 8, 6, 6, 5, W, space, Q, space, Q, three spaces; 3, ten spaces, 1; 7, 8, six spaces, W, two spaces, 6, Q, two spaces, W; 8, four spaces, E, eight spaces, Q; Q, five spaces, W, four spaces, R, to W spaces, 5; 6, Q, fourteen spaces; Q, 7, E, six spaces, Q, five spaces, 1; 2, R, E, 1, four spaces, R, space, W, W; 3, Q, Q, nine spaces, E; Q, five spaces, E, six spaces, E, 1; Q, five spaces, T, 7, 2, 2, E, 7, space, 7; 6, space, R, 5, space, 2, 7, space, 3, W; Q, E, 7.

920 — E, R, space, 5, T; 5, 8, two spaces; W, Q, space, 5, Y.

1020 — W, 8, space, E, R; E, Q, space, 5, 8; 5, R, space, W, Q.

1120 — J, M.

1230 — J, M.

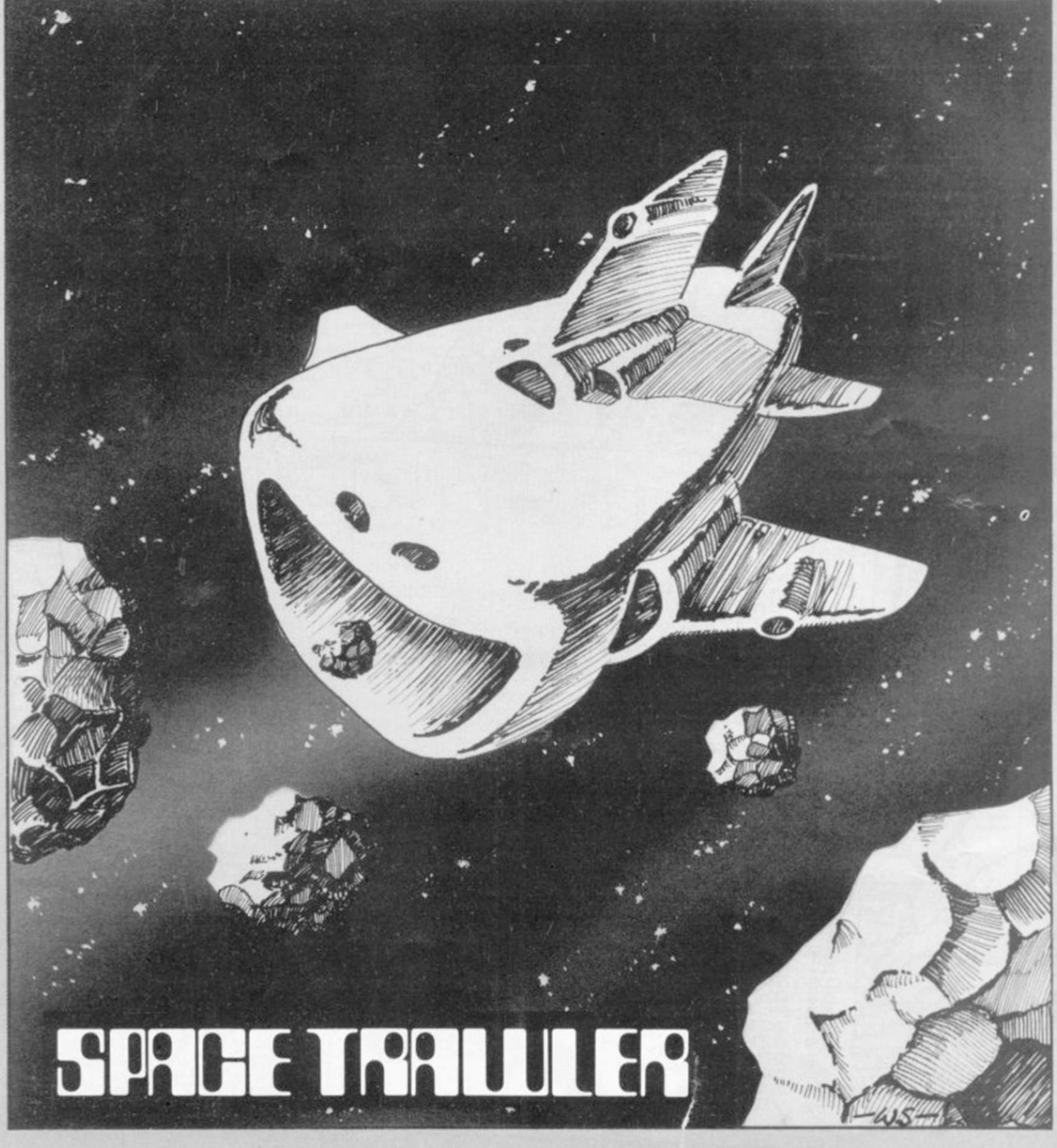
```
 10 REM "TOWNS"
 20 REM BY T.E. NEWHAM
100 PRINT AT 0,22;" ";TAB 21;"
";TAB 19;"                ";TAB 19;"
";TAB 20;"              ";TAB 20;"
";TAB 20;"            ";TAB 20;"
";TAB 16;"                  ";TAB 16;"
";TAB 17;"                    ";T
AB 17;"                  ";TAB 17;"
";TAB 15;"                ";TAB 15;"
";TAB 17;"                  ";TAB 1
9;"                ";TAB 17;"
";TAB 15;"              ";TAB 15;"
";TAB 14;"
200 DIM N$(22,15)
210 LET N$(1)="45 18BIRMINGHAM"
220 LET N$(2)="44 05BOURNEMOUTH"
230 LET N$(3)="42 09BRISTOL"
240 LET N$(4)="56 15CAMBRIDGE"
250 LET N$(5)="36 11CARDIFF"
260 LET N$(6)="47 17COVENTRY"
270 LET N$(7)="62 07DOVER"
280 LET N$(8)="47 28LEEDS"
290 LET N$(9)="41 25LIVERPOOL"
300 LET N$(10)="55 11LONDON"
310 LET N$(11)="44 25MANCHESTER"
320 LET N$(12)="46 37NEWCASTLE"
330 LET N$(13)="62 19NORWICH"
340 LET N$(14)="49 21NOTTINGHAM"
350 LET N$(15)="45 13OXFORD"
360 LET N$(16)="34 02PLYMOUTH"
370 LET N$(17)="50 05PORTSMOUTH"
380 LET N$(18)="50 10READING"
390 LET N$(19)="48 25SHEFFIELD"
400 LET N$(20)="47 06SOUTHAMPTON
"
410 LET N$(21)="35 12SWANSEA"
420 LET N$(22)="50 30YORK"
430 LET O=0
440 LET U=0
450 PRINT AT 5,14;"SCORE";TAB 1
4;"OR=";TAB 14;"NO=";
460 GOTO 600
500 LET O=0
510 LET R=INT (RND*22)+1
520 LET X=VAL N$(R,TO 2)
530 LET Y=VAL N$(R,3 TO 4)
540 UNPLOT X,Y
550 IF INKEY$="" THEN GOTO 550
560 IF INKEY$="O" THEN GOTO 750
570 IF INKEY$="A" THEN GOTO 850
580 PLOT X,Y
590 GOTO 540
600 PRINT AT 0,5;"EASY";AT 2,6;
"OR";AT 4,5;"HARD";AT 6,5;"(E/H
)";
610 PAUSE 4E4
620 IF INKEY$="E" THEN GOTO 700
630 IF INKEY$="H" THEN GOTO 500
700 PRINT AT 0,5;"    ";AT 2,6;
"    ";AT 4,5;"    ";AT 6,5;"
    ";
710 FOR I=1 TO 22
720 PRINT AT I-1,0;I;AT I-1,3;N
$(I,5 TO );
730 NEXT I
740 PRINT AT 0,24;"PRESS""0""";
TAB 26;"THEN";TAB 24;"INPUT NO";
TAB 24;"+NEWLINE";
750 GOTO 500
760 INPUT S
765 LET T=INT (S/12)
770 IF S=R THEN GOTO 900
780 IF S<>R THEN GOTO 1000
800 PRINT AT 0,3;"NAME THE";AT
4,4;"TOWN ";AT 6,4;"A";TO";TAB 0;AT
10,0;"PRESS ""A"" TO";TAB 0;"ANS
WER";TAB 0;"SPELL THE NAME
";TAB 0;"AND ""NEWLINE""";
810 FOR Y=1 TO 20
820 PRINT AT 2,0;"
```

SPACE TRAWLER is one of the best invaders games we have seen for the unexpanded ZX-81. You blast through a scrolled-up hyper-space attempting to avoid colliding with the dreaded black inverse spaces. On the way you must do your best to trawl up as many comets and asteroids as possible.

As the program stands, it is more a question of space dodgems than of amassing a high score but that could be amended easily by reducing the size of the black holes.

Congratulations to D Pickering of Bordon, Hampshire for cramming so much into so little.

```
  1 LET S=0
  3 LET H=15
 20 LET H=H+(INKEY$="8")-(INKEY
$="5")
 30 PRINT AT 3,H;
 40 LET P=PEEK (PEEK 16396+256*
PEEK 16397)
 50 LET S=S+(10 AND P=27)+(50 A
ND P=23)
 60 IF P=128 THEN GOTO 500
 90 PRINT (("U" AND INKEY$="")+(
"," AND INKEY$="5")+("." AND INK
EY$="8"));AT 10,RND*31;CHR$ 27;AT
 10,RND*31;CHR$ 23 AND RND>.75;A
T 3,H;CHR$ 0;AT 10,RND*27;"
"
 120 SCROLL
 130 GOTO 10
 500 PRINT AT 3,H;"";AT 15,14;S
```



THE EXPLORER'S GUIDE To The ZX81

The Book for the ZX81 Enthusiast.

By Mike Lord, 120 pages.

Programs for 1K RAM, and programs for 16K RAM. Games, Business and Engineering Applications. RAM & I/O Circuits. Useful ROM Routines. Hints and Tips.

£4.95

What Can I Do with 1K?

By Roger Valentine. A fresh and original book containing 40 programs and routines for the unexpanded ZX81.

£4.95

The ZX80 Magic Book

With 8K ROM/ZX81 Supplement

£4.75

Mastering Machine Code on your ZX81

By Toni Baker. 180 pages of immense value to beginner and expert alike.

£7.50

We welcome Access

VISA

ALL PRICES INCLUDE U.K. P & P AND 15% VAT WHERE APPLICABLE. OVERSEAS CUSTOMERS ADD £1.50 CARRIAGE PER ORDER.

TIMEDATA LTD Dept H 57 Swallowdale, Basildon, Essex SS16 5JG Tel: (0268) 411125 (MON-FRI)

TIMEDATA

20 ZX SPECTRUM PROGRAMS

500 usr def chrs generator
Tank battle/Alien chase
PSYCOL personality assessment
*** PLUS LOTS MORE ***
£4.95 inc VAT + P&P on cassette

40 essential PEEKS + POKES for your Spectrum and ZX81 including **BREAK IN** — get into any ZX81 auto run program —
Booklet — £2.00p.

ZX ASTEROIDS (ZX81 only)

(Spectrum version coming soon)
More attractive features than Raquel Welch — **£4.95p.**
5K m/c cassette — simply the best!

ELECTRIC PENCIL COMPANY
1 Mount Vernon, Hull
N. Humberside. Tel: 0482 825234
Trade enquiries welcome.

"THE BEST ZX81 BOOK"

THE ZX81 COMPANION



Bob Maunder

LINSAC

If you have a Sinclair ZX81 and want to use it to its full potential then, as the experts have all agreed, this is the book for you. It contains detailed guidelines and documented programs in the areas of gaming, information retrieval and education, as well as a unique listing of the 8K ROM for machine code applications.

'Far and away the best ... once again Linsac has produced the book for the serious end of the market'. – *Your Computer, November 1981.*

'The ZX81 Companion is a most professional product ... with many good illustrative programs, tips and warnings'. – *Education Equipment, October 1981.*

'Bob Maunder's attempt to show meaningful uses of the machine is brilliantly successful ... thoughtfully written, detailed and illustrated with meaningful programs ... To conclude – the book is definitely an outstandingly useful second step for the ZX81 user'. – *Educational ZX80/81 Users' Group Newsletter, September 1981.*

Send your cheque for **£7.95** (includes UK p&p) to:

LINSAC (SU) 68 Barker Road, Linthorpe, Middlesbrough TS5 5ES.

ISBN 0 907211 01 1

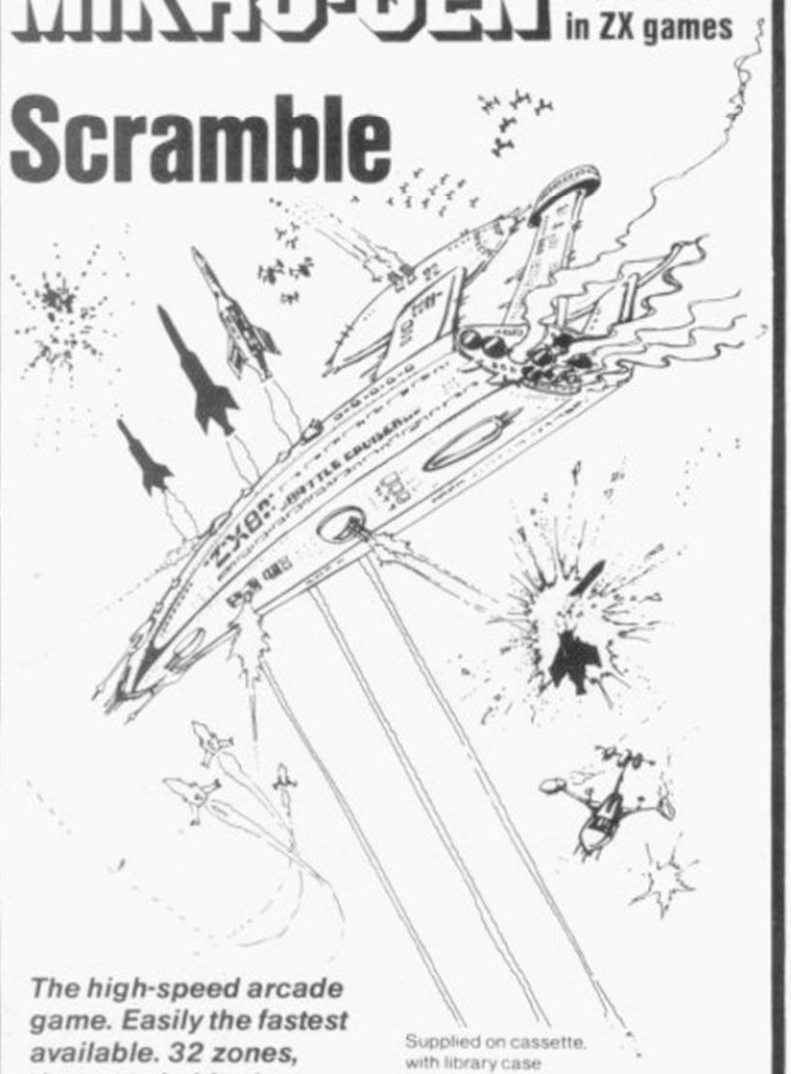
Price **£7.95**

from

MIKRO-GEN

the leaders in ZX games

Scramble



The high-speed arcade game. Easily the fastest available. 32 zones, thrust and altitude controls.

Supplied on cassette, with library case

ONLY £3.95

Other great ZX games and add-ons from Mikro-Gen:

Space Invaders
the best you can get, with ever-increasing rate of play

Breakout
with seven bat angles to make it really difficult

Bomber
positively addictive

ZX Chess
The original – and still the best!

Sorcerer's Castle
takes you into a world of magical adventure

Above games all supplied on cassette, with library case

£3.95 each (ZX Chess £6.50)

A/D Converter Board
Lets you connect analogue joysticks to the ZX81 digital inputs. Suitable for many other applications, easy to connect – and it improves RAM pack stability!

ONLY £18.50

Joysticks
Connect via our A/D Board – makes your ZX81 a true programmable games machine

ONLY £9.50 EACH

Disassembler/Monitor
An absolute must when learning machine code – lets you enter and run your own code

ONLY £3.95

Write for full details of the Mikro-Gen range of programs and add-ons, available from local stockists or direct from the manufacturers (please make cheques/PO's payable to Mikro-Gen and add 40p post & packing)

Suppliers of Software to Sinclair

MIKRO-GEN

24 Agar Crescent Bracknell Berks RG12 2BK
Tel: Bracknell (0344) 27317

ZX81 16K

TASWORD

WORD PROCESSING ON THE ZX81!

Your ZX81 becomes a word processor with TASWORD. Type in letters, documents and pictures, store them on tape, and edit and update existing documents. With a printer, which is not essential, you can print your documents.

TASWORD FEATURES INCLUDE

- **OVER 300 LINES** of text in a text file.
- **CURSOR CONTROL** and auto repeat on all keys.
- **SCROLL** up and down through the text file.
- **AUTOMATIC** word-wrap and right-justification.
- **FULL ZX81** character set including inverse characters and graphics symbols.
- **INSERTION AND DELETION** of lines and characters.
- **A HELP PAGE** onto the screen at the touch of a key.
- **CENTRE** text on the screen, and move text left and right.
- **REFORMING** of edited text to a neat layout with a single keystroke.

TASWORD TUTOR

We send you a manual and a cassette. One side contains TASWORD. The other side contains TASWORD and TASWORD TUTOR. This teaches you word processing using TASWORD. No programming knowledge is required to use TASWORD.

£6.50 fully inclusive

Mail order only. Allow up to 14 days delivery.

Please make cheques/P.O. payable to

TASMAN SOFTWARE

17 HARTLEY CRESCENT, LEEDS LS6 2LL

COMPUTACALC ZX

FAMILY BUDGET FIGURES

	DEC	JAN	FEB	MAR	APR	MA
MORTGAGE	167	167	167	167	167	16
PHONE	42			35		
GAS			62			31
ELECT.		43			35	
CAR	63	71	66	61	70	65
INSUR.	12	12	12	12	12	12
RATES			235			
TOTAL	284	293	544	275	284	27

An advanced spreadsheet program for the Sinclair ZX81 with 16K RAM.

This versatile software allows manipulation and inspection of data in the most convenient way ever. Ideal for financial planning, personal budgeting, cashflow analysis and countless other business, home, scientific and technical applications.

The screen acts as a window on a much larger grid (up to 38 × 38) of titles and numbers (up to 9 digits). Change one number or formula and all dependant results change automatically. Save on tape or printout for a permanent record.

Tasks that would take hours with pencil, paper and calculator can be performed in seconds with COMPUTACALC ZX.

Cassette and booklet — £7.95. Available from W.H. Smith, Better Computer shops and mail order from SILICON TRICKS, Dept S7, 2-4 Chichester Rents, London WC2 1EJ. (Tel: 01-603 6074)

Silicon Tricks

NOW AVAILABLE **SPECTRACALC** for Spectrum 16K & 48K — All features of computacalc ZX and more — **£12.95** mail order only.



U.S. firm makes a new printer

AN AMERICAN company, Mindware, has produced a blue-ink-on-plain-paper printer for the ZX-81. Having 16 characters per line, it cannot produce the full screen picture like the Sinclair printer but the user can set various modes to give the display he wants by POKEing a system variable 16417 with the mode required.

After that the printer will react like the Sinclair printer to COPY, LLIST and LPRINT. The port used is the same as the Sinclair printer and an EPROM in the printer controls its operation without taking-up any memory space.

Mode 1 is the screen split in half, the left-hand side being printed before the right-hand side; Mode 2 will be used for extra character sets in the printer; Mode 3 is for a 16-character line LIST and Mode 0 is used for LLIST.

The paper used is the same type as for till rolls and the ink cartridges are easily available. All graphics are printed. The printer costs £65. Mindware is at 70, Boston Post Road, Wayland, MA 01778 U.S.A.

stantly by typing-in RAND USR 16025.

It will then provide facilities such as a full renumber of GOTOs, as well as GOSUBs and line numbers, Find, Insert, Delete, Move, Copy and Keep Basic lines within a program. Keep and Insert store program lines above RAMTOP to be Inserted into another program. Alter allows you to search the program for a string of characters and replace them. A help instruction is also included, giving instructions on using ZXED.

The 4K EPROM is in the RAM socket provided on the graphics board and does not affect the use of the other EPROM. The cost of the EPROM is £9.95 from d'Ktrontics, 23 Sussex Road, Gorleston, Great Yarmouth, Norfolk. A keyboard is also available for the Spectrum complete with numeric pad for £30, plus £15 for the case, but you have to add £1.50 for postage and packing.



Mindware printer.

ZXED is now on EPROM

ZXED d'Ktronics Basic editor is now available on EPROM for those with the graphics board from the same firm. Instead of a long wait for the cassette to load, it is available in-

ZX-81 tests the temperature

CHESHIRE Micro Design has produced a temperature sensor for the ZX-81. The device, called the ZR3, plugs into the EAR and power sockets of a ZX-81 and can measure temperatures from -5 to +100 degrees centigrade.

The measurement time is one second and a USR machine code routine is provided as a listing or on cassette. The unit is hermetically-sealed and the probe can be up to 35 metres long; two metres is provided.

The probe returns a number between 500 and 2000. Accuracy is claimed to be to one degree centigrade.

The ZR3 can be obtained from Cheshire Micro Design, 66, Close Lane, Alsager, Stoke-on-Trent ST7 2TR. Tel: 093-63-6196. It costs £17.50 including post and VAT for the U.K. Foreign orders should add postage for 240 grammes.

Ad-Lib plot for graphics

A GRAPHICS plotter sheet for the ZX-81 is available from Ad-Lib for formatting your screen display. It consists of a plastic-coated paper sheet 8 by 11½in., with the screen PRINT squares on one side and the PLOT squares on the other.

On the PRINT side there is also a list of the graphics symbols. The sheets are supplied with an overhead projection pen which must be used. They can be reused by erasing the drawing with a damp cloth.

The cost of five sheets and one pen is £2.50 and a pack of coloured pens for formatting on the Spectrum is available at £4.75 from Ad-Lib, 2A Grovelands Avenue, Hitchin, Herts. Tel: 0462-56074.

Twin EPROM from Taurus

TAURUS Computer Design has produced two EPROMs on a board for fitting inside the ZX-81. The first contains a monitor plus an added dis-

continued on page 38



continued from page 37

assembler in 4K. The second contains an assembler for rapid translation of machine code programs into bytes on which the Z-80A can run.

Together they make a very powerful machine code facility which is available at switch-on by using a USR routine. The board fits underneath the keyboard and resides in the memory from 8K-16K.

There is also a word processing EPROM (4K) which will provide up to five character sets, including lower-case characters. The monitor, disassembler, assembler and character set are also available on cassette.

The board and monitor disassembler costs £30, the character set EPROM £10, and the assembler EPROM £12. Cassette versions — monitor £8.75, disassembler £6.50, character set £6.50, assembler £6.50; a user manual is provided with each. Taurus is at 47 High Street, Baldock, Herts SG7 6BG. Tel: 0492-893900.

Gordon keyboard

GORDON Electronics has produced a keyboard in a case which requires no soldering to attach it to the ZX-81. The pins provided on the end of the ribbon cable push into the keyboard sockets on the ZX-81 printed circuit board.

The cost of the keyboard is £25.50 and in its case it is £37.50, including VAT and postage.

Gordon Electronics, 76 Mountbatten Road, Braintree, Essex CM7 6TP. Tel: 0376-26048.

Memotech expansion

MEMOTECH has added three new black boxes to its range. A hi-res board — 192 x 256 pixels — can have its memory page anywhere in RAM and it can also have more than one of the 6.5K pages stored in memory for rapid graphics. The hi-res can be used with any of the company's RAM packs, including the new 32K.

The 32K RAM pack can have an existing 16K RAM pack — not only from Memotech — added to give 48K of usable memory.

The black box is a Centronics-parallel port plus driving software to run a printer. The 32K RAM costs £49.95, Hi-res £61.80, Centronics port £41.90.

Memotech Ltd, 3 Collins Street, Oxford OX4 1XL. Tel: 0865-722102.

Mansfield printer paper

MANSFIELD Computers and Electronics now supplies printer paper at £10.95 for six rolls, as well as software and books for the ZX user. Mansfield Computers and Electronics is at 76 Ratcliffe Gate, Mansfield, Notts NG18 2JB. Tel: 0623-31202.

New for ZX81 users

EVEN MORE MEMORY WITH OUR BYGER BYTE 32K+ RAM PACK

Why put aside your 16K RAM Pack when you can use it together with the new Byger Byte 32K + Ram Pack to give you **48K of memory.**

No trailing leads or wires — all you need do is plug the existing 16K Ram Pack into the back of the new Byger Byte 32K + Ram Pack and **Bingo 48K of memory.**

Uses existing power supply. New 32K Ram Pack is tested and guaranteed with the following 16K Ram Packs-Byg Byte, Sinclair, Downsway.

Also available: 16K Ram Packs £22, new 32K + Ram Pack £39.50, Standard 32K Ram Pack £35, 64K Ram Pack £53.95. Tape loading interface for trouble free loading of program £9.50. New high quality keyboard with bleep and reset £49.95.

All prices are inclusive of VAT and free postage and packing.

Name _____

Address _____

Make cheques payable to Pheonix Marketing and I enclose my cheque/PO for £_____

Please debit my Access/Barclay Card

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Date _____

Signature _____

● New 32K Ram Pack	£22.00	☐
● Standard 32K Ram Pack	£39.50	☐
● 64K Ram Pack	£53.95	☐
● Tape boarding interface	£9.50	☐
● New high-quality, fully cased keyboard	£49.95	☐

● *Please indicate order by ticking boxes*

PHEONIX MARKETING
OAKLANDS HOUSE, SOLARTRON ROAD, FARNBOROUGH, HANTS.
TEL: (09552) 514990

GREAT NEWS for ZX81 AND Spectrum owners!

HIRE ZX cassettes for just £1 each!

Why pay up to £10 or more for a single cassette of programs—which may only interest you for a while—when you can hire from a vast range of 130 programs for just £1 (plus 25p p/p) for a fortnight!

Software Library caters for users of ZX81 (1K and 16K) **and** Spectrum —and it's ideal if you're thinking of upgrading, for you can switch to tapes suitable for your new hardware at any time, at no extra cost, knowing you haven't tied up your money unnecessarily.

Subjects include exciting machine-code games, educational, toolkit and home/club/business utility programs. **ALL** cassettes are genuine commercial originals, and a free quarterly newsletter packed with tips keeps you up-to-date with new introductions.

SPECIAL OFFER! Join NOW and get your first tape on **FREE** hire!

SU

S-L

The Sinclair Owners' SOFTWARE LIBRARY

Heather Cottage, Warren Road,
Liss, Hants GU33 7DD.

I'd like to join the Software Library for the next 12 months, and enclose my membership fee of £5. Please send my first program tape on free hire, plus a list of others available. I understand that I am under no obligation to hire any minimum number of further tapes, and that if I'm dissatisfied with my first tape you will refund my money in full and without question.

NAME.....

ADDRESS.....

.....Tel.No.....

I own a Sinclair ZX81 1K / ZX81 16K / ZX Spectrum (delete as appropriate)

ZX Educational Software

Spectrum Junior Education £5.50

Use your Spectrum to help your children with their school work. This cassette contains eight attractive, easy-to-use programs for the 7 to 11 age group.

Topics include English comprehension, spellings, homophones, junior science, maths and history.

Entering your own questions and answers allows you to adapt two of these programs for exercises in any subject area.

Moving colour graphics and sound are extensively used to improve motivation.

Suitable for 16K and 48K machines. User documentation supplied with the cassette.

O-Level Chemistry (C1) £5.50

This cassette contains four clearly presented revision/tutorial programs. The subject matter has been carefully structured to cover the most important aspects of:

* Elements, compounds and mixtures.
* Structure, bonding and properties.
* Redox, electrolysis and the activity series.
* Acids, bases and salts.

48K Spectrum and 16K ZX81 versions of the cassette are available. Please specify which you require.

Professional Computer Assisted Learning materials from:

CALPAC COMPUTER SOFTWARE
108 Hermitage Woods Crescent, St Johns, Woking, Surrey GU21 1UF.

Overseas orders: £6.50 ($11.60) per cassette; includes AIRMAIL postage.

SILVERSOFT personal computer software

ZX81/16K SOFTWARE

☐ **"STARTREK"** £4.95

16K STARTREK: Exciting space adventure game including klingons starbases, phasors, 8 × 8 galaxy, 4-levels of play, long and short range scanners, etc.

☐ **"SUPER-WIMPUS"** £4.95

16K SUPER WUMPUS: Can you hunt and catch the mysterious wumpus in his underground labyrinth? Intriguing underground adventure.

☐ **"GRAPHIC—GOLF"** £4.95

16K GRAPHIC GOLF: Try out your golfing expertise, on the computer's golf course, 18-different graphically display holes. Hazards, include lakes, trees, wind, rough etc.

☐ **"GAMES PACK 1"** £4.95

16K GAMES PACK 1: Fantastic value for money, nearly 50K of programs on one cassette. Five games including "Real Time Graphic" Lunar Lander, Starwars, Hammurabi, Minefield, Mastermind.

ZX-ARCADE ACTION

☐ **NEW!! "MUNCHER!!"** £5.95

At last Pacman for your ZX-81, all the arcade features plus!? software for the QS character board.

☐ **"SPACE-INVADERS"** £4.95

Simply the best yet, the closest thing to real Invaders on the ZX81. Full arcade features! including 1 or 2 player option and software to drive the QS character-board.

☐ **"ASTEROIDS"** £5.95

Authentic representation of the arcade game including L, R, thrust and fire controls, 5-levels of play and alien spaceships.

☐ **"DROPOUT"** £5.95

Exciting NEW arcade game. Can you destroy the aliens before they build up in their atomic plies and overwhelm you.

Dealers enquires welcome, generous discounts.
When ordering 2 or more deduct £1.00. Send S.A.E. for Catalogue.
Tick boxe(s) required.
Cheques/POs payable to "SILVERSOFT".
Name .....
Address .....
.....

WANTED ZX81, Spectrum. BBC Micro Software

Excellent Royalties — S.A.E. for details.
All Arcade games run in 4K

SILVERSOFT (Dep. SU7)
35 Bader Park, Bowerhill,
Melksham, Wiltshire.

HILDERBAY LTD
Professional Software

SPECTRUM SOFTWARE now available!

Details from us.
48K Payroll £25 until 21 September

Tape recorder suitable for microcomputer use, aligned and tested on computer signals **£22 + £2 p&p.**

Hiderbay Loading Aid. Load your microcomputer from tape first time every time! **£5.95.**

ZX-81 16K RAM packs, comprehensively tested (for bad bits, addressing faults, printer, saving) £30.

HILDERBAY SUMMER ZX-81 SALE

Beamscan (beam analysis) **Payroll** **Stock Control**	**£13 each**
Optimax	**£20** until 21 September
Budget I & II	**£9** (2 programs)
Time Ledger **Critical Path**	**£8 each**
Financial Pack I **Gold**	**£5 each**

These programs have been described and reviewed previously (or we can prove details).

All prices include VAT, and are post free. Sale prices are valid until 21 September 1982. Free updates, comprehensive telephone and personal support, and competition prizes are not available for summer sale purchases.

HILDERBAY LTD
Professional Software
8/10 Parkway
Regents Park
London NW1 7AA

Tel: **01-485 1059** *Telex:* **22870**

GAMES PACK
Beat this for value! Five 16K programs Plus two 1K programs

3-D Battle (M/code - 1K)
City Bomb (M/code - 1K)
Warp Wars (Basic & M/code - 16K)
Snake (Basic 16K)
Sweet Tooth (Basic & M/code - 16K)
Slalom (Basic 16K)
Black Holes (Basic 16K)

ALL ON ONE CASSETTE FOR ONLY £4.95 ($9.90)

NEW
GRAPHICS TOOLKIT
(another masterpiece by Paul Holmes)

22 exciting MACHINE CODE routines that give you control over your screen as never before!

(ZX81 - 16K RAM ONLY)

Draw/Undraw draws or deletes your multi-character shape which is defined in a REM statement.
Foreground On/Off use this to 'protect' existing characters on your screen.
Border/Unborder draws a border round the edges of your screen area. Edit lines can be used if required.
Fill fills any number of lines you specify, starting at any line you specify, by your chosen character.
Reverse converts all characters to their inverse video, control as in FILL.
Print Position Controls UP, DOWN, LEFT, RIGHT. Alter your next PRINT position in the direction indicated.
Editprint moves next PRINT position to first edit line.
Scroll Facilities UPSCROLL, DOWNSCROLL, RIGHTSCROLL, LEFTSCROLL. Scroll your screen in the direction indicated.
Onscreen/Offscreen turns your screen on or off.
Background On/Off fills your screen by your specified character.

An ESSENTIAL addition to your 16K RAM ZX81
TOOLKIT
(written by Paul Holmes)

Provides the following additional facilities:-

Line renumber - you state starting number and increment value. GOTO's and GOSUB's included in line renumber.
Search and List - searches for and lists every line containing specified character.
Search and replace - changes every occurance of a character as you require.
Free space - tells you how many free bytes you have left.
Search and Replace will search the screen for every occurrence of the character you specify and replace it with your new character.
Square draws a square or rectangle from your specified co-ordinates.

All these routines are in machine code for SUPER-FAST response! GRAPHICS TOOLKIT uses only 2K of your RAM and that includes space to load the programmers TOOLKIT described above.

ALL FOR ONLY £5.95 ($11.90)

This includes a cassette with 2 copies of the program, 2 copies of a demonstration program plus a comprehensive instruction booklet with examples.
All prices are fully inclusive.

SPECIAL GRAPHICS ROUTINES

Hyper graphics mode - graphics never seen on a ZX81 before.
Fill - fills your screen instantly with your specified character.
Reverse - changes each character on your screen to its inverse video.
TAPE ROUTINE - provides a system WAIT condition until a signal is received in the cassette ear jack.

All these routines are written in machine code and together take up only 1K of your precious RAM -an incredible achievement!!

FOR 16K ONLY £4.95 ($9.90)

NEW
BATTLESHIPS & CRUISERS GAME
(16K - ZX81)

First computer version of this popular game of strategy and tactics. Both grids on view together. Establish the position of your fleet then locate and destroy the computer's fleet. Visual display shows hits and misses made and gives running score.

ONLY £4.95 ($9.90)

As reviewed in 'Your Computer' March 1982
16K RAM PACK
ONLY £26.50 (347.70)

Quite simply the best available plus FREE 'Alien Attack' (7K-M/code) on cassette - Value £5.75 ($11.00).



Fully built tested and guaranteed. Uses existing power supply (min. 600 m.a.)
Compatible with printer.
No wobble problems.
Gold plated edge connector for perfect contact with your ZX81.
Normally despatched within 10 days of receipt of your order.

With advances in microtechnology we are now able to offer the **64K RAM PACK.**
Same quality as the 16K but giving massive memory to your ZX81, with external dimensions no larger than the 16K Ram Pack (above).
ONLY £62.95 ($119.95).

OVERSEAS CUSTOMERS PLEASE NOTE: ALL PRICES ARE APPLICABLE FOR EXPORT, INCLUDING AIRMAIL POSTAGE. PAYMENT MAY BE MADE IN STERLING (MONEY ORDER AVAILABLE AT YOUR BANK) OR YOUR OWN U.S. $ CHEQUE, MADE PAYABLE TO *JRS SOFTWARE*. DESPATCH NORMALLY 7 DAYS FROM RECEIPT OF ORDER.

JRS SOFTWARE
19 WAYSIDE AVENUE, WORTHING, SUSSEX. BN13 3JU Telephone: (0903) 65691

ZX Software

SCREEN KIT 1 — MORE POWER TO YOUR SCREEN in Basic programs

BORDERS - any size - anywhere on screen
SCROLL - in ALL FOUR directions
FILL SCREEN - any graphic or character
CLEAR and REVERSE PART OF SCREEN - any part
FLASHING CURSOR - anywhere on screen - simulates INPUT

ZX81 4K to 64K most routines work on ZX80 8K ROM

with **DATA FILES** and MEMORY LEFT

SAVE BASIC VARIABLES on cassette
LOAD back into ANY program
all at DOUBLE SPEED

- 880 bytes of machine code gives **INSTANTANEOUS SCREEN RESPONSE.**
- Becomes part of your Basic program.
- No need to Load separately.
- Can be added to existing program.

SUPERB VALUE £5.70 Inc VAT & P+P C.W.O.

ZX-MC — MACHINE CODE DE-BUG/MONITOR

At last, **COMPLETE FREEDOM FROM BASIC** for machine code programmers

- Versatile entry commands for Hex code and String entry.
- Comprehensive Run & De-bug commands, including REGISTERS DISPLAY & BREAKPOINTS.
- Hex dump to printer for hard copy.
- 16 essential commands for M/C programming.
- Occupies 2½K RAM in Basic area.
- Supplied on cassette with 36 page manual.

- **SAVE, LOAD, VERIFY AT DOUBLE SPEED** from any part of RAM.
- Fast machine code routines operating from Basic area of RAM.
- Write your M/C programs above Basic area Screen memory (D-FILE) never moves.
- SELF CONTAINED design, for the serious programmer - cannot be used with Basic programs.

£7.50 Inc VAT & P+P C.W.O.

ZX81 4K to 64K ZX SPECTRUM version available soon

REM-LOAD — MACHINE CODE ENTRY/DE-BUG

- A version of ZX-MC without the SAVE/LOAD/VERIFY facilities.
- **ENTER, RUN, DE-BUG** machine code in Basic REM lines.
- Operates from above RAMTOP.
- Compatibility with Basic.
- Supplied on cassette with 30 page manual, for ONLY —

£6.95 Inc VAT & P+P C.W.O.

ZX81, 16K to 64K ZX SPECTRUM version available soon

SAE for more details of software

Picturesque

6 CORKSCREW HILL, WEST WICKHAM, KENT BR4 9BB
Mail order only — Allow 14 days delivery
PLEASE SEND FOR DETAILS OF SPECTRUM SOFTWARE



Andrew Hewson.



Data handling can be achieved on ZX-81

I CANNOT claim that the column has a theme this month, as the letters in my postbag have been too varied; it must be something to do with the weather. John Perry of New Malden, Surrey, writes: **"I have been trying to convert a program written for the TRS-80 but the program uses DATA and READ statements which are not available on the ZX-81. I am considering jumping on the machine because if it cannot handle data it is useless."**

There is a solution to the problem but first let me explain that DATA and READ statements provide a method for declaring the value of variables at the time the program is written, to save the user from entering the items at run-time. For example, the lines:

```
10 DATA 1, 2, 3
20 READ A, B, C
```

will assign the values 1, 2 and 3 to A, B and C respectively every time the program is RUN. The same effect could, of course, be achieved by using

```
10 LET A = 1
15 LET B = 2
20 LET C = 3
```

The real power of DATA and READ statements is that they allow the programmer to change the values of variables during execution. For example:

```
10 DATA 1, 2, 3, 4, 5, 6
20 READ A, B, C
.
.
.
.
.
1000 READ A, B, C
```

will cause A, B, C to take the values 1, 2, 3 initially and then 4, 5, 6 at line 1000. Once again, the same effect could be achieved using LET statements and so the ZX-81 Basic programming manual is correct in pointing out on pages 145 and 146 that READ and DATA are more or less superfluous instructions.

To prevent Perry jumping on his ZX-81, here is a method of simulating READ and DATA:

```
10 PRINT "INITIALISE,
CALCULATE OR SAVE*(I,C,S)?"
20 INPUT Z$
30 GOTO 10 + 40*(Z$ = "I")
+ 190*(Z$ = "C") +
1990*(Z$ = "S")
50 PRINT "INITIALISE",,"ENTER
TEN SETS OF THREE
CONSTANTS"
60 DIM B(3,10)
70 FOR I = 1 TO 10
80 FOR J = 1 TO 3
90 INPUT B(J,I)
100 NEXT J
110 NEXT I
120 PRINT "INITIALISATION
COMPLETE"
130 GOTO 10
.
.
.
.
.
2000 PRINT "SAVE ROUTINE",,
"ENTER PROGRAM NAME"
2010 INPUT Z$
2020 SAVE Z$
2030 GO TO 10
```

For the purposes of the demonstration I have assumed that the important part of the program lies between lines 200 and 1999. The initialising routine at lines 50 to 130 asks the user to enter the values which simulate the DATA statement. Those values need only be entered once, because the save routine at line 2000 saves both the program and the variables on cassette and then jumps back to the beginning of the program.

Next time the program is loaded from cassette it will "come in running" and jump back to line 10 with the values of all the variables, in particular the values in array B, still intact. He is then free to transfer the values out of the array later in his program.

In fact, once the values of B are established, lines 50 to 130 are redundant and could be deleted by entering each line number in turn in the usual way — see my answer to Mike Chandler later for a more interesting method. It is important, however, not to start a program by using RUN if you want to retain the variables. You should use GOTO 1 or some other appropriate line number instead.

John Randall of Woking, Surrey, should note the use of GOTO instead of RUN. He writes: **"Can you suggest a programming technique so that initials and a score are**

continued on page 42





continued from page 41

keyed-in and retained during saves to enable a best-score system to operate for games?"

I have been asked that kind of question a surprising number of times. The answer is that so long as you do not use RUN, NEW or CLEAR, all your variables are retained. They are also copied on to cassette during SAVE and copied back into memory during LOAD.

"Deleting lines by entering their line numbers in turn is a nuisance. Is there a method for deleting blocks of lines?" asks Mike Chandler of Glasgow.

There is, because the length in bytes of each line is held in two locations immediately following the line number and we can manipulate them to our advantage. To see the line length, clear your ZX-81 by entering NEW and then enter the following line:

10 REM

Then PEEK at the first few bytes in the program area which starts at 16509 and you will see:

Address	Contents	Meaning
16509	0	line number =
16510	10	256*0 + 10 = 10
16511	2	line length =
16512	0	2 + 256*0 = 2
16513	234	code for REM
16514	118	code for newline

Notice that the line length excludes the four bytes required for the line number and the line length. The following routine finds the address of the first byte of two lines entered by the user:

```
9000 DIM B(2)
9101 LET START = 16509
9020 PRINT "ENTER FIRST AND
LAST LINE NOS"
9030 INPUT B(1)
9040 INPUT B(2)
9050 IF B(1)< 0 OR B(2)<
OR B(1)> 9999 OR
B(2) 9999 THEN GOTO 9020
9100 FOR I = 1 TO 2
9110 LET L = PEEK (START + 2)
 + 256*PEEK (START + 3)
9120 LET LINEND = 256*PEEK
START + PEEK (START + 1)
9130 LET START = START + L + 4
9140 IF LINEND< B(I) THEN GOTO
9110
9150 LET B(1) = START —
(L + 4)*(I = 1)
9160 NEXT I
```

The routine finishes with the two addresses held in B(1) and B(2). The next trick is to fool the ZX-81 into thinking that all the lines between and including the two line numbers are just one monster line by POKEing the difference between B(2) and B(1) less 4 into the slot for the line length of the first line. That is achieved by adding the lines:

```
9200 LET B(2) = B(2) — B(1) —4
9210 POKE B(1) + 2, B(2) —
256*INT (B(2)/256)
9220 POKE B(1) + 3, INT (B/2)/256)
```

The monster line can then be deleted in the usual way, by entering the line number alone.

Derek Chadwick of Kingston, Surrey, has an interesting question. He asks: **"Is there any way of lining-up figures by the right? I am calculating interest amounts to two decimal places".**

The following routine will round to two decimal places the data entered at line 20 and right-justify the figure printed at line 80. Notice that 0.5 is added in the calculation to round the number in line 30 because the INT function always rounds-down. If the 0.5 were not present, then 9.877, for example, would be rounded-down to 9.87 when it should be rounded-up to 9.88.

The print position is determined by converting the value of I to a string and then calculating where the decimal point occurs; it functions correctly even if I is an integer and hence has no decimal point.

```
10 LET D$ = "."
20 INPUT I
30 LET I = INT (100*I + 5)/100
40 LET ZS = STR$ I
60 IF ZS (J) = D$ THEN GOTO 80
70 NEXT J
80 PRINT AT 21, 16-J; Z$
90 SCROLL
100 GOTO 20
```

Janet Peterson of Grove asks: **"Is it possible for a cassette tape to wear out? I am a teacher and my class has used a commercial cassette of games many times but I am finding it increasingly difficult to load."**

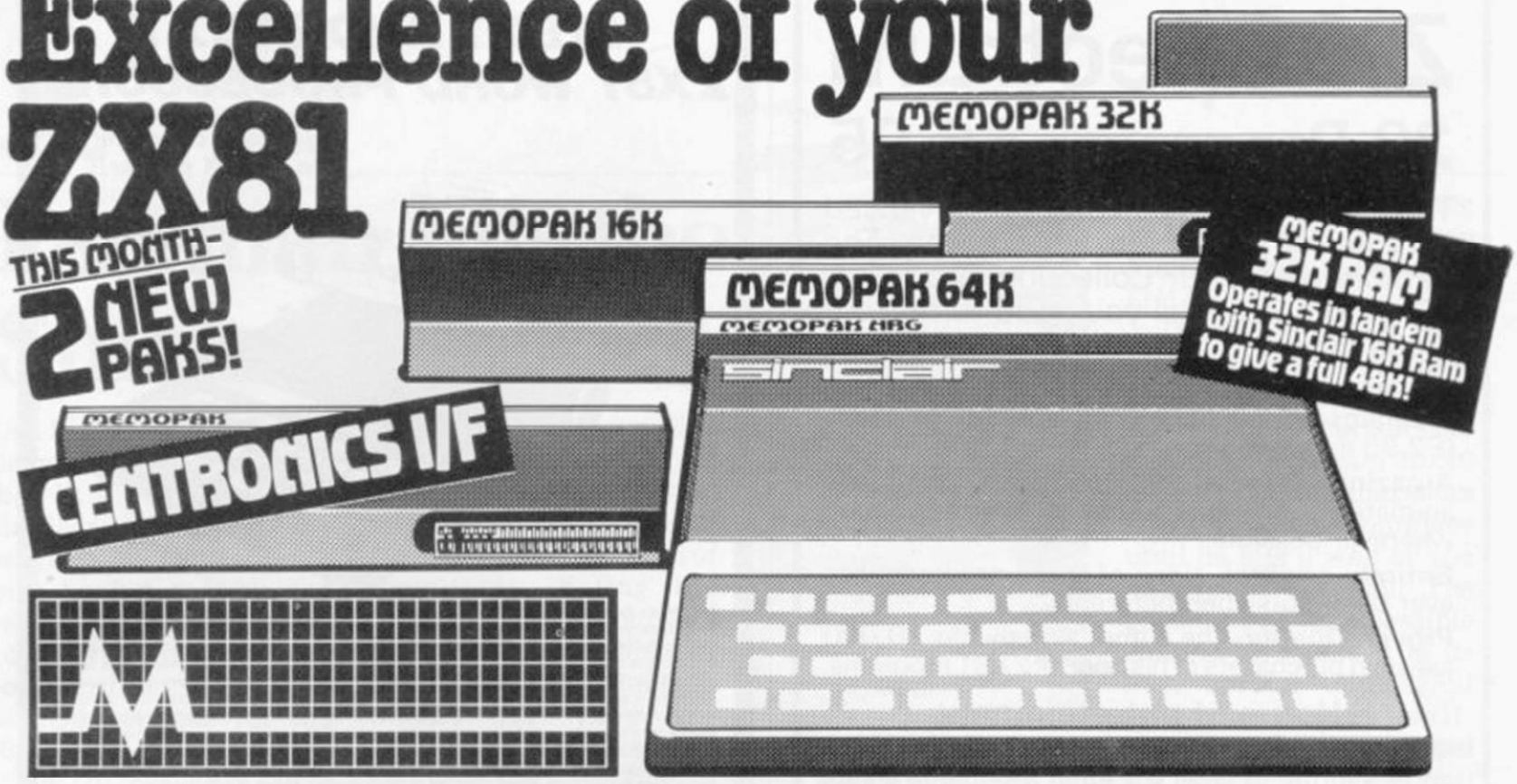
Yes, magnetic tape will fail eventually. There are several problems. First, simply reading a cassette degrades the signal stored on it by a small amount so if you LOAD from it many times the signal will become weak. Second, if you leave a cassette untouched the signal from each layer of tape will print through on to the next, causing an eventual degradation of the tape. Finally, if you always stop the cassette at the same place and then re-wind it, the tape will stretch.

My advice is always to make a second copy of important cassettes. If you have a commercial cassette which you cannot copy because you cannot break the program while it is running, then "exercise" the cassette regularly by re-winding it completely. That will help to avoid print-through and stretch.

©Hewson Consultants, 1982.

●Please address problems and queries to Andrew Hewson, Helpline, Graham Close, Blewbury, Oxfordshire.

MEMOTECH Explores the Excellence of your ZX81



Memotech's Memopak Range

All five of the currently available Memopaks are housed in elegant black anodised aluminium cases, and are styled to fit wobble-free onto the back of the ZX81, allowing more add-ons (from Memotech or Sinclair) to be connected.

£68.70 plus VAT

MEMOPAK 64K MEMORY EXTENSION

The 64K Memopak extends the memory of the ZX81 by 56K, and with the ZX81 gives 64K, which is neither switched nor paged and is directly addressable. The unit is user transparent and accepts commands such as 10 DIM A(9000).
Breakdown of memory areas...0-8K-Sinclair ROM. 8-16K-This area can be used to hold machine code for communication between programmes or peripherals. 16-64K-A straight 48K for normal Basic use.

£43.43 (32K) / £26.00 (16K) plus VAT

MEMOPAK 32K and 16K MEMORY EXTENSIONS

These two packs extend and complete the Memotech RAM range (for the time being!) A notable feature of the 32K pack is that it will run in tandem with the Sinclair 16K memory extension to give 48K RAM total.

£52.00 plus VAT

MEMOPAK HIGH RES GRAPHICS PACK

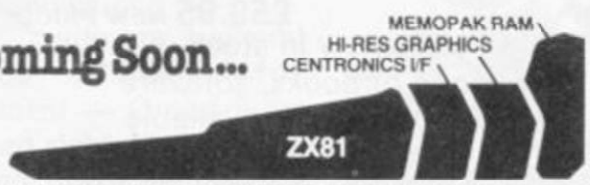
HRG Main Features — • Fully programmable Hi-Res (192 × 248 pixels) • Video page is both memory and bit mapped and can be located anywhere in RAM. • Number of Video pages is limited only by RAM size (each takes about 6.5K RAM) • Instant inverse video on/off gives flashing characters • Video pages can be superimposed • Video page access is similar to Basic plot/unplot commands • Contains 2K EPROM monitor with full range of graphics subroutines controlled by machine code or USR function

£34.70 plus VAT

MEMOPAK CENTRONICS TYPE PARALLEL PRINTER INTERFACE

Main Features — • Interfaces ZX8I and parallel printers of the Centronics type • Enables use of a range of dot matrix and daisy wheel printers with ZX8I • Compatible with ZX8I Basic, prints from LLIST, LPRINT and COPY • Contains firmware to convert ZX8I characters to ASCII code • Gives lower-case characters from ZX8I inverse character set

Coming Soon...



A complete range of ZX81 plug-in peripherals

Digitising Tablet **RS232 Interface**

Access/Barclaycard Holders Please Tel. Oxford (0865) 722102 (24 Hrs)

We regret we are as yet unable to accept orders or enquiries concerning the above products, but we'll let you know as soon as they become available.

© R. Branton & G.A.C. Boyd 1982

Please make cheques payable to MEMOTECH Ltd.

Please Debit my Access/Barclaycard* account number

*Please delete whichever does not apply

Please send me	Price	No	Total
64K RAM £68.70 + £10.30 VAT	£79.00		
32K RAM £43.43 + £6.52 VAT	£49.95		
16K RAM £26.00 + £3.90 VAT	£29.90		
HRG £52.00 + £7.80 VAT	£59.80		
CENTRONICS I/F £34.70 + £5.20 VAT	£39.90		
Packaging & Postage £2.00 per unit			
		TOTAL ENC	

SIGNATURE _____ DATE _____

NAME _____ ADDRESS _____

_____ TELEPHONE _____

We want to be sure you are satisfied with your Memopak – so we offer a 14-day money back Guarantee on all our products.

Memotech Limited, 3 Collins Street, Oxford OX4 1XL, England Tel: Oxford (0865) 722102 Telex: 837220 Orchid G

ZX Spectrum
20 Programs £6.95

The ZX Spectrum has brought advanced computing power into your home, The Cambridge Colour Collection, a book of 20 programs, is all you need to make it come alive.

No experience required. Simply enter the programs from the book or load them from tape (£2.95 extra) and run.

Amazing effects. All programs are fully animated using hi-res graphics, colour and sound wherever possible.

Entirely original. None of these programs has ever been published before.

Proven Quality. The author already has 30,000 satisfied purchasers of his book of ZX81 programs.

Hours of entertainment

- **Lunar Landing.** Control the angle of descent and jet thrust to steer the lunar module to a safe landing on the moon's surface.
- **Maze.** Find your way out from the centre of a random maze.
- **Android Nim.** Play the Spectrum at the ancient game of Nim using creatures from outer-space.
- **Biorhythms.** Plot the cycles of your Emotional, Intellectual and Physical activity. Some would say this is not a game at all.

Improve your mind

- **Morse.** A complete morse-code training kit. This program will take a complete beginner to R.A.E. proficiency.
- **Maths.** Adjustable to various levels, this program is an invaluable aid to anyone trying to improve their arithmetic.

Run your life more efficiently

- **Home Accounts.** Keeping track of your finances with this easy-to-use program will enable you to see at a glance where the money goes and plan your spending more effectively.
- **Telephone Address Pad.** Instant access to many pages of information.
- **Calendar.** Displays a 3 month calendar past or future, ideal for planning or tracing past events.

ORDER FORM:

Send Cheque or P.O. with order to:–
Dept. D., Richard Francis Altwasser, 22 Foxhollow, Bar Hill, Cambridge CB3 8EP

Please send me

☐ Copies Cambridge Colour Collection Book only £6.95 each.
☐ Copies Cambridge Colour Collection Book & Cassette £9.90 each

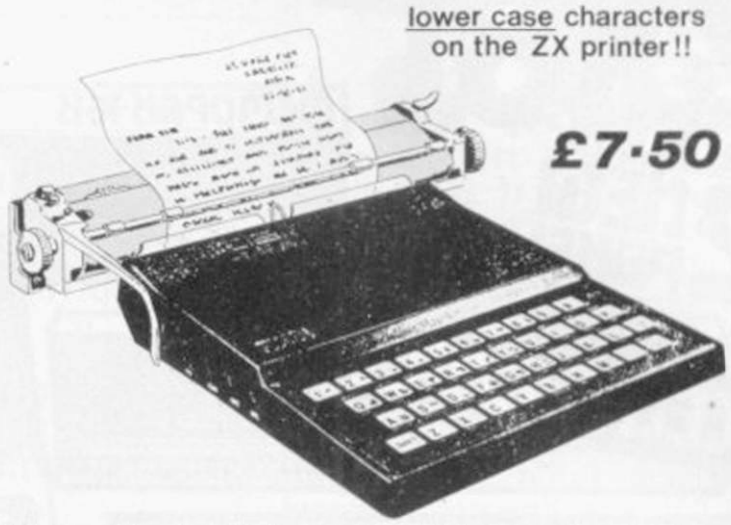
Name: _____

Address: _____

_____

LTEXT AND ZTEXT
ZX81 WORD PROCESSORS

lower case characters on the ZX printer!!



£7·50

No longer need you be confined to space games, battleships and the like. With these programs your ZX81 becomes a viable commercial machine. ZTEXT (upper case characters only) and LTEXT (upper and lower case characters) are word processors which incorporate a text editor and a formatter/printer. The text editor allows you to type test in and edit it. The formatter/printer takes the text and sends it to be screen or ZX printer, justifying it and formatting according to commands embedded in the text. Included in the range of commands are such useful operations as string search, string replacement and a merge facility enabling a skeleton document to be filled with variable information. LTEXT caters for both upper and lower case characters. No, that is not a misprint. By utilising the high resolution graphics feature of the ZX printer Graham Asher has built a complete set of lower case characters. These program come complete with a detailed manual.

Send 95p (redeemable against first order) for full catalogue and FREE listing. Please state ZX81 on order.
All prices include VAT and P&P available from
Oasis Software, Lower North Street, Cheddar, Somerset.
Tel: Cheddar 743409
Dealer enquiries welcome

ACCESS ORDERS TAKEN BY PHONE 24 HOURS A DAY

OASIS SOFTWARE



Sinclair ZX81 microcomputer
now at Cambridge Computer Store!

ZX81 Assembled	**£69.95**
ZX81 Kit	**£49.95**
16K RAM	**£29.95** *NEW PRICE*
Printer	**£59.95** *NEW PRICE*

All units now in stock
Wide range of books, software and DCP packs also available in our 'Budget Micros' department.

Cambridge Computer Store

1 Emmanuel Street, Cambridge CB1 1NE
Phone (0223) 358264/65334

Also: Acorn Atom • VIC-20 • Tandy TRS-80



Pac-man hits the Sinclair scene

PAC-MAN, the colourful chomping video game from the U.S., has hit the Sinclair scene with a vengeance. Not content with having a book and even a hit record about it, no fewer than three companies have developed versions for the 16K ZX-81.

The DJL Software **Zuckman** is written in 10K of machine code and has all the addictive features of the original within the limitations posed by the ZX-81 character set. You are the gobble-man ("0") being chased by the ghosts — inverse commas — as you make your way round the 29x21 maze, eating the dots in your path.

One of the reasons for the enormous popularity of Pac-man is the way he hunter can be eaten by the game; if you eat one of the four corner "energy posts", the ghosts change their appearance and you can then chase them and win a bonus if you catch them.

You have to be careful, as, after a few seconds, they revert to their old nasty selves.

DJL made an unusual choice of keys for movement — Q and P for left and right, M and X for up and down — but the knack can soon be acquired. Zuckman costs £5.95 from DJL Software, 9 Tweed Close, Swindon, Wiltshire.

In the Babtech **Zedman,** you are a mouse in a 19x19 maze; the standard cursor controls are used for movement. The four ghosts move from the central area one after another and roam the maze in search of their prey. Eating the dollar signs in the corners makes the ghosts edible for a short time but Babtech warns that they are slippery creatures and may pass you if you rush at them.

You have three lives but if you find it all too easy you have 10 skill levels



from which to choose to keep you on your toes.

The 4K machine code Zedman is complete with **Spacers,** an invaders-type program, giving two arcade games for £5.95. Babtech is at 3, Bakerton Mains View, Edinburgh, EH14 3BR.

The third Pac-man look-alike is the Abersoft **Mazeman,** which also uses the standard cursor controls, this time on a 30x20 maze. Once the mazeman starts moving he continues until he hits a wall or you change his direction. The ghosts have four possible shapes; A means it is its own normal unpleasant and dangerous self, moving randomly round the maze; B means you have eaten a corner "power capsule" and the ghosts are vulnerable; inverse B means they are about to turn nasty again.

Written in 5K of machine code, the game also provides an extra mazeman if you score 10,000 points. Mazeman costs £4.45 from Abersoft, 7 Maesafallen, Bow Street, Dyfed, SY24 5BA.

Playing at business

IF YOU FANCY yourself as a financial whizz-kid, test your skills with two new business games from CCS, **Airline** has good animated bar charts and histograms and is full of unexpected hazards.

We were hi-jacked by the PLO but managed to make a profit at the end of the first year. In the next year, however, we overspent on staff and faced the prospect of resigning. There are some pertinent decisions to be made and the game provides a useful introduction to the business world and its terminology. The aim of Airline is to take-over British Airways as soon as possible.



In **Autochef,** it is to buy Trusthouse Forte by the judicious management of a chain of restaurants and fast food outlets. There are three levels of difficulty, although even on the easy level we lost a fair amount of money, and it helps to have a pen and some paper to keep track of cost forecasts, rent, and other vital factors.

The games cost £4.75 each, and are available from CCS, 14 Langton Way, London SE3 7TL.

Pixel makes use of space

TWO INTERESTING new space games, both in 16K, are from Pixel Productions. In **Subspace Striker,** you are the captain of the Swordfish, which lurks in hyperspace shooting-down enemy vessels with its deadly Antimat torpedoes. A fairly familiar theme is enlivened by some splendid graphics of the various spaceships and excitement is added by the capacity of the Swordfish to surface and dive to avoid enemy fire.

An especially good destruction sequence compensates for the mis-

continued on page 46





continued from page 45

fortune of suffering a direct hit. The instructions are a little confusing at first but stay with it. It costs £5.50 for the ZX-81 version.

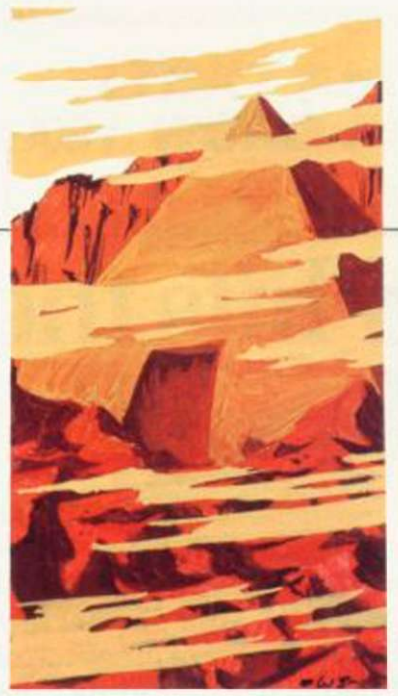
There are outstanding graphics in **Trader**, too, many of them animated, and the story line is original and entertaining. You are an inter-galactic trader trying to make a profit on your wares while escaping a variety of pit-falls on your journey from moon to moon.

You will need to do some quick thinking and it helps to have pen and paper handy to keep tabs on your stocks. We made a killing on Synthomunch, a yukky kind of staple food popular in the Meridien area, but cannot guarantee it will work for you.

The game is in three parts, so that it is in effect a 48K saga, with plenty to keep you absorbed to the end. The complete thing costs £10.50. Both games are available from Pixel Productions, 39 Ripley Gardens, London SW14 8HF.

Adventurous Synacroop

SYNACROOP Software has produced a cassette of four games, all in 16K. Two are short and simple. There is a two-player gambling game, **Up against the wall**, and a straightforward shoot-out with alien spacecraft



called **Revenge of the flying saucers.**

Each side also features a more sophisticated adventure, one of which is called **Escape from the Pyramid of Mars.** There the aim is to collect four keys from the depths of the pyramid without being annihilated by a mysterious flashing defence mechanism. The graphics are lively and because the hazard is a random one, the suspense builds-up, especially when safety is in sight.

Escaping before the oxygen runs out is problematic but not impossible.

The other adventure is **Curse of the Aztec tomb,** based mainly on graphics, depicting fiendish dangers such as falling boulders and bridges which close as you are about to jump on to them. You will need nimble fingers on the control keys and perhaps a practice game or two to earn a high score. The cassette costs £4.95 and is available from Synacroop Software, 63 Cedar Avenue, Cosely, West Midlands.

ZX81 HEWSON CONSULTANTS ZX SPECTRUM

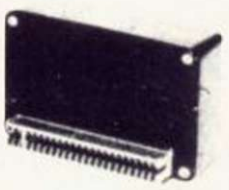
HINTS AND TIPS FOR THE ZX81 by Andrew Hewson £3.95

The most complete book at the price

"Good value and quite fascinating . . . a very inexpensive way of acquiring months of programming experience" Your Computer Nov 1981

80 pages explaining how to squeeze a computing quart out of a Sinclair pint pot. Saving Space – vital reading for all ZX81 users.
Understanding the Display File – using the display file as memory, clearing a part of the display, using tokens in PRINT statements. Converting ZX80 programs – explaining simply but comprehensively how to convert the hundreds of published ZX80 programs. Chaining programs – revealing techniques for passing data between programs, calling subroutines from cassette and establishing data files. Machine Code Programs – all you want to know about ZX80 machine language. Explaining how to write, load, edit and save machine code and how to debug your routines. Routines and programs are scattered liberally throughout the text and the final chapter consists of 12 useful, interesting entertaining programs such as LINE RENUMBER, BOUNCER, SHOOT, STATISTICS, etc.

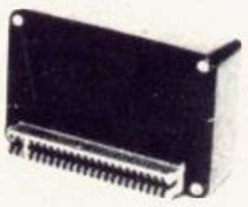
16K MEMORY



THE BEST VALUE FOR MONEY 16K RAM on the market. Coming complete with case, simply plugs into the port at the back of your Sinclair. Money back guarantee.

£26.95

48+8K NEW £61.95



0-8K *Sinclair Rom
8-16K *The contents of this area of RAM are unaffected by loading programs from cassette. Can be used to store machine code routine or to store data for use by more than one program.
16-32K *Basic program area and display file.
32-64K *Variable and array area. Massive memory area for storage of data.
*Directly addressable and user transparent.
*Facts sheet FREE with each RAM purchased.

64K MEMOPACK

0-8K – *Same as 48+8K.
8-16K *Can be switched out in 4K blocks to leave room for memory mapping and vacant addresses for graphics etc ROM(s). The contents of this area of RAM are unaffected by loading programs from cassette. Can be used to store machine code routine or to store data for use by more than one program.
16-32K *Same as 48+8K.
32-64K *Same as 48+8K.

£79.00

Z80 OP CODES £1.45

A must for the beginner and the experienced programmer alike. This hand ready reckoner lists all 600 plus Z80 machine code instructions in decimal and hexadecimal with their mneumonics. Each Op Code is succinctly explained and cross-referenced. Supplied in a protective transparent wallet for easy reference and durability.

PROGRAMMERS TOOLKIT ZX81 £6.50

Toolkit functions include:
* RENUMBER including the destination lines of GOTO's and GOSUB's, START and Finish lines and Step size specified by you.
* DELETE part or all of a program at your command.
* REPLACE character(s) or token(s) with an equal number of others specified by you.
* EDIT to creat sub routines at a stroke by moving blocks of basic program lines.
* FIND a basic program string specified by you.
* *INPUT* prompts for a two digit hexadecimal code and pokes it in at a specified address.
* Separate version available for 48+8 and 64K memories (resides at 8192).

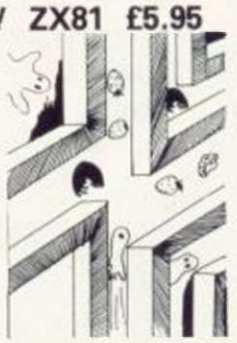
PILOT ★ ZX81 £5.95

New and exciting, Pilot challenges you to take off, fly between beacons, then land whilst watching wind speed and dodging craggy mountains – either could lead to disaster! If you take the challenge, you may soon learn to fly solo – so detailed are the flying instructions. Coast along in Autopilot – jut to gain confidence, then battle your way through 6 further modes, 6 different ways of trying to steer your plane safely back to base, increasing in difficulty, testing your skills. Good luck with your fight against the unpredictable elements!



PUCKMAN *NEW!* ZX81 £5.95

* All action display
* Scour the maze for food
* Dodge the ghosts who come to devour you
* Automatic option – the machine plays itself
* Full keyboard display
* Full instruction display
* Continuous scoring
* Beat the best score to date
* Super graphics when used with Quick Silva graphics board



20 BEST PROGRAMS FOR THE ZX SPECTRUM £7.95

BY ANDREW HEWSON

NEW

* Have fun with your Spectrum
* Full length programs
* Learn by example
* Full colour graphics

All programs fit the 16K machine, including:

Index File –	a flexible filing program for your address book, bank account etc.
Music –	Write your own tunes, save them load them, alter them, and play them.
Sketch –	Use your computer as a drawing tablet.
Duckshoot –	Learn how to manipulate the attributes file and have fun too!
Digitiser –	Convert pictures to a digital form and store them.
Machine code editor –	Write, alter and load hex code, name routines and call them by name, insert and delete machine code.

SPACE INTRUDERS FOR THE ZX SPECTRUM

Features include:
Full sound and colour action
3 laser bases, 4 defences
M/C super fast action
High score display, descending aliens, 64 aliens in each squadron

Squadron after squadron attack your position

ALL THIS YOURS FOR ONLY **£5.95**

Cheque with order or quote Access or Barclaycard number to: **HEWSON CONSULTANTS**, Dept SU, 60A St Mary's Street, Wallingford, Oxon OX100EL. ECM9

Honorary club member served on *HMS Hermes* during the conflict in the South Atlantic.

ZX-81 sails to Falkland Islands

DURING the Falklands crisis we received many programs simulating some of the events in the South Atlantic. We have decided, however, to print only one special submission.

The listing overleaf was produced by a sailor on *HMS Hermes* while he was on active service with the Task Force.

In recognition of his part in the action we have decided to make Chief Petty Officer Trevor Walhen, 36, an honorary member of the Sinclair User Club. He received the news when he returned to Britain with *Hermes* towards the end of July. "It was marvellous," he said, "It made my homecoming even better."

He has had his ZX-81 since March and had a ZX-80 previously. Although he is an electronics engineer in the Royal Navy, in which he has served for 20 years, he did not start taking a deep interest in computers until he saw a colleague with a ZX-80.

"I read about them when they were first on sale but I was not really interested until I saw one and saw what it was capable of doing," Walhen says.

When the Task Force moved south, he took his ZX-81 with him to provide relaxation from the strain of the conflict — "I used to work during the night from 8pm to 8am and when I came off I would spend about two hours at a time with the ZX-81."

He adds that he had ordered a 16K RAM pack from Sinclair Research but as it had not arrived, he used to borrow one from a colleague, who also had his ZX-81 on board.

He sent his first program to *Sinclair User* in May but while he was in the South Atlantic he improved it twice before he submitted the final version, which is printed here and titled **HMS Hermes.** It takes 5K of memory.

"Because of its topicality, great interest was

continued on page 48

25pc off Kempston Spectrum add-on

CONTINUING the policy we began last month, we are again making two exclusive offers to members of the Sinclair User Club. This month it involves Carnell Sofware and Kempston Electronics.

To link with the start of our new *Spectrum User* section we are offering a discount of 10 percent off the add-ones developed by Kempston for the new machine. They include the 24-line user I/O port which allows you to have 24 individually-controlled lines. Normally it costs £16.50 but club members can obtain it for £14.90 including VAT.

Two items which have been produced for the time when the Microdrive is ready towards the end of the year are also being offered. A ZX motherboard which normally costs £16.95 is available for £15.25 and a ZX stackable connector, costing £5.50, will cost members £4.95.

Kempston's other major product, its 41-key click keyboard, is also available in this exclusive offer to members. The normal price is £26.50 but members can obtain it for £23.85.

STAR BARGAIN

The other part of our offer involves the range of software from Carnell Software. Members can save 25 percent of the normal price of the three cassettes sold by Carnell.

That reduces the cost of the **Volcanic Dungeon/ Hangman** from £4.50 to £3.40 and **Alien Intruder** and **Wumpus Adventure** from £5 to £3.75. All prices include VAT.

As usual, to permit members to take advantage of these offers, you can include an order with your membership application. A form is printed below.

MEMBERSHIP FORM

I wish to join the Sinclair User Club and enclose my subscription of £12

Name .....

Address .....

.....

.....

.....

Which computer do you own?

ZX-81 ☐ Spectrum ☐

Send your coupons to Sinclair User Club, ECC Publications, 30-31 Islington Green, London N1 8BJ. Cheques should be made payable to Sinclair User Club.

continued from page 47

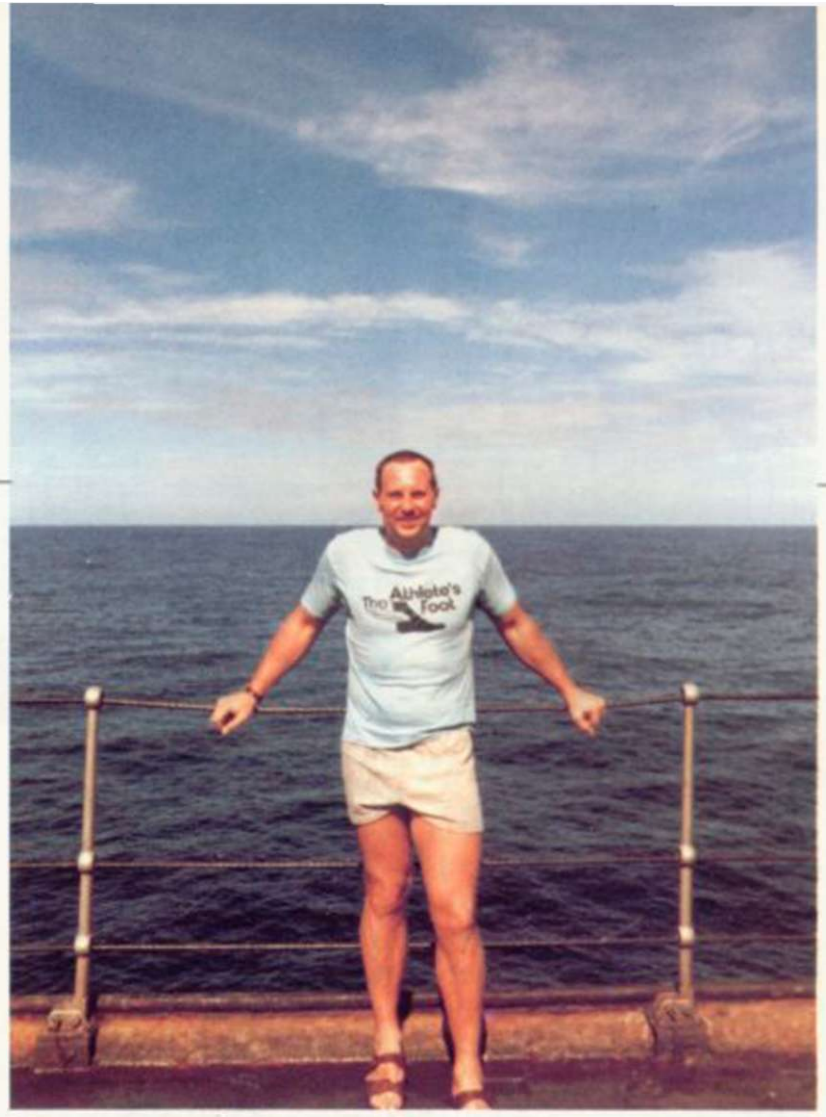
shown by other members of the crew and it helped ease the tension," he says.

Now he is home, Walhen is looking forward to a little relaxation and considering which computer to buy next.

In the game, an Argentinian Super Etendard aircraft is firing at Hermes, which is firing back. The aircraft is armed with Exocet missiles and bombs, which are released at random. Hermes has four Seacat missiles, which are also fired at random.

The carrier's other defence is its chaff device for decoying the Exocet. That is controlled by the player, who must press INKEY$ C as soon as it appears below the aircraft. The player also controls the movement of Hermes by the 5 and 8 keys.

To win, the player has to knock out 10 aircraft which can win by sinking the Hermes. That needs a score of 12, which can be achieved by receiving three for every Exocet hit and two for every bomb hit. Hermes is also being attacked by a submarine.



CPO Trevor Walhen as he crosses the equator on his way south.

Due to lack of space we have not been able to print our usual list of user groups. We apologise for this omission and will attempt to include it in October.

```
  100 LET S=0
  120 LET T=0
  130 LET H=10
  140 LET X=0
  150 LET P=0
  160 GOSUB 9000
  170 GOSUB 2000
  180 FOR E=0 TO 27
  190 PRINT AT 0,E;"■";AT 1,E;"■
■"
  210 LET A=INT (RND*21)+5
  220 IF E>H-4 OR (A<>H AND A<>H+
1) THEN GOTO 300
  230 FOR B=-12 TO -1
  240 PRINT AT B,A;"*"
  250 PRINT AT B,A;" "
  260 LET A=A-.5
  270 NEXT B
  280 IF A=E-1 OR A=E OR A=E+1 OR
 A=E+2 OR A=E+3 THEN GOTO 1000
  300 LET F=INT (RND*18)+6
  310 IF E<H+3 OR (F<>H+6 AND F<>
H+7) THEN GOTO 390
  320 FOR G=-12 TO -1
  330 PRINT AT G,F;"*"
  340 PRINT AT G,F;" "
  350 LET F=F+.5
  360 NEXT G
  370 IF F=E OR F=E+1 OR F=E+2 OR
 F=E+3 OR F=E+4 THEN GOTO 1000
  390 PRINT AT 11,H+4;"Y"
  410 LET M=INT (RND*22)+2
  420 IF M<>E+2 AND M<>E+3 THEN G
OTO 690
  430 PRINT AT 2,M;"▬"
  440 PAUSE 30
  450 LET C=-12
  460 IF INKEY$<>"7" OR X=5 THEN
 GOTO 530
  470 FOR C=-12 TO -8
  480 PRINT AT C,H+1;"*"
  490 PRINT AT C,H+1;" "
  500 NEXT C
  510 PRINT AT C,H-2;"********"
  520 LET X=X+1
  525 GOSUB 9000
  530 FOR N=2 TO 15
  540 PRINT AT N,M;"▬"
  550 PRINT AT N,M;" "
  560 LET M=M+.5
  570 IF C<>-7 THEN GOTO 590
  580 IF N=7 AND (M=H-2 OR M=H-1
OR M=H OR M=H+1 OR M=H+2 OR M=H+
3 OR M=H+4) THEN GOTO 1100
  590 NEXT N
  600 PRINT AT 7,H-2;"        "
  610 IF M=H OR M=H+1 OR M=H+2 OR
 M=H+3 OR M=H+4 OR M=H+5 OR M=H+
6 OR M=H+7 THEN GOTO 1200
  690 PRINT AT 11,H+4;"T"
  710 LET J=INT (RND*24)+3
  720 IF J<>E+1 AND J<>E+2 AND J<
>E+3 THEN GOTO 650
  730 FOR K=3 TO 13 STEP 2
  740 PRINT AT K,J;"■"
  750 IF INKEY$="" THEN GOTO 800
  760 LET H=H+(INKEY$="8")-(INKEY
$="5")
  770 GOSUB 3000
  780 LET H=H+(H<0)-(H>23)
  790 GOSUB 2000
  800 PRINT AT K,J;" "
  810 NEXT K
  820 IF J=H OR J=H+1 OR J=H+2 OR
 J=H+3 OR J=H+4 OR J=H+5 OR J=H+
6 OR J=H+7 THEN GOTO 1300
  830 IF INKEY$="" THEN GOTO 900
  840 LET H=H+(INKEY$="8")-(INKEY
$="5")
  850 GOSUB 3000
  860 LET H=H+(H<0)-(H>23)
  870 GOSUB 2000
  910 LET U=INT (RND*15)+6
  920 IF U=P+5 THEN GOSUB 6000
  930 LET P=P+1
  940 IF P=25 THEN LET P=0
  950 PRINT AT 0,E;" ";AT 1,E;"
 "
  960 NEXT E
  970 GOSUB 9000
  980 IF S<10 THEN GOTO 150
  990 IF S=10 THEN GOTO 1500
 1010 PRINT AT 0,E;"+    +"
 1020 PRINT AT 1,E;" ZAP "
 1030 PRINT AT 2,E;"+    +"
 1040 PAUSE 30
 1050 PRINT AT 0,E;"      "
 1060 PRINT AT 1,E;"      "
 1070 PRINT AT 2,E;"      "
 1080 LET S=S+1
 1090 GOTO 970
 1110 PRINT AT 7,H-2;"DECOYED"
 1120 PAUSE 30
 1130 PRINT AT 7,H-2;"        "
 1140 GOTO 700
 1210 PRINT AT 13,M-1;"HIT"
 1220 PAUSE 30
 1230 PRINT AT 13,M-1;"   "
 1240 GOSUB 2000
 1250 LET T=T+3
 1260 GOSUB 9000
 1270 IF T>=12 THEN GOTO 1400
 1280 GOTO 700
 1310 PRINT AT 13,J-1;"HIT"
 1320 PAUSE 30
 1330 PRINT AT 13,J-1;"   "
 1340 GOSUB 2000

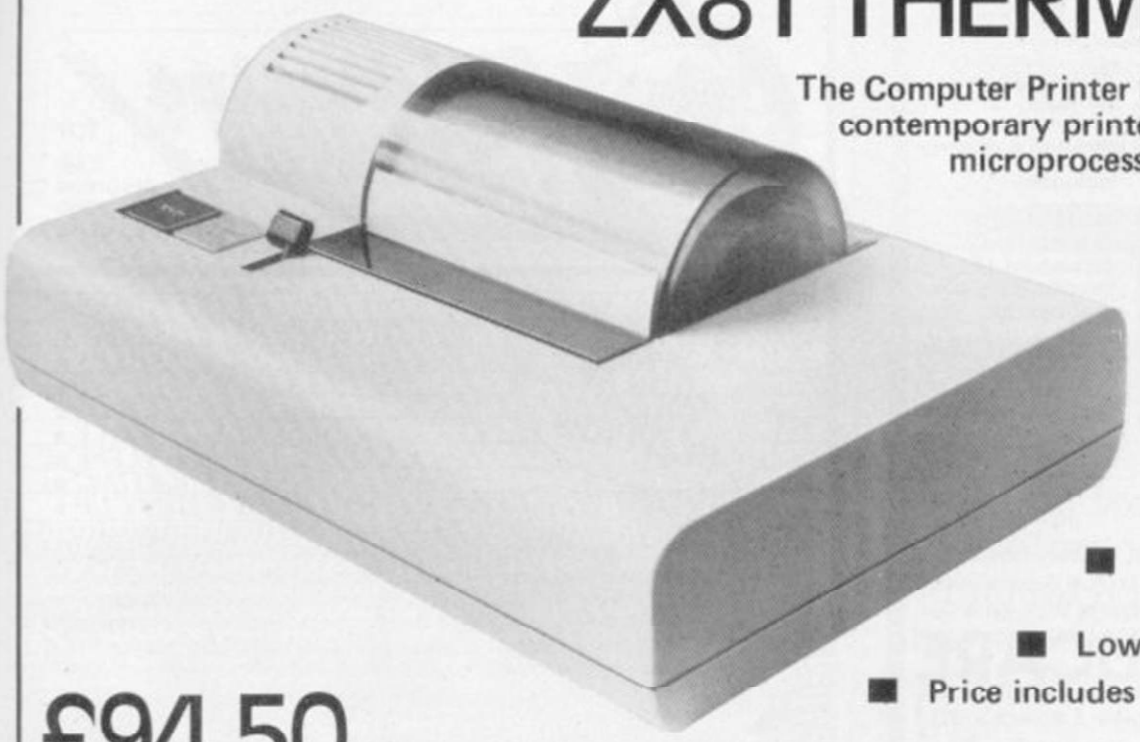
 1350 LET T=T+2
 1360 GOSUB 9000
 1370 IF T>=12 THEN GOTO 1400
 1380 GOTO 900
 1410 PRINT AT 11,M;"**    **"
 1420 PRINT AT 12,M;" SUNK "
 1430 PRINT AT 13,M;"**    **"
 1440 PAUSE 300
 1450 CLS
 1460 PRINT AT 4,10;"THAT WAS"
 1470 PRINT AT 6,6;" A DUMMY RUN"
 1480 PRINT AT 10,6;"PLAY AGAIN D
UMMY"
 1490 PRINT AT 12,3;"BUT THIS TIM
E ENGAGE BRAIN"
 1495 STOP
 1510 CLS
 1520 PRINT AT 4,7;"BRITISH VICTO
RY"
 1530 PRINT AT 5,7;"-------------
---"
 1540 PRINT AT 10,10;"WELL DONE"
 1550 PRINT AT 12,6;"YOU HAVE SHO
T DOWN"
 1560 PRINT AT 14,6;"10 SUPER ETE
NDARDS"
 1570 PAUSE 400
 1580 CLS
 1600 PRINT AT 4,10;"PLAY AGAIN"
 1610 PRINT AT 5,10;"----------"
 1620 PRINT AT 8,7;"TRY AND SHOOT
 10"
 1630 PRINT AT 10,10;"MORE DOWN"
 1640 STOP
 2000 PRINT AT 11,M+4;"T";AT 12,M
+3;"▬";AT 13,M;"▬▬▬▬"
 2010 RETURN

 3000 PRINT AT 11,M+3;"   ";AT 12
,M+2;"     ";AT 15,M-1;"
 "
 3010 RETURN
 6010 CLS
 6020 GOSUB 7000
 6030 GOSUB 9000
 6040 PRINT AT 15,P+3;"▬";AT 14,P
;"▬▬▬▬"
 6050 FOR R=-10 TO -2 STEP 2
 6060 PRINT AT R,U;"■"
 6070 IF INKEY$="" THEN GOTO 6120
 6080 LET M=M+(INKEY$="8")-(INKEY
$="5")
 6090 PRINT AT 0,M+3;"   ";AT 1,M
+2;"     ";AT 2,M-1;"
 "
 6100 LET M=M+(M<0)-(M>25)
 6110 GOSUB 7000
 6120 PRINT AT R,U;" "
 6130 NEXT R
 6140 IF U=M OR U=M+1 OR U=M+2 OR
 U=M+3 OR U=M+4 OR U=M+5 OR U=M+
6 OR U=M+7 THEN GOTO 6200
 6150 CLS
 6160 GOSUB 2000
 6170 GOSUB 9000
 6180 RETURN
 6200 PRINT AT 2,U-1;"HIT"
 6210 PAUSE 30
 6220 LET T=T+2
 6230 IF T>=12 THEN GOTO 1400
 6240 GOTO 6150
 7000 PRINT AT 0,M+4;"T";AT 1,M+3
;"▬";AT 2,M;"▬▬▬▬"
 7010 RETURN

 9000 PRINT AT 17,9;"HMS HERMES";
AT 18,9;"----------";AT 21,0;"BR
ITAIN= ";S;AT 21,17;"ARGENTINA=
";T;AT 9,0;X
 9010 RETURN
```

THE PROFESSIONAL ONE

ZX81 THERMAL PRINTER



The Computer Printer high speed matrix printer combines contemporary printer mechanism design with advanced microprocessor based VLS I control electronics and distinctive functional styling.

- Professional high performance 40 column line printer.
- Attractively styled durable housing.
- Total interfacing.
- Quiet operation.
- Graphics capability standard.
- Uses Olivetti dot matrix thermal print mechanism.
- Low cost thermal paper supply.
- Price includes ZX interface and one roll of paper.

£94.50

inclusive of ZX interface and one roll of paper.
Please add £16.47 to cover postage, packing and VAT (total £110.97).
Please allow maximum of 28 days for delivery.

COMPUTER PRINTER DIVISION
DEAN ELECTRONICS LIMITED
Glendale Park Fernbank Road Ascot Berkshire England
Telephone 0344 885661 Telex 849242

ABERSOFT

7 MAESAFALLEN, BOW ST, DYFED, SY24 5BA

ZX81 & Spectrum Games

Now NEW LOW prices!!!!

PROGRAM	OLD	NEW 81	SPECTRUM
Chess 1.4 10 levels m/c	10.00	8.95	
Adventure 140 locations based on the original (At £10.00 well worth the money Sinclair User Issue 2 review)	10.00	8.95	9.95*
Invaders Fast m/c arcade action	5.00	4.45	
Mazeman All the features of the original arcade version m/c	5.00	4.45	4.95

*requires 48k Spectrum

All prices are inclusive
Return of post service

PSS

PERSONAL SOFTWARE SERVICES, 112 OLIVER STREET, COVENTRY CV6 5FE.

SALE

ZX81 16K **SOFTWARE** 16K ZX81

AS PART OF OUR CONTINUING POLICY OF UNBEATABLE VALUE FOR MONEY, WE ARE OFFERING FOR THIS MONTH ONLY OUR RANGE OF PROGRAMS IN PACKAGE FORM AT UNBELIEVABLE PRICES.

STAR PACK Includes PUCK-MAN *and* MAZE DRAG RACER. These are the best arcade games available and are written in super-fast machine code to give unbelievably good results — a brilliant package — highly recommended £4.95

SPACE PACK All the best space games in one package — includes SPACE DEFENDER, STAR TREK, ALIEN and TAILGUNNER. Amazing value at only £4.95

GAMES PACK An excellent selection of games including GRAND PRIX, NIGHT-MARE PARK, SUPER-BREAKOUT (M/C) and HIGH RISE (M/C) £4.95

PROGRAMMERS PACK 1 ZX COMPILER and ENHANCED BASIC — The compiler has helped many people write in MACHINE CODE — ENHANCED BASIC takes the strain out of programming. Some of its many features include auto renumbering, block deletion etc. £4.95

PROGRAMMERS PACK 2 WORDFIX and GRAFIX. A complete image + text manipulation system. Essential for those who need complex images or texts in their programs. £4.95

GAMES PACK 2 Includes STOCKS & SHARES, BREAKOUT (M/C), DAY AT THE RACES, PONTOON and TOWERS OF HANOI. Quality programs at crazy price £4.95

PERSONAL SOFTWARE SERVICES, 112 OLIVER STREET, COVENTRY CV6 5FE.

These packages are all available at £4.95 each, **£6.95 for two** or **£8.50 for three. All prices are inclusive of VAT and carriage by return of post.**

Send cheque/PO to: PSS, 112 Oliver Street, Coventry CV6 5FE or send two 1st class stamps for a copy of our fully detailed catalogue.

***STOP PRESS* NOW AVAILABLE — 'QSAVE' THE HARDWARE/SOFTWARE COMBINATION PACKAGE THAT LETS YOU LOAD AND SAVE A FULL 16K IN ONLY 26 SECONDS FOR *LESS* THAN £20.00. SAE FOR DETAILS.**

EDUCATIONAL COMPUTING
on the
ZX81

Suit children ages 5-11

No comparable collection offers so much for so little

THE LITTLE PROGRAMMES WHICH ARE BIG EDUCATORS

Here at last. A set of programmes to turn your Sinclair ZX81 into a powerful educational tool. And you don't even need to know programming. There are clear instructions and plenty of tips & advice. Designed to go beyond drill & practice the promote learning through interaction & discovery.

All programmes fit 1K

Creative use of graphics

Many innovative ideas

Fully documented

Includes many games

Educare's **50** 1K PROGRAMMES for PRIMARY EDUCATION

Includes:-

TORTOISE
A simplified version of the famous Turtle programme

CODED MISSILE
Combines the fun of arcade games with learning

£4.95 only
incl. p & p

Graph-plotter ● Histogram ● Simon-spell ● Sketchboard ● Times-table ● Sets
Series-quiz ● XY-coordinates ● Count ● Equations ● Areas ● Guess-a-Volume
Angles ● Upstairs-Downstairs ● Music-notes ● See-saw ● Wipe-out ● Spell
Temperature ● Clock ● Money ● Snake
Mastermind ● Number-shoot ● +26 more **EDUCARE**

To: EDUCARE, 139a Sloane St, London SWIX 9AY

Please send me .....copies Educare's 50.
I enclose cheque/postal order for £.....
Name.....
Address.....

Let your child benefit early. Send now

Now! For the SPECTRUM 48K!



FOOTBALL MANAGER

Addictive Games

for
ZX81
SPECTRUM
TRS80
VIDEO GENIE

★ AS MANY SEASONS AS YOU LIKE ★ 4 DIVISIONS ★
★ PROMOTION & RELEGATION ★
★ FULL LEAGUE TABLES ★
★ TRANSFER MARKET ★
★ INJURIES ★
★ 7 LEVELS OF PLAY ★
★ SAVE GAME FACILITY ★
★ MANAGERIAL RATING ★
★ PICK YOUR TEAM FOR EACH MATCH ★ F.A. CUP ★

JUST LOOK AT THESE FEATURES

This is NOT a mere simulation. This is an exciting and highly enjoyable game in which you play the part of a Football Manager coping with the problems and decisions involved in running your club. There are so many features it is impossible to list them here but included are form (top teams NORMALLY win), giant-killings, wage bills to pay, and you can even be sacked! It is a game requiring a great deal of skill, and people play it for literally hours on end (we have PROOF!).
WE GUARANTEE that this is one of the best computer games you've ever played!
BUT BEWARE, this game is extremely addictive!

HARDWARE REQUIRED	
Spectrum 48K RAM	TRS80/ Video Genie LEVEL II 16K RAM
ZX 81 16K RAM	

To Order send Cheque/P.O. £7.95 made payable to: ADDICTIVE GAMES at: Dept S.U. P.O. BOX 278 CONNIBURROW MILTON KEYNES MK14 7NE PLEASE STATE COMPUTER

sinclair user

What is the best way to guarantee that you never become bored with your Sinclair computer?
The answer is to subscribe to *Sinclair User*, written specifically for owners of ZX-80s, ZX-81s and Spectrums. *Sinclair User* is the latest montly from ECC Publications — pioneers of Practical Computing, WHICH COMPUTER?, and Computer & Video Games. Whether you bought your system yesterday or are an old hand, you are probably an enthusiast for your machine ad your biggest problem is likely to be obtaining all the information to satisfy your interest. *Sinclair User* is devoted to quenching your thirst for information.
As the name suggests, the content is geared specifically to helping you, the user. There are pages of information on available hardware and software. Our aim is to make *Sinclair User* invaluable and we chronicle applications which are of special interest.

Make sure you get it each month

Can you continue to obtain the most from your Sinclair without reading *Sinclair User* every month? So why not fill the subscription order form **today?** Send it to *Sinclair User*, ECC Publications, 30-31 Islington Green, London N1 8BJ.

Overseas rates: Europe £18, Outside Europe £24 (Including air-mail postage) Cheques should be made payable to EEC Publications.

Subscription Order Form

I wish to start a subscription to *Sinclair User*. I understand that I may cancel my subscription at any time and you will refund the balance.

☐ I enclose a cheque for £9 for 12 issues (U.K. only — including postage).

☐ Please charge my credit card.

Card Name_____ No._____
Address _____
_____
Signed_____
Date_____

Win a ZX-99 by filling the screen



Our competitions have proved so popular that we are to continue them, despite having awarded the last of our printers in last month's contest, the winner of which will be announced next month.

We have decided to continue our policy of offering major prizes and this month we will be giving the winner a ZX-99 tape control system for the ZX-81.

This month our competition is based on an idea from a reader, Tony Poulter, of Meopham, Kent. The aim is to write a program for the 1K ZX-81 which will display a full screen of 748 characters. As that is regarded as impossible, it may be necessary to award the prize to the person who manages to achieve the greatest number of characters. We shall be looking also for the most elegant and flexible solution.

As a tie-break, should one be necessary, we want you to write a slogan beginning with the words: "I would like a Spectrum because. . ."

Entries should reach us by September 13.

The usual rules about the editor's decision being final and employees of ECC Publications being ineligible apply.

ENTRY FORM

Complete this slogan, which will be used as a tie-break: I would like a Spectrum because .....

Name .....

Address .....

.....

Send your entries to ECC Publications, 30-31 Islington Green, London N1 8BJ to arrive not later than September 13.

SPECTRUM

32K RAM.

Upgrade your 16K Spectrum to full 48K. Easy to fit. No soldering needed. Full instructions supplied.
(S32) *£39.95*

Sound Amplifier and Tape Switching Unit.

Add on unit for your Spectrum. Amplifies the sound output. Separate tone and volume controls. Eliminates hum loops when saving to tape. Eliminates plug swapping when loading or saving programs on cassette. No extra power supply required.
(SSU) *£22.50*

Spectrum — ZX81 Converter.

Use your ZX81 Rampacks and other ZX81 units on your new Spectrum in addition to your Spectrum add-ons.
(S81C) *£15.00*

ZX81

16K Expandable RAM.

Uniquely expandable to 32K by the addition of our 16K Expansion Module.

Basic 16K RAM Pack (8116)	*£25.00*
16K Expansion Module (8116E)	*£19.95*
Full 32K RAM Pack (8132)	*£39.95*

All prices fully inclusive of VAT and P&P.

Send now to:

STONECHIP ELECTRONICS
UNIT 4, HOSKINS PLACE,
WATCHETTS ROAD,
CAMBERLEY, SURREY.
Tel: (0276) 681131

Make cheques or P.O's payable to STONECHIP LTD.

PLEASE SEND ME ☐ S32 ☐ SSU ☐ S81C ☐ 8116 ☐ 8116E ☐ 8132

I ENCLOSE £.....

NAME .....

ADDRESS .....

.....

.....

ALLOW 28 DAYS DELIVERY

CARNELL SOFTWARE

ZX81 ADVENTURE SPECIALISTS

C2: VOLCANIC DUNGEON/HANGMAN £4.50

A) VOLCANIC DUNGEON: Rescue if you can the Elfin Princess. Mythical monsters, pits, fiery caverns, diminishing strength and water make your quest anything but easy.
FULL 16K PROGRAM * * SAVE GAME ROUTINE * * SINGLE KEY ENTRY * *
"Volcanic Dungeon is terrific value and I would recommend it to anyone" Mrs Thomas Cornwall

B) HANGMAN: Delux version of the classic game. Play against an opponent or the computer's 400 word vocabulary. Good graphics.

C3: ALIEN INTRUDER/HIEROGLYPHICS £5.00

A) ALIEN INTRUDER: You awaken to find you are the only survivor on the Explorer Class 3 Starship. Can you escape before you also fall victim to the Alien monstrosity that devoured the crew? There are many ways to end this adventure but only one way to survive!
FULL 16K PROGRAM * * INTERACTIVE GRAPHICS * * SAVE GAME ROUTINE * *

B) HEIROGLYPHICS: Decode the ancient 39 symbol alphabet in time to save the famous explorer, "Wullie Makeit" from a sandy grave.
FULL 16K PROGRAM * *ANIMATED GRAPHIC DISPLAY * * RANDOM CODE * *

C4: WUMPUS ADVENTURE/MOVIE MOGUL £5.00

A) WUMPUS ADVENTURE FOR 1 TO 4 PLAYERS: Seek the famous creature in the most dangerous Wumpus hunt ever. All the usual features are there:
SUPERBATS * PITS * TREMORS * SWAMPS * MAGIC ARROWS
PLUS Exciting new features EVIL GOBLINS that will try to sacrifice you to the Wumpus.
* GIANT SERPENTS * WUMPUS MUCK * MAGIC SPRINGS *
FULL 16K PROGRAM * * RANDOM & PRESET CAVE PATTERNS * * YOU CONTROL THE LEVEL OF DIFFICULTY * * GREAT FUN FOR YOU AND YOUR FRIENDS * *

B) MOVIE MOGUL: Guide your film through the often hilarious traumas of production. Use your budget wisely and you may make a fortune. Success depends on many factors and not just luck.
FULL 16K PROGRAM * * *

ORDERS: Plus 50p P&P or large S.A.E. for list to:-

CARNELL SOFTWARE
4 STAUNTON ROAD, SLOUGH, BERKS. SL2 1NT
The above are also available from BUFFER MICROSHOP, STREATHAM, LONDON

ZX SPECTRUM CITY

Within a few weeks of getting our first ZX-81 we had a good working version of "MONOPOLY". We did not think it would sell so we scrapped it. We have been kicking one another ever since! However, it was developed in parallel to a mainframe game called "CITY" which was an enhanced version of "MONOPOLY" played on a street map of London rather than the standard board. The street map took up a few hundred kilobytes and thus was not easily put into the ZX-81. The basic mechanics of the game are available for the ZX-81 but the game is played on a blank map. The streets are constructed with the buildings. Now, along came the SPECTRUM with 48K of RAM and in went the street map, not London but an imaginary town. The colour facilities made the program simpler than the mainframe version because much more information can be displayed to the player on one screen. In the end 'CITY" is not at all like the game that inspired it. Everyone that we have invited to test it says that it is much better!

16K ZX-81 CITY £6. 48K ZX SPECTRUM CITY £8.

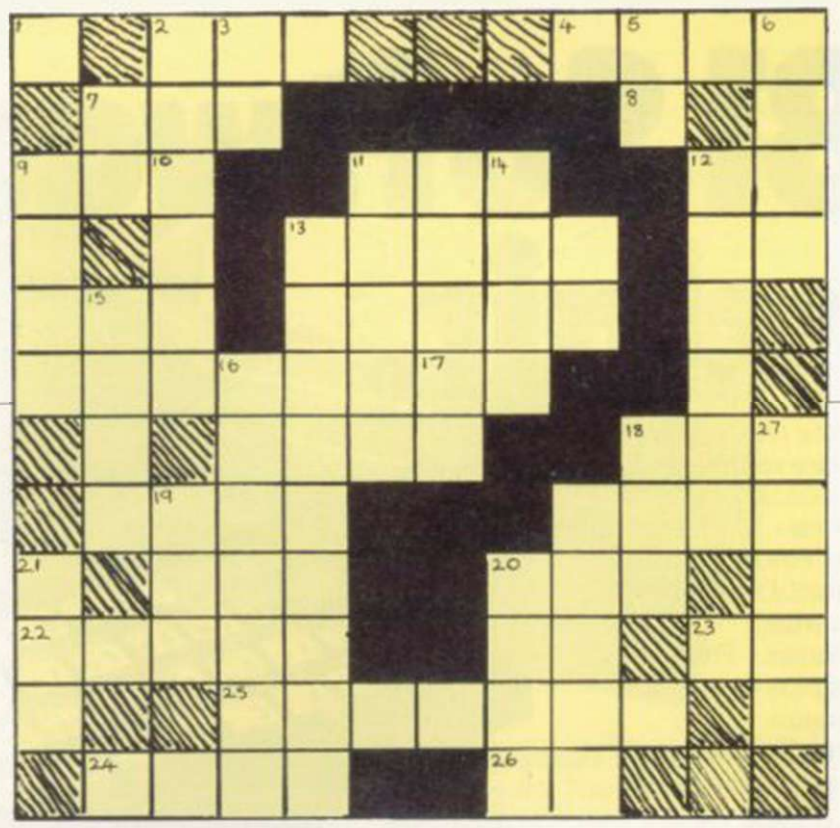
ZX ASSOCIATIVE DATABASE SYSTEM

A variable format database in which nothing need to pre-defined. It adapts to your needs as you use it. Conventional searches, sorts, updates, merges, etc, become a thing of the past. Our local "EXPERTS SYSTEMS" expert is quite worried about it.

16K ZX-81 ADBS £9. 16 or 48K ZX SPECTRUM ADBS £14

DOCIMODUS

161 Walmersley Road, Bury, Lancashire BL9 5DE.



Philip Joy considers a pair of old mind games, anagram and crossword, and finds them difficult for computers.

Good use of screen by rare word games

I HAVE decided to include details about two things, a review of two programs, which are old mind games, **Anagram** and **Crossword.** The second thing is adventure games, on which I have received some very interesting comments.

First, Anagram and Crossword, both on one cassette and sent for review. It is obtainable from Warren Newman, 3 Thalia Close, Greenwich, SE10 9NA. The tape arrived with a brief description about both games.

Crossword was difficult to load, with the volume level critical, but that is common and is something ZX-81 owners expect. Newman's letter says: "It is, so far as I am aware, the first electronic version of a crossword puzzle".

I am not sure about it being the first but they are not very common. One reason is that they can be done only once; apart from changing the clues and answers, nothing else can be done when you finish it. You need someone else to make up and type the crossword, otherwise you will know the answers. For the same reason you must not list the program or the answers will be shown and the puzzle ruined.

It has a fast response time, using the fast mode of the ZX-81, and uses the screen well. One point is that there is an option to display the crossword. If you did that, surely the whole puzzle would be ruined? The clues are related to ZX-81 computer terms and so will appeal to enthusiasts.

On the B side of the tape, Newman says that a standard game of Anagram is offered with three levels of play. Again, though, the game was difficult to load, but once in you can make a back-up for your day-to-day use. One thing about this type of game is that it becomes uninteresting after playing many games. Again, as in Crossword, the screen is well-used; not all games make good use of the screen but these two certainly do.

My thanks to Newman for supplying the cassette for review. The cost is £4.95 and you will need 16K. I think it is reasonable value for money and if you like that kind of puzzle, you will like these programs. My thanks also to Leo Amatino, who looked at these games and gave unbiased remarks.

I would like to mention another game I received on tape, an "unbeatable" version of multiple-pile **Nim.** I say unbeatable in quotes, because no-one I have asked to play it has beaten it, including me. It has won some games and drawn some, but has not been beaten — a remarkable achievement.

With some of the rubbish programs on the market for the ZX-81, this program, I think, should be sold, but the sender has no plans to do so, so far as I know.

My favourite type of mind game is the adventure type, a game which is a total mind game like chess, but with more fun and general appeal. Adventures are the type of game in which you are projected into some castle/forest and you have to solve some problem, like finding the long-lost treasure.

Along the way there are numerous problems and each has an exceptional solution. Most microcomputer adventures have completion times of around a month.

The idea is derived from the large mainframe computers, where large disc packs are used to store the game and your progress. It is a fact that some computer centres stopped work while the workers tried to finish a problem.

Of course, the ones on micro-computers like the ZX-81 are not so complicated, but just as much fun to play, and there are many for the 16K ZX-81. They often produce much frustration but there is great satisfaction when a month of work produces a result.

Please send details of Mind Games to Philip Joy, 130 Rush Green Road, Romford, Essex, RM7 0QA.

'Crosswords can be done only once; apart from changing the clues and answers, nothing else can be done.'

New ZX81 Software from Sinclair.



A whole new range of software for the Sinclair ZX81 Personal Computer is now available – direct from Sinclair. Produced by ICL and Psion, these really excellent cassettes cover games, education, and business/household management.

Some of the more elaborate programs can only be run on a ZX81 augmented by the ZX 16K RAM pack. (The description of each cassette makes it clear what hardware is required.) The RAM pack provides 16-times more memory in one complete module, and simply plugs into the rear of a ZX81. And the price has just been dramatically reduced to only £29.95.

The Sinclair ZX Printer offer full alphanumerics and highly-sophisticated graphics. A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. So now you can print out your results for a permanent record. The ZX Printer plugs into the rear of your ZX81, and you can connect a RAM pack as well.

Games

Cassette G1: Super Programs 1 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Invasion from Jupiter. Skittles. Magic Square. Doodle. Kim. Liquid Capacity.
Description – Five games programs plus easy conversion between pints/gallons and litres.

Cassette G2: Super Programs 2 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Rings around Saturn. Secret Code. Mindboggling. Silhouette. Memory Test. Metric conversion.
Description – Five games plus easy conversion between inches/feet/yards and centimetres/metres.

Cassette G3: Super Programs 3 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Train Race. Challenge. Secret Message. Mind that Meteor. Character Doodle. Currency Conversion.
Description – Fives games plus currency conversion at will – for example, dollars to pounds.

Cassette G4: Super Programs 4 (ICL)
Hardware required – ZX81.
Price – £4.95.
Programs – Down Under. Submarines. Doodling with Graphics. The Invisible Invader. Reaction. Petrol.
Description – Five games plus easy conversion between miles per gallon and European fuel consumption figures.

Cassette G5: Super Programs 5 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Martian Knock Out. Graffiti. Find the Mate. Labyrinth. Drop a Brick. Continental.
Description – Five games plus easy conversion between English and continental dress sizes.

Cassette G6: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Galactic Invasion, Journey into Danger. Create. Nine Hole Golf. Solitaire. Daylight Robbery.
Description – Six games making full use of the ZX81's moving graphics capability.

Cassette G7: Super Programs 7 (ICL)
Hardware required – ZX81.
Price: – £4.95.
Programs – Racetrack. Chase. NIM. Tower of Hanoi. Docking the Spaceship. Golf.
Description – Six games including the fascinating Tower of Hanoi problem.

Cassette G8: Super Programs 8 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £4.95.
Programs – Star Trail (plus blank tape on side 2).
Description – Can you, as Captain Church of the UK spaceship Endeavour, rid the galaxy of the Klingon menace?

Cassette G9: Biorhythms (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – What are Biorhythms? Your Biohythms.
Description – When will you be at your peak (and trough) physically, emotionally, and intellectually?

Cassette G10: Backgammon (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Programs – Backgammon. Dice.
Description – A great program, using fast and efficient machine code, with graphics board, rolling dice, and doubling dice. The dice program can be used for any dice game.

Cassette G11: Chess (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Chess, Chess Clock.
Description – Fast, efficient machine code, a graphic display of the board and pieces, plus six levels of ability, combine to make this one of the best chess programs available. The Chess Clock program can be used at any time.

Cassette G12: Fantasy Games (Psion)
Hardware required – ZX81 (or ZX80 with 8K BASIC ROM) + 16K RAM.
Price – £4.75.
Programs – Perilous Swamp. Sorcerer's Island.
Description – Perilous Swamp: rescue a beautiful princess from the evil wizard. Sorcerer's Island: you're marooned. To escape, you'll probably need the help of the Grand Sorcerer.

Cassette G13: Space Raiders and Bomber (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £3.95.
Programs – Space Raiders. Bomber.
Description – Space Raiders is the ZX81 version of the popular pub game. Bomber: destroy a city before you hit a sky-scraper.

Cassette G14: Flight Simulation (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £5.95.
Program – Flight Simulation (plus blank tape on side 2).
Description – Simulates a highly manoeuvrable light aircraft with full controls, instrumentation, a view through the cockpit window, and navigational aids. Happy landings!

Education

Cassette E1: Fun to Learn series – English Literature 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Novelists. Authors.
Description – Who wrote 'Robinson Crusoe'? Which novelist do you associate with Father Brown?

Cassette E2: Fun to Learn series – English Literature 2 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Poets, Playwrights. Modern Authors.
Description – Who wrote 'Song of the Shirt'? Which playwright also played cricket for England?



Cassette E3: Fun to Learn series – Geography 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Towns in England and Wales. Countries and Capitals of Europe.
Description – The computer shows you a map and a list of towns. You locate the towns correctly. Or the computer challenges you to name a pinpointed location.

Cassette E4: Fun to Learn series – History 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Events in British History. British Monarchs.
Description – From 1066 to 1981, find out when important events occurred. Recognise monarchs in an identity parade.

Cassette E5: Fun to Learn series – Mathematics 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Addition/Subtraction. Multiplication/Division.
Description – Questions and answers on basic mathematics at different levels of difficulty.

Cassette E6: Fun to Learn series – Music 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Composers. Musicians.
Description – Which instrument does James Galway play? Who composed 'Peter Grimes'?

Cassette E7: Fun to Learn series – Inventions 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Inventions before 1850. Inventions since 1850.
Description – Who invented television? What was the 'dangerous Lucifer'?

Cassette E8: Fun to Learn series – Spelling 1 (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £6.95.
Programs – Series A1-A15. Series B1-B15.
Description – Listen to the word spoken on your tape recorder, then spell it out on your ZX81. 300 words in total suitable for 6-11 year olds.

Business/household

Cassette B1: The Collector's Pack (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Collector's Pack, plus blank tape or side 2 for program/data storage.
Description – This comprehensive program should allow collectors (of stamps, coins etc.) to hold up to 400 records of up to 6 different items on one cassette. Keep your records up to date and sorted into order.

Cassette B2: The Club Record Controller (ICL)
Hardware required – ZX81 + 16K RAM.
Price – £9.95.
Program – Club Record Controller plus blank tape on side 2 for program/data storage.
Description – Enables clubs to hold records of up to 100 members on one cassette. Allows for names, addresses, 'phone numbers plus five lots of additional information – eg.type of membership.

Cassette B3: VU-CALC (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Program – VU-CALC.
Description – Turns your ZX81 into an immensely powerful analysis chart. VU-CALC constructs, generates and calculates large tables for applications such as financial analysis, budget sheets, and projections. Complete with full instructions.

Cassette B4: VU-FILE (Psion)
Hardware required – ZX81 + 16K RAM.
Price – £7.95.
Programs – VU-FILE. Examples.
Description – A general-purpose information storage and retrieval program with emphasis on user-friendliness and visual display. Use it to catalogue your collection, maintain records or club memberships, keep track of your accounts, or as a telephone directory.

How to order

Simply use the FREEPOST order form below and either enclose a cheque or give us your credit card number. Credit card holders can order by phone – simply call Camberley (0276) 66104 or 21282 during office hours. Either way, please allow up to 28 days for delivery, and there's a 14-day money-back option, of course.

sinclair
ZX81
SOFTWARE

Sinclair Research Ltd,
Stanhope Road, Camberley, Surrey, GU15 3PS.
Tel: Camberley (0276) 66104 & 21282.

To: Sinclair Research, FREEPOST, Camberley, Surrey, GU15 3BR.
Please send me the items I have indicated below.

Qty	Cassette	Code	Item price	Total
	G1: Super Programs 1	30	£4.95	
	G2: Super Programs 2	31	£4.95	
	G3: Super Programs 3	32	£4.95	
	G4: Super Programs 4	33	£4.95	
	G5: Super Programs 5	34	£4.95	
	G6: Super Programs 6	35	£4.95	
	G7: Super Programs 7	36	£4.95	
	G8: Super Programs 8	37	£4.95	
	G9: Biorhythms	38	£6.95	
	G10: Backgammon	39	£5.95	
	G11: Chess	40	£6.95	
	G12: Fantasy Games	41	£4.75	
	G13: Space Raiders & Bomber	42	£3.95	
	G14: Flight Simulation	43	£5.95	
	E1: English Literature 1	44	£6.95	

Qty	Cassette	Code	Item price	Total
	E2: English Literature 2	45	£6.95	
	E3: Geography 1	46	£6.95	
	E4: History 1	47	£6.95	
	E5: Mathematics 1	48	£6.95	
	E6: Music 1	49	£6.95	
	E7: Inventions 1	50	£6.95	
	E8: Spelling 1	51	£6.95	
	B1: Collector's Pack	52	£9.95	
	B2: Club Record Controller	53	£9.95	
	B3: VU-CALC	54	£7.95	
	B4: VU-FILE	55	£7.95	
	ZX 16K RAM pack	18	£29.95	
	ZX Printer	27	£59.95	
	Post & packing – *only* if ordering hardware		£2.95	

TOTAL £ ____

I enclose a cheque/postal order to Sinclair Research Ltd for £ ____

Please charge my *Access/Barclaycard/Trustcard no.
*Please delete as applicable.

Mr/Mrs/Miss

Address

NSA22

special offer

EXCLUSIVE SINCLAIR USER OFFER



Build your own Sinclair Special ZX-81 Kit Offer ONLY £29·95 (plus p&p)

SAVE £20 on a Sinclair ZX-81 kit. A special offer open only to readers of *Sinclair User* has been negotiated with Sinclair Research, which means you can buy the world-beating ZX-81 for just £29.95 (plus post and packing).

Stocks are limited, so be sure to place your order soon. Allow 28 days for delivery. Maximum four units per applicant.

To: Sinclair User Special Offer,
ECC Publications, 30-31 Islington Green, London, N1 8BJ

Please send me _ _ _ _ _ ZX-81 kit(s) at the special *Sinclair User* price of £29.95 plus £2.95 p & p.

Please tick if you require a VAT receipt ☐

*I enclose a cheque/postal order payable to Sinclair Research Ltd for £____

*Please charge to my Access/Barclaycard/Trustcard account no. _____

*Please delete/complete as applicable

Signature _____

Name Mr/Mrs/Miss _____

Address _____

SOFTRAX
ZX81–16K

NEW

DRAW POKER
Start with a credit of £10 and become a multi-millionaire or lose everything! An addictive game based on mathematical probability and including recognisable graphics!
On cassette only £3.95

BINGO
Don't be unsociable! Share your ZX81 with family and friends in a pleasant game of bingo. The computer produces as many tickets as you want and displays the number board and draw. (Printer required)
On cassette only £3.95

Both programs on one cassette only £6.40

All prices inc. p&p

Cheques or P.O.s to:-
SOFTRAX (Dept S.U.),
26, Third Avenue,
Bath,
Avon

Mail order only.

ZX-81 16K ADVENTURE GAME. Full 16K used. Plenty of Action — map supplied, plus detective game of Logic (2-4 players). Both on cassette only £3.50. S. Taylor, 2 Greenway, Eltham, London SE9 5SZ.

SPECTRUM PROGRAMS. BOMBER — high quality compulsive basic program plus PAINTBOX — sketch, draw, print, save and load for cartoons, displays etc. £5.00 on cassette. D R Pope, 62 Cockereil Close, Wimborne, Dorset BH21 1XT.

SINCLAIR BUILT ZX-81. + Bi-pac sound box. Original packing + manual leads power-pack, 3 cassettes for 16K + ZX-81 companion £80 o.n.o. Phone Oxted 2834.

EDUCATIONAL SOFTWARE
ZX-81 (16K)

G.C.E. "O" LEVEL FRENCH REVISION: 3 teach and test Grammar programs plus 3 Vocabulary programs.
G.C.E. "O" LEVEL MATHS REVISION: 1 teach and test program plus 2 programs of generated questions from "O" level syllabus (with explanations).
JUNIOR MATHS 1: Long Multiplication, Long Division, HCF, LCM, Fractions 1 (+ & –), Fractions 2 (× & ÷).
JUNIOR MATHS 2: Areas, Perimeters, Simple Equations, Percentages, Sets, Venn Diagrams.
JUNIOR ENGLISH 1: Meanings 1, Meanings 2 (harder), Parts of Speech, Proverbs, Similes, Anagrams.
JUNIOR ENGLISH 2: Idioms, Opposites 1, Opposites 2 (harder), Group Terms, Odd Word Out, Spellings.
ARITHMETIC FOR THE UNDER 8's: Add, Subtract, Multiply, Divide. Allows for entry of units first. 3 levels.
EDUCATIONAL QUIZ: 4 programs on General Knowledge, Reasoning, English and Maths. All questions use RND function.

£4.50 per cassette or send sae for catalogue to: ROSE CASSETTES, 148 Widney Lane, Solihull, West Midlands B91 3LH.

NEW * **FROGGER** * NEW

ANOTHER ZX81 (16k) first!
* Moving Cars, Logs, Turtles
* Alligators, Diving Turtles
* Three 'Screens' of Action
* All Arcade Features
* Entirely Machine-Code

ONLY £5.95 inc. P&P.

* * * * * *

ZUCKMAN

First Authentic ZX81 (16k) Version of 'PUCKMAN'
* ALL Machine Code (10k)
* FOUR Indepedent Ghosts
* Trail, Energy Posts etc.
* High-score 'Hall of Fame'
* Authentic Arcade Action

ONLY £5.95 inc. P&P
Send PO or cheque to:

DJL SOFTWARE
9 Tweed Close, Swindon, Wilts SN2 3PU.

ZX-EPROM — ADD EPROM POWER TO YOUR ZX COMPUTERS

2716 ZX-Eprom Programmer, with ZIF Socket, low cost at £27.75 (A). Enables M/C and basic routines to be stored in Eprom. Simple to use, instructions and software supplied.
25V Stabilised supply for (A) £7.75 (B)
Eprom-read card £8.25 (C).
Eprom Programmed with **Breakout, life + toolkit** (renumber, read, data, restore. block-fill, block-delete, size of program, free memory, decimal-hex, hex-decimal, M/C Eprom Read Card).
Programmer and Read-card connect directly to ZX-81/80.
P + P on A and B £1 (U.K.), £2 overseas.
ZX-SPECTRUM? Please enquire.

ORME ELECTRONICS, 2 Barripper Rd., Camborne, Cornwall.

---

sinclair supermart

BINGO ON 1K 13 line listing calls 1 to 99 random order and displays tabulated check-back. Cheque or P.O. £1 to C. Jefferies, 280 Whitefields Rd, West Midlands B91 3PA.

ZX-81 IN CUSTOM-BUILT CASE. 16K RAM. Power supply. Full size keyboard, leads, manual 240V outlet ext speaker. Tape power outlet. Fully fused, must be seen. Plus programs £100.

CAR LOG

A new **USEFUL** suite of professional programs for the **ZX81** (16K).
1. Very simple to use with full instructions.
2. Complete cassette record of mileage and itemised expenses.
3. All conceivable ratios, totals and projections computed.

CAR LOG is suitable for your car, your dad's car or your whole fleet of trucks.

Only £8.95.
NIMROD SORTWARE
4 Stanley Rd., London SW14 7DZ.

---

sinclair supermart

---

sinclair supermart

ZX 16K MARVELS 4

QUALITY GAMES ON ONE CASSETTE FOR ZX81

* **EVOLVE**
FULL SCREEN INTERACTIVE "LIFE"
* **BREAKOUT**
* **NIM**
4 SKILL LEVELS & UNBEATABLE
METEOR STORM
FAST MOVING GRAPHICS GAME

SEND
CHEQUE/PO WITH ORDER TO:
ROWLANDS & SIMMONDS
46 Merriefield Ave, Broadstone, Dorset

ONLY £3.95 (INC P&P)

ZX-81 GAMES FROGGING (arcade-frogger). Guide your frog across the river. Becomes harder, crocodiles etc. **MINOTAUR.** Beat the monster to maze exit. £4 cassette! D. Warrington, 1 Haddon Drive, Bakewell DE4 1 BD.

16K/81 GAMES TAPE includes Chinvader 1, Chinvader 2, ChScramble, ChCentipede, Ch3-D Maze, ChStartrek. All in m/c, very fast and addictive. On tape for only £5.

ZX81 — 16K
FOOTBALL POOLS PROGRAM

* Lists out, in order of preference, the 16 most likely score-draws; also the 16 most likely homes, draws and aways.
* Picks out the results on the bookmakers' **Fixed Odds** coupons that have been given over-generous odds. Calculates your expected profit!
* Allows the user to update the tables week by week as results come in.

For a cassette of the program, plus an instruction leaflet giving a brief explanation of the theory send £5.95 to:

HARTLAND SOFTWARE
(Dept. S)
8 PENZANCE PLACE, LONDON W11 4PA

ZX-81/SATELLITE TV. Independent researcher clearing out current/on-going project files. (Other commitments prevent completion.) Satellite TV Documentation in the form of: Original material — photographic/photostatic reproductions — computer listings — programme cassette. Incl: Technical Descriptive literature — "buzzword" jargon dictionary — what's what/who's who directory — satellite disposition schedule — dish antenna parabolic curve/form generator. A vast amount of facts, figures etc. giving a valuable insight into tomorrows "boom" business of the electronics industry. Send cheque/PO to the value of £5.00 to: A. J. Innes, 82 St Pauls Parade, Cusworth, Doncaster, South Yorkshire DN5 8LP.

SPECTRUM AND ZX-81 SOFTWARE

COSMOS. Save your fleets from the marauding aliens in this new m/c space game with dramatic graphics on your ship's sensor screen. **£4.99**
TABLE TUTOR. A complete menu driven course in multiplication tables with examples, tests, homework and answer service for the under 10's. **£3.99**
QUARTET. A compendium of crosswords, puzzles and memory game (multiplayer) with up to 10 difficulties. **£3.99**
TRIAD. Three new puzzles to perplex and frustrate even the Cubists. **£3.99**

Supplied on cassette SAE for catalogue
VORTEX SOFTWARE, 26 Crawford Road, Hatfield, Hertfordshire AL10 0PG

SINCLAIR ZX-81, 16K RAM, 9 months old, complete. Excellent condition. £80. Marmer, Whitehall Cottage, Rhodes Minnis, Canterbury, Kent CT4 6YA. Tel: Lyminge 862604.

WANTED. WANTED. Top quality 16K ZX-81 and Spectrum programs. Highest commission paid. Please send tape and instructions to: Scorpio Research, 24 Geary Drive, Brentwood, Essex.

---

10 ZX-81 1K GAMES TAPE, including: UFO, Air Battle, Doodle-Bug, Demon Kill, + stick on soft keys. Send £4.00 (Post Free) to Jackett Software, 48 Fairwater Ave, Welling, Kent.

---

sinclair supermart

AMAZING NEW BREAKOUT FOR 16K ZX-81. Features: super fast machine code speed, on screen scoring, excellent graphics, Before/After game random graphics patterns. Also two versions of Star Smash. You whiz past flying stars. Also in machine code. Just send £3.95 to Autosoft, 5 Burnside, East Bolden, Tyne & Wear NE36 0LS. PO/Cheques to M. Watson.

SPORTING FORECASTS

Professor Frank George's well-known Football Pools Forecasting program is now available on the

SINCLAIR ZX81 16K

Spectrum version soon.

A Horse-Race Forecast Program in preparation.

Write to: Professor F.H. George
Bureau of Information Science
Commerce House, High Street,
Chalfont St. Giles, Bucks.

SPECTRUM AUDIO AMPLIFIER — really hear the keyboard and BEEPs, just plugs in, only £9.95 complete. A. Pennell, 14 Sweyn Rd., Cliftonville, Kent.

sinclair supermart

ZX81/SPECTRUM

*P.S.E. GAMES TAPE 1 (16K) — Tower of Brahma, Wipe-out, Missile Attack, Stopwatch, Space Adventure and Depth Charge.
£3.75 (inc. P&P)
*P.S.E. GAMES TAPE 2 (16K) — Fruit Machine, Battleships, Fighter Pilot, Night Fighter, Defender, Missile Command.
£4.95 (inc. P&P)
(Arcade games on Games Tape 2 written in fast-action machine code.)
*P.S.E. GERMAN LANGUAGE EDUCATION SYSTEM (16K).
Children taking 'O' or 'A' levels? Business abroad? Penfriends? Want to improve your current standard? System covers grammar, verbs, vocabulary, hints and aids for learning, including random tests to test progress and drive lessons home. 4 tapes: GERMAN GRAMMAR 1, 2, and 3, and P.S.E. DATAPHRASE — a computerised phrasebook for essential phrases in common usage.
Each tape £5.50, or £16.50 for all 4. Prices include P&P.
*P.S.E. FRENCH LANGUAGE EDUCATION SYSTEM (16K). — Available shortly.
P.S.E. language tapes produced in conjunction with a local school. Special terms can be sent on request for school usage.
Professionally-produced tapes and documentation by mail order only from: Precision Software Engineering, 20 Shelton Ave., Newark, Notts. NG24 4NX. SAE for further details/up to date price list.

ZX-81 + 16K RAM SINCLAIR BUILT. Leads, adaptor manual all boxed. Hardly used, plus computable ZX and phone pad etc. £70. Write Harrison, Flat 583, 19 Newport Court, London WC2H 7JS.

ZX81 + MEMOTECH 64K. Cost £150 but will accept £110 o.n.o. J D Peel, 10 Croftlands Bigrigg Egremont Cumbria. Phone Seascale 28333 ext. 23393 in day.

PERSONNEL RECORD SYSTEM. Controls records of holidays and sickness with management reports. *Menu driven *Displays records on screen or direct to ZX Printer *High speed machine-code save and load facility to create data files. Two programs on one cassette priced £9.95. Send cheque or postal order to: Warren Newman, 3 Thalia Close, Greenwich SE10 9NA.

SPECTRUM WORD PROCESSOR. On-screen edit — insert, replace, scroll. Word-wrap, justification, file-handling, double-space printing. Cassette and manual £15. **L-GAME,** new, based on de Bono, £5. Brian Hebbes, 6a Newlands Avenue, Southampton.

ZX81 (16k)
educational software

ON YOUR MARKS

• • •

Primary arithmetic in the form of games

Five routines on one cassette accessed by menu selection. Superb graphics enhancement.

Price: £6.95
Computatutor
3 Thalia Close,
Greenwich SE10

SPECTRUM — ZX81

BUSINESS GAMES

AUTOCHEF As MD you must negotiate for leases, decide on menu prices, level of wages, advertising and dividends and forecast levels of inflation. If you are not successful you will be made to resign!

AIRLINE. You must decide on number of aircraft to operate, loan and fuel contracts, whether to buy or charter, and levels of staffing and maintenance.

PRINT SHOP. As owner of a printing company you have to decide on staffing, paper stocks, quotations, work schedule and cash requirements.

£4.75 for one, £8.00 for any two or £12.00 for three.

C.C.S. 14 Langton Way, London SE3 7TL. Tel: 01-858 0763

SPECTRUM?

NEW GAME * 2 PLAYERS *
(16K Spectrum)
***** STELLAR DUEL *****
Only one Starship Captain will survive to command the Imperial Fleet.
WILL IT BE YOU?
* **LAND ON PLANETS**
* **PHASORS**
* **SEND IN ASSAULT TROOPS**
* **WARP & SUB LIGHT SPEED**
* **COLOUR: SOUND: CARNAGE!**

SPECRUM ON ITS WAY?
Have this SUPER NEW GAME ready. Easy load cassette £5.75 inc post etc.
TRICODER CAMBRIDGE.
(Mail order)
75, Oxford Rd.,
Cambridge CB4 3PH.

BINGO ON 1K. 13 line listing calls 1 to 99 random order and displays tabulated check-back. Cheque or PO £1 to C. Jefferies, 280 Whitefields Rd, West Midlands B91 3PA.

ZX SPECTRUM16K GAMESPACK 1. Fast moving asteroids, Batnum, Bomb run, missile command and defender only, £5.50 the lot. Sae for details, R. Bhattacharya, 3 Wensley Close, Harpenden, Herts.

10 AMAZING 16K ZX-81 GAMES. Includes startrek, Pacmaze and vampires. Very good graphics. $8 on cassette.P.O. or cheques to Michael Bredbury, 25 Brynhedydd Road, Rhyl, Clwyd, North Wales LL 18 3UH.

OMEGA*SOFT. The last word in educational and games programs for the SPECTRUM and ZX-81. Maths1 or English1 (9-14) only £3.95 for 5-prog cassette. Sae for catalogue. 299 Laburnum Grove, Portsmouth.

Sell your used computer or peripherals through Sinclair Supermart at low cost... up to 30 words for only £5.

Have you updated your computer or do you no longer use that add-on? Instead of leaving it lying around, turn it into cash be placing a classified advertisement in Sinclair Supermart and reach around 40,000 users of the Sinclair ZX systems. Please write your advertisement in the boxes below, one word per box. Underline words required in bold type. Your name, address and/or telephone number should be included *Please print in block capitals.*
Note—this service is open only to private advertisers. The advertisement will appear in the earliest possible issue.

Name:
Address:
Tel:

Have you included the fee of £5?

Conditions
The Advertisement Manager reserves the right to alter, reject or suspend an advertisement without assigning any reason. Advertisements are accepted subject to approval of copy and to the right of the Advertisement Manager to alter, reject or cancel any order without explanation. The Proprietors are not liable for any loss from any cause whatever, nor do they accept liability for printers' errors. The Advertisers shall indemnify the Publishers in respect of any claim, cost and expenses arising out of any libellous or malicious matter or untrue statement in any advertisement published for the advertisers, or any infringement of copyright, patent or design therein. The placing of any order will be deemed to be an acceptance of these conditions.

ADVERTISEMENT INDEX

ABERSOFT	49		
ADDICTIVE GAMES	50	KEMPSTON	24
AFDEC	22	LINSAC	35
ARTIC COMPUTING	18	MC ASSOCIATES	20
BUFFER MICRO	15	MELBOURNE HOUSE	4
CALPAC	39	MEMOTECH	43
CAMBELL SYSTEMS	26	MIKRO GEN	36
CAMBRIDGE COMP. SHOP	44	MICROWARE	26
CARNELL SOFTWARE	52	MICHAEL ORWIN	2
CLASSIFIED	57 & 58	NORTHERN PREMIER	24
COMPUTEX CASES	8	OASIS SOFTWARE	44
D.K. TRONICS	11	P.S.S.	49
DATA ASSETTE	17	J.G. PRINCE	25
DEAN ELECTRONICS	49	PICTURESQUE	40
DIGITAL INTEGRATION	24	PHOENIX MARKETING	38
DOCIMODUS	52	READ OUT	59
EDUCARE	50	RICHARD ALTWASSER	44
ELECTRIC PENCIL CO.	35	SCISOFT	25
FULLER MICRO	14	SOLENT SOFTWARE	26
GEMINI MARKETING	25	SILICON TRICKS	36
HARRIS & LOCKYER	26	SOFTWARE FARM	20
HEWSON CONSULTANTS	46	SOFTWARE LIBRARY	39
HILDERBAY	40	SILVERSOFT	39
INTERFACE	22	SECOND-HAND SINCLAIR	24
J.R.S.	40	TASMAN	36
J.K. GREYE	18	TIMEDATA	35
KAYDE	60	ZX SAS	22

sinclair supermart

THE ZX BOOK CLUB



DUE SEPTEMBER 1982
written by the man who helped write the documentation for the ZX Spectrum:-

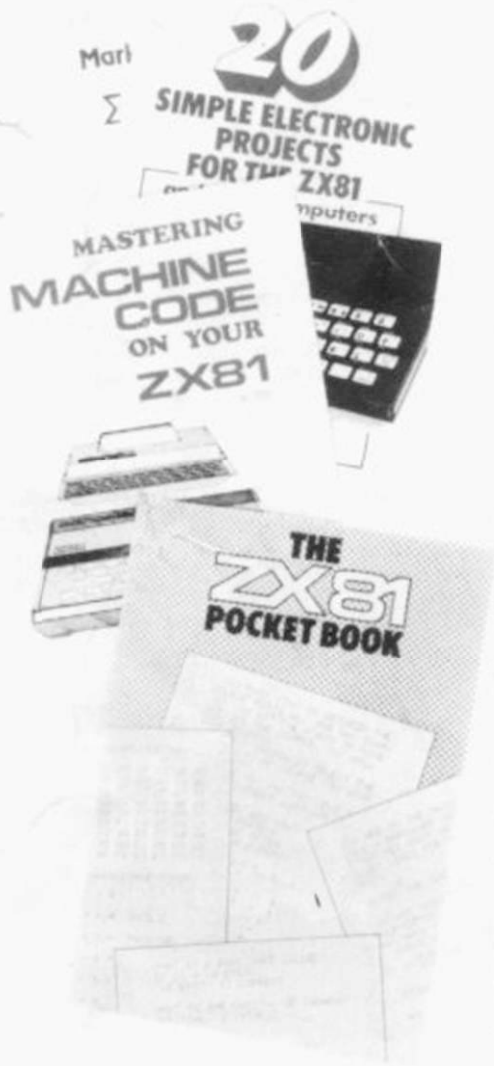
LEARNING TO USE THE ZX SPECTRUM COMPUTER

only **£5.95**

by Robin Bradbeer. 100 pages fully illustrated.

This book has been written specially to help new and prospective owners of the ZX Spectrum to easily understand the operation and full capabilities of this amazing new microcomputer.

* *Provides clear descriptions of the hardware and functions, describing use of the new keyboard, command keys and editing facilities.*
* *Explains simple programming using Sinclair BASIC.*
* *Describes graphics and colour facilities in detail.*
* *Includes many programs, including animation.*
* *Appendices cover technical details and a glossary.*



ALSO DUE SEPTEMBER 1982 – and also by Robin Bradbeer:–

LEARNING TO USE THE ZX81 COMPUTER

only **£5.95**

by Robin Bradbeer. 100 pages fully illustrated.

In the same series as the Learning to Use the ZX Spectrum, this new book follows the same format, style and content and will prove an invaluable guide for new (and experienced!) ZX81 owners.

Other bestselling titles:–

Byteing Deeper into Your ZX81 by Mark Harrison
20 Simple Electronic Projects for the ZX81 by Stephen Adams
Mastering Machine Code on your ZX81 by Toni Baker
The ZX81 Pocket Book by Trevor Toms

READ-OUT PUBLISHING COMPANY LTD
8 Camp Road, Farnborough, Hampshire, GU24 6EW Telephone: 0252 510331/2 Telex 858001 GOWER G

READ-OUT PUBLISHING COMPANY LTD

8 CAMP ROAD, FARNBOROUGH, HAMPSHIRE GU24 6EW.
24 hour answering service. Telephone: 0252 510331/2

Name _____

Address _____

_____

Make cheques payable to Read-Out Publishing Company Ltd.

I enclose my cheque for £.....

Please debit my Access ☐

Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signed _____

Date _____

☐ Please reserve my copy/ies of
☐ Learning to Use the ZX Spectrum @ £5.95
☐ Learning to Use the ZX81 @ £5.95

☐ Please send me _____ copy/ies of
☐ Byteing Deeper into Your ZX81 @ £6.45
☐ 20 Simple Electronic Projects for the ZX81@ £7.45
☐ Mastering Machine Code on Your ZX81 @ £8.50
☐ The ZX81 Pocket Book @ £6.95

SU2

KAYDE Electronic Systems

ZX80/1
ZX KEYBOARD WITH REPEAT KEY

£37.95 inc VAT



Fully cased keyboard £37.95
Uncased keyboard £27.95
Keyboard Case £10.95

This is a highly professional keyboard using executive buttons as found on top quality computers. It has a repeat key and comes complete in its own luxury case. This is a genuine professional keyboard and should not be confused with toy keyboards currently available on the market.

KAYDE 16K RAM PACKS

£29.95 inc VAT

The 16K RAMPACK simply plugs straight into the user port at the rear of your computer. It is fully compatible with all accessories and needs no extra power and therefore it will run quite happily on your Sinclair power supply. It does not over-heat and will not lose memory at all. As you may know some makes go down to 11K after being on for a while.

This 16K RAMPACK is very stable and will not wobble or cause you to lose your programme. It comes fully built and tested with a complete money back Guarantee.

KAYDE FLEXIBLE RIBBON CONNECTOR

£12.95 inc VAT

Stops movement of RAM PACK and other accessories
(Not needed with a *KAYDE* RAMPACK)

KAYDE 4K GRAPHICS BOARD

£29.95 inc VAT

The *KAYDE* Graphics Board is probably our best accessory yet. It fits neatly inside your ZX81. It comes complete with a pre-programmed 4K Graphics ROM. This will give nearly 450 extra graphics and with there inverse makes a total of over nine hundred.

The *KAYDE* Graphics Board has facilities for either 2K or RAM (for user definable graphics) 4K of ROM or our 4K Tool Kit Chips that will be available shortly. All the graphics are completely software controlled, therefore they can be written into your programmes. Here are a few examples: **A full set of space invaders — Puckman — Bulits, Bombs — Tanks — Laser Bases and Alien Ships.**

NO EXTRA POWER NEEDED

KAYDE 16K GRAPHICS BOARD SOFTWARE

£5.95 EACH

Peckman: The only true ZX version of the popular arcade game.
Centipede: "In all I think this is the best presented moving graphic program I've yet seen" Phil Garratt, Interface.
Space Invaders: The best version available anywhere.
Graphic Software can only be used with a Graphics board.

KAYDE 16K 81 SOFTWARE

£5.95 EACH

Centepede "In all I think this is the best presented moving graphics program I've yet seen" Phil Garratt Interface.
3D/3D Labyrinth. A Cubit Maze that has corridors which may go left, right, up, down.
Peckmen (the latest addition in 81 games).

WHY WAIT TO PAY MORE
FAST IMMEDIATE DELIVERY

Post to:
Dept SU
Kayde Electronic Systems Ltd
The Conge
Great Yarmouth
Norfolk NR30 1PJ
Tel: 0493 57867 (Dept SU)

Don't Forget you can always order on the telephone with your credit card

All products include VAT all hardware comes fully built and tested with a 14 day money back option

Access

VISA

DEPT.
SU5

I enclose £.....
Name .....
Address .....
.....
.....

Please add £1.50 P/P for all hardware and 50p for all software.
Please make cheques payable to Kayde Electronic Systems Ltd.