INTERFACE

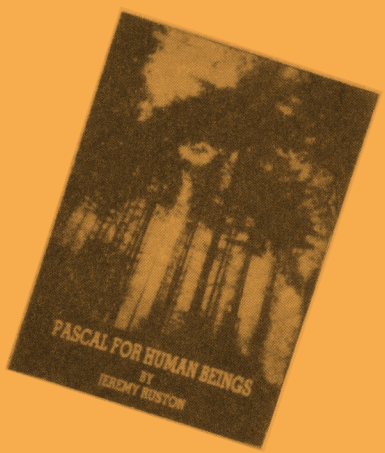
ZX80 ATOM ZX81 BBC

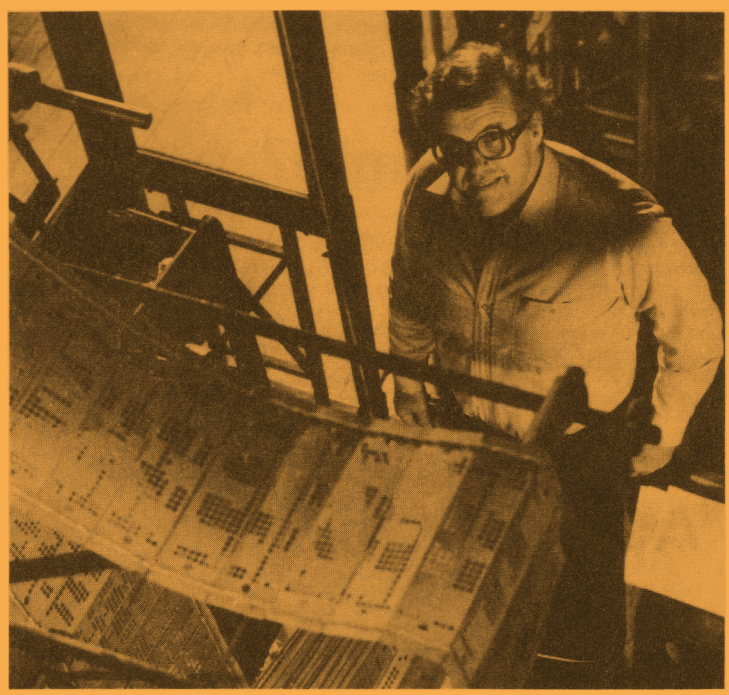
The monthly magazine for ZX80, ZX81, Atom and BBC Microcomputer

March 1982, Volume 2, Issue 7

INSIDE THIS ISSUE:

- We review 'The Soul of a New Machine'
- A host of new games for the Acorn Atom
- Memotech memory expansion unit reviewed
- ZX Education with Eric Deeson
- More tricks for your ZX printer





The Jacquard loom (and friend) from the BBC Computer programme. You can see the loom just beyond THE CHALLENGE OF THE CHIP exhibition at the Science Museum.

Zippy printing

Frank O'Hara writes:

Someone lent me the book of the ZX81 printer, and I was interested in the general graphics programs shown. They perform quite well after I have done my own things with them. But I am sorry to see that even professionals are putting these patterns out in a way that does not do them full justice. They do suggest saving them in a string, but there is no mention of the most striking use of them. i.e. fast and dynamically by storing the points in an array. May I illustrate this from one of your own programs?

The method does require the 16K RAM pack of course. Taking Tony Baker and Tim Hartnell's "SPIRAL PLOT/UNPLOT", this is what I do with it: —

```
10   REM "SPIRAL"
20   FAST
30   DIM X(400)
40   DIM Y(400)
50   FOR I=1 TO 400
60   LET A=PI*I/50
70   LET B=(400-I)/400
80   LET X(I)=30+20.5*COS A*B
90   LET Y(I)=20+20*SIN A*B
100  NEXT I
110  STOP [optional]
120  SLOW
130  PRINT "SPIRAL, PLOT/UNPLOT"
140  FOR I=1 TO 400
150  FOR X(I), Y(I)
160  NEXT I
170  FOR I=400 TO 1 STEP -1
180  UNPLOT X(I), Y(I)
190  NEXT I
200  FOR K=1 TO 100
210  NEXT K
220  GOTO 140
```

The steps in using this are: —

1. Save it **without** its variables. This is important, since some of these patterns can fill the RAM with variables, and you waste tape space and a lot of time if you save them, defeating the whole object of the exercise. (You could of course delete 8 lines of program then, but the loss far outweighs the gain).
2. Just RUN it. After about 50 secs running fast it stops with report 9/110. You are now ready to go. **Fasten your seat belts.**
3. Enter "GOTO 120" and N/L (do NOT press RUN or CONT!) It prints the title, and in 25 secs does its 4 loops of spiral; another 25 secs and they are unplotted; a 2 sec pause governed by line 200 and off it goes again for as long as you like, until you press BREAK or shake the table, in fact. I can watch this sort of thing for hours. I also think it makes the ZX81 graphics in the **speed** aspect comparable with much costlier micros. Of course you can't do a chain of patterns together this way; there won't be enough memory. If you want lots of patterns together you will have to settle for slower motion. I think the speed is what makes graphics really interesting. I also think these results are pretty good for mere BASIC, without the hours of work involved in machine code programming.

FRANK O'HARA

A new champ?

Dear INTERFACE,

For Christmas I received my own Sinclair ZX81. Shortly after I bought your book "Getting acquainted with your ZX81", edition 3.

I am letting you know my score for the Star-burst program on page 59, which is 1807 top score.

I am 9 years old and did not cheat. By the time this letter reaches you, I hope to have scored even more.

JAMIE LONG

A new ZX mystery

Dear INTERFACE,

It would appear that my ZX81 has become a Time Machine or an instrument of thought transference. During the last couple of months or so, whilst sitting in front of it, I have pondered on the possibility of forming a ZX81 Club in this area. Today, on receiving January '82 INTERFACE and turning to page 2 under the heading of New Clubs, I find not only that this has become a reality but I am apparently the Secretary! I (and possibly the whole computer world) am longing to know how this apparent miracle has come about. Have you any explanation?

To help you in your investigation I would mention:

(a) I did fill in your survey questionnaire stating I was willing to correspond with others in the area and my name was amongst those published to this effect in your November issue. But none of the others have been awarded a club all of their own.

(b) I have suggested to my local Council that such a Club should be formed with their support and they have expressed interest — but apart from them contacting one or two existing clubs to seek advice no positive steps have yet been taken — and I doubt whether they would have mentioned my name.

(c) I did write to Kenneth Baker, the Minister responsible for Information Technology Year, informing him of the possibility of a Club being formed and requesting any Government information available on the forming of such a Club. Is it possible that Tim Hartnell is a pseudonym for the Minister of Information Technology? — Incidentally, the response from the Ministry was a huge pile of bumph, none of which had any relevance to forming a Club.

There is, of course, the possibility that due to the long hours spent looking at the flickering screen I have gone completely ga-ga and that I have in fact written telling you of a non-existent club. This is the explanation favoured by my wife. Please write and tell me it isn't true.

Now to the future. I suggest you do not delete my name from the list of Clubs. Hopefully the response to your entry will ensure that a club will be formed and will be known as the club that formed itself by magic.

ROYSTON WALLIS,
22 Mallard Crescent,
Pagham,
Bognor Regis.

TIM replies: I favour the ga-ga theory. Then again, I *may* have made a mistake. . .

CLUB NEWS

Each month in INTERFACE we feature news and contact addresses for local user groups. Please let us know if you've formed your own ZX80, ZX81 or Acorn Atom/Proton user groups.

The North London Hobby Computer Club has a ZX80/81 users group meeting each Monday night from 6-9 pm. It is held at the North London Polytechnic, Holloway Road, London, N7 (diagonally opposite Holloway Road tube station).

If you'd like to join a London-based Atom/Proton user group, ring C Holt on 01-427 6088 or M Jaffer on 01-429 0842.

Other local groups:

- Roger Pyatt, 23 Arundel Drive, Orpington, Kent (66) 20281.
- Austin Knott, 269 Telegraph Road, Deal, CT14 9EJ.
- Christoph Moeller, Gross Kurfurstenstasse 41a, 4800 Bielefeld 1, Germany.
- Keith Hays, 14 Newsham Road, Lancaster, LA1 4DG.
- Danmarks Nationale ZX80 og ZX81 Club, Skovmosvej 6, 4200 Slagelse Dk Denmark.
- Steve Brumby, 38 Eastfield Road, Messingham, Scunthorpe, Sth Humberside.
- Ken Knight, 22 Mount Street, Aylesbury, Bucks, HP20 2SE (0296 5181).
- David Blagden, PO Box 159, Kingston upon Thames, Surrey, KT2 5YQ.
- Anthony Quinn, Heckenrosenweg 6, 3170 Gifhorn, W. Germany.
- Conrad Roe, 25 Cherry Tree Avenue, Walsall, WS5 4LH.
- Ian Watt, 107 Greenwood Road, Clarkeston, Glasgow.
- J Palmer, 56 Meadowfield Drive, Edinburgh (031-661 3181).
- Leeds Microcomputer Users Group. Meets fortnightly on Thurs eve in Leeds, new members welcome. Contact: Paul O'Higgins, 20 Brudenell Mt, Leeds 6, tel: (0532) 742347 after 6.
- Manchester Atom Users' Group. Meets last Tues monthly during school terms at Abraham Moss Centre, Crescent Rd, Manchester 8. Contact: John Ashurst, 061-370 5121 ext 27 (day), 061-681 4962 (eves).
- Medway Atom Users' Group. Meets last Tues monthly during school terms at St John Fisher School, Ordnance St, Chatham. Contact: Clem Rutter, (0634) 42811 (day).
- Would anyone interested in forming a computer club in the Portsmouth area please contact Dave Cocker on Portsmouth 751156.
- Brunel Computer Club: meets alternate Wednesdays, 1900-2200 hrs at St Werburgh's Community Centre. Contact: Mr R Sampson, 4 The Coots, Stockwood.
- Worle Computer Club: meets alternate Mondays 1900-22.30 at Woodsprings Inn Function Rooms. Contact: S Rabone, 18 Castle Rd, Worle, Weston-Super-Mare, Avon, tel: 0934 513068.
- KAOS — the official 6502 users' group of Australia. Has a range of projects within special interest groups: hardware, software, amateur radio, Pascal, education. Publishes monthly newsletter. Contact: Mr Ian Eyles, 10 Forbes St, Essondon, Victoria, Australia 3040.
- P Compton, 29 North Marine Road, Scarborough, Nth Yorks, YO12 7EY.
- Alan Gunnell, 66 Nursery Road, Hookend, Nr Brentwood, Essex.
- Jonathan Meyer, Vanspaen Straat 22, 6524 H.N. Nymegen, Holland.

Royston H Wallis, 22 Mallard Crescent, Pagham, Bognor Regis, West Sussex, PO21 4UU.
Raymond Betx, Chemin du Moulin 38, 1328 Ohain, Belgium

If you write to us, please allow up to a month for a reply. We get over 130 letters a day now, so the backlog, at times, can be pretty bad. The 44-46 Earls Court Road address is just for mail. There is nobody working there who is associated with the club, so a visit to the address is fruitless.

ZX Education

I always feel, surrounded in my *Interface* corner as I tend to be by asteroids, catacombs and gremlins, that this feature must be thought to be a makeweight. But I know, really, that it isn't, that Tim sees it as a serious part of the mag. and that there's lots of folk (well, a few) out there reading it.

The last bit of evidence lies in my daily mailbag, a fair percentage of which comes from Interface readers. But most of the enquiries are not from teachers (the Educational ZX80/1 Users' Group has got most of them hooked by now), but from parents. "How can my ZX80/1 help my child with geography/school work/reading/etc?" or from pupils and students asking the same question more directly.

It is quite clear that in many ZX homes there is an urge to use the machine for teaching the children. Now the need is beginning to be met. How? Educational software is growing rapidly.

Of the 150 + organisations listed in EZUG's Directory of suppliers to the ZX market (£1.00 from the address below), there are ten providing teaching programs. One is EZUG itself; Sinclair, Video Software and Artic Computing (who need no introduction) are there too — and the rest are specialists.

In this piece I would like to introduce those organisations to you as worth your consideration if you're looking for help with Willy's schoolwork. Alphabetical order; addresses at the end; all 16K ZX8OU/ZX81.

AVC Software seems to be the biggest of these suppliers, though it has been around for only a few months. Its slogan is "16K ZX81 software for learning in school and at home" — that shows they are mindful of the parents' demands. A number of their programs have been accepted for EZUG's Library — a good recommendation as EZUG's assessment procedures are rigorous. They market about a dozen items currently — for children of all ages from about eight, and in a growing range of subject areas. The gaming approach is quite common and the programs stretch ZX graphics to an impressive limit. Try their "Hangperson" (yuk) series for instance — beautiful hangmen, with clues and other educational trimmings, in primary geography and secondary science (at the moment).

Parsons have released three teaching cassettes so far, all pleasant collections of fairly neatly designed programs. "Geography" looks at various aspects of this important subject, while "Fun learning" and "Art and Fun" (especially the former) are well worth thinking about too. This Company is very new, so I haven't had time to give their products a thorough going over yet — but I think they're worth watching.

Rose cassettes comes Number Two in this race (if it is a race). On one hand, the Company has been around so long that it must have one of the greyest beards in the ZX game; on the other hand their range (although growing) is smaller and less versatile than AVC's. Again some of these programs have reached EZUG's list, which means that teachers assess them as good learning material. There are several cassettes, in English (primary level) and math's (primary and secondary), each with half a dozen beautifully designed and helpful programs.

Turner consultants have taken quite a while to get their feet wet, but now have available a number of primary maths programs. These are well designed, solid items — entirely valid if a bit — er — unexciting. The Company, like most of the others here, use teacher writers and test their material in schools — that is just what we must expect of special-purpose software like this. (Mind you, I expect that approach of all commercial programs; amazing how many don't seem to have been produced and grilled by experts!)

I am surprised that **Video Software** hasn't been accorded much mention in these pages. For many months they have been presenting the world with superb little-business programs and serious games. A number of their programs are useful for business/commercial students — and they are all good, solid, well presented items. I think in particular of "Videoview" (your own Prestel), "Videoplan" (your own Visicalc), "Videograph" (a valuable space planner) and "Stock Market" (a sort of board game for budding business-children).

That all doesn't add up to ten suppliers, does it? Well, the "odd" ones out are **Scisoft** (secondary science — whose material we haven't yet seen) and **Spencer** (whose programs are specifically for teachers — see *Your Computer* and the EZUG *Newsletter* for reviews if you want).

According to *Which?* last summer, a large percentage of folk buy personal computers for their children's education — and an even larger percentage come to find that they are invaluable for that purpose. With the ZX81 coming up to its first birthday, there is now a large and rapidly growing range of home teaching software around for this micro. Watch the GCE pass-rates soar....

AVC SOFTWARE, PO Box 415, Birmingham 17
PARSONS, 23 Coxhill Gardens, River, Dover, Kent
ROSE CASSETTES, 148 Widney Lane, Solihull, West Midlands
SCISOFT, 5 Minster Gardens, Newthorpe, Eastwood, Notts
SPENCER, The Sycamores, Queen's Road, Hodthorpe, Notts
TURNER CONSULTANTS, 3 Hillgarth, Underbarrow, Kendal, Cumbria
VIDEO SOFTWARE, Stone Lane, Kinver, Stourbridge, West Midlands
...and of course
EZUG, Highgate School, Birmingham 12

ERIC DEESON

Software review — MOI Othello

Mine of Information's OTHELLO is recorded twice on each side of a cassette, and is accompanied by a 16-page booklet which contains rules, how to play, hints on play, LOADing the program, as well as the program listing. This means you could, in theory, enter the whole program yourself, but the thought of entering a 5000 character REM statement seemed a little too daunting to contemplate.

LOADing, which took about three minutes, was difficult, but it was worth persisting. I don't think it is MOI's fault, because I have trouble loading a security copy I made. The difficulty could be caused by line one.

My first impression was NICE GAME, SHAME ABOUT THE GRAPHICS. It would have been much clearer if either the B's or W's which were used to indicate the pieces were inverted. The display includes the current board, the score, and last moves.

You have various options when you move. You either enter your move or press NEWLINE when the display changes to a menu which includes the options of a new game, change level, replay last move, change sides, pass, or return to BASIC.

There are nine levels of play — from novice (1) to expert (9). On lower levels, the response is very quick, taking only five seconds or so on level five.

My only other criticism is that the program always plays in FAST mode. It would be nice for it to be in slow on lowest levels so the novice could see the board continuously.

The length of time for a move increases approximately by five on each level (work out for yourself how long level 9 takes).

I was pleased to notice a discernable difference in play on each level and players will improve quickly until they reach level 5 or 6. I'd be surprised if anyone won at level 7.

In conclusion I have found this easily the best OTHELLO program on the market for the ZX81. It wil improve beginners play as well as the more experienced. Buy it.

GRAHAM CHARLTON

NOTE FROM TIM: Ian Logan, who wrote the 1K OTHELLO/REVERSI we are selling, was a trifle cheesed off that MOI was selling their game at the ZX Microfair, as he says he gave MOI some advice on how to solve problems they were having with the program, and was now disgruntled to find it being sold in competition with his. That's showbusiness.

WHAT CAN I DO WITH 1K?

If your answer is "not much", then you must read the new book from V&H, 'What Can I Do With 1K? (40 programs and routines for the 1K Sinclair ZX81)'.

Here at last are some serious (and some fun!) programs which all run in 1K.

Don't be misled by the titles: 'Roulette' actually analyses gambling systems; 'Chinese Horoscope' reveals your birth sign, month sign, element and ascendant; 'Payroll' handles ALL tax bands. These are not just simple programs.

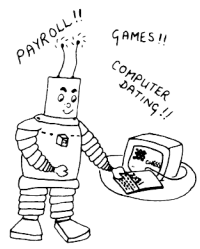
FREE OFFER!!!

A free listing of 'Chess in 1K' is included with all mail-orders mentioning this magazine!

'What Can I Do With 1K?' is available from most good bookshops, computer shops, or direct from:-

V&H Computer Services
182c Kingston Rd.
Staines
Middx.

Tel: Staines 58041

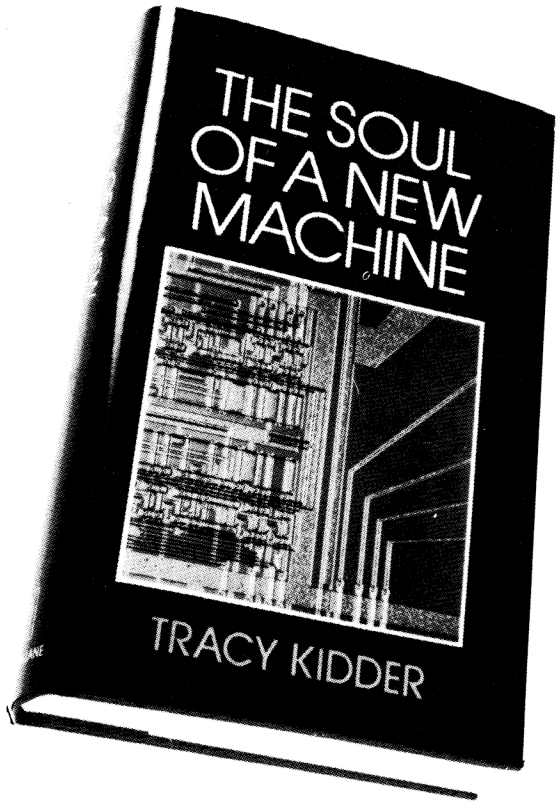


Price £4.95(inc. p&p).
Also available on cassette £4.95

A pioneering book in a field that involves us all

The Soul of a New Machine

TRACY KIDDER



The first great classic of the computer age.

This remarkable true story of life and work behind the closed doors of an American high technology corporation follows a team of dedicated computer wizards who pushed themselves to their physical and intellectual limits to build – in record time – a revolutionary mini-computer.

Launched quietly in America, THE SOUL OF A NEW MACHINE received tremendous critical acclaim and became a publishing phenomenon – selling over 120,000 copies within six weeks of publication.

"Splendid...all of Mr Kidder's hopes for his book have been fulfilled"
— *The New York Times*

"Fascinating...a gripping account of people at work"
— *Wall Street Journal*

"Brilliant, concise and original" — *Playboy*

"The Soul of a New Machine" is available from the users' group. See order form inside back cover.

Judith Morris reviews a very unusual bestseller

HOW KIDDER TRACED THE SOUL OF A 32-BIT MINI

One week last year, a new title crept silently into the US best-sellers list published by the *New York Times*. Called *The Soul of a New Machine**, it was slotted in a non-fiction list alongside such books as the *Never-Say-Diet* book, the *Beverley Hills Diet, The Hite Report on Male Sexuality, How to Make Love to a Man* and *Miss Piggy's Guide to Life.*

For some obscure reason, a book which tells a true story about the creation of Data General's new 32-bit minicomputer sold more than 120,000 copies in the US during its first six weeks of publication, topping the bestseller lists and beating the sex and slimming manuals hands down.

Next month it will be launched in the UK. Described as 'the first classic of the computer age', the book tells what is ostensibly a mundane and boring tale of product development, and yet it has been heralded as 'as compellingly readable as the best of thrillers "gripping and remarkable" and "brilliant".'

The *Soul of a New Machine* was written by Tracy Kidder (who is a man). Kidder was a 36-year-old journalist working for *Atlantic* monthly when his editor suggested that he investigate computers, and put him in touch with Tom West, a Data General manager. From that moment on the story assumes James Bond like proportions.

Kidder spent eight months in a closely-guarded basement where a team of carefully selected computer engineers worked against the clock to produce Data General's Eclipse MV/8000, which they code-named Eagle. The story is, as you may have guessed, about their hopes, their fears, their joys and their anguish.

The book traces the evolution of the machine right from the day when the notion was first conceived, and the team was given a year to develop it. From there, it shows how brilliant, but inexperienced young men straight from college were hired to work on the project — 'because they do not know what is supposed to be impossible' and how they were required to 'sign up', or, in other words, agree that neither family or friends would interfere with the completion of their work.

Under the direction of Tom West, nicknamed 'The Prince of Darkness', the book shows how this band of whizz kids, who call themselves the Hardy Boys and the Microkids, pushed themselves to their physical and intellectual limits to achieve their goal.

The task is not a job but the whole purpose for their existence — they work in a basement with no contact with any other Data General employee, intent upon every engineer's dream 'getting a machine out of the door'.

Few of them know or care what will happen to the computer when it is finished. 'I don't know how computers get sold, I just build 'em,' said one of the kids. Others admit that they don't even know how much computers cost.

They work 80 hours a week, and longer. One of the engineers, Veres, solves a major debugging problem in the shower. 'I get quite a lot of work done in the morning while taking a shower,' he says. 'Showers are kinda boring things.'

Problems come and go, one particular bug which causes many sleepless nights is treated by Kidder as a gripping who-dunnit mystery. But throughout the book the story becomes not just one of how a machine was made, but of the ways in which unrelenting pressures and challenges affect the lives of the people concerned.

We read of Wallach, the systems architect who experienced a 'golden moment' when the plan for the Eagle's memory protection suddenly came to him and then kicks walls because he feels 'as if he had invented a particularly nice kind of arch for the doorway of a supermarket.'

We read of Rosen, the designer whizz kid who decides he has burnt himself out by the time he is 24, and one night disappears, leaving a note on top of the terminal saying he has gone to join a commune in Vermont 'and will deal with no unit of time shorter than a season'.

We read about Alsing, who at 35 is the old man of the team. There is a great fear of what will happen to everyone when they get old. 'When a computer engineer gets old,' says one, 'he gets turned out to pasture or else made into dog food.'

The heady excitement described by the engineers and programmers in Kidder's book is difficult to reconcile with the building of the Eclipse MV/8000. They were not, after all, launching a space craft, they were building a 32-bit mini, which had been done before — in fact the reason that the designers were only given a year in which to build the prototype was that Data General had gone into that market so late.

To some, the devotion and enthusiasm of these perfectionists may be difficult to understand. To others, it may be familiar.

It is the dedication of those within a large organisation, who know that there will be no rewards at the end either in money or in glory for simply doing a job properly, no matter what it takes.

'There's 30 guys out there who think this is their machine,' says West, referring to the engineers. 'I don't want that tampered with. It's useful to me right now. Some of the kids don't have a notion that there's a company behind all this. It could be the CIA funding this. It could be a psychological test.'

In the end, the Eagle team had created 4,096 lines of microcode, over 200,000 lines of system software, several hundred pages of flow charts, 240 pages of schematics, 24 hours of videotape describing the machine and diagnostic programs amounting to hundreds of line of code.

The heroism and strength of the team when the project was at its peak contrasts sadly with how they appear at the end of the book — when Eagle is officially launched at a press conference. There, they are just a group of awkward young men, uncomfortable in their suits. They all sit together and nobody talks to them. None of their hard work is mentioned, even the machine's name has been changed, it is no longer anything to do with them, and they are left empty and disillusioned.

But unlike many others like them, the Eagle team did have their reward. They are all in Kidder's book. Kidder himself admits he realised that West's main motive for having him around was to create more excitement, and perhaps people act like characters in a book when they know they are going to be characters in a book.

Nevertheless, computer engineers and programmers have never before been the heroes of books.

The amazing popularity of *The Soul of a New Machine* seems to have broken down the barriers which once separated such people from the real world. Kidder peppers his book with a wealth of technical details which explains to the layman exactly what goes into computer development and the intricacy of the problems.

This never distracts from the story, but rather adds to the general feeling of tension that maybe, one time, there might actually be a problem to which there is no solution.

It is certainly not a theme which would be written about twice.

'Presumably the stonemasons who raised the cathedrals worked only partly for their pay,' says Kidder towards the end of his book. 'They were building temples to God. It was the sort of work that gave meaning to life. That's what West and his team of engineers were looking for.'

TOTTLEBANK

MICROCOMPUTING COURSES

WANT TO GET STARTED?
ALREADY STARTED, BUT HAVING TROUBLE?

PUT YOUR COMPUTING ON A FIRM FOOTING

COME ON A 1-WEEK COURSE FOR BEGINNERS
IN THE PEACEFUL ATMOSPHERE OF A 17TH CENTURY
LAKE DISTRICT FARMHOUSE.

CHALLENGING ENJOYABLE
DELICIOUS FOOD
BEAUTIFUL SETTING

GARDNER 022-985-660

Hard facts

— with Stephen Adams

This is one of the largest continuous memories available for the ZX81, 48K is fully available to the Sinclair BASIC. Also it is one of the easiest to use, a ribbon cable connects the memory to the ZX81 and the memory supplies not only itself with power, but also the ZX81. A simple POKE, a NEW and away you go.

The memory is contained in a black wedge shaped box with a hump and edge connectors at the back. The ZX81 sits in front of the hump and a connector plugs into the expansion port (or the printer if you have one). Three is a red LED on the hump next to a reset switch, this indicates whether the unit is on. The 9 volt power supply for the ZX81 comes from the unit via a cable terminated in a 3.5 mm plug and was rather short on the review model. This caused it to cover up the MIC and EAR sockets as well as the T.V. output socket making it difficult to plug in the cables.

The unit is mains powered via a filtered supply and is sufficient to operate the printer, plus anything else that you ran with the 16K pack connected. To use the 48K, switch on the mains after connecting up the various leads to the unit, T.V. etc. and you will have 16K available (Sinclair's memory test routine assumes only 16K of memory and so starts testing at 32767). To obtain a full 48K the variable RAM TOP must be changed to 64K, this is done by POKEing locations 16388/16389 with 255 and then giving the command NEW. This will tell the BASIC that its top of memory is 64K and has 48K (from 16K to 64K) to play with.

There are some restrictions on what use this memory can be put to however, not imposed by the manufacturer, but by Sinclair.

a) No machine code can be run by USR over 32767.
b) The display file (screen) must not exceed 32767, therefore the BASIC program plus display file must be less than 16K.

Therefore 32K of this 48K MUST be used for variables making it more a business asset than a games machine. Stock control of 2000 items and a payroll for 500 people are two that are available now.

Expansion is via a P.C.B. socket (40 way) at the back of the unit and requires a special plug. This plug will not give all the connections available on the ZX81, but all the address lines and data lines are buffered. Also available are +12 volt (300ma), +5 volt (300ma), and −5 volt (50ma). This limits some of the add-ons available as no mother board would fit onto the ZX81 and leave room for the edge connector to the memory unit. The printer however just fits and can be placed on the hump.

FOR THE TECHNICALLY MINDED

If you wish to save yourself £20 plus VAT, you may decide to build your own unit. The kit arrives with detailed step by step instructions, metal case with plastic cover, components (including 4116's in a metal tube to prevent damage from static), memory P.C.B., ready-made power supply board (including mains filter), and ribbon cable complete with soldered on 46-way connectors at both ends. All the I.C.'s are socketed and suitable hints on soldering are included. Precautions abound throughout the instructions and it should be easy enough for someone who has built a ZX81 from a kit. Memotech will however repair, for cost, anyone's boards. A circuit diagram is included for both the power supply and memory board. This is included for both the ready made and kit versions as it contains the connections for the 40-way ribbon cable connector (0.1 mm).

The red LED indicates the power supply (9 volt) is on and not that there is a supply to ZX81. The reset swtich disconnects this supply after the LED to reset the ZX81, this was done say the designers due to timing problems with the RAM if the reset line was used. The power supply runs at a nice steady temperature even with the printer connected, aided by the ventilation slots in the top of the case. No white-outs were noticed over several periods of 5 – 6 hours use.

One of the disadvantages of the 40-way connector provided to expand the system is that it fails to supply all the connections that the ZX81 has available at its expansion connector. This makes it a bit awkward if you wish to use lines such as ROMCS to control other boards. The edge connector layout is shown in Figure 1. Compare this with the one in the manual to see what else is missing. The edge connector is buffered inside the unit so that it can drive more boards from the address and data lines. The expansion connector is a standard ribbon cable connector and you will require a plug which costs £4.40 + VAT to use it. This connector is more stable and reliable than the ZX81's.

ON TEST

The memotech board is reliable, provides on board expansion buffering and provides its own power supply. I talked to one of its business users at a recent show and found that he had had no problems either. The 48K memory means there are certain disadvantages as it cannot be used with other boards which use memory locations 16K – 64K. This should not worry business users, except where the removal of some of the lines from the new 40-pin plug means that they cannot control the lines they want to.

The length of the 9 volt lead should be made a lot longer so that the ZX81 can be moved off of the memotech board and not foul the T.V. and other connectors.

The use of the extra 48K of memory can mean that long programs can be written, provided that most of the memory is used for data storage. The actual use of the memory board is simple and the whole 48K can be LOADed from tape in 19 minutes.

One disappointment is that the ROM still repeats itself in the 8K – 16K section which could have been decoded by the unit and that some of the RAM could not be readdressed into this space to give more memory for machine code routines.

Memotech should do well with this well made unit, which provides more than enough memory for any use and overcomes many of the problems with the 16K RAM pack including dodgy connectors.

Memotech is at 103, Walton Street, Oxford OX2 6EB. Telephone: 0865-513356. The 48K RAM board costs £109 as a kit and £129 ready built. VAT should be added to both.

The Sinclair ZX81: Programming for Real Applications

Published by The Macmillan Press
ISBN 0 33 332973 2

This is not a review. It can't be because I wrote both the article and the book. In these circumstances I can't be expected to do a hatchet job on my own work and no one would take a glowing report seriously. My editor has told me that a review copy will be sent to Eric Deeson so you will all have to wait for Eric's considered opinion as to whether the aims that I have set myself have been achieved. Tim asked me to let him have a descriptive article on the book and here it is. I have tried to make it as objective as possible.

Games are a first class introduction to programming and are necessary to focus your developing programming technique. Many ZX enthusiasts have passed through this stage in their development and are looking for software which does real work and ideas to help them write more serious programs themselves. There seems to be no lack of neat and interesting ideas in all the magazines but what is lacking in almost all cases is any follow-through. The ideas are offered but not developed to a conclusion and the reader is often left in the air, frustrated by these tantalising but unfinished goodies. All the ideas in the book have been developed to the point where they can be built into real programs to do real jobs. The programs can be mine, full lists are given for ten major jobs, or your own. There are two chapters devoted to developing programs for the ZX81 based on the techniques from the book.

Lack of finance forced me to do my data processing jobs on the ZX computers or do it by hand with a calculator. Necessity forced me to consider alternative ways of using the Sinclair BASIC and these have proved to be very useful. There is nothing highly technical in the book and all the programs are in BASIC so even the relatively inexperienced user will find the material quite straightforward. Expect to find a logical extension to the material in the hand book and some interesting twists in the way that it has been put to work.

I have tried not to produce a book of listings. "Real Applications" is a book *with* "listings with a difference". There are seldom more than ten lines of code to cope with at a time. Those ten lines are documented in English rather than in Jargon and the explanation is given there and then. Each line which is not entirely self-explanatory is accompanied by a note. All the GOTO lines tell you what to find at the target address, all the GOSUB lines say what the subroutine will do, each PEEK or POKE line is accompanied by details of the data and consequences of the addresses. I hope that this different approach to the presentation of listings will reduce programming fatigue and therefore the number of keying mistakes. The constant supply of information will allow you to relax a little and not have to remember the effect of jumping to each of the memory addresses.

So much for the style, what about the contents. There are financial programs to run one account, "personal finances", or many, the banking program which will run a Friendly society, Christmas club or school bank. All the usual functions are there and many more. Not many finances programs will cope with monthly, annual AND quarterly standing orders. The banking program runs hundreds of accounts, copes with overdrafts, charges and credits interest on a daily basis, does regular accounts and prints a balance sheet.

There is a word processor, two in fact. One is a little smaller than the other to make room for an add on facility that might well be built into larger machines in future, a readability calculator. This allows the suitability of the text for readers of different reading ability to be assessed. Some of the facilities to be found in a dedicated word processor are very slow to run in BASIC and will be presented in machine code as an upgrade in a book which is being written at the moment. About two and a half thousand words can be stored in the fully expanded machine and these are fully available for editing, deleting and rewriting at all times. The text is not lost by the use of RUN.

Probably the most powerful program in the book is bulk storage which will allow you to store more pieces of information in the 16k ZX81 than there are memory bytes AND still have room for the program that will get it all in and then sort, find and list all the data which corresponds to criteria which you specify while the program is running. The common items to two separate lists can be printed to allow correlations to be found.

There are educational administration programs to run continuous assessment schemes and to analyse a school's examination results in a fraction of the time that is taken during the school holidays normally. There is even a routine which will allow any numerical input mistakes without crashing. This might be useful for programs designed for use by those with no experience at all who might put the odd letter o in in place of zero or who might put two decimal points in a single number. There is a hardware chapter with some simple but worthwhile modifications.

All the way through the writing process I pushed and pushed at the edges of what I thought that the machine could possibly do. The more that I pushed the more it did and did well. The result is that there is still more material and this will be used in the next book which will probably have more of a business bias. Education is likely to make lots of demands on the machines but I hope to offer a mixture of software in this and future books which will make the material of interest and valuable to a wide readership. I have had a great deal of satisfaction in pushing the little machines further than most people thought that they would go and I hope that those who have outgrown the usual Material on offer to ZX enthusiasts will share my satisfaction.

RANDLE HURLEY

ZX81 programs

Map maker

L. Simson writes:

I have used Australia as an example as it is a good shape for the screen and does not have fiddly indentations.

TO MAKE ANY MAP

First draw your map on a 64 x 44 grid numbered 0 – 63 across and 0 – 43 up from the bottom left-hand corner. Next mark the squares you want plotted, making compromises where necessary. Now write down the X (across) and Y (up) values for each point (see 10 REM). Then use p181 and ff of the ZX81 manual to find what characters have the codes equal to your plot values. Enter them after "10 REM" as a long string without separation except for the following two dodges which you will see I have used in the "Australia" REM.

1. After 20 entries in the REM, i.e. X and Y 10 times, put 2 spaces which you will see as 00 in the listing. This makes it easier to find where you are if you have to EDIT! The REM is in neat blocks of 10 plot pts.
2. After 4 batches of 20 entries (= 40 plot positions) you will see I have put 128 and started a new REM. Code 128 (inverse space) is picked up by line 140 which makes the jump to the next REM. This limits your REMS to 3 lines and makes EDITing much less tedious.

End the last REM with the graphic on the "H" key (code 136). Line 160 deals with this.

N.B: Enter the *characters* corresponding to the following codes:

10	REM	7	8	5	9	5	11	4	13
	4	15	3	17	2	18	1	20	1	22
	1	24	0	0	2	26	4	27	6	28
	8	29	10	30	12	30	14	31	15	32
	17	33	17	35	0	0	18	37	19	38
	21	38	23	39	25	40	26	42	28	43
	30	43	32	43	34	43	0	0	36	42
	35	40	35	38	37	37	38	35	40	34
	42	33	44	34	46	35	47	37	128	
20	REM	47	39	47	41	48	43		
	49	41	49	39	50	37	51	35		
	51	33	52	31	53	29	0	0		
	54	27	56	25	58	23	60	21		
	60	19	61	17	61	15	61	13		
	61	11	60	9	0	0	58	7		
	57	6	55	4	53	3	52	1		
	50	1	48	1	46	1	44	2		
	42	3	0	0	43	5	42	7		
	40	6	40	7	39	9	38	11		
	36	11	35	10	33	12	31	13	128	
30	REM	29	14	27	14	25	14	23	13	
		21	12	19	11	17	11	15	10	
		13	10	11	9	0	0	9	9	
		136								

[*NOTE:* The double spaces (code 00) in the REM apart from dividing the REM into small blocks, do have the effect of putting a pixel at 0,0, but this is not likely to be used on most maps].

The "PRINT" statements can be cut out if you just wish to try the plotting from the REM.

```
100  LET A = 16514
110  LET B = A + 1
120  LET X = PEEK A
130  LET Y = PEEK B
140  IF X = 128 THEN LET A = A + 7
150  IF X = 128 THEN GOTO 110
160  IF X = 136 THEN GOTO 1000
170  PLOT X, Y
180  LET A = B + 1
190  LET B = A + 1
200  GOTO 120
     [PUT 1000 STOP IF THE FOLLOWING IS NOT WANTED]
1000 PRINT AT 15, 24; "SYDNEY – *"
1010 PRINT AT 18, 11; "ADELAIDE – *"
1020 PRINT AT 14, 2; "*– PERTH"
1030 PRINT AT 0, 6; "DARWIN – *"
1040 PRINT AT 21, 24; "*"
1050 PRINT AT 21, 20; "MEL"; AT 21, 26; "BOURNE"
1060 PRINT AT 10, 19; "BRISBANE – *"
1070 PRINT AT 17, 21; "CANBERRA*"
1080 PRINT AT 6, 7; "                                    "
                GR8     GRG XII                  GR5
1090 PRINT AT 7, 7; "       AUSTRALIA          "
                GR8     GRA              GR      GR5
1100 PRINT AT 8, 7; "                                    "
                GR8     GRF XII                  GR5
1110 STOP
```

Lines 1080, 1100 and the graphics in 1090 can be omitted if desired.

© L. SIMPSON

Printer tricks

David Kelsall of St Albans writes:

I enclose the printout of a program to print wide letters on the Sinclair ZX81 printer (using 16K memory). There is, attached, a hexadecimal listing of the REM statement. If your readers are interested, here is a list of the assembler mnemonics:-

```
LD HL, 16508
CALL 16529
LD B, C
CALL 16529
LD (16507), BC
RET
LD C, 255
RLD
BIT 0, A
JR NZ, +4
RES 0, C
RES 1, C
BIT 1, A
JR NZ, +4
RES 2, C
RES 3, C
BIT 2, A
JR NZ, +4
RES 4, C
RES 5, C
BIT 3, A
JR NZ, +4
RES 6, C
RES 7, C
RET
```

(How about a year's free subscription?) I also enclose a program for double height characters — a bit slower, but all in BASIC. *A$* can be re-printed in either program by using *GOTO 9988*.

The programs can, of course, be combined to produce 16 large letters per line. No prizes for doing this!

```
  REM STATEMENT IN HEX

21 7C 40 CD 91 40 41 CD
91 40 ED 43 7B 40 C9 0E
FF ED 6F CB 47 20 04 CB
81 CB 89 CB 4F 20 04 CB
91 CB 99 CB 57 20 04 CB
A1 CB A9 CB 5F 20 04 CB
B1 CB B9 C9
```

```
WIDE    CHARACTERS

   1 REM 5?RNDLN ▒RNDINKEY$LN ▒R
ND GOSUB ??RNDTAN : COPY GOSUB 7
ACS ?4▒ ACS ▒ACS ▒ACS ?4▒ ACS ▒AC5
 ▒ACS ?4▒ ACS ▒AC5 ▒ACS ?4▒ ACS ▒R
C5 ▒TAN
   2 IF PEEK 16389=124 THEN GOTO
 5
   3 PRINT "RESERVE MEM (POKE 16
389,124)"
   4 STOP
   5 FOR I=0 TO 112
   6 POKE 31744+I,PEEK (2161+I)
   7 NEXT I
   8 POKE 31800,63
   9 POKE 31857,201
 100 LET B$="UIDE  CHARACTER5"
 110 DIM A$(32,8)
 120 FOR X=2 TO 32 STEP 2
 130 FOR Y=1 TO 8
 140 LET P=PEEK (7679+5*CODE B$(
X/2)+Y)
 150 POKE 16508,P
 160 RAND USR 16514
 170 LET A$(X-1,Y)=CHR$ PEEK 155
08
 180 LET A$(X,Y)=CHR$ PEEK 16507
 190 NEXT Y
 200 NEXT X
 210 REM
 220 REM COPYRIGHT D.J.KELSALL
 230 REM JANUARY 1982
```

```
  240 REM
9986 REM PRINT A$
9990 FOR J=1 TO 32
9991 FOR K=1 TO 8
9992 POKE 32255+K+8*(J-1),CODE A
$(J,K)
9993 NEXT K
9994 NEXT J
9995 FOR H=0 TO 31
9996 POKE 16444+H,H
9997 NEXT H
9998 LET HPRINT=USR 31744
```

```
*PRINT DOUBLE HEIGHT CHARACTERS*
```

```
    1 IF PEEK 16565+256*PEEK 1656
9=31744 THEN GOTO 5
    2 REM POKE 16389,124
    3 PRINT "MEMORY NOT RESERVED"
    4 STOP
    5 FOR I=0 TO 112
    6 POKE 31744+I,PEEK (2151+I)
    7 NEXT I
    8 POKE 31800,63
    9 POKE 31857,201
   90 DIM A$(32,16)
  100 LET B$="*PRINT DOUBLE HEIGH
T CHARACTERS*"
  110 FOR Y=1 TO 32
  120 FOR X=0 TO 15
  130 LET A$(Y,X+1)=CHR$ PEEK (76
80+8*CODE B$(Y)+INT (X/2))
  140 NEXT X
  150 NEXT Y
9986 REM PRINT A$, 8 LINES AT A
TIME
9989 FOR I=0 TO 10 STEP 8
9990 FOR J=1 TO 32
9991 FOR K=1 TO 8
9992 POKE 32255+K+8*(J-1),CODE A
$(J,K+I)
9993 NEXT K
9994 NEXT J
9995 FOR H=0 TO 31
9996 POKE 16444+H,H
9997 NEXT H
9998 LET HPRINT=USR 31744
9999 NEXT I
```

Alien attack

Simon Gregory of Kelsall writes to us about this program:

ALIEN ATTACK generates a series of random aliens which the attack ship, piloted by the player, has to shoot down whilst avoiding the lethal missiles. However, the attack ship is also protecting its home planet from missile strikes. Only one life is given in this game so you have to have quick reactions. Using the keys "7" and "6" to move up and down and "8" to fire, you must out-manouvre and destroy 30 aliens in unlimited time.

```
  5  LET Y=0
 10  LET Z=0
 50  PRINT TAB(4);"A*L*I*E*N**A*T*T*A*C*K"
 60  FOR F=1 TO 70
 70  NEXT F. 75 CLS
 80  PRINT AT 7,7;"G*E*T**R*E*A*D*Y"
 85  FOR G=1 TO 70
 90  NEXT G
 95  CLS
100  LET L=PEEK(16396)+PEEK(16397)*256+1
101  LET X=0
105  LET S=0
110  LET T=0
115  LET U=0
190  FAST
191  FOR A=0 TO 21
194  PRINT AT A,0;"1 Graphic Shifted H(□), 31 inverse spaces (□)"
197  NEXT A
200  SLOW
202  LET A=10
204  FOR F=1 TO 70
206  NEXT F
210  LET A$="□□□"(1 inverse "=" sign, 2 inverse spaces)
215  LET B$="□□□"(1 inverse "*", 1 inverse "> ", 1 inverse "-" sign)
220  LET C$="□□□"(same as line 210)
230  PRINT AT 9,3;A$
240  PRINT AT 10,3;B$
250  PRINT AT 11,3;C$
500  IF INKEY$<>"6" THEN GOTO 600
505  GOSUB 1505
600  IF INKEY$<>"7" THEN GOTO 700
605  GOSUB 1605
700  IF INKEY$<>"8" THEN GOTO 800
705  GOSUB 1710
800  GOSUB 1805
900  IF S>=30 THEN GOTO 2000
905  GOTO 500
1505 IF A<20 THEN LET A=A+1
1510 PRINT AT A-1,3;A$
1520 PRINT AT A,3;B$
1530 PRINT AT A+1,3;C$
1540 PRINT AT A-2,3;"□□□"(3 inverse spaces)
1550 RETURN
1605 IF A>1 THEN LET A=A-1
1610 PRINT AT A+1,3;C$
1620 PRINT AT A,3;B$
1630 PRINT AT A-1,3;A$
1640 PRINT AT A+2,3;"□□□"(same as line 1540)
1650 RETURN
1710 LET I=L+33*A
1713 FOR C=5 TO 30
1714 LET M=PEEK(I+C+1)
1715 IF M=118 OR M=128 THEN GOTO 1726
1716 PRINT AT A,C-1;"□□□□"(4 inverse "*"s)
1717 LET S=S+1
1719 IF M=150 THEN LET X=1
1720 IF M=150 THEN LET S=S-1
1725 GOTO 1733
1726 LET J=I+C
17270 POKE J-1, 128
1728 POKE J,150
1732 NEXT C
1733 PRINT AT A,4;"□"(inverse "> ")
1735 PRINT AT A,5;"□"(inverse "-")
1737 LET V=PEEK(L+33*A)
1738 PRINT AT A,C-1;" "□□□□"(4 inverse spaces)
1739 IF V=136 THEN PRINT AT A+1,0;"□"(Graphic shifted H)
1740 RETURN
1805 REM INVADER MAKER
1810 LET D=INT(RND*20)+1
1820 LET E=INT(RND*24)+5
1835 LET E$=""□□□□"(1 inverse space, 1 inverse "<", 1 inverse "(",
     1 inverse ":")
```


PSION COMPUTERS

ZX81-16K RAM

BACKGAMMON

the oldest game on the youngest computer

"Backgammon is a great game—easy to learn, fast, exciting, a perfect game of chance and skill . . . . it has lasted for three thousand years"

£5.95

including VAT and postage

Psion Computers brings you a program of the highest quality to play Backgammon on the Sinclair ZX81. It plays with remarkable skill using high-speed machine-code to evaluate the statistics and strategy of the game—outstanding display, rolling dice, doubling cube, 4 levels of play.

Also from PSION

£3.85

including VAT and postage

Sci-Fi FANTASY GAMES

Side A Perilous Swamp, Side B Sorcerer's Island

Role-playing adventure-style games

Dear Sir,
Many thanks for the Fantasy Games cassette recorded at the 5th
An excellent cassette, loads first time and is great fun to play

PSION Cassettes are factory produced by high-speed automated equipment under strict quality control. Colourful printed inserts contain detailed description and instructions

I enclose a postal order/cheque for £ in payment for

☐ Backgammon (£5.95) ☐ Fantasy Games (£3.8

Name .....

Address .....

.....

To: Psion Ltd
2 Huntsworth Mews
Gloucester Place
London NW1 6DD

```
1840  PRINT AT D,E;E$
1850  LET K=L+33*D
1853  FOR F=E TO 0 STEP -1
1855  LET N=PEEK(K+F)
1857  IF N=118 OR N=128 OR N=136 OR N=142 OR N=144 OR
      N=147 THEN GOTO 1860
1858  GOTO 2300
1860  POKE K+F,150
1861  POKE K+F+1,128
1862  IF INKEY$="6" THEN GOSUB 1505
1863  IF INKEY$="7" THEN GOSUB 1605
1864  IF INKEY$="8" THEN GOSUB 1710
1865  IF X=1 THEN GOTO 1871
1866  NEXT F
1867  LET T=T+1
1869  PRINT AT D,0;"□"(inverse space)
1870  PRINT AT D,E+1;"□"(inverse "<")
1871  IF X=1 THEN LET U=U+1
1872  LET X=0
1873  RETURN
2000  CLS
2001  PRINT TAB(7);"INVADERS DESTROYED*";S
2002  PRINT
2003  PRINT TAB(7);"MISSILES DESTROYED*";U
2004  PRINT
2007  PRINT TAB(7);"MISSILE STRIKES*";T
2008  PRINT
2009  PRINT TAB(3);"********HIGH SCORES*********"
2010  IF S>Y THEN LET Y=S
2011  IF U>Z THEN LET Z=U
2012  PRINT TAB(3);"*MOST INVADERS DESTROYED*";Y;"**"
2013  PRINT TAB(3);"* 25 spaces **"
2015  PRINT TAB(3);"* MOST MISSILES DESTROYED*";Z;"**"
2016  PRINT TAB(3);" 28*'s"
2020  PRINT
2025  PRINT TAB(5);"ANOTHER GAME (Y/N)?"
2030  INPUT Q$
2040  IF Q$="Y" THEN GOTO 70
2050  IF Q$="N" THEN PRINT TAB(4);"O.K. GOODBY* EARTHLING"
2060  IF Q$="N" THEN GOTO 2080
2070  IF Q$<>"Y" OR Q$<>"N" THEN GOTO 2030
2080  STOP
2300  CLS
2305  PRINT TAB(G);"ATTACK SHIP DESTROYED"
2306  GOTO 2001
```

© SIMON GREGORY

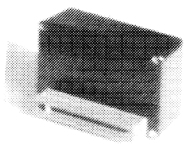
ZX80 **JRS SOFTWARE** ZX81

19 WAYSIDE AVENUE, WORTHING, SUSSEX, BN13 3JU
TELEPHONE WORTHING 65691 (Evenings and Weekends only)

16K RAM PACK £35 ($69.95)

WHY PAY MORE

Fully built, tested and guaranteed
Black case
No 'wobble' problems – fully supported by ZX81
Fully compatible with printer etc, etc.
Full refund if not delighted



(Please allow 14-21 days for delivery)

An ESSENTIAL addition to your 1K RAM ZX81 (or ZX80 8K ROM)
(please state which when ordering)

TOOLKIT (written by PAUL HOLMES)

Provides the following additional facilities:-

Line renumber – you state starting number and increment value.
Search and replace – changes every occurence of a character as you require.
Free space – tells you how many free bytes you have left

SPECIAL GRAPHICS ROUTINES

Hyper graphics mode – graphics never seen on a ZX81 before.
Open – instantly sets up as many empty print lines as you require. (1K version only)
Fill – used in conjunction with OPEN 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 – many uses !

All these routines are written in machine code and together take up only 164 BYTES of your precious RAM - an incredible achievement!!

The price is incredible too! ONLY **£3.95 ($7.90)** for cassette, including FULL instructions and example programs.

ALSO available 16K version ONLY **£4.95 ($9.90)** which includes all the above PLUS:-
GOTO's and GOSUB's included in line renumber.
Search for and list every line containing specified character.

16K VERSION

CASSETTE professionally recorded by SOUND NEWS STUDIOS

GAMES PACK – ***Beat this for value! 5 × 16K programs PLUS 2 × 1K programs*** **£4.95 ($9.90)**

3-D Battle (M/code-1K) – Fast-moving space battle with continuous count-down of energy units left.

City Bomb (M/code-1K) – Destroy the buildings and land your plane. Your fuel has nearly gone and you circle the city lower and lower.

Warp Wars (Basic & M/code-16K) – Features realistic space-craft moved by M/code for instant response.
(previously sold at Microfair with Sweet Tooth for £4.95)

Snake (Basic-16K) – A game of thought and skill. Pass through all the marked squares without crossing or doubling back on your path, but watch out for the expanding black blob.
(previously sold at Microfair for £3.95)

Sweet Tooth (Basic & M/code-16K) – M/code routines used to move your fat face round the screen and gobble the sweets.

PLUS Slalom and Black Holes (previously sold together for £4.95)

OVERSEAS CUSTOMERS PLEASE NOTE Payment may be made in Sterling (Money Order available at your bank) or $U.S. (U.S.A. customers only).

ALL GOODS SENT AIRMAIL

Reincarnation

In the December INTERFACE we printed a LIFE program, but failed to acknowledge it as having been contributed by J.M. Edwards of Coventry. Sorry 'bout that. Here's the program (correctly listed this time) again, in the version sent to us from Mr. Edwards:

He also includes a simple moving display program:

```
  1 REM **1K*ZX81*8X8*LIFE**
  2 REM ****J.M.EDWARDS****
 10 INPUT A$
 15 LET T=VAL "6"
 20 LET O=LEN ""
 30 LET I=PI/PI
 40 LET H=VAL "3"
 45 LET R=I+I
 55 DIM B$(H,T)
 59 LET C$=""
 60 FOR K=0 TO T-I
 65 FOR L=I TO H
 67 LET C=L+K-I+T*((L+K=I)-(K+L
=T+R))
 70 LET B=CODE A$(C)
 80 FOR J=I TO T
 90 LET B=B/R
110 LET B$(L,J)="■" AND B<>INT
B
115 LET B=INT B
120 NEXT J
125 PRINT AT C,T;B$(L);
127 NEXT L
128 LET L=0
129 FOR J=I TO T
130 LET B=0
135 FOR P=I TO H
140 FOR Q=J-I TO J+I
150 LET C=Q+T*((Q=0)-(Q>T))
160 IF B$(P,C)="■" THEN LET B=B
+I
165 NEXT Q
170 NEXT P
180 LET L=L+R**(J-I)*(B=H OR B=
R+R AND B$(R,J)="■")
190 NEXT J
200 LET C$=C$+CHR$ L
210 NEXT K
215 LET A$=C$
220 GOTO CODE "U"

 10 LET A$="**********ZX81*1K***
MOVING*STRING(ANY*LENGTH)DISPLAY
**J.M.EDWARDS."
 20 LET B$=A$(1)
 30 LET A$( TO ) A$(2 TO )
 40 LET A$(LEN A$)=B$
 50 PRINT AT 10,0;A$
 60 GOTO 20
```

Brain boggler

Albert Wetters snag (page 9 January issue) is because powers and roots are not alway dead right. Try "PRINT 81 – 3**4" or "PRINT 5 – SQR25".

The enclosed program and its print out give the integral solutions of "A cubed and B cubed = C squared," for A and B up to 50.

S. CHAPMAN
Sevenoaks

```
 10 LET X=-16
 20 FOR A=1 TO 50
 30 FOR B=1 TO 50
 40 LET D=A*A*A+B*B*B
 50 LET C=INT (SQR D+.5)
 60 IF C*C=D THEN GOSUB 100
 70 NEXT B
 80 NEXT A
100 LET X=X+16
110 IF X>16 THEN LET X=0
120 PRINT TAB X;A;TAB X+4;B;TAB
X+8;C,
130 RETURN
```

16	32	192	18	9	81
18	18	108	21	7	98
22	26	168	25	50	375
26	22	168	32	16	192
32	32	256	37	11	228
46	2	312	50	25	375
50	50	500	51	51	500

The best enhancement yet for the ZX enthusiast - for just £9!

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 80's and ZX 81's. Sinclair User is the latest monthly 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. And your biggest problem is likely to be obtaining all the information to satisfy your interest. We promise that Sinclair User will be devoted entirely to quenching your thirst for information.

Issue one is Published on 1 April and is an absolute must for Sinclair devotees. So make sure **you** guarantee that you get **your** copy by taking out a subscription **now.**

As the name suggests, the content will be geared specifically to helping the user. There will be pages of information on available hardware and software. Our expert writers will analyse established products to help you make the right choice. There will be exclusive pre-release snippets on products which are about to hit the market. Our aim is to make Sinclair User invaluable and we will chronicle applications which are of special interest.

For example, in the first issue we will look at business applications and we visit a school where the pupils are having the time of their lives using their Sinclairs. Each month we will carry eight pages of programs. Another must for every user is our first-rate helpline service. And we intend to carry as much information as possible about clubs.

Last but not least let us say that the best way you can guarantee you like the magazine is by participating yourself. Don't forget to ask us your queries; send in your programs - for which we will pay £10 if we publish - and be sure to tell us if you are using your ZX 81 in a special way. Send in your club news and tell us of any interesting people out there in userland. And just in case you need further convincing, look at the editorial plans for the first six issues.
Can you continue to get the most out of your ZX without reading the Sinclair User? So why not fill in the subscription order form **today?**

Editorial Plans

April

Hardware overview
Software overview

May

The Sinclair 16K RAM dissected
Adventure games programs

June

Disks - a look into the future
Graphics software

July

The ZX81 memory map analysed
Debugging programs

August

The Sinclair printer and its alternatives
Chess programs

September

Enhancements for the enthusiast (e.g. colour, sound, high resolution, speech)
Business software for the ZX81

sinclair user

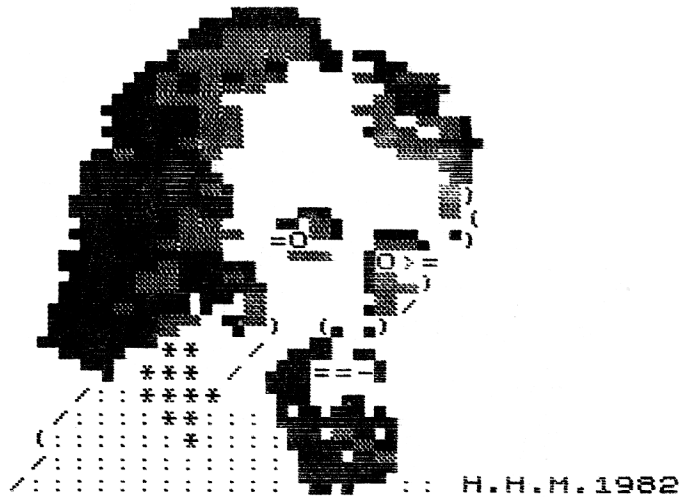
Overseas rates: Europe £18, Outside Europe £24 (Including air-mail postage) Cheques should be made payable to ECC Publications.

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 (UK only - including postage)
☐ Please charge my credit card.
No.
Card Name
Name
Address
Signed
Date

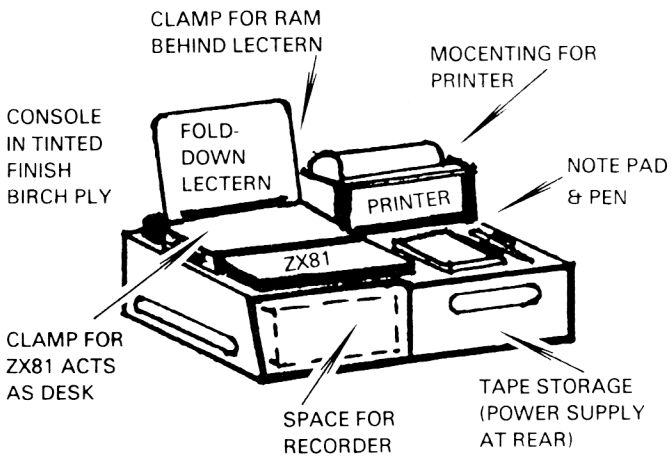
From Kowloon, Hong Kong, H Hugh McAllum shows us a few tricks with the ZX printer:

```
 1 REM "SKETCHPAD"
 5 FAST
 6 FOR N=0 TO 63
 7 PLOT N,43
 8 PLOT N,0
 9 NEXT N
10 FOR P=0 TO 43
11 PLOT 0,P
12 PLOT 63,P
13 NEXT P
15 SLOW
20 LET X=32
30 LET Y=22
40 GOSUB 500
50 UNPLOT X,Y
60 PLOT X,Y
70 GOTO 40
80 GOSUB 500
90 GOTO 80
100 GOSUB 500
110 PLOT X,Y
120 UNPLOT X,Y
130 GOTO 100
500 IF INKEY$="1" THEN GOTO 40
510 IF INKEY$="2" THEN GOTO 80
520 IF INKEY$="3" THEN GOTO 600
530 IF INKEY$="0" THEN GOTO 100
540 IF INKEY$="5" THEN LET X=X-
1
550 IF INKEY$="6" THEN LET Y=Y-
1
560 IF INKEY$="7" THEN LET Y=Y+
1
570 IF INKEY$="8" THEN LET X=X+
1
590 RETURN
```

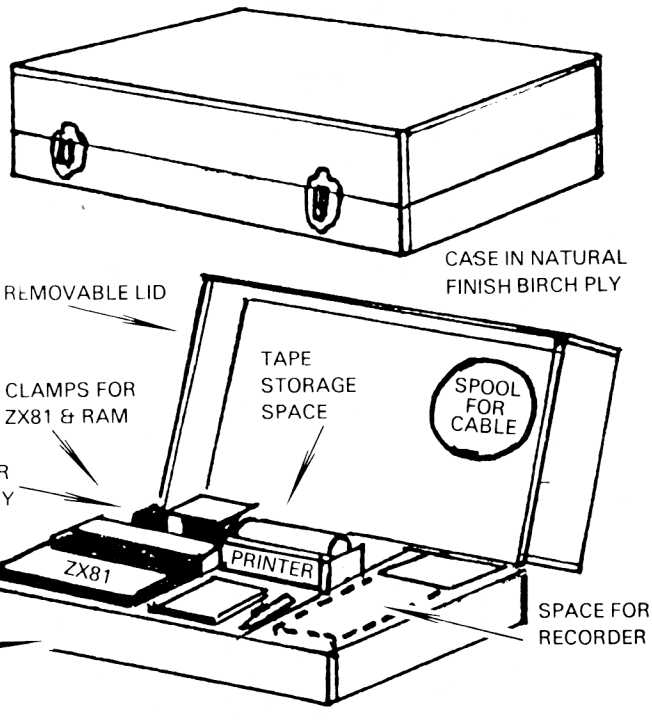



```
 50 FOR N=0 TO 1000
 60 LET X=INT (RND*22)+10
 70 LET Y=INT (RND*22)
 80 IF X+Y<24 THEN GOTO 55
 90 PLOT X,Y
100 PLOT X,43-Y
110 PLOT 63-X,43-Y
120 PLOT 63-X,Y
130 NEXT N
```

ZX81 SYSTEM CONSOLE or CASE



!!!Prevents the dreadful RAM PACK GLITCH!!!



FROM: — ZX BUSINESS SYSTEMS,
14, BROOKFIELD GARDENS,
RYDE, ISLE OF WIGHT
TEL. 0983 65897.

PRICES: CONSOLE — £15 } includes
CASE — £25 } p&p.

ZX80 programs
Channel Minefield

This program for a 1K ZX80 will challenge your memory as you try to guide your ship, character 132, through a channel being strewn with mines. At each move two mines are laid at random in the channel. The trick is that after each move these mines disappear from view but they, and all the ones laid in previous moves, are still lurking dangerously below the surface ready to sink you if you hit them. Hence you must remember where they are with the aid of the grid provided and steer round them if you are to get through safely. You can move forward, forward and up, or forward and down by using 8, 7, and 6 respectively.

```
10   LET A=13
20   LET P=0
30   LET Q=0
50   DIM B(36)
60   FOR J=1 TO 36
70   LET B(J)=1
80   NEXT J
200  PRINT "CHANNEL MINEFIELD"
202  PRINT
210  PRINT "▗*1-3-5-7-9---"
220  PRINT "A";
230  FOR X=1 TO 36
240  IF X=13 OR X=25 OR X=37 THEN PRINT
242  IF X=13 THEN PRINT "B";
250  IF X=25 THEN PRINT "C";
260  IF NOT X=A AND NOT X=P AND NOT X=Q THEN PRINT "*";
270  IF X=A THEN PRINT CHR$(132);
280  IF X=P OR X=Q THEN PRINT "M";
320  NEXT X
330  PRINT
335  PRINT "▗*----------"
340  PRINT
400  INPUT G$
410  IF G$="99" THEN STOP
420  IF G$="8" THEN LET A=A+1
430  IF G$="7" THEN LET A=A-11
440  IF G$="6" THEN LET A=A+13
500  LET P=RND(36)
51   LET Q=RND(36)
520  IF P=A THEN LET P=P+1
530  IF Q=A THEN LET Q=Q+1
600  LET B(P)=2
610  LET B(Q)=2
620  IF A<1 OR A>36 THEN GOTO 930
630  IF B(A)=2 THEN GOTO 910
640  IF A=12 OR A=24 OR A=36 THEN GOTO 950
700  CLS
710  GOTO 200
910  PRINT
915  PRINT "HIT MINE SUNK"
920  STOP
930  PRINT "RUN AGROUND"
935  STOP
950  PRINT
960  PRINT "THROUGH SAFELY YOU WIN"
```

© D. C. GILCHRIST 1982

MORSE CONVERTING PROGRAM

```
10   REM 03561E16011D1A55052B0E170A062A1B3A0715022D350B362E5A
20   PRINT "?"
30   INPUT A$
40   LET A=CODE(A$)-38
50   IF A=-37 THEN STOP
60   IF A>-1 AND A<26 THEN GOTO 100
70   PRINT,
80   LET A$=TL$(A$)
90   GOTO 40
100  LET C=(PEEK(16427+A*2)-28)*16+PEEK(16428+A*2)-28
110  FOR B=0 TO 7
120  IF C AND (2**B) THEN PRINT ".";
130  IF C AND (2**(B+1)) THEN PRINT "—";
140  LET B=B+1
150  NEXT B
160  GOTO 70
```

When you run this program with a null-string (" "), sysvar E_LIN = 16685, which means then program takes up 261 bytes. Then you have to add the amount of space the two variables (B & C) takes. B takes 7 bytes (i th because it's a FORTO variable, C takes up 3 bytes, which makes the total amount of storage used 271 bytes increasing with 1 each typed letter.

USE:

When the "?" is displayed, type in your string to be converted. The program only converts letters, and any other characters result in a space (8 char).

© OLE NOERREGAARD,
Suensonsgade 9,
DK-1322 Copenhagen K,
Denmark

Alien Contact

Let the Galaxy know who is master with this 1K ZX80 program from P. Sherwood of Kent.

```
10   LET A=1
20   LET B=0
30   FOR C=1 TO 10
40   LET D=RND(21)-1
50   PRINT, "WARNING"
60   PRINT "SENSORS SHOW ALIEN CONTACT"
70   FOR E=1 TO 3
80   PRINT "GUESS WHICH SECTOR THEY ARE IN"
90   PRINT "NOT ABOVE 20"
100  PRINT "GO NO.";A
110  INPUT F
120  CLS
130  IF F>20 THEN GOTO 110
140  IF F=D THEN GOTO 300
150  IF C=10 AND E=3 THEN GOTO 400
160  IF E=3 THEN GOTO 500
170  IF D<F THEN GOTO 600
180  IF D>F THEN GOTO 700
190  NEXT E
200  NEXT C
210  STOP
300  PRINT "WELL DONE"
310  PRINT "SHIP DESTROYED"
320  LET B=B+1
330  PRINT "SCORE=";"B;"▗*OUT OF*;A
340  LET A=A+1
350  GOTO 200
400  PRINT "KKKKKEEEEERRRRRBBBBBOOOOOMMMMM"
410  PRINT "BAD LUCK GOT YOU"
415  PRINT "SHIP AT □";D
420  PRINT "SCORE=";B;"▗*OUT OF '10"
430  PRINT "BYE"
440  PRINT "GAME TERMINATED"
450  GOTO 200
500  PRINT "KKKKKEEEEERRRRRBBBBBOOOOOMMMMM"
510  PRINT "BAD LUCK GOT YOU"
520  PRINT "SCORE=";B;"▗*OUT OF*";A
530  LET A=A+1
540  GOTO 190
600  PRINT "SHIP MOVED AWAY"
610  PRINT "WRONG GO DOWN"
620  GOTO 190
700  PRINT "SHIP MOVED AWAY"
710  PRINT "WRONG GO UP"
720  GOTO 190
```

BUFFER MICRO SHOP

(NEXT TO STREATHAM STATION)

NEW RETAIL CENTRE FOR

✳ **ZX 81** ✳

SOFTWARE, GAMES,
RAM-PACKS, KEYBOARDS

Items from most leading mail order suppliers — games, serious, business and technical progs — available over the counter, sae appreciated for catalogue.

★ ★ ★

374A STREATHAM HIGH ROAD, LONDON SW16

TEL. 01-769 2887

Catch the Cat

You must have heard about the cat that crept into the crypt and got up to no good. This little game, written in BASIC for the 1K ZX80, concerns catching that famous feline.

The game is played on a black rectangle of 32 by 10. The cat is represented by an inverse letter Q and the player by an inverse asterisk. The player moves by inputting one of the cursor control keys ,5,6,7, or 8 (←,↓,↑,→). If your micro has not got these particular keys then any four consecutive number keys will serve. Just alter lines 22 and 23 to suit. When NEWLINE is pressed the move is executed and the cat moves too (if it chooses). The cats movements are governed by the random number generator. Both the player and the cat are kept in the crypt by the conditional control expressions on lines 22,23, and 29,30. There is no danger of POKEing off screen.

If you have a memory mapped display you won't need lines 18,19, or 20 which simply set B to the current start address of the ZX80 floating display file. Those fortunate enough to have more memory than I have can make the game more difficult by introducing a jump into the cats movements to make it even more erratic.

In play the cat occasionally runs towards you and jumps into your arms. Whenever I play the perverse creature always manages to sneak past and away at the last minute. My daughter claims that it helps to whisper "Here Kitty, Kitty" but I'm a little bit sceptical about that. Input the following listing and see if you can guess which way the cat is going to jump.

I.S. HOWSON

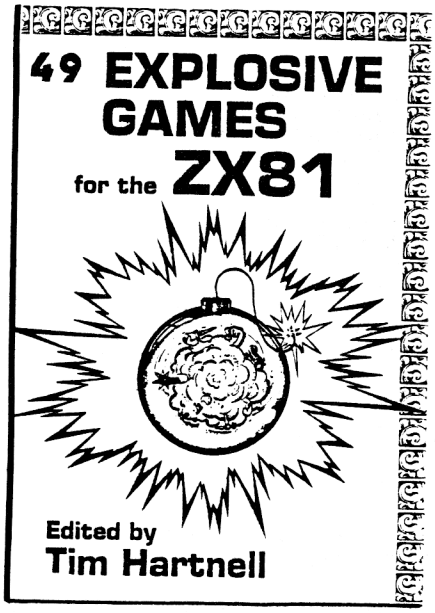
```
1   LET A=0                          Lines 1 to 8 declare the variables
2   LET B=0                          before PEEKing and POKEing.
3   LET D=0
4   LET E=0

5   LET F=1
6   LET G=1
7   LET H=32
8   LET I=-1
9   PRINT CHR$(148);                 Player in start position.
10  FOR J=1 TO 318
11  PRINT CHR$(128);                 Prints the crypt.
12  NEXT J
13  PRINT CHR$(182)                  Cat in start position.
14  LET J=10                         Now that the display is printed we
                                     can use the loop variable for
                                     something else.
15  INPUT C                          Players move.
16  LET I=I+1                        Count moves.
18  LET E=PEEK(16397)                Lines 18,19,20 set B to start
                                     address of display file.
19  IF E>127 THEN LET E=E-256
20  LET B=PEEK(16396)+E*256
21  POKE B+(G-1)*33+F,128            Black square in player position.
22  IF C=6 AND G<10 OR C=7           Returns line +1 or -1 if there is
    AND G>1 THEN LET                 room.
    G=G-2*C+13
23  IF C=5 AND F>1 OR C=8            Returns column +1 or -1 if there
    AND                              is room.
    F<32 THEN LET
    F=F+(2*C-13)/3
```

(Listing continues on page 15)

EXPLOSIVE GAMES FOR THE ZX81

Explosive games include:

— INVADERS
— BREAKOUT
— SQUASH
— DRAUGHTS
— DEATH MAZE



This new 140 page book has listings for every game we thought you might want, including GALACTIC INTRUDERS, BREAKOUT, DRAUGHTS/CHECKERS, STAR TREK, DEATH MAZE and 4-IN-A-ROW. As well, there are a host of new games, and adaptations of old favourites. Many of the programs will run in just 1K, including a simplified SPACE INVADERS-type program.

Some of the games are based on chance and others depend on skill, both yours and the computers. But we've tried to ensure that each and every program contains programming techniques which you'll be able to adapt for your own programs.

MOST PROGRAMS ARE DUMPED FROM THE PRINTER, SO THEY ARE GUARANTEED TO RUN...

Here's what you get in this great, new book:

DEATH MAZE ASTER-DIVE *STAR TREK* DODGEM *GALACTIC INTRUDERS* 18TH HOLE *CHECKERS/DRAUGHTS* MAHOGANY *BREAKOUT* CONEY ISLAND *DALI* PEEK-A-BOO, POKE-A-BOO *HUAMBO* HAPPY CHAPPY *NIM* BUGBITE *MOONBASE* SHOWOFF *MUSIC* MENACE *MAGIC SQUARE* TWENTY-ONE *TOWER* HANGPERSON *AVOID* BOMBER *RALLY* LIFE *MIRROR LIFE* 4-IN-A-ROW *SANDOWN* DEMON *DEMONSTRATIONS AND SUBROUTINES (triangles, missile, solid sine)* HOW LONG HAVE I GOT? *RUSSIAN ROULETTE* JUPITER LANDER *MINIVADERS* SMUGGLERS BOLD *SIMON* GRAND MASTER (perpetua, snowflake, pea pod, scarsdale, blip blip) *WARPO* BOWLING *SPEEDWAY (racer, brands hatch, wise-man)* SNAP *HADYN* UFO *SQUASH*

More than half of the games will fit a 1K ZX81. Many feature real time interaction and moving graphics. This explosive book is just £5.25

Order form for 49 EXPLOSIVE GAMES FOR THE ZX81 is inside the back cover

Win £1000!

British Telecom's Prestel — the world viewdata service, is offering a prize of £1,000 to the designer of the best Prestel adaptor for the ZX81.

Telesoftware — computer programs distributed from a central source via teletext or viewdata to computers in schools, homes and offices — is a growth area on Prestel. Following the initiative of the Department of Industry in funding the Council for Educational Technology's Educational Telesoftware Project, many program publishers are becoming active with program libraries of up to 1,000 pages strong being established.

Amongst the microcomputers that can receive Prestel already are the Apple, the Pet, the TRS 80, the Acorn Atom and Research Machines' 380Z. The BBC computer, the Acorn Proton, and many others will soon be added to the list.

However, one of the hardest to crack technically is the Sinclair ZX81, as yet without Prestel adaption. Prestel is therefore offering a prize of £1,000 to enterprising designers, which will be awarded to the designer of the ZX81 adaptor which combines best the elements of low price, elegant design and practical robustness.

The closing date for the competition is March 14th. A working prototype capable of being modified so as to receive approval for attachment to the telephone network must be submitted. Designs will remain the property of the designer.

Further details, specification and entry forms are obtainable from Tony Sweet, Prestel Headquarters, Telephone House, Temple Avenue, London EC4Y 0HL. Telephone 01-583 9811.

Machine-code debugging

ZX81 owners who have ventured into the realms of machine code will be all too familiar with the frustrations of programming the computer at machine level. The major problem is where do you store the machine code so that it is safe, easily accessible, and can be Saved to, and Loaded from cassette?

To overcome this problem, and make machine code entry simple, PICTURESQUE has produced a fast and versatile machine code de-bug program, for use on an expanded (16K) ZX-81, and called "ZX-MC", that offers the facility to;

(i) inspect memory locations, and enter Op. codes directly in Hex
(ii) execute a routine from a specified address
(iii) inspect and manipulate the CPU registers
(iv) insert a breakpoint in a routine, to return control to "ZX-MC"
(v) insert, or delete, up to 255 bytes within a routine, without destroying the subsequent code

But by far the most useful features offered by "ZX-MC" are the facilities to;

(vii) Save a named file to cassette from any area of RAM from 4E00H upwards, at twice the speed of the ZX-81 Basic Save routine,

and

(viii) Load that named file back into the correct area of RAM, again at double speed, thus freeing the machine code programmer from any restrictions imposed by the Basic operating system.

"ZX-MC" resides in approximately 2¼K of RAM, above the area occupied by BASIC, which means that the display RAM (D-FILE) does not move, and therefore, the display can be accessed with known, absolute addresses.

"ZX-MC" is available on cassette, with full documentation, for £6.50, from PICTURESQUE, at 6, Corkscrew Hill, West Wickham, Kent BR4 9BB.

PICTURESQUE was originally conceived as an audio-visual production company, but as a result of investigations into computer controlled projection, now wishes to present itself as a new name in the ranks of computer software companies, and is at present devoted to supplying software for the Sinclair ZX-81, with the emphasis on machine code programming.

Other programs available on cassette include "Life", written in machine code for a 16K machine; an adventure game, "Quest", written in Basic (16K); and a suite of machine code routines for use in 16K Basic programs that provides a fast "clear screen" routine, a "clear part of screen" routine, a "draw a border of any size" routine, a fast screen scroll routine, and a routine that simulates INKEY$, with the addition of a flashing cursor that can be placed anywhere on the screen.

ZX in Indonesia

Dear INTERFACE,

I would like to inform you that I have formed a club for the ZX81 as well as the ZX80 right here in Jakarta, Indonesia. I have 3 members already. Two own ZX80's and one owns a ZX81. I own a ZX81 plus the 16K pack and I would be glad if you could put my name in the club news in the next issue so other owners of the ZX family in Indonesia could join the club. Thank you.

As every owner of a ZX81 knows, the top line of the screen always leans to the right a few minutes after being switched on (in slow mode). I have made the following to cure the problem:

1. I replaced the heatsink (which I think is too small) with a giant size (a 16 × 6 cm of 3 mm thick aluminium) and put the 5v regulator right in the middle of it. This new heatsink seizes the whole space below the keyboard and adds some weight to the ZX81 to make it a "real" small computer. (My friends said the ZX81 looks like a toy because of its weight). With this new heatsink the problem was cured for a while. I have waited for 20 to 30 minutes before having the top line lean again to the right, while with the original heatsink supplied the top line leaned after 5 to 10 minutes operation. I tried to locate another heat source and found out the Sinclair logic chip is the warmest.

2. I cut out a small U-shaped piece of aluminium and glued it above the chip. I have run the ZX81 for 6 hours continuously at an ambient temperature of 28 – 30°C and have found no more leaning problems.

This solution also eliminates the frequency shift problem of the modulator. With the old heatsink I had to readjust the tuner of my T.V. now and then to get a clearer picture on the screen. Now the picture stays steady all the time.

I hope this will help other ZX81 owners from the "leaning headache".

J. S. WIJAYA.
Jakarta,
Indonesia.

Anyone for N4?

Dear INTERFACE,

I'd be interested in getting in touch with other local ZX81 owners, if you'd care to publish my address.

SASHA BILTON,
242 Hermitage Road,
Haringey,
London N4 1NJ.

The club in Orpington

Dear INTERFACE,

I have constantly promised you a letter containing full details of the Orpington Computer Club of which, I am sure you know, I am the Secretary. However, thanks to your continual publicity on our behalf, the Club has grown to such an extent we are having to introduce an Associate Membership Section for those people who are telephoning us from all over the U.K. and now writing from France and Spain. For them a subscription of £8 per annum will entitle them to receive copies of the Club's very comprehensive and valued reports on software and hardware add-ons, as well as the Club's magazine and where feasible, urgent investigation of ZX faults.

The Club itself meets every Friday at Christ Church Hall, Charterhouse Road, Orpington at 8pm. Membership covers simply everyone from beginner to professional programmer and small business users. Each have their own groups.

ROGER PYATT,
23 Arundel Drive,
Orpington,
Kent BR6 9JF.

PROGRAMS IN EDUCATION
for the
ZX81 (16K)

49, Brittains Lane, Sevenoaks, Kent. TN13 2JP

Vocab Master £3.25
Vocab Master is a foreign language vocabulary tester. Enter the words you have to learn together with their English equivalents and the computer will fire them at you at random.

Objective Tester £3.25
This is a multi-purpose program designed for use by pupils or teachers. Enter the questions and responses for any subject and in next to no time it will be ready to run.

Capital Cities £2.95
Improve your general knowledge by pairing capital cities with countries of the world.

England £3.25
Name the major English towns and geographical features as they appear on the map of England. Both Capital Cities and England on 1 cassette £4.95

Maths Invaders £2.95
Stop the alien invasion of earth. Choose your weapon +, −, * or /!

Educational Games on one cassette £3.25
Quadrilogic (Mastermind 6 levels), Anagrams and English Counties (Hangman)

Send s.a.e. for full list of programs available.

OVERSEAS CUSTOMERS: Please add 50p to cover postage. (International order — sterling).

```
24   LET A=B+(G-1)*33+F        Sets A to new player position
25   IF PEEK(A)=182 THEN GOTO  Is cat caught?
     40
26   POKE A,148                Player in new position.
27   POKE B+(J-1)*33+H,128     Rub out cat.
28   LET D=RND(4)              Generate cat move.
29   IF D=1 AND H<32 OR D=2    Returns +1 or -3 to cat column
     AND H>2 THEN LET          if there is room.
     H=H-4*D+5
30   IF D=3 AND J<9 OR D=4
     AND J>1 THEN LET
     J=J-4*D+14                Returns +2 or -2 to cat line if
                               there is room.
32   LET A=B+(J-1)*33+H        Set A to new cat position.
33   IF PEEK(A)=148 THEN GOTO  Prevents the cat jumping on top
     28                        of the player.

38   POKE A,182                Cat in new position.
39   GOTO 15                   Next move.
40   PRINT "YOU CAUGHT THE
     CAT IN";I;"MOVES"
```

© I.S. HOWSON

Discover the Word

The game is for two players. The idea of the game is for one of the players to input a word (1-17 letters) when told by the program. The enter the number of letters in the word.

The program then prints the display, (which consists of a line at the top showing the number of lives left (eleven, one lost every time an incorrect guess is made) then the alphabet is printed on two lines with the letters already used blanked out. Then the blank spaces of the word you are looking for (unless it has been correctly guessed) show the number of letters in the word.

When all your lives are used up, the word is displayed, or if the word has been fully guessed then the number of lives left.

TO PLAY:—

1). One player inputs word (maximum of seventeen letters).
2). Same player inputs number of letters in the word.
3). Second player inputs his guess.
4). This then is blanked out in the letter box. If the letter is in the word sought after then it is printed in or if it is not then one life is lost.
5). If all lives not lost or game has not ended then go to instruction (4).
6). If all lives lost then word is shown, or if correctly guessed then the number of lives left if shown.
7). End of game input answer to question "another go" if another is required then nput "y" or "yes" if another go not required then input "no" or "no".
8). If another go then go to instruction one.

```
10   LET A=0
20   DIM B(25)
30   FOR C=0 TO 25
40   LET B(C)=C+38
50   NEXT C
60   CLS
70   PRINT "ENTER WORD (1/17)"
80   INPUT D$
90   LET E$=D$
100  PRINT D$
110  PRINT "INPUT NO. LETTERS"
120  INPUT F
130  DIM G(F)
140  DIM H(F)
150  FOR C=1 TO F
160  LET H(C)=CODE(D$)
170  LET D$=TL$(D$)
180  NEXT C
190  FOR C=1 TO 11
200  CLS
210  FOR J=1 to 12-C
220  PRINT "(shift A)";J;
230  NEXT J
240  PRINT "(shift A)"
250  PRINT
260  FOR J=0 TO 1
270  PRINT "(shift A)";
280  FOR K=0 TO 12
290  PRINT CHR$(B(J*13+K));
300  NEXT K
310  PRINT "(shift A)"
320  NEXT J
330  PRINT
340  PRINT "(shift A)";
350  FOR J=1 TO F
360  PRINT CHR$(G(J));
370  NEXT J
380  PRINT "(shift A)";F;"(shift A)"
390  IF A=F THEN GOTO 580
400  INPUT D$
410  LET L=CODE(D$)
420  IF L<38 THEN GOTO 400
430  IF B(L-38)=128 THEN GOTO 400
440  LET M=0
450  FOR K=1 TO F
460  IF L=H(K) THEN GOSUB 490
470  NEXT K
480  GOTO 530
490  LET M=1
500  LET A=A+1
510  LET G(K)=H(K)
520  RETURN
530  LETB(L-38)=128
540  IF M THEN GOTO 200
550  NEXT C
560  PRINT
570  PRINT "(shift A)";E;"(shift A)"
580  IF A=F THEN PRINT "CORRECT*";12-C;"/11"
590  PRINT "ANOTHER*GO?"
600  INPUT D$
610  IF CODE(D$)=62 THEN RUN
```

© C.R. GREEN

Acorn Atom

As you probably know, the Atom Users' Group run by Richard Meredith of "Sheerwater", Yealm View Road, Newton Ferrers, Plymouth, is now run by David Frost of 18 Frankwell Drive, Potters Green, Coventry, West Midlands. All correspondence should be directed to this new address.

Visicalc type plug-in ROM for Atom owners

Acornsoft, the software division of Acorn Computers have just launched Atomcalc. It is available as a plug-in 4K ROM, and costs £39.10. Acornsoft have made it very easy to use. (David Johnson-Davies, a director of Acornsoft told us at INTERFACE: "If you can use an ordinary calculator then you can use Atomcalc. You need no programming skills at all".) Atomcalc can cope with anything from a household budget to company accounts.

"You set up a series of automatic calculating functions like totalling or percentages. Then fill in the columns with your figures and the program produces the answers. If you want to change one figure in the calculation it immediately changes the relationship of all the other figures involved".

"So, for example, you can see what effect on profit a 5% increase in sales might have or a 10% increase in production, or a 3% drop in transport".

Atomcalc is available direct from Acornsoft or Atom dealers.

Several of this month's programs were submitted by Ian Smith who will be — as a result — a little richer this month. Remember, we pay £5 for each Atom program we use.

A collection of 39 of the best ATOM programs used in INTERFACE is now available in a new book called "39 TESTED PROGRAMS FOR THE ACORN ATOM". The price to the general public is £5.30, but for members of the Independent Acorn (Atom/BBC) Users' Group, this book is just £2.65. The order form is inside the back cover. Authors featured will receive two complimentary copies.

Soccer

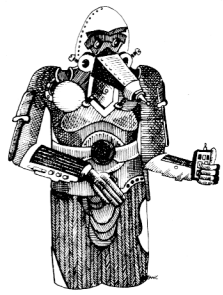
This 3K program, by Ian Smith, acts as a TV game, with two players moving their bats to hit the ball. The person on the left uses the "Q" to move up and the "shift" to move down, while the player on the left uses the "P" key (up) and the '.' key (down). The first person to score 15 goals wins. The ball comes from a random part of the goals after a goal is scored.

```
 5REM soccer by i.smith
10DIM AA2;Z=&8020;T=(6*32)+4;U=(6*32)+27;@=5
11E=A.R.%11;IF E>5;G=33
12IF E<6;G=-31
13H=34+(32*E)
14F.A=0TO1;AAA=0;N.;P.$21
15P=&21C
16C;JSR &FE71
17BCS P+9
18JSR P+11
19STA &032C
20RTS
21LDA @&FF
22BNE P-6
23PHP
24JMP &FEA7
25J;P.$6;K=0
26?&E1=0
40CLEAR0;P.$30,AA1,"        SOCCER      "AA0
41F.A=1TO30;A?Z=204;N.
42F.A=((14*32)+1)TO((14*32)+29);A?Z=204;N.
43F.A=1TO2;B=(A*32)+1;B?Z=213;N.
44F.A=12TO13;B=(A*32)+1;B?Z=213;N.
```

```
 45F.A=2TO12;B=A*32;B?Z=60;N.
 46F.A=1TO2;B=(A*32)+30;B?Z=234;N.
 47F.A=12TO13;B=(A*32)+30;B?Z=234;N.
 48F.A=2TO12;B=(A*32)+31;B?Z=62;N.
 49A=1;A?Z=197;A=30;A?Z=202;A=449;A?Z=212;A=478;A?Z=232
 50F.P=0TO100;WAIT;N.
 52F.A=6TO7;B=(A*32)+4;B?Z=106;N.
 53F.A=6TO7;B=(A*32)+27;B?Z=106;N.
 60H?Z=42
100IF ?*B001=127;T=T+32;Q=1;IF T>388;T=388
101IF ?*B001=239;T=T-32;Q=2;IF T<36;T=36
102IF Q=1;Q=0;C=T-32;C?Z=32;C=T+32;C?Z=106
103IF Q=2;Q=0;T?Z=106;C=T+64;C?Z=32
104LINK *21C
106IF K=*50;U=U-32;R=2;IF U<59;U=59
107IF K=*2E;U=U+32;R=1;IF U>411;U=411
108IF K=*FF;G.115
109IF R=1;R=0;C=U-32;C?Z=32;C=U+32;C?Z=106
110IF R=2;R=0;U?Z=106;C=U+64;C?Z=32
115H?Z=32;H=H+G
120IF H?Z=60;AA0=AA0+1;P.$7,$7,$7;G.a
121IF H?Z=62;AA1=AA1+1;P.$7,$7,$7;G.b
122IF H?Z=204;GOS.c
123IF H?Z=106;GOS.d
124IF H?Z=213;GOS.d
125IF H?Z=234;GOS.d
126IF H?Z=197ORH?Z=202ORH?Z=212ORH?Z=232;G=-G;H=H+G
130H?Z=42
150G.100
170aE=A.R.%11
171IF E>5;G=31
172IF E<6;G=-33
175H=61+(32*E);G.185
177bE=A.R.%11
178IF E>5;G=33
179IF E<6;G=-31
180H=34+(32*E);G.185
185F.A=0TO32 STEP32;B=A+T;B?Z=32;B=A+U;B?Z=32;N.
186T=(6*32)+4;U=219
187F.P=0TO50;WAIT;N.
190P.*30,AA1,"        SOCCER      "AA0
191IF AA0=15ORAA1=15;?*E1=*80;E.
192G.52
200cIF G=33;G=-31;H=H+G;R.
201IF G=-31;G=33;H=H+G;R.
202IF G=-33;G=31;H=H+G;R.
203IF G=31;G=-33;H=H+G;R.
240dE=A.R.%2
241IF G=31A.E=0;G=33;H=H+G;G.260
242IF G=31;G=1;H=H+G;G.260
243IF G=-33A.E=0;G=-31;H=H+G;G.260
244IF G=-33;G=1;H=H+G;G.260
245IF G=-31A.E=0;G=-33;H=H+G;G.260
246IF G=-31;G=-1;H=H+G;G.260
247IF G=33A.E=0;G=31;H=H+G;G.260
248IF G=33;G=-1;H=H+G;G.260
249IF G=1*E=A.R.%3;G.255
250IF G=-1;E=A.R.%3
251IF E=0;G=-31;H=H+G;G.260
252IF E=1;G=33;H=H+G;G.260
253IF E=2;G=1;H=H+G;G.260
255IF E=0;G=-33;H=H+G;G.260
256IF E=1;G=31;H=H+G;G.260
257IF E=2;G=-1;H=H+G;G.260
260IF H?Z=204;GOS.c;R.
265R.
1000E.
```

Invade

Another great program from Ian Smith, Invade occupies 2K, and provides a full explanation of how the game works, and how to play it. You are above an alien castle in your space ship. You have an arsenal of only 150 bombs with which to destroy the whole building. This is not gross overkill, as each bomb can only destroy a single brick. You controls are "G" (to drop a bomb), "3" (to move right) and "G" (to move left). Of course, it is not as simple as just flying over head and raining bombs on the hapless inhabitants of the castle. The alien's defence system ensures that from time to time, you will feel the wrath of their weapons. You have limited time, and a limited number of bombs. This is not a game for the fainthearted.



```
  1REM invade by i.smith
  2DIM VV2,P-1;L=*B002;P.$21
  5[;:VV0 LDA L;LDY #81;:VV1 LDX *80;:VV2 DEX;BNE VV2;EOR @4
 10STA L;DEY;BNE VV1;RTS;]:P.$6;?*81=25
 15A=0;B=A+1;C=A+2;Z=*8000;E=0;F=-1;D=0;H=0;@=0;I=-1
 20P.$12"YOU ARE ABOVE AN ALIEN CASTLE INYOUR SPACESHIP."'
 25P."YOU HAVE 150 BOMBS TO DESTROY"'"THE WHOLE BUILDING."
 30P.'"EACH BOMB CAN DESTROY ONLY ONE "'"BRICK."
 35P.'"THE BOMBS FALL FROM THE MIDDLE"'"OF YOUR SHIP."
 36P.'"TO FIRE PRESS G."
 37P.'"TO MOVE RIGHT PRESS 3."
 38P.'"TO MOVE LEFT PRESS Q."
 42P.'"BE CAREFUL!! THE ENEMY AIMS "'"MISSILES AT YOU WHICH"
 43P." YOU MUST"'"AVOID."
 45P.''"PRESS G TO START."
 46DO U.?*B001=247
 50P.$12'';CLEAR0
 60Q=5;F.T=Q TO27;T?*81E0=*A0;N.;F.T=Q TO27;T?*81C0=*A0;N.
 61F.T=Q TO27;T?*81A0=*A0;N.;F.T=Q TO27;T?*8180=*A0;N.
 62F.T=Q TO27 STEP3;T?*8160=*A0;S=T+1;S?*8160=*A0;N.
 75C?Z=*FF;A?Z=*FF;B?Z=*CC
100IF ?*B001=247A.F=-1;F=B+32;F?Z=42;E=E+1
101IF?*B001=239;D=-1;C?Z=*20
102IF?*B001=253;D=1;A?Z=*20
110A=A+D;B=B+D;C=C+D;D=0
115IF A<0;A=0;B=1;C=2
116IF C>30;A=29;B=30;C=31
120A?Z=*FF;B?Z=*CC;C?Z=*FF
130IF I=-1;I=B+480
131J=I;I=I-32
133IF I<=0;J?Z=*20;I=-1;G.150
134IF I?Z=*FFORI?Z=*CC;G.400
135IF I?Z=*A0;G.150
140I?Z=33
145IF J?Z=*A0;G.150
146J?Z=*20
150IF F<>-1;F?Z=*20;F=F+32;G.a
200G.100
300aIF F?Z=*A0;F?Z=*20;F=-1;H=H+1;?*80=200;LINK VV0;G.330
305IF F>512;F=-1;?*80=170;LINK VV0;G.335
310F?Z=42;G.100
330IF H=108;P."CASTLE DESTROYED WITH "E" BOMBS.";G.500
335IF E=150;G.450
340G.100
400?*80=250
401F.Y=0TO5;LINK VV0;F.U=0TO10;WAIT;N.;LINK VV0
402F.U=0TO5;WAIT;N.;N.
405A?Z=*20;B?Z=*20;C?Z=*20;J?Z=*20
410P."YOU HAVE BEEN SHOT DOWN."
420FP.'"YOU HIT "(H/108)*100" % OF IT.";G.500
450P."OUT OF AMMUNITION."
500E.
```


ZX CHESS I
reduced to: **£8.00**

Very popular machine code program, with six levels of play and an analysis option. Unbeaten except by:

ZX CHESS II
now only: **£14.00**

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.

ADVENTURE 'A' £5.00 — You find yourself stranded on an alien planet. Can you reach your ship and escape?

ADVENTURE 'B' £7.00 — 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 'C' £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.

GALAXY WARRIOR £3.00

Fast and exciting interactive animated graphics game. Hunt clingons and go through black holes...

1K GAMES PACK £3.00

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

ARTIC COMPUTING
396 JAMES RECKITT AVENUE
HULL, HU8 OJA

Fruit machine

When tested at a fete, this 3K program, written by Ian Smith, made a profit for him of £4 although, he assures us, it does pay out. The combinations on the right show the winning lines and the price (in pence). "X" is wild (that is, anything). All you need to do is follow the instructions. You can hold as many reels as you like. Simply enter Y or N to hold. The clever sound routine adds to the effectiveness of this program.

```
 1REM fruit machine by i.smith
 3@=0;T=0;B=0;Q=0;R=0;L=0
 5DIM AA12;F.Z=1TO12;DIM A1;AAZ=A;N.
 6DIM BB3;F.Z=1TO3;DIM A1;BBZ=A;$BBZ=" ";N.
10$AA1="*";$AA2="^";$AA3="<";$AA4="£";$AA5="/";$AA6="`"
15$AA7="#";$AA8="3";$AA9="$";$AA10="|";$AA11=")";$AA12="o"
20P.$21;DIM VV2,LL0,P-1;J=#B002
25[;;LL0 JSR #FFE6;STA #80;RTS;]
30[;;VV0 LDA J;LDY #81;;VV1 LDX #80;;VV2 DEX;BNE VV2;EOR @4
35STA J;DEY;BNE VV1;RTS;];P.$6;?#81=30
50P.$12'';CLEAR0
60F.Z=0TO12;P." ";N.;P."COMBINATION  SCORES"
61GOS.g;P."$ $ $      100"'
62GOS.g;P."^ ^ ^       80"'
63GOS.g;P."* * *       70"'
64GOS.g;P.") ) )       60"'
65GOS.g;P."` ` `       50"'
66GOS.g;P."X ` `       40"'
67GOS.g;P."# # #       30"'
68GOS.g;P."X # #       25"'
69GOS.g;P."X 3 3       20"'
70GOS.g;P."X X 3       15"'
71GOS.g;P."X X /       10"'
73F=A.R.%12+1;G=A.R.%12+1;H=A.R.%12+1
74$BB1=$AAF;$BB2=$AAG;$BB3=$AAH
75P.$30"        fruit  machine"''"PAY OUT : "T
77P.''''"  1   2   3"''"  "
80P.$BB1"   "$BB2"   "$BB3'''';?#E1=0
100P."PAY 10P."'"PRESS SHIFT"'"TO START."'
105DO U.?#B001=127;T=0
107P.$11$11$11"          "'"              "'"          "
108P.$30''"PAY OUT :     "$8$8$8$8,T
109P.''''''
110C=A.R.%100+20;D=A.R.%100+20;E=A.R.%100+20
111IFC>=D A.C>=E;Y=C;G.115
112IFD>=E;Y=D;G.115
113Y=E
115F.O=0TO Y
120B=B+1;GOS.a
125Q=Q+1;GOS.b
130R=R+1;GOS.c
140$BB1=$AAF;$BB2=$AAG;$BB3=$AAH
150P.$11"  "$BB1"   "$BB2"   "$BB3';N.
170L=L+1;IF L=3;G.z
175P.''"HOLD 1 ";LI.LL0;IF?#80=#59;C=1;B=0;G.180
177C=A.R.%100+10;B=0
180P.'"HOLD 2 ";LI.LL0;IF?#80=#59;D=1;Q=0;G.185
182D=A.R.%100+10;Q=0
185P.'"HOLD 3 ";LI.LL0;IF?#80=#59;E=1;R=0;G.188
187E=A.R.%100+10;R=0
188P.'$11,$11,$11"          "'"          "'"          "'
189IF C=1A.D=1A.E=1;P.$11,$11,$11;G.z
190P.$11,$11,$11,$11,$11;G.111
200aIF B>=C;R.
205F=F+1;IF F>12;F=1
210?#80=50;LI.VV0;R.
250bIF Q>=D;R.
255G=G+1;IF G>12;G=1
260?#80=70;LI.VV0;R.
300cIF R>=E;R.
305H=H+1;IF H>12;H=1
310?#80=90;LI.VV0;R.
400zL=0;B=0;Q=0;R=0
405IF $BB1="$"A.$BB2="$"A.$BB3="$";T=T+100;G.475
410IF $BB1="^"A.$BB2="^"A.$BB3="^";T=T+80;G.475
415IF $BB1="*"A.$BB2="*"A.$BB3="*";T=T+70;G.475
420IF $BB1=")"A.$BB2=")"A.$BB3=")";T=T+60;G.475
425IF $BB1="`"A.$BB2="`"A.$BB3="`";T=T+50;G.475
430IF $BB2="`"A.$BB3="`";T=T+40;G.475
435IF $BB1="#"A.$BB2="#"A.$BB3="#";T=T+30;G.475
440IF $BB2="#"A.$BB3="#";T=T+25;G.475
445IF $BB2="3"A.$BB3="3";T=T+20;G.475
450IF $BB3="3";T=T+15;G.475
455IF $BB3="/";T=T+10;G.475
470?#80=250;LI.VV0;LI.VV0;G.75
475F.Z=0TO10;?#80=130;LI.VV0;F.M=0TO3;WAIT;N.;N.;G.75
500yF.Z=0TO16;P." ";N.;R.
```

Asteroid belt

```
 1REM asteroid belt by i.smith
 2P.$12;C=#80D0
 4P."   a s t e r o i d  b e l t"''
 5P."WHICH DIFFICULTY FACTOR DO YOU"'"WANT :"'
 6P."1-VERY EASY"'"2-EASY"'"3-AVERAGE"'"4-DIFFICULT"'
 7P."5-IMPOSSIBLY DIFFICULT";IN.L
 9IF L>5ORL<1;G.13
10IF L<4;X=1000+((L-1)*500)
11IF L=4;X=3000
12IF L=5;X=4000
15@=5
16P.'"YOU HAVE TO DODGE"X" ASTEROIDS"'
17P."TO MOVE RIGHT PRESS REPT"'"TO MOVE LEFT PRESS SHIFT"'
20S=100;LI.#FFE3
25CLEAR0;?#E1=0
30F.I=0TO1000
40A=A.R.%31;B=A.R.%31;D=A.R.%31;E=A.R.%31;F=C-32
50A?#81E0=42
55IF L=2 A.I%2=0;B?#81E1=42
60IF L=3ORL=4ORL=5;B?#81E1=42
62IF L=4ORL=5;D?#81E2=42
63IF L=5;E?#81E3=42
65P.'
70?F=32;IF ?#B001<>#FF;C=C-1;IF C<#80C1;C=#80C1
71IF ?#B002=151 OR ?#B002=135;C=C+1;IF C>#80DF;C=#80DF
72IF ?C=42;S=S-1;P.$7
73?C=#A1
80N.I
85@=3
90P."SCORE : "S'
95IN."DO YOU WANT ANOTHER GO (Y/N)"J
96IF J=N T.G.100
97IF J=Y T.G.1
100?#E1=#80;E.
```

Heathrow

```
YOU ARE THE CAPTAIN OF A JET
AIRCRAFT LANDING AT HEATHROW
IN THICK FOG YOU DEPEND ENTIRELYON INSTRUMENTS
A COPY OF THE INSTRUCTIONS
WOULD BE USEFUL DURING FLIGHT
PRESS 'SPACE' TO READ EACH FRAME'T' KEEPS YOU ON TRACK
'C' CUTS AIR SPEED (A/S)
'V' INCREASES A/S
'W' CONTACTS TOWER AT 11 OR 12 MFROM TOUCH DOWN (T/D)
'U' LOWERS UNDER-CARRIAGE (U/C)
AFTER'OUTER BEACON'
'H' TRIMS A/C TO HORIZON
AFTER 'INNER BEACON'
'L' TURNS A/C 90 DEG. TO LEFT        for safe landing
VEL <225 & >205
ALT <100
U/C DOWN
NOT > 4YDS. OFF TRACK
ON COURSE 270
A/C TRIMMED TO HORIZON
TOWER CHECKED-RUNWAY CLEAR
          flight plan
TURN LEFT ON TO 000 AT 14 M FROM T/D
CONTACT TOWER AT 11 OR 12 M.
U/C DOWN AFTER 'OUTER BEACON'
TURN LEFT ON TO 270 AT 7 M. FROM T/D
TRIM TO HORIZON AFTER INNER
BEACON
KEEP A/S AT ABOUT 215

thick fog-visibility zero!
ONLY ONE KEY AT A TIME!
CONTROLS RESPOND AFTER 2 SECS.
```

```
10S=0;W=0;E=0;M=0;N=0;@=3;Z=0;L=0;C=90;H=0
20D=15;V=230;G=900;X=32;Y=25;F=500;B=#DE
30 DIMP(-1);P.$21;[;JSR#FE71;STY#80;RTS;];P.$6
40 CLEAR0;?#E1=0
50MOVE32,30;PLOT1,0,-10;LI.T.;R=?#80;IFR=52 PLOT15,X,Y;X=32
60 C=90
70IFA.R.%4=0 PLOT15,X,Y;X=X-4;F.K=1TO10;WAIT;N.;PLOT13,X,Y
80IFA.R.%4=1 PLOT15,X,Y;X=X+4;F.K=1TO10;WAIT;N.;PLOT13,X,Y
90A=R.%3;IFR=40 AND D<3 N=1
100IFD<3 AND N=1 A=0
110 IFR=54 V=V+10;F=F-10
120 IFR=35 V=V-10
130 V=V+5;IFABS(X-32)>8 L=L+1
140 IFV<205 V=V-7
150 IFV>350 V=350
160MOVE32,44;PLOT1,-10,-A;MOVE32,44;PLOT1,10,A;F.K=1TO60;WAIT
170 N.;MOVE32,44;PLOT3,-10,-A;MOVE32,44;PLOT3,10,A
180E=E+1;IFE%5=0 D=D-1
190 IFD<0 D=0
200 F=F-5;G=G-2700/V;IFG<1 G=0
210!B=#198080;P."HEADING"
220 C=C-(32-X)/4;IFC>93 C=93
230 IFC<87 C=87
240IFX=32 C=90
250!B=#1B80A0;P.C
260IFD=14 AND R=44 H=1
270!B=#1B80A0; IFH=1 P."   "
280IFH=1 C=C-90;IFC<0 C=C+360
290!B=#1B80A0;IF H=1 P.C
300IFD=7ANDR=44 H=2
310!B=#1B80A0;IFH=2 P."   "
320IFH=2 C=C+180
330!B=#1B80A0;IFH=2 P.C
340IFD<14ANDH=0 G.m
350 IFD<6 ANDH<>2 G.n
360!B=#1581C0;P."DRIFT";!B=#1581E0;P.X-32
370!B=#018000;P."TRIM";!B=#018020;IFN=1AND D<3 P."CORRECT"
380!B=#0D8040;P."HORIZON"
390!B=#198150;IFD<5;P."final approach"
400!B=#81C0;P."A/S";!B=#81E0;P.V
```

```
410!B=#178190;P."MILES";!B=#0781C0;P."TO T/D";!B=#0881E0;P.D
420!B=#1081C0;P."ALT";!B=#1081E0;P.G
430!B=#8060;IFV<185 P."stall!!disaster!!";P. $7$7$7$7$7;G.a
440IFV<205 ANDV>=185 P.$7$7"A/S TOO LOW"
450 IFV>=205P."              "
460!B=#8080;IFX>36P.$7"TO RIGHT OF TRACK"
470IFX<28 P.$7"TO LEFT OF TRACK"
480 IFX>24 AND X<36 P."                    "
490!B=#1D8000;P."U/C";!B=#1D8020;IFM=0P."UP"
500!B=#1C8020;IFR=53 M=1;IFM>=1 ANDD<10 P."DOWN";M=M+1
510!B=#1A8040;F.J=1TO30;WAIT;N.;IFM>1 AND D<10 P."LOCKED"
520!B=#1C81C0;P."FUEL";!B=#1C81E0;P.F
530 !B=#1B8100;IFD<10 P."OUTER"
540!B=#1A8120;IFD<10P."BEACON"
550!B=#018100;IFD<3 P."INNER"
560!B=#018120;IFD<3 P."BEACON"
570!B=#1B8160;IFD<13 P."TOWER"
580!B=#138180;IFR=55 AND D<13 AND D>10 W=1
590 IF W=1 P."CLEAR TO LAND"
600IF F<1 F=0;P.$27$12"          out of fuel!!";F.J=1TO120;WAIT
610 IF F<1 N.;G.a
620IFD=0ANDG<100ANDM>=1ANDN=1ANDX<40ANDX>24 S=1
630IFS=1 ANDV<=225 ANDV>=205 G.b
640IFD=0 AND G>=100 G.g
650IFD=0 AND M=0 P.$7$7$27$12"          no wheels!!";F.J=1TO60
660IF D=0 AND M=0 WAIT;N.;G.a
670IFD=0 AND V>225 G.c
680IFD=0ANDG<100ANDM>=1ANDN=1AND(X<=440RX>=20) Z=1
690IFZ=1ANDV<=225ANDV>=205 G.d
700IFD=0ANDG<100ANDM>=1AND N=0 G.e
710 IFD<3 AND W=0 G.h
720 IFD=0 AND V<205 G.j
730IF ABS(X-32)>12 AND D<5 F.J=1TO7;P.$7;N.;G.f
740 G.50
750E.
760aF.J=1TO200;?#B000=#F0;WAIT;?#B000=0;WAIT;N.;CLEAR4
770F.J=1TO300;WAIT;N.;P.$27$12"          nasty!!"
780GOS.1;P.$12;E.
790b CLEAR4;MOVE125,192;PLOT5,118,170;MOVE131,192
800 PLOT5,138,170;F.J=1TO30;WAIT;N.
810MOVE125,192;PLOT7,118,170;MOVE131,192;PLOT7,138,170
820 MOVE120,192;PLOT5,110,160;MOVE136,192;PLOT5,146,160
830F.J=1TO30;WAIT;N.;MOVE120,192;PLOT7,110,160;MOVE136,192
840 PLOT7,146,160
850MOVE115,192;PLOT5,100,150;MOVE141,192;PLOT5,156,150
860F.J=1TO30;WAIT;N.;MOVE115,192;PLOT7,100,150;MOVE141,192
870PLOT7,156,150
880MOVE100,192;PLOT5,80,130;MOVE156,192;PLOT5,176,130
890F.J=1TO30;WAIT;N.;MOVE100,192;PLOT7,80,130;MOVE156,192
900PLOT7,176,130
910MOVE90,192;PLOT5,40,0;MOVE166,192;PLOT5,216,0
920 GOS.1
930 P.$27$12"   WELL DONE! SAFE LANDING";GOS.1
940P.''"PILOT RATING"(280+F-4*L)/4-4"%";E.
950cP.$7$7$27$12"A/S TOO HIGH!! overshoot!"''
960P."GO ROUND AGAIN";GOS.1;G.10
970d P.$7$7$27$12"WELL YOU'RE DOWN,SOMEHOW!"''
980P."BUT YOU SHOOK YOUR PASSENGERS!"''
990P."YOU ARE"ABS(32-X)" YARDS OFF THE RUNWAY!";E.
1000eP.$7$7$27$12 "YOU LANDED ON A WING AND A"''"PRAYER!"''
1010P."GET YOUR HORIZON RIGHT NEXT TIME!"''
1020P."(IF THERE IS ONE)"''
1030P."YOU HAVE 8 SECONDS TO CLEAR THE PLANE"
1040 F.J=1TO480;WAIT;N.;G.a
1050f P.$7$7$27$12"          emergency!!!"''
1060P."ONLY 4 MILES TO T/D-YOU ARE TOO"''"FAR OFF TRACK!!"''
1070P."AND ON COLLISION COURSE WITH"''"ANOTHER AIRCRAFT!"''
1080P."press emergency button-e!"''
1090F.J=1TO120;WAIT;N.
1100LINK TOP;R=?#80;IFR=37 GOS.z;G.10
1110P."too late!!!";GOS.1;G.a
1120gP.$7$7$7$27$12"too high!too high!!"''
1130P."YOU ARE HEADING STRAIGHT FOR"''"THE TOWER!"''
1140GOS.1;IFA.R.%3=0 GOS.z;G.10
1150 G.a
1160h F.J=1TO7;P.$7;N.;P.$27$12
1170P."     no contact with tower!"''
1180P."RUNWAY BLOCKED!!";GOS.1;G.a
1190j P.$7$7$27$12"you'll never make it!!A/S TOO LOW!!";GOS.1
1200 G.a
1210m F.J=1 TO10;P.$7;N.;P.$27$12
1220P."you are way off course!!"''
1230P."YOU FAILED TO TURN LEFT"''"ON TO COURSE 000"''
1240P."AT 14 M. TO T/D"''
1250P."RE-JOIN STACK!!";GOS.1;GOS.1;G.10
1260nF.J=1TO10;P.$7;N.;P.$27$12
1270P."shocking error!!"''"YOU FAILED TO TURN LEFT"''
1280P."ON TO FINAL APPROACH-COURSE 270"''
1290P."AT 7 M. FROM T/D"''"tower block ahead!!!";GOS.1
1300 P.''"look out!!";GOS.1;GOS.1;G.a
1310zP."lucky escape!!"''"APPROACH AGAIN";GOS.1;GOS.1;WAIT;R.
13201 F.J=1TO180;WAIT;N.;R.
```

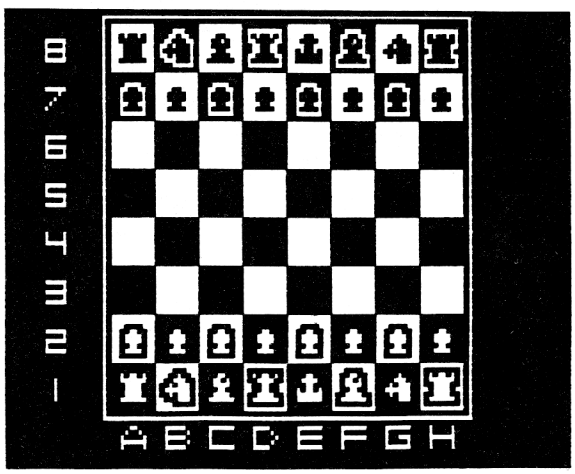
Noughts and Crosses

Enter 5 to go first, Ø to allow the computer to have first move.

```
 1 REM Noughts & Crosses
 2 REM ADAPTED ARTHUR JOHNMORE
 3 REM FROM PROGRAM BY
 4 REM STUART ROBERTS
10DIMBB9,PP9;Y=R.
20P.$12;@=0;?#E1=0
30FORA=1TO9;BB(A)=A
40PP(A)=0
50N.
70E=0;Q=0
90N=0
100 X=4
110P.$30''
120FORA=1 TO 9
130IFA=X GOSUB 770
140IF BB(A)=0 GOTO 400
150IF BB(A)=10 GOTO 430
160PRINT BB(A)" "
170NEXT A
180P.''
200IF N=1 GOTO 460
210IFE=8 P."I WIN!"';GOTO 970
220IFQ=5 P."IT'S A DRAW"';GOTO 970
230IN.Z;IFBB(Z)<>Z GOTO 230
250Q=Q+1
260IFZ=11 GOTO 300
270N=1;BB(Z)=0
290GOTO100
300BB5=10;GOTO90
320FOR A=C TO D
330IF BB(A)=A  BB(A)=10
340A=A+F
350NEXT A
360G.90
370IFBB5=5 G.30
380BB(D)=10;G.90
400P."O ";PP(A)=1;G.170
430P."X ";PP(A)=4
450G.170
460 REM Respond
470G=0
480C=1
490D=9
500F=3
510GOS.h
520C=3;D=7;F=1
550GOS.h
560D=9;F=2
580GOS.h
590C=2;D=8
610GOS.h
620C=1;D=7
640GOS.h
650D=3;F=0
670GOS.h
680C=4;D=6
700GOS.h
710C=7;D=9
730GOS.h
740G=G+1;IF G=5 G.90
760G.480
770X=X+3;P.'';R.
810hE=0
820FOR A=C TO D
830E=E+PP(A)
840A=A+F
850N.A
860IF E=3 G.960
870IF G=0 R.
880IF E=8 G.320
890IF G=1 R.
900IF E=2 G. 320
910IF G=2 R.
920IF E=5 G.320
930IF G=3 R.
940IF (E=1)OR(E=4) G.370
950 RETURN
960P.''"YOU WIN!!"''
970P.'
990IN."ANOTHER GAME (Y OR N)"K
1010 IF K=Y G.1
1200P.'''"OK, THANKS FOR PLAYING";E.
```

```
1 2 3
4 5 6
7 8 9
?5

1 2 3
4 0 6
7 8 9

1 2 3
4 0 6
7 8 X
?3

1 2 0
4 0 6
7 8 X
?4

1 2 0
0 0 6
X 8 X

1 2 0
0 0 6
X X X
I WIN!
```


Acorn Atom CHESS



THE PROGRAM YOU'VE BEEN WAITING FOR!

Fantastic machine code chess game for the 12K Atom. Features include: split screen (high res. + alphanumerics); many levels of play; castling & en passant; computer plays black or white. Supplied on cassette with instructions. *PRICE ONLY £9.00*

Order form for

ATOM CHESS inside back cover

BBC Microcomputer

Compiled by Jeremy Ruston. © 1982.

The BBC have at last supplied the relevant information to allow us to connect our printer to our Model B. For those that being baffled by the circuit in the provisional users' guide, the connections are:

PRINTER END	COMPUTER END
Pin 1 ($\overline{\text{strobe}}$)	Pin 1 ($\overline{\text{strobe}}$)
Pin 2 (data Ø)	Pin 2 (data Ø)
Pin 3 (data 1)	Pin 3 (data 1)
Pin 4 (data 2)	Pin 4 (data 2)
Pin 5 (data 3)	Pin 5 (data 3)
Pin 6 (data 4)	Pin 6 (data 4)
Pin 7 (data 5)	Pin 7 (data 5)
Pin 8 (data 6)	Pin 8 (data 6)
Pin 9 (data 7)	Pin 9 (data 7)
Pin 1Ø ($\overline{\text{ack}}$)	Pin 1Ø ($\overline{\text{ack}}$)

Ok, the table above makes the connections look simple, but it bears little resemblance to the table as published in the afore mentioned users' guide.

Clive Sinclair called a press conference the other day, amid much secrecy. We all thought the ZX82, or at least a BBC-compatible machine was on it's way, but sadly, it was just Uncle blowing his trumpet at his formidable achievements in the US.

The BBC are now supplying the machines BASIC in a single 16Kbyte ROM, but the operating system is still being shipped as four 4Kbyte EPROMS. The interesting thing about this is that none of the machines have the necessary software to drive the sound synthesiser, which should be in the BASIC ROM. By placing a large order for uncompleted BASIC ROMs, are the BBC giving up about getting to work? Some of this months programs show you how to get at the sound features, via assembly language.

Time and I have been trying to agree on certain standards for all the non-trivial programs we write. The BBC have been fairly freely circulating their idea of software standards, but it seems to us that they unduly rigid, and even inapplicable to INTERFACE programs. For example, they dwell for a couple of pages on the subject of how menus should be presented. How many magazine programs have you seen which need to use menus?

Some of their points are worth, however, bearing in mind: Pressing "escape" should, via the BBC machines excellent error trapping facilities, return the user to the beginning of a program, or some other controlled state. All user input should require the use of the "return" key, even if it is only a single character, because otherwise the user may get unsure about how to respond to various questions, and so press "return" in response to a "GET", thus placing spurious characters in the input buffer, which will almost certainly corrupt the next input.

As a logical extension of this, clear the buffer before any keyboard inputs are requested, with "*FX 15,Ø". Otherwise your naive user will be merrily hitting the keyboard in anger, while waiting for an input prompt to come up. When it does, all the keys he pressed will be used as input, which can be disconcerting. Variable names should reflect the use a variable will be put to. In addition, I think it is often a good idea to use lower case variable names, so you are not limited in your choice of names.

Multi statement lines should be avoided. I know this is a difficult rule to keep, but it is vital. Pick up an issue of PCW, and turn to the programs section. Just about every program in that section of the magazine uses multi statement lines, and is very difficult to assimilate as a result. Obviously there's absolutely no sense in making life more difficult for you than it need be, but do think carefully before you send your programs in for publication here or anywhere else, "Is is readable". You may not realise it now, but it is easily the most important step you can take to help IT82.

Most of these points are not applicable to short programs. They should also be supplemented by the techniques you use already, e.g. subroutines and careful planning of all reasonable sized programs.

This month, I present a bumper stock of 5 BBC programs:

Program 1 is a simple program which fills a mode 7 teletext screen with small (two character cell) rectangles. It works placing a random choice of 7 strings somewhere on the screen. The strings are made up of one of the characters from CHR$(129) to CHR$(135) and CHR$(157). CHR$(157) makes the rest of a line on the screen the same colour as the current text foreground colour, which in this example is always given in the screen cell before.

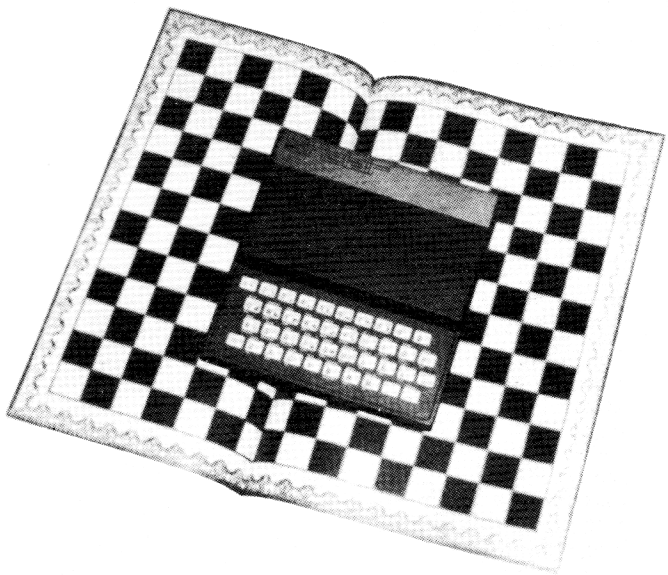
Program 2 draws rather larger rectangles in either mode 5 or 2, depending on whether it is running on a model A or B. It does this by putting the machine in mode 7, and noting the value of HIMEM, the start of screen memory. It then sets M$ to "A" or "B", depending on the model of the machine it is running on. The rectangles are created by defining a random graphics window and clearing it to a specified colour.

Programs 3 and 4 are two versions of the same program. Program 3 generates large characters in mode Ø (up to 3Ø) of them while program 4 generates 15 large colour letters, in mode 7. Both are based around the same procedure. This procedure can be used in other programs, it prints the character in A$ at X,Y on the screen, using F$ as the foreground character, and B$ as the background colour.

Program 5 generates really good patterns in mode Ø or mode 4, depending on the value in line 8Ø. It is complete with musical accompaniment.

34 Amazing Games for the 1K ZX 81

By Alastair Gourlay



This incredible collection of tested games programs shows just how flexible and exciting the 1K ZX81 can be. If you have no additional memory, you need this great new book from Alastair Gourlay, a member of the users' club from Scotland.

AMAZING GAMES FOR THE 1K ZX81 is just £3.95. Order form inside the back cover.

Programs include SUICIDE MISSION, NIAGARA, CHARIOTEER, ICBM, STOCKMARKET, OUTLAW, ALONG THE WIRE, BREAKOUT, SQUASH AND SPACE AMBUSH. As well there is information on making the most of 1K, scrolling, keyboard reading from machine code, how to emulate ON GOTO and ON...PRINT, and selective string assignment.

Rectangles

```
   10 MODE 7
   20 B$=CHR$(29+128)
   30 DIM COL$(7)
   40 FOR T=1 TO 7
   50 COL$(T)=CHR$(T+128)+B$
   60 NEXT T
   70 REPEAT
   80 PRINT TAB((RND(20)-1)*2,RND(24)-1)
;COL$(RND(7));
   90 UNTIL FALSE
```

Random Rectangles

```
    10 REM RANDOM RECTANGLES
    20 REM Copyright (C) Jeremy Ruston
    30 MODE 7
    40 IF HIMEM=31744 THEN M$="B" ELSE M$
="A"
    50 IF M$="A" THEN MODE 5 ELSE MODE 2
    60 REPEAT
    70 IF M$="A" THEN GCOL RND(5)-1,128+R
ND(4)-1 ELSE GCOL RND(5)-1,128+RND(16)-1
    80 X=RND(1280)-1:Y=RND(1024)-1
    90 L=RND(1280)-1:M=RND(1024)-1
   100 IF X>L THEN PROCSWOP(X,L)
   110 IF Y>M THEN PROCSWOP(Y,M)
   120 VDU 24,X;Y;L;M;
   130 CLG
   140 UNTIL FALSE
   150 DEF PROCSWOP(A,B)
   160 LOCAL C
   170 C=A
   180 A=B
   190 B=C
   200 ENDPROC
```

Mode Ø Large Characters

```
    10 REM Mode 0 large characters.
    20 REM (Character gen. starts at C000
 hex.
    30 REM Copyright (C) Jeremy Ruston 19
82
    40 MODE 0
    50 REM Redefine 'HASH' to be a ball.
    60 VDU 23,35,&3C,&7E,&FF,&FF,&FF,&FF,
&7E,&3C
    70 PRINT TAB(0,1);STRING$(30," ");TAB
(0,0);
    80 INPUT "Enter a phrase of 30 charac
ters, or less"'P$
    90 IF LEN(P$)<30 THEN P$=P$+" ":GOTO
90
   100 FOR X=0 TO 72 STEP 8
   110 FOR Y=0 TO 16 STEP 8
   120 L$=MID$(P$,1+(Y/8)*10+(X/8),1)
   130 PROCBIGGY(L$,X,Y,"#"," ")
   140 NEXT Y,X
   150 END
   160 REM This procedure can be used in
other programs :
   170 REM It prints A$ at 8 times normal
 size, at X,Y.
   180 REM 'ON' cells will be printed as
F$, 'OFF' cells
   190 REM as B$.
   200 DEF PROCBIGGY(A$,X,Y,F$,B$)
   210 LOCAL ROW,V,COL
   220 FOR ROW=0 TO 7
   230 PRINT TAB(X,Y+ROW);
   240 V=?((ASC(A$)-32)*8+&C000+ROW)
   250 FOR COL=7 TO 0 STEP -1
   260 IF (V AND (2^COL))=2^COL THEN PRIN
T F$; ELSE PRINT B$;
   270 NEXT COL
   280 NEXT ROW
   290 ENDPROC
```

Large Characters

```
    10 REM Colour large characters.
    20 REM (Character gen. starts at C000
 hex.
    30 REM Copyright (C) Jeremy Ruston 19
82
    40 MODE 7
    50 INPUT "Enter a phrase of 15 charac
ters, or less"P$
    60 IF LEN(P$)<15 THEN P$=P$+" ":GOTO
60
    70 FOR X=0 TO 32 STEP 8
    80 FOR Y=0 TO 16 STEP 8
    90 L$=MID$(P$,1+(Y/8)*5+(X/8),1)
   100 PROCBIGGY(L$,X,Y,CHR$(255),CHR$(12
9+(ASC(L$) MOD 7)))
   110 NEXT Y,X
   120 END
   130 REM This procedure can be used in
other programs :
   140 REM It prints A$ at 8 times normal
 size, at X,Y.
   150 REM 'ON' cells will be printed as
F$, 'OFF' cells
   160 REM as B$.
   170 DEF PROCBIGGY(A$,X,Y,F$,B$)
   180 LOCAL ROW,V,COL
   190 FOR ROW=0 TO 7
   200 PRINT TAB(X,Y+ROW);
   210 V=?((ASC(A$)-32)*8+&C000+ROW)
   220 FOR COL=7 TO 0 STEP -1
   230 IF (V AND (2^COL))=2^COL THEN PRIN
T F$; ELSE PRINT B$;
   240 NEXT COL
   250 NEXT ROW
   260 ENDPROC
```


GETTING ACQUAINTED WITH YOUR ACORN ATOM (184 pages, 80 programs)

This is it. The book every Acorn Atom owner has been waiting for. A host of programs, with detailed, clear explanations of how they were written; chapters on arrays and strings; PEEK and POKE; mastering the graphics; Atomic logic; and much more.

Programs in this great book include *TWENTY ONE, GRAND PRIX SPECIAL, MORDE-CHAI-MIND, LABYRINTH, MYSTICO, LIFE, BREAKOUT, MALACHI, TARTAN ARMY, SWAPPO, CHUCK-A-LUCK, SEVENTH HEAVEN, CRAPS, REVERSI . . . and more!*

An important chapter GETTING TO GRIPS WITH ASSEMBLER tells you what Assembler is, how and where to use it, and how to make the best use of the Assembler material in your Acorn manual. You'll also read about keyboard scans, PLOT and much more.

GETTING ACQUAINTED WITH YOUR ACORN ATOM, by Trevor Sharples and Tim Hartnell is just £7.95, and is the one certain way to ensure you make the most of your Atom computer. Introduction by John Galt.

Order form is inside the back cover.

Patterns

```
   20 REM Copyright (C) Jeremy Ruston 19
82
   30 REM *** Assemble sound assembly la
nguage ***
   40 PROCASS
   50 REM *** Set TIME, which counts in
0.01 secs, to zero ***
   60 TIME=0
   70 REM *** To run in MODE 0, set 'mod
e' equal to zero ***
   80 mode=4
   90 IF mode=4 THEN step=4 ELSE step=2
  100 MODE mode
  110 FOR X=0 TO 1279 STEP step
  120 Y=SIN(RAD(X))*X/4
  130 REM *** Generates a new sound in p
roportion to curve ***
  140 PROCSOUND((X/step) MOD 3,ABS(SIN(R
AD(X))*255),15)
  150 FOR G=-300 TO 1100 STEP 200
  160 IF TIME>100 THEN PROCCHANGE
  170 MOVE X,G+Y
  180 DRAW X,G+Y+X/6.4
  190 NEXT G
  200 NEXT X
  210 REPEAT
  220 IF TIME>100 THEN PROCCHANGE:PROCSO
UND(RND(3)-1,RND(255),15)
  230 UNTIL FALSE
  240 DEF PROCCHANGE
  250 LOCAL C,D
  260 C=RND(7)
  270 REPEAT
  280 D=RND(7)
  290 UNTIL D<>C
  300 VDU 19,0,C,0,0,0,19,1,D,0,0,0
  310 TIME=0
  320 ENDPROC
  330 DEF PROCASS:DIMZ%30:P%=Z%:[OPT 0:P
HP:LDY#&FF:SEI:STY&FE43:STA&FE4F:INY:STY
&FE40:LDY#&10:.WAIT DEY:BNE WAIT:LDY#&08
:STY&FE40:PLP:RTS:]:ENDPROC
  340 DEFPROCC(C%) A%=C%:CALLZ%:ENDPROC
  350 DEF PROCA(CH%,AT%) PROCC(&80+CH%*3
2+31-AT%):ENDPROC
  360 DEF PROCF(CH%,FR%) PROCC(&80+CH%*3
2+(FR%MOD16)):PROCC(FR%/16):ENDPROC
  370 REM *** PROCSOUND generates a soun
d in channel CH% of volume AT% ***
  380 REM *** and frequency FR%.   Chann
el 3 generates noise, not pure tones ***
  390 DEF PROCSOUND(CH%,FR%,AT%):PROCA(C
H%,AT%):PROCF(CH%,FR%):ENDPROC
```

PASCAL FOR HUMAN BEINGS:

Jeremy Ruston's first book - Pascal for Human Beings - has just been published by INTERFACE. The book contains a 12K compiler, dumped from the BBC Micro, which will run on most microcomputers using Microsoft.

The compiler will convert a Pascal program into its BASIC equivalent.

Contents of this fine new book:

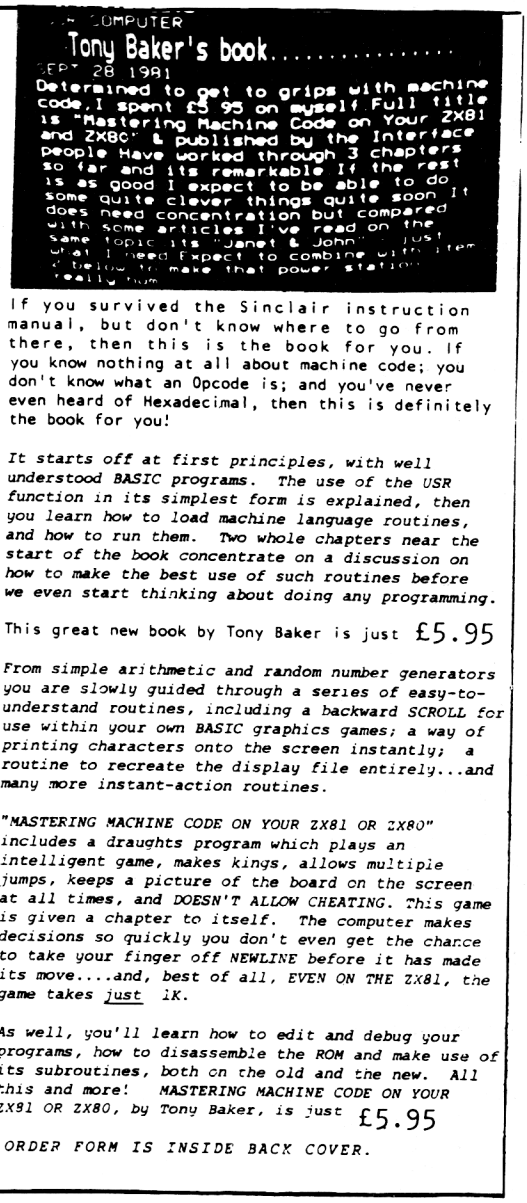
- Simple Pascal programs
- How numbers work
- Variables (simple types)
- CHAR type variables and CONSTants
- Rudyards bit (IF)
- Standard functions
- FOR loops
- REPEAT UNTIL loops
- WHILE loops
- Arrays
- The CASE statement
- The TYPE declaration
- User defined functions
- User defined procedures
- The 12K compiler

You can order PASCAL FOR HUMAN BEINGS using the form inside the back cover.

ZX81 CONSTRUCTION PROJECTS

Another new book from INTERFACE this month is written by Stephen Adams. This book -- 20 SIMPLE ELECTRONIC PROJECTS FOR THE ZX81 -- is the book for you if you hanker to build things to hook onto your computer to extend its usefulness.

Projects include a numeric key pad, score board, thermometer, burglar alarm and light pen. Details inside the back cover.



If you survived the Sinclair instruction manual, but don't know where to go from there, then this is the book for you. If you know nothing at all about machine code; you don't know what an Opcode is; and you've never even heard of Hexadecimal, then this is definitely the book for you!

It starts off at first principles, with well understood BASIC programs. The use of the USR function in its simplest form is explained, then you learn how to load machine language routines, and how to run them. Two whole chapters near the start of the book concentrate on a discussion on how to make the best use of such routines before we even start thinking about doing any programming.

This great new book by Tony Baker is just £5.95

From simple arithmetic and random number generators you are slowly guided through a series of easy-to-understand routines, including a backward SCROLL for use within your own BASIC graphics games; a way of printing characters onto the screen instantly; a routine to recreate the display file entirely...and many more instant-action routines.

"MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80" includes a draughts program which plays an intelligent game, makes kings, allows multiple jumps, keeps a picture of the board on the screen at all times, and DOESN'T ALLOW CHEATING. This game is given a chapter to itself. The computer makes decisions so quickly you don't even get the chance to take your finger off NEWLINE before it has made its move....and, best of all, EVEN ON THE ZX81, the game takes just 1K.

As well, you'll learn how to edit and debug your programs, how to disassemble the ROM and make use of its subroutines, both on the old and the new. All this and more! MASTERING MACHINE CODE ON YOUR ZX81 OR ZX80, by Tony Baker, is just £5.95

ORDER FORM IS INSIDE BACK COVER.

CLASSIFIED ADVERTISEMENTS:

You can advertise in INTERFACE. Personal ads (selling off unwanted ZX80's, memory boards and the like) are £1.85 for up to 20 words, 13p each additional word. Business ads, including software and listings, are £4.75 for up to 20 words, 18p each additional word. Copy date is 15th of month preceding publication.

AT LAST! BOMBER, ASTEROIDS and PHOENIX for the 16K ZX81 from IRAS SOFTWARE, only £5 each. BOMBER features five stages with machine code subroutines. Send cheque or P.O. to I. Robinson, 2 Colville Road, Wallasey, Merseyside, L442AS.

INDEXED WALLETS for eighty 10" ZX81 PRINTER LISTINGS, enclosed in hardcovered binder. £4.50 plus £1.00 p & p. Wysdale 36, Poole Park Road, St Budeaux, Plymouth.

GOOD, CHEAP ZX81 listings for sale. Games and educational programs included. Send SAE for details to 19 Hockley Lane, Wingerworth, Chesterfield.

3K RAM BOARD, 1K fitted. Much ZX software for sale. Original tapes/listings/books. Richard van Woerden Kegworth 3465.

MOON PROGRAM- produces full lunar details of position and phase for any hour of any day. Suitable for ZX81 with 16K. Send cheque for £6 to J S Coombes, 97 Hollyfast Road, Coventry, CV6 2AE. Money-back guarantee.

ZX81 (Sinclair built), 16K RAM, P.S.U., leads etc. £100. Contact Geoff Williams, 15 Kersland Street, Glasgow, G12 8BW

ZX81 HEX monitor. As seen at the ZX Microfair. The easiest way to enter, edit, debug machine code programs. M/c subroutines in BASIC programs are easy. Functions include EDIT, TABULATE, INSPECT/MODIFY REGISTERS, SEARCH, COPY. Occupies 2K m/c, needs 16K. Well worth £5. Sae please for details to D P AKNAI, 117 HAZELDELL, WATTON-AT-STONE, HERTFORD, SG14 3SP

For 16K ZX81: BOMBER, ASTEROIDS, PHOENIX -- and now -- MISSILE COMMAND. All with machine code subroutines and high scores from IRAS SOFTWARE. All games sold on quality cassette for only £5 each. All cheques/po to Mr I Robinson, 2 Colville Road, Wallasey, Merseyside, L44 2AS

NUMBERS: Competent person wanted to solve number problem from limited information. Special programs for ZX80/81 also wanted written from time to time. Generous fees given. Tom Cullen, 12 Islandbridge Court, Dublin 8.

BEHIND THE SCENES - WITH MARK CHARLTON

I've discovered that Tim Hartnell, who always keeps things pretty close to his so-called chest, is editing a magazine for the Computing Today people which is all about ZX computers. Called ZX COMPUTING, the new magazine is very thick (like Tim), around 120 pages, will be all glossy and colourful, and is intended to come out as a quarterly. It will be available before the next Microfair, and you'll be able to get it at Smiths and all the usual places. Tim is looking even more harrassed than normal getting the first issue together. I believe there are at least two machine code articles, a host of programs for ZX80, 1K ZX81 and 16K ZX81 as well as book, hardware and software reviews. All the ZX81 programs have been dumped straight from the printer. They'll all run, without modification. There's also a major article on ways of getting moving graphics on the ZX81 in BASIC. The new magazine is called ZX COMPUTING and is out in a few days. Whatever you do, don't tell Tim I told you.

Mark Charlton

MARK CHARLTON (author of THE GATEWAY GUIDE TO THE ZX81 AND ZX80)

JOIN THE USERS CLUB AND MAKE SURE YOU GET NEXT MONTH'S INTERFACE

Special book offer - members only - see below for details

I own ( )a ZX80 ( )a ZX81 ( )an Acorn Atom (( )a BBC Microcomputer

Please register me as a member of ( ) The National ZX80 and ZX81 Users' Club
( ) The Independent Acorn (Atom/BBC) Users' Group

Please send me:

( ) The next 12 issues of INTERFACE.. I enclose £9.50 (UK), £12.50 (Europe), £16 (other)
( ) THE EARLY DAYS - a reprint of Interface one to four, ZX80 only - £2.50

Back issues for the following months (all others sold out):
( ) Jan 81 ( ) Feb 81 ( ) Mar ( ) April ( ) Sept ( ) October
( ) Nov ( ) Dec ( ) Jan '82 ( ) Feb '82

BOOKS:
( ) Getting Acquainted with your ZX81 - Tim Hartnell - 128 pages - includes Word Processor, Draughts, 80 programs in all - £4.95
( ) Mastering Machine Code on Your ZX81 or ZX80 - Tony Baker - 180 pages - £5.95
( ) The Gateway Guide to the ZX81 and ZX80 - Mark Charlton - 180 pages - £5.95
( ) Getting Acquainted with your ZAcorn Atom - Hartnell, Sharples - 180 pages - more than 70 programs - £7.95
( ) 49 Explosive Games for the ZX81 - edited Tim Hartnell - £5.25
( ) 34 Amazing Games for the 1K ZX81 - Alastair Gourlay - £3.95
(programs for both above books dumped direct from printer)
( ) Pascal for Human Beings - Jeremy Ruston - £6.45
( ) 39 Tested Programs for the Acorn Atom (The best of Interface) - £6.45 non-members - £3.20 members
( ) Symphony for a Melancholy Computer - 20 games for the Vic 20 - all dumped direct from the printer - £6.95
( ) 20 Simple Electronic Projects for the ZX81 - Stephen Adams - £6.95
( ) Getting Acquainted with Your Vic 20 - Tim Hartnell - £5.95
( ) The soul of a new machine - £7.50

Interface,
44 - 46 Earls Court Road,
London W8 6EJ

Please send me the indicated items. I enclose a cheque for £____, being total cost of items indicated above, less 10 per cent if I am a member, plus 30p per item (not needed for INTERFACE magazine) for post and packing.

Name _____

Address _____

_____

Deduct 10 per cent if you're a club member and are ordering before April 7. Book prices rise next month.

----------please send this page or a copy----------

Contents of INTERFACE not attributed to others
copyright (c)
Tim Hartnell 1982

Practical Computing and Your Computer present...

THE Computer Fair

Personal computers
Home computing
Small business systems

April 23-25, 1982
Earls Court, London

Friday & Saturday: 10am – 6pm
Sunday: 10am – 5pm

Admission £2.00 adults
£1.00 children under 16.

At The Computer Fair you can see and compare an enormous range of personal and home computers. Find out what they can do and which one would suit you best. Talk to the experts and discover for yourself how much – or how little – you need to spend. Choose from an amazing abundance of software programs and packages, cassette units, VDU terminals and scores of computer games.

Swap your views and know-how with hundreds of other home computer enthusiasts – and find out a whole lot more from computer professionals.

Plus – The Micro Mouse Contest.

Come and watch the incredible ingenuity of computer controlled "mice" and how they find their way (or not!) to the centre of a maze. The knockout heats and the Euromicro British Final can all be seen at The Computer Fair!

Bring the whole family – don't miss this opportunity of bringing computers into your everyday life.

INFORMATION TECHNOLOGY

Bringing computers to everyday life