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Personal Computing Today

February 1984
80p

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Software Reviews: Games Galore for you to play



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Personal Computing Today

VOLUME 2 NUMBER 7 FEBRUARY 1984

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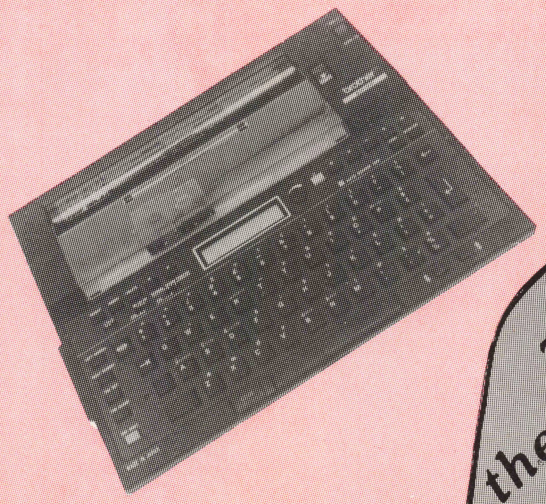
Greetings and welcome to this February issue of *Personal Computing Today*. You will note from the address on this page that the hardworking editorial staff have been moved to new brighter and roomier premises in Golden Square, from where we hope to produce an even better value-for-money magazine. So note down this address and use it for all future correspondence with us. We hope to be hearing from a lot of you this year, both with news and views and with program submissions — send us anything and we promise to give it fair consideration.

This month we have two hardware reviews for you. We had great fun testing out the Brother EP-22 typewriter/printer which got appreciative comments from many of the staff. We also took a long hard look at the latest Memotech offering, the larger of the new MTX series machines, the MTX512. Turn now to these sections to get the low down on what's new on the home computer scene.

A special feature this month is a Readers' Survey which we are carrying out in conjunction with a research student at Heriot Watt University. All of us interested in home computing should be fascinated by the state of the industry past, present and future. However, accurate facts can only be obtained from the people who actually own and use the micros, i.e. you. So, you would be doing a great service both to yourselves, by letting us know exactly what you want from the magazine, and to the science of computing by completing this quick and simple questionnaire and sending it off to our editorial offices at the earliest opportunity.

Also this month we have an extended software review section containing more than twenty write ups on the good and not so good sofware currently available; games and utilities can be found in the two review sections. So, if you've money to spare or are just interested in what's available turn now to one of these two special sections.

Finally, we have plenty of programs for you to type in and run, so without further ado, turn to the pages of your choice and have fun!



Turn over the page for a full contents list of this issue.



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Good and bad, we bring you the latest information on the computing scene.

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Missile Attack 13
Use your computer to play at being Superman in this game defending cities from destruction.

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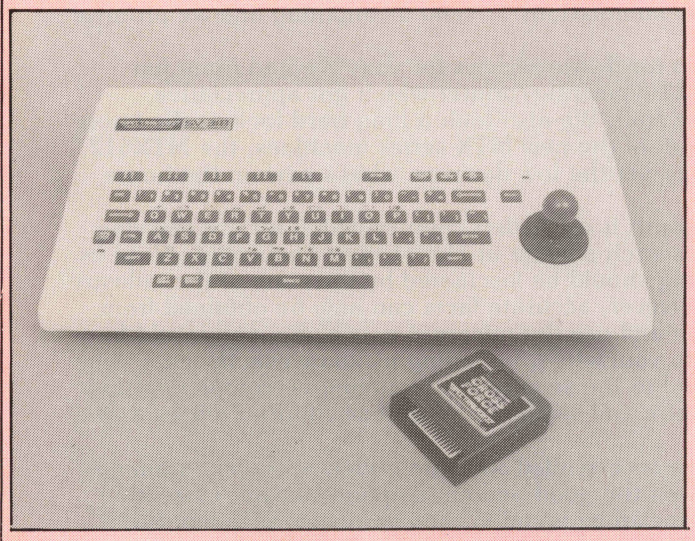
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Magic Micro Mission 25
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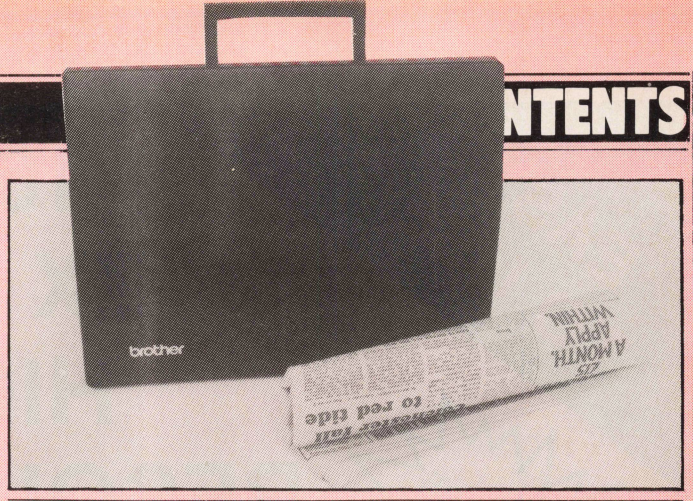


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Memotech MTX 512 microcomputer 48
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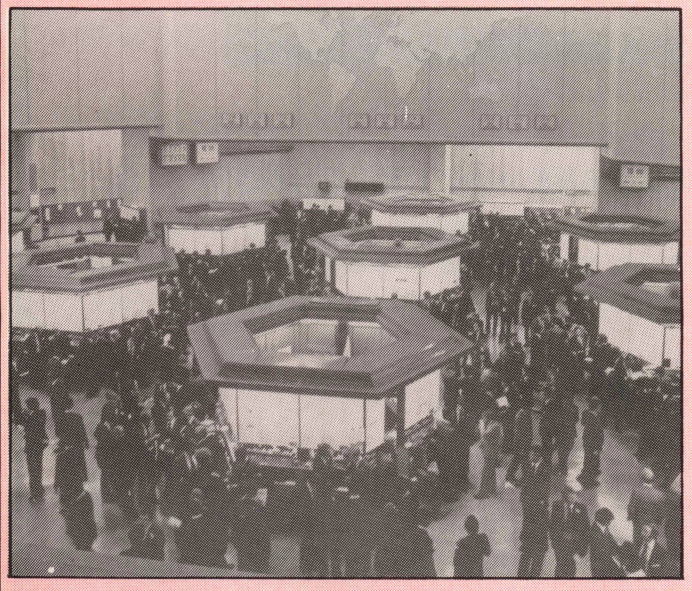
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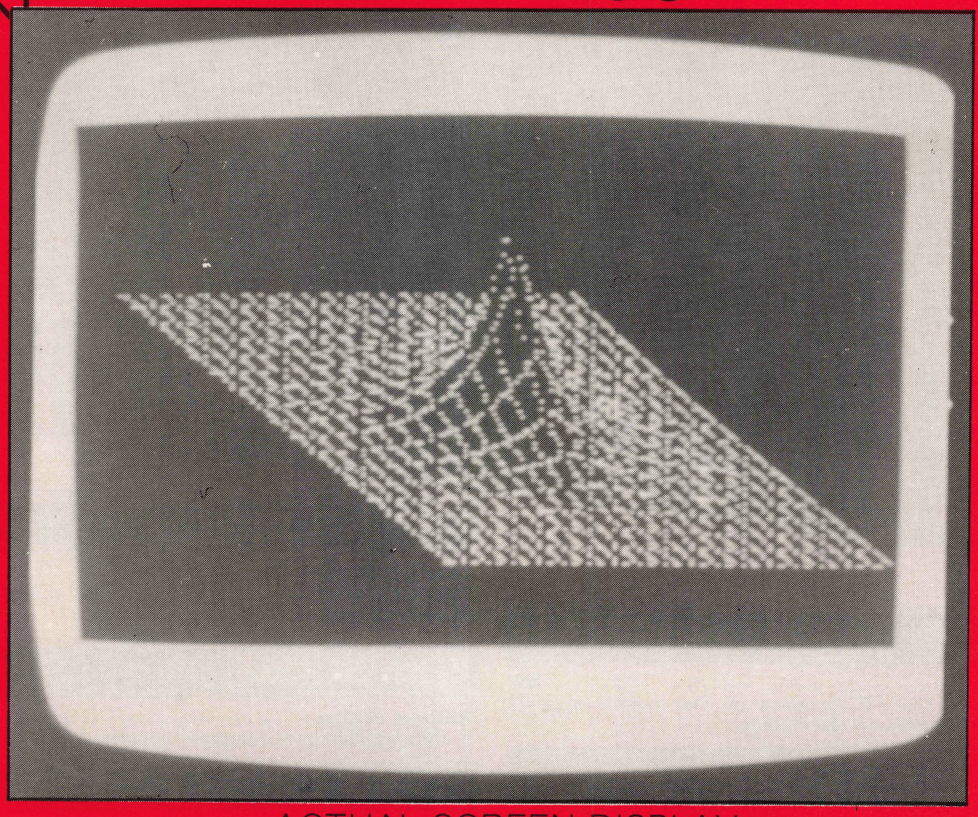
Software Checklist 93
This month the checklist features software buys for the Atom, Dragon, Sharp, Oric, and Sinclair machines.

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Initially designed for use with identical computers, i.e. ZX81 to ZX81 or Spectrum to Spectrum the new Micro-Myte 60 CAN NOW be used to interface the ZX81 to the Spectrum and vice versa, by using the appropriate interface software which is available as an optional extra. (Limited to resolution of 64 x 32 for screen contents in black and white only and selected data.)

The Micro-Myte 60 is simple to operate and utilises the computing power of the host machine to the full, eliminating costly hardware and the need for a separate power supply.

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The price includes the modem, ZX81 and Spectrum software on cassette, connection cable and operating instructions, with a 12 month guarantee.

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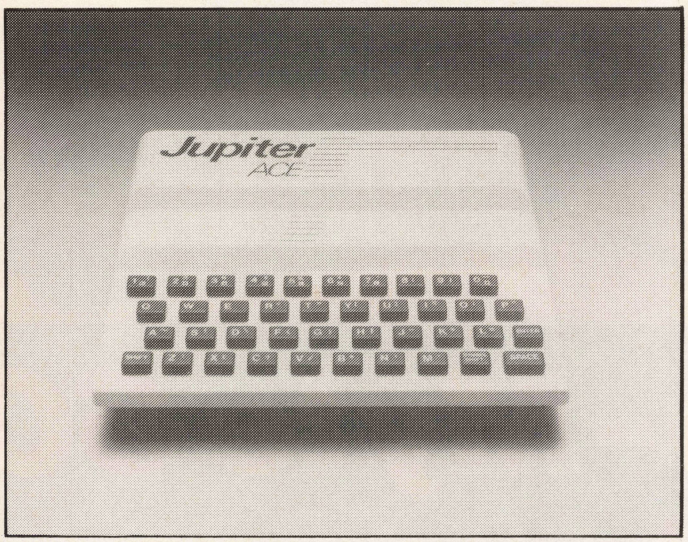
NEWS NEWS NEWS

Jupiter Cantab Duped by Non Payment of Orders

As you will have heard Jupiter Cantab have gone out of business. At the Meeting of Creditors held in November the following reasons were given for the necessity of this action.

Large orders had been placed for the Jupiter Ace home computer, which used a sophisticated and user-friendly version of the FORTH language, and problems of cash flow arose when these orders were cancelled or not paid for. The consequent loss of cash restricted the Company's research and, not surprisingly in such a rapidly advancing field as home computers, they were unable to keep pace with the market.

It is always sad to hear of companies going under. With the present frantic race to make niches in the home computer market, we can only expect more situations like this.



Brainwave for Newbrain

At last I am happy to be able to report a business story with a happy ending. Amongst the sinking home computer manufacturers one company has been given a reprieve.

Newbrain, the computer manufactured by Grundy Business Systems has been rescued from obliteration by the timely purchasing of the company by Tradecome International B.V. This organisation has appointed the aptly named Brainwave Software Company to act as its UK distributor of the Newbrain. The contact address is 2-3 Belchamp Road, Tilbury-Juxta-Clare, Nr Halstead, Essex. Tel: (0787 237831).

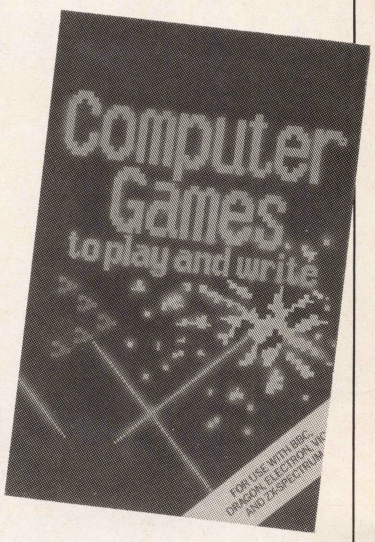
Maintenance service for the BBC Micro

A special low cost on-site maintenance service is being offered through Acorn dealers or directly from the company concerned, DDT Maintenance Ltd of Birmingham. The £50 annual fee entitles BBC users to a 24 hour engineer response in the event of a fault arising. A further £25 a year will cover you for a replacement machine should the repairs on your own micro need to be completed in DDT's workshop.

Sounds like a good idea? Then contact DDT on 021 459 5959.

Compendium of Computer Games

A new book from Arrow promises hours and hours of entertainment for the computer enthusiast. 'Computer Games to Play and Write' by Dan Isaaman, now a first year Computer Engineering student at Manchester University, has a striking cover and is packed to the gunnels with games to play and write. Published by Arrow Books, this value for money paperback costs £1.50 and is available from leading booksellers and some computer stores.



T.I. Reassurance

Following the many rumours that Texas Instruments too bite the dust, the European Consumer Division Marketing Manager has given the following reassurance to existing users and retailers.

"It is understandable that existing users and potential purchasers of the TI 99/4A Home Computer will be concerned about continuining availability of software, peripherals and service facilities. Regarding software, we have examined our existing stocks and are confident that we shall have sufficient to meet market demand into the forseeable future both for existing titles and many of those recently announced. Supplies of TI peripherals are limited but numerous third parties both in Europe and the U.S. supply products which are compatible with the TI 99/4A.

"As for service, I can assure all TI 99/4A owners that T.I. will honour all warranties on the product and will continue to provide out-of-warranty service facilities for an indefinite period."

Software Editor at Saturation Level

Since the December issue, in which we put out a call for software reviewers, hit the streets our editorial offices have been flooded with letters from hopeful readers offering their services.

We never expected to discover so many of you had literary ambitions. Or was it the lure of free software which promted you to put pen to paper and to tell us many interesting facts about yourselves and your machine? I wonder!

Anyway, thanks very much for taking the trouble to write. Since the response was so overwhelming, we have to disappoint about 90% of the people who wrote in. Our apologies for this but even the present glut of software houses couldn't hope to supply all of you with programs to review.

NEWS NEWS NEWS

Computers to obey the spoken command!!

Orion Data Limited, a Brighton based company, with a high technological base, have produced a computer add-on claimed to be the first of its kind in the world.

'Micro Command' translates spoken commands into signals which can then be recognised and acted upon by the computer. In order to recognise different accents, pitch and pronunciation, a 'voice print' is taken of each new operator.

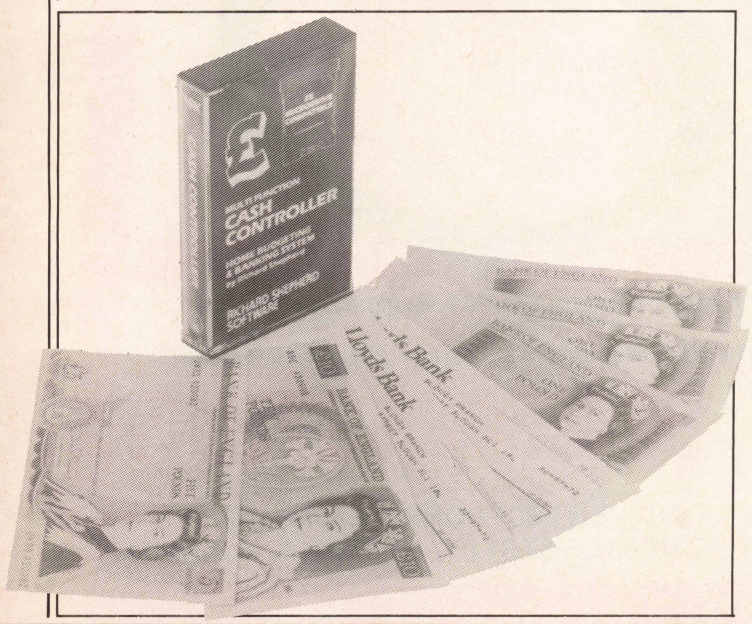
It is intended that this voice recognition unit be used to replace the conventional joystick control in computer games. Whether or not it can translate the commands quickly enough remains to be seen!

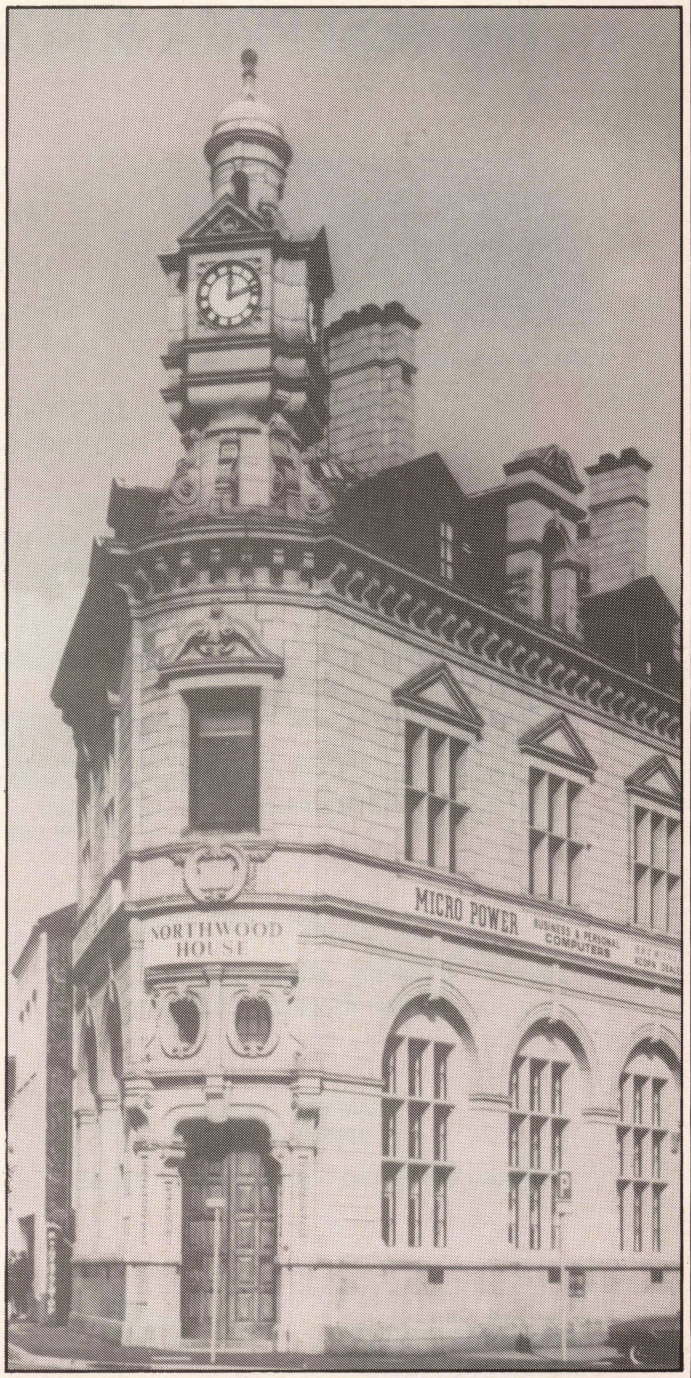
Initially to be launched for the Spectrum, there are plans to produce versions for the other home computers soon. Recommended retail price is £49.94 which includes the unit, instruction leaflet, microphone and cassette. Further information from Orion Data Ltd 0273 672994.

Cash Controller

Richard Shephard Software have launched a Cash Controller program to load with the newly introduced ZX Microdrive. This professional style program has a "Save to ZX Microdrive" option in the main menu. This obviously allows the user to save the program onto a blank microdrive cartridge when supplies are more easily available.

Cash Controller is a home budgeting and banking system which can handle up to 400 transactions, automatically allocated against 16 selected budget headings such as rates, gas etc. The program gives statements on request, a standing order facility, single item search plus full budget analysis, and all these protected by a personal security password, which even your bank cannot now ensure. The program costs £9.95 and is available by mail order or from most leading computer stores. Richard Shepherd Software, Elm House, 23-25 Elmshott Lane, Cippenham, Slough. Tel: (06286) 63531.





Power to the North

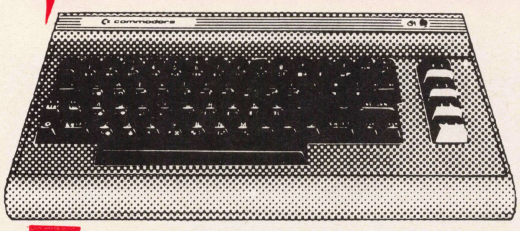
Micro Power, one of the leading producers of software catering for the home computer market have moved into grand new premises in the centre of Leeds.

The new store contains two showrooms, an extensive technical department and two floors of offices. Product support, an important facility when choosing software, is catered for in the technical Department with facilities and space for extensive soak-testing (no, water-proofing has not yet reached the software scene), as well as sophisticated fault finding equipment. Their new address is Northwood House, North Street, Leeds LS7 2AA. Tel: (0532) 458800.

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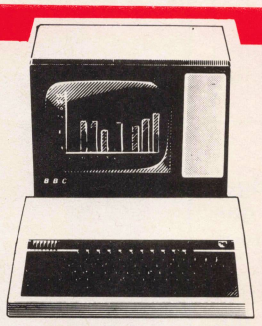
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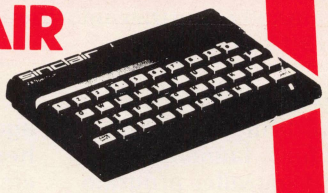
BBC

BBC Model B – £399.00
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Disk S/S 100k – £265.00
Disk Interface – £100.00
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1.2k ROM – £11.50
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(inc. £1000 FREE software)



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BBC Econet system

SINCLAIR



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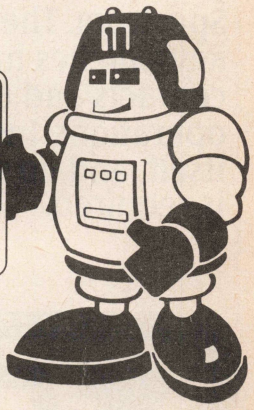
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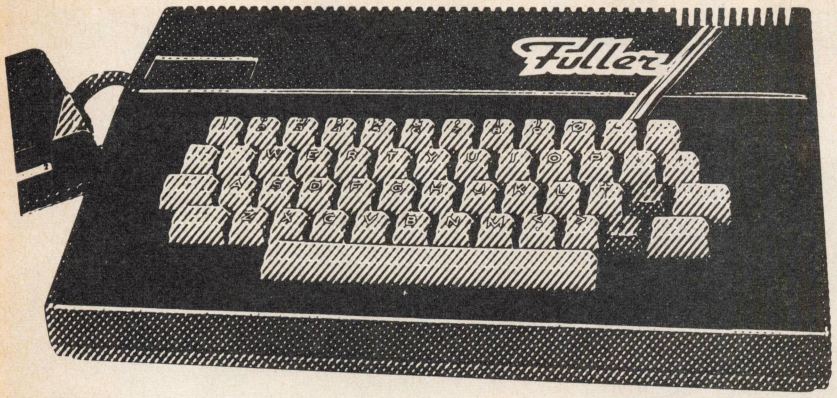
The Daventry Computer Centre
67 High St., Daventry.
Telephone: Daventry (03272) 78058

The Newbury Computer Centre
47 Cheap Street, Newbury.
Telephone: Newbury (0635) 41929

Please Note: While Microstyle will endeavour to maintain sufficient stocks of items currently or previously advertised we regret that all items are offered for sale subject to availability from manufacturers.

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THE NEW FDS for the SPECTRUM, ZX81, LAZER 200, JUPITER ACE,

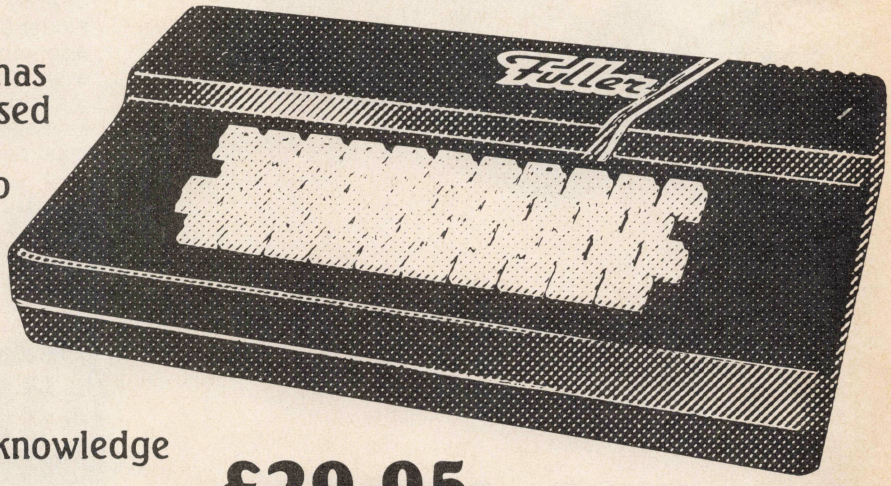
This elegant desk top system, designed for the professional user. In its slimline case, the superior keyboard contains all the graphic characters for the above computers. With the additional function keys and SPACE-BAR, speedy and accurate data entry is made simple. The Fuller FDS is easy to install, based on the very popular FD42 system, it requires no soldering or technical knowledge. For the user who is reluctant to install his computer circuit board inside the FDS a buffer is available (at extra cost) which simply plugs onto the expansion port and connects directly to the keyboard.
The FDS is now Microdrive compatible.

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Firmly established in the development of computer hardware, the acknowledged leaders in their field, the vast range of Fuller experience is available to you through their comprehensive selection of accessories. This ever expanding range make Fuller the natural extension for your Computer.

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For the ZX81 or Spectrum. The FD42 has long been a best seller, the unit, housed in an attractive A.B.S. plastic case, transforms the Sinclair computer into a useful professional unit, providing graphic characters for the ZX81 or Spectrum. The full travel keyswitches have gold plated contacts and are guaranteed for 10^6 operations. Installation is simplicity itself, and no soldering or technical knowledge is required.



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RS 232 PRINTERFACE £34.95
Rom based software. Versatile printer interface. Comes complete with instructions and lead.

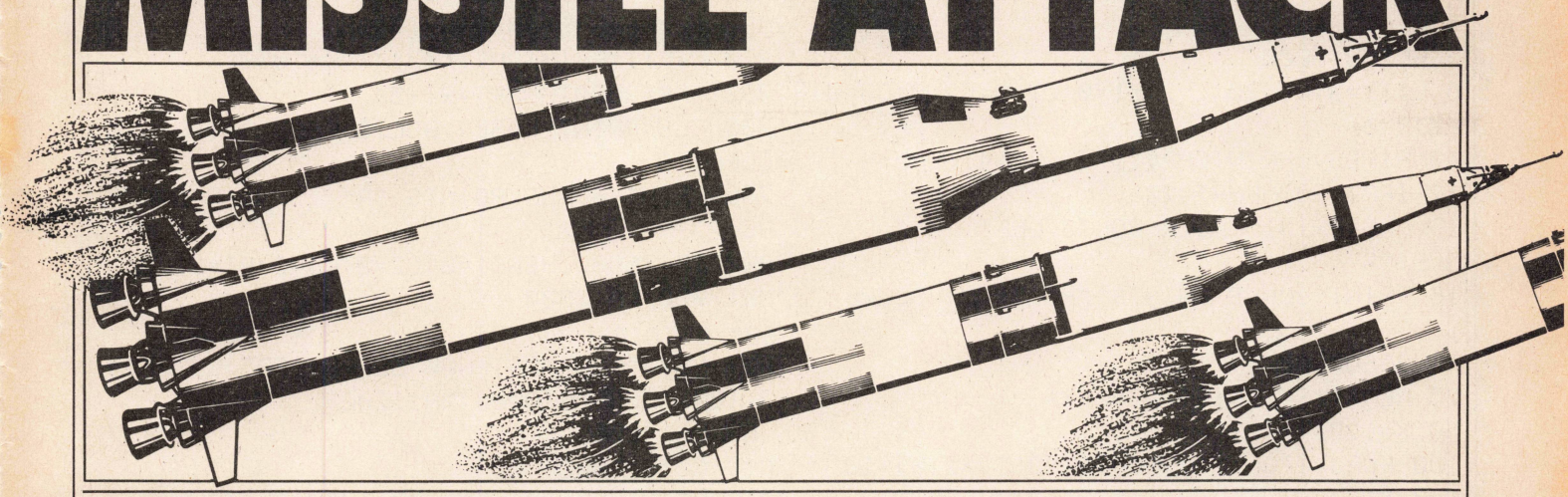
CENTRONICS PRINTER FACE £39.95 80p P&P
As above but for parallel printer with CENTRONICS input (leads can be supplied at an extra cost)

DUAL PRINTERFACE Features both RS 232 and CENTRONICS INTERFACE £49.95 80p P&P

Fuller Micro Systems
The ZX Centre, 71 Dale Street,
Liverpool 2. Tel: 051-236 6109.

SOFTWARE

MISSILE ATTACK



Lawrence Lynch puts you in charge of the Combat computer engaged in saving cities from death and destruction.

You are hidden deep underground manning your combat computer. The alarm sounds and your screen flashes up with an imminent air raid warning. Switching quickly to defence mode, you are presented with a graphic simulation of the three cities it is your duty to defend.

As the enemy missiles descend towards the cities you must intercept them with your automatic range-finder and release a destructive laser bolt. Surviving three attacks (3000 bonus) will earn you 5 laser bolts to replenish your dwindling reserves. Surviving six attacks (6000 bonus) will promote you to defend three new cities (i.e. replacing any lost) and reset your lasers to maximum (20 bolts).

WARNING At any moment a missile may release an aerial bomb which will destroy a city if it explodes over it. It should also be noted that should the gunsight be moved off the edge of the screen it will re-appear on the opposite side.

HOW IT RUNS

Line 0	Gosub Instructions
Line 3	Gosub redefined characters
Line 6	Initialise variables
Lines 25-250	Set start co-ordinates for missiles.
Lines 300-750	Nain Loop.
Line 420	Z = Random aerial bombs.
Line 460	Checks if aerial bomb is over city.
Line 640	Sets gunsight.
Lines 660-690	Allow gunsight to disappear off one side of the screen to re-appear opposite.
Line 770	Increments incoming missiles.
Lines 900-920	Explode missile when hit.
Lines 1000-1210	Explode city if missile hits.
Lines 1500-1550	Erase laser explosions.
Lines 1900-2450	Move gunsight.
Lines 4000-4350	Fire laser.
Lines 4990-5390	Draw landscape and delete cities hit.
Lines 6000-8030	Explode city if hit by bomb.
Lines 10000-10030	Place text on HI RES screen.
Lines 11000-12000	End game or replay: HS = Hi-score.
Lines 12000-12085	Instructions.
Lines 13000-14000	Hi-score and music.
Lines 14000-14090	Low score music.
Lines 14090-16000	Redefining graphics.
Lines 16000-16160	Set colour.

HINTS ON CONVERSION

Apart from the music and sound commands and screen co-ordinates which will have to be altered to suit other micro's, the Oric uses microsoft BASIC which should make it relatively easy to convert.

As the program was written on a 48K Oric, 16K Oric owners will have to change the POKES in Lines 15000 & 15020 from 46080 to 13312. Other micro owners wishing to convert the program will have to redefine their own graphics.

Variables used

CI	Cities
C1	City 1
C2	City 2
C3	City 3
HS	H1-Score
S	Score
R	Bonus Points Z1
Z1	No. of missiles destroyed.
L	No. of missiles on screen.
X,Y	Co-ordinates of Gunsight.
L(J), Y1(J), KL(J)	Co-ordinates of missiles.
Z	Generate random aerial bombs.
MM	Detects when laser fired.

ORIC

MISSILE ATTACK

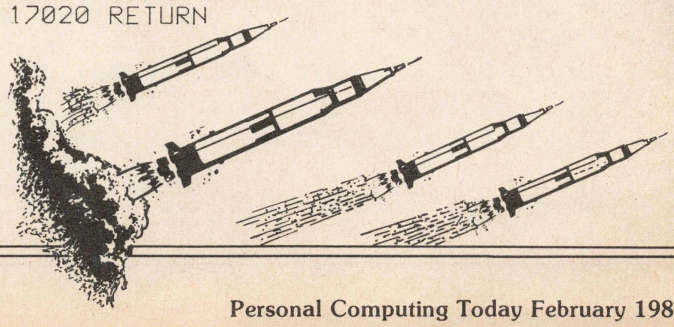
PROGRAM LISTING

```
0 PRINTCHR$(6)%CLS:PAPER4:INK3:GOSUB1200
0
3 GOSUB15000
6 CITY=3:RT=20:L=2:Z1=0:C1=0:C2=0:C3=0:S
=0:R=0
10 HIRES: PRINTCHR$(17):IFL>4THENL=4
12 IFRT>20THENRT=20
15 CLS:PRINT"LASER BOLTS LEFT "RT"    SC
ORE "S
16 PRINT"BONUS POINTS "R"    HI SCORE "H
S
20 GOSUB5000
25 REM***SET MISSILES ***
50 X=120:Y=100
100 FORJ=1TOL:L(J)=INT(RND(1)*210)+13
150 Y1(J)=INT(RND(1)*30)+8:KL(J)=1
250 CURSETL(J),Y1(J),KL(J):DRAW2,2,1:NEX
TJ
280 REM*** MAIN LOOP ***
300 REPEAT
350 FORJ=1TOL:Y1(J)=Y1(J)+3:L(J)=L(J)+3
355 IFKL(J)=0THENZ=0:GOTO650
357 IFMM=1THENGOTO360
359 CURSETX,Y,3:CHAR98,0,0
360 IFL(J)=>228THENL(J)=19
370 IFL(J)>=36ANDL(J)<=70ANDY1(J)=>157TH
ENGOTO1000
380 IFL(J)=>106ANDL(J)=<140ANDY1(J)=>157
THENGOTO1100
390 IFL(J)=>172ANDL(J)=<206ANDY1(J)=>157
THENGOTO1200
400 IFPOINT(L(J),Y1(J))=-1THENEXPLODE:Z1
=Z1+1:GOSUB900:KL(J)=0
420 IFY1(J)>40ANDY1(J)<167THENZ=INT(RND(
1)*100)
455 IFZ=5ORZ=20THENFORA=1TO2:CURSETL(J),
Y1(J),3:DRAW0,167-Y1(J),2:N
EXTA
456 IFZ=5ORZ=20THENZAP:EXPLODE:GOSUB900
460 IFZ=5 OR Z=20THENGOTO6000
490 REM*** MOVE MISSILES ***
500 CURSETL(J),Y1(J),KL(J):Z=0:DRAW2,2,1
550 IFY1(J)=>186THENEXPLODE:GOSUB900:KL(
J)=0:Z1=Z1+1
640 CURSETX,Y,3:CHAR98,0,1
650 NEXTJ:GOSUB1500
660 IFX=<20THENX=224
670 IFY=>140THENY=140
680 IFX=>225THENX=21
690 IFY=<18THENY=18
700 IFC1<2THENGOTO807
750 UNTILZ1=>L
760 Z1=0:SS$="BONUS1000":CURSET70,95,3:G
OSUB10000:S=S+1000:WAIT100
770 L=L+1:PRINTCHR$(17):R=R+1000
780 IFR=3000THENRT=RT+5
790 CLS:PRINT"LASER BOLTS LEFT "RT"    S
CORE "S
795 PRINT"BONUS POINTS "R"    HI SCORE "
HS
800 IFR=6000THENC1=0:C2=0:C3=0:RT=20:GOS
UB17000:WAIT300
806 GOTO10
807 SS$="YOU MUST NOW SURRENDER":CURSET4
3,100,3:GOSUB10000:WAIT200
:GOSUB14000
808 GOTO11000
810 PRINTCHR$(6):PAPER7:INK0:CLS:END
900 FORW=1TO6:CIRCLEW,1:NEXTW:FORW=1TO8:
CIRCLEW,0:NEXTW
905 IFZ=5ORZ=20THENRETURN
910 IFY1(J)<148THENS=S+100:CLS:PRINT"LAS
ER BOLTS LEFT "RT"    SCORE
 "S
915 IFY1(J)<148THEN PRINT"BONUS POINTS "
R"    HI SCORE "HS
920 RETURN
1000 IFC1=1THENGOTO500
1001 C1=1:CITY=CITY-1:Z1=Z1+1:EXPLODE:KL
(J)=0
1005 C=1:FORA=1TO2:FORP=1TO25:CURSET54,1
74,0:CIRCLEP,C:NEXTP:C=0:NE
XTA
1010 GOTO650
1100 IFC2=1THENGOTO500
1101 C2=1:CITY=CITY-1:Z1=Z1+1:EXPLODE:KL
(J)=0
1105 C=1:FORA=1TO2:FORP=1TO25:CURSET126,
174,0:CIRCLEP,C:NEXTP:C=0:N
EXTA
1110 GOTO650
1200 IFC3=1THENGOTO500
1201 C3=1:CITY=CITY-1:Z1=Z1+1:EXPLODE:KL
(J)=0
1205 C=1:FORA=1TO2:FORP=1TO25:CURSET189,
174,0:CIRCLEP,C:NEXTP:C=0:N
EXTA
1210 GOTO650
1500 REM***ERASE EXPLOSION***
1505 IFMM=1THEN1510ELSE2000
1510 A=0:B=199:C=A+X+2:D=Y-B+3:MM=0
1520 CURSET0,199,0
1530 DRAWC,D,3
1540 FORA=1TO12:CIRCLEA,0
```

```
1550 NEXTA
1900 REM**SET AND MOVE GUNSIGHT***
2000 REM
2110 CURSETX,Y,3:CHAR98,0,1
2130 K$=KEY$:IFK$=""THENRETURN
2150 IFK$=CHR$(32)THENGOTO4000
2300 IFK$=CHR$(8)THENCHAR98,0,0:X=X-9:RE
TURN
2350 IFK$=CHR$(9)THENCHAR98,0,0:X=X+9:RE
TURN
2400 IFK$=CHR$(10)THENCHAR98,0,0:Y=Y+9:R
ETURN
2450 IFK$=CHR$(11)THENCHAR98,0,0:Y=Y-9:R
ETURN
3600 REM***FIRE LASER***
4000 IFRT=0THENRETURN
4005 A=0:B=199:MM=1:RT=RT-1
4010 CLS:PRINT"LASER BOLTS LEFT "RT"
SCORE "S
4020 PRINT"BONUS POINTS "R"     HI SCORE
"HS
4050 C=A+X+2:D=Y-B+3
4100 CURSET0,199,0:DRAWC,D,2
4150 CURSET0,199,0:DRAWC,D,2
4250 SHOOT
4300 FORA=1TO12:CIRCLEA,1
4350 NEXTA:RETURN
4990 REM *** LANDSCAPE ***
5000 FORX=187TO199
5001 CURSET0,X,1:DRAW239,0,1:NEXTX
5005 GOSUB16000
5008 REM *** MOUNTAIN ***
5009 X=13:Y=190:A=26:REPEAT
5010 CURSETX,Y,1:DRAWA,0,1
5011 X=X+1:Y=Y-1:A=A-2
5012 UNTILA=<0:IFC1=1THENGOTO5060
5020 SS$="ccccc":CURSET36,183,0:GOSUB100
00
5030 SS$="cc cc":CURSET36,175,0:GOSUB100
00
5040 SS$="cc  c":CURSET36,167,0:GOSUB100
00
5050 SS$="c   c":CURSET36,159,0:GOSUB100
00:CURMOV-5,0,1:DRAW0,-6,1
5060 X=72:Y=190:A=30:REPEAT
5070 CURSETX,Y,1:DRAWA,0,1
5080 X=X+1:Y=Y-1:A=A-2
5090 UNTILA=<0
5220 CURSET74,1,3
5230 SS$="MISSILE ATTACK":GOSUB10000:IFC
2=1THENGOTO5280
5240 SS$="ccccc":CURSET106,183,0:GOSUB10
000
5250 SS$="cc cc":CURSET106,175,0:GOSUB10
000
5260 SS$="cc  c":CURSET106,167,0:GOSUB10
000
5270 SS$="c   c":CURSET106,159,0:GOSUB10
000:CURMOV-5,0,1:DRAW0,-6,1
5280 X=140:Y=190:A=30:REPEAT
5290 CURSETX,Y,1:DRAWA,0,1
5300 X=X+1:Y=Y-1:A=A-2
5310 UNTILA=<0:IFC3=1THENGOTO5360
5320 SS$="ccccc":CURSET172,183,0:GOSUB10
000
5330 SS$="cc cc":CURSET172,175,0:GOSUB10
000
5340 SS$="cc  c":CURSET172,167,0:GOSUB10
000
5350 SS$="c   c":CURSET172,159,0:GOSUB10
000:CURMOV-5,0,1:DRAW0,-6,1
5360 X=206:Y=190:A=29:REPEAT
5370 CURSETX,Y,1:DRAWA,0,1
5380 X=X+1:Y=Y-1:A=A-2
5390 UNTILA=<0:RETURN
6000 IFL(J)>36 AND L(J)<70THENGOTO6001EL
SEGOTO7000
6001 IFC1=1THENGOTO500
6002 C1=1:CITY=CITY-1:EXPLODE
6005 C=1:FORA=1TO2:FORP=1TO25:CURSET54,1
74,3:CIRCLEP,C:NEXTP:C=0:NE
XTA
6010 GOTO490
7000 IFL(J)>106 AND L(J)<140THENGOTO7001
ELSEGOTO8000
7001 IFC2=1THENGOTO500
7020 C2=1:CITY=CITY-1:EXPLODE
7100 C=1:FORA=1TO2:FORP=1TO25:CURSET126,
174,3:CIRCLEP,C:NEXTP:C=0:N
EXTA
7110 GOTO490
8000 IFL(J)>172ANDL(J)<206THENGOTO8001EL
SEGOTO500
8001 IFC3=1THENGOTO500
8010 C3=1:CITY=CITY-1:EXPLODE
8020 C=1:FORA=1TO2:FORP=1TO25:CURSET189,
174,0:CIRCLEP,C:NEXTP:C=0:N
EXTA
8030 GOTO490
9999 REM*** PLACE TEXT ***
10000 FORI=1TOLEN(SS$)
10010 CHAR ASC(MID$(SS$,I,1)),0,1
10020 CURMOV7,0,3
10030 NEXTI:RETURN
11000 TEXT:PRINT
11005 PRINT:PRINT"   YOU HAVE SURRENDERE
D":WAIT200:CLS
11006 IFHS<STHENHS=S:GOTO13000
11020 PRINT:PRINT:PRINT:PRINTSPC(12)CHR$
(4)CHR$(27)"JYOU SCORED "S
```

MISSILE ATTACK

```
11025 PRINT:PRINT:PRINT:PRINTSPC(8)CHR$(
27)"JHIGH SCORE IS "HS;CHR$
(4)
11030 PRINT:PRINT:PRINT:PRINT"  ANOTHER
GO? (Y/N)"
11040 GET A$
11050 IFA$="N"THENGOTO810
11060 IFA$="Y"THENGOTO6
11070 GOTO11040
12000 PRINT:PRINTSPC(14)CHR$(4)CHR$(27)"
NAIR RAID"CHR$(4)
12001 REPEAT
12002 FORX=125TO80STEP-1
12003 SOUND1,X,10:PLAY1,0,0,0
12004 NEXTX:WAIT65:Y=Y+1
12007 UNTILY=4
12008 PLAY0,0,0,0
12009 EXPLODE
12026 PRINT:PRINT:PRINT"MOVE GUNSIGHT AR
OUND SCREEN USING"
12027 PRINT"CURSOR ARROWS ANY OTHER KEY
WILL FIRE"
12028 PRINT"LASER WHICH WILL INTERSECT T
HE GUN"
12029 PRINT"SIGHT AND EXPLODE."
12035 PRINT
12040 PRINT"IF A LASER EXPLOSION TOUCHES
 THE TIP"
12050 PRINT"OF A MISSILE THE MISSILE WIL
L BE"
12060 PRINT"DESTROYED AND SCORE WILL INC
REASED BY 100 POINTS"
12065 PRINT:PRINT"SURVIVING AN ATTACK WI
TH AT LEAST ONE"
12070 PRINT"CITY INTACT WILL EARN 1000 P
OINTS"
12075 PRINT:PRINT"BEWARE AERIAL BLASTS!!
!
12076 PRINT"====================
12077 PRINTCHR$(4);
12078 PRINT" "CHR$(27)"JIF TWO CITES FAL
L GAME IS OVER"CHR$(4)
12079 PRINT
12080 PRINT"      3000 BONUS POINTS GAIN
S 5"
12082 PRINT"      EXTRA LASER BOLTS (Max
 20)"
12083 PRINT"6000 BONUS POINTS GIVES A BO
NUS CITY"
12084 PRINT"AND SETS LASER BOLTS TO 20"
12085 PRINT"Press any key to start"
12090 GETB$:RETURN
13000 PRINT:PRINTSPC(8)CHR$(4)CHR$(27)"N
A NEW HIGH SCORE"
13010 PRINT:PRINT:PRINT:PRINTSPC(10)CHR$
(27)"J"HS;"POINTS";CHR$(4)
13020 A$="1536581:685631"
13030 FORJ=1TOLEN(A$)
13040 IFJ=8THENWAIT50
13050 X=ASC(MID$(A$,J,1))-48
13060 MUSIC1,3,X,0
13070 MUSIC2,4,X,0
13075 MUSIC3,5,X,0
13080 PLAY7,0,5,400:WAIT50
13090 NEXTJ
13100 WAIT150:PLAY0,0,0,0
13130 GOTO11030
13900 REM*** FUNERAL MARCH ***
14000 IFS>HSTHENRETURN
14003 A$="66669886656"
14005 FORJ=1TO11
14009 X=ASC(MID$(A$,J,1))-48
14010 IFJ=2ORJ=3ORJ=5THENWAIT40
14012 IFJ=6ORJ=8ORJ=10THENWAIT40
14030 MUSIC2,2,X,0
14040 MUSIC3,3,X,0
14050 PLAY6,0,5,90:WAIT10
14060 NEXTJ
14070 WAIT100:PLAY0,0,0,0
14090 RETURN
14900 REM*** DEFINE GRAPHICS ***
15000 FORA=0TO7:READD:POKE46080+A+(8*ASC
("b")),D:NEXTA
15010 DATA0,54,34,8,34,54,0,0
15020 FORA=0TO7:READD:POKE46080+A+(8*ASC
("c")),D:NEXTA
15030 DATA63,45,45,63,45,63,45,63
15060 RETURN
16000 REM *** SET COLOUR ***
16020 CURSET0,0,3:FILL10,1,18
16030 CURSET0,185,3:FILL15,1,18
16040 CURSET6,187,3:FILL13,1,~
16050 CURSET12,0,3:FILL10,1,0
16120 CURSET0,9,3:FILL178,2,16
16125 CURSET12,9,3:FILL178,1,1
16130 CURSET0,9,3:FILL178,1,18
16140 CURSET234,9,3:FILL178,1,18
16160 RETURN
17000 CURSET19,85,3:SS$="BONUS CITY AND
20 LASER BOLTS!"
17010 GOSUB10000:R=0:CI=3
17020 RETURN
```



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YOUR LETTERS

This page is where you get the chance to put your opinions in print. Personal Computing Today welcomes letters from you on any aspect of microcomputing and views in general — as long as they're printable!
Please drop us a line to: The Editor, Personal Computing Today, 1 Golden Square, London W1R 3AB.

Dear PCT,
After purchasing the December issue of *Personal Computing Today*, I feel I have to write in with a few criticisms. Firstly, what happened to the Oric program advertised on the cover and in the editorial?

Secondly I cannot believe 'P.W.S' review of Severn Software's Dinky Kong. I can think of many criticisms of this program, not least the fact that you have to stop the tape and type CLOAD to get the second half of the program to RUN.

My third criticism refers to the Oric entry in your Hardware Factfile. This has been inaccurate for months now — witness your own review of the Oric Printer!

Sorry if I seem to be overly critical because I generally enjoy your magazine, especially the 'Hints on Conversion' and 'How it Runs' sections of your programs. Hope the Oric program gets into the next issue and that this letter is taken as I intended it — constructive criticism (I hope!).
Yours sincerley
D L Carter
Swindon

Editor's Reply: Thank your for you letter. I'll answer your points in sequence. You weren't the only person to spot the mistake on the cover of December's PCT. I only wish we could say it was done deliberately to keep you on your toes. As it is I can only apologise to those of you who were disappointed that the promised Oric program did not appear. There is a simple explanation, and that is that the 'cover lines' have to be produced a long time before the rest of the copy. We hoped to include a program for the Oric but due to last minute technical difficulties had to miss it out of the published magazine. However, I hope you enjoyed Reversi in our January issue and there's another program, 'Missile Attack' in this issue.

As for your other comments they have been noted and the omissions from the Factfile will be rectified.

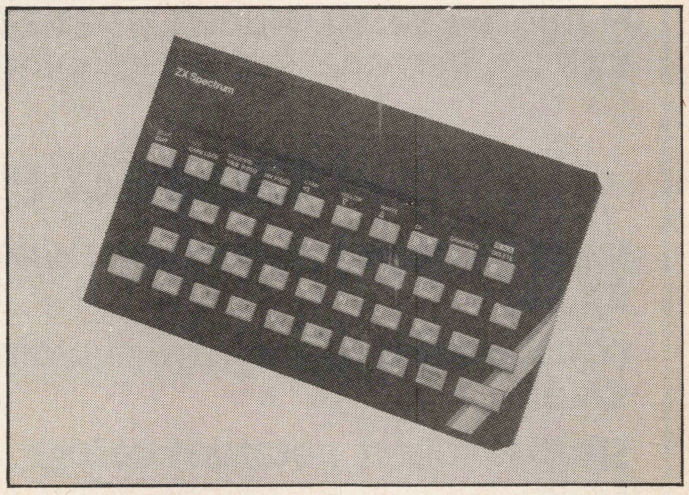
Dear PCT,
I wonder if you have heard of anyone who is using computers with mentally handicapped people. I look after five youngsters in my job and I am trying to think how computers can be used in helping them. If any of your readers have any brainwaves or if they are already putting their ideas into action, I would love to hear from them. Thank you for publishing this letter.

Editor's reply: There must be many applications of computer technology in the teaching of mentally handicapped people. Educational software for all age groups is flooding onto the market at an incredible rate. I don't know of any which is specifically geared to those people who may be slower at the learning process but would have thought that many of the programs for younger children would be suitable.

However, if any readers have more specific comments to make or help to offer, you can contact this reader at 124 Station Road, Ashington, Northumberland, NE63 8HE.

Dear PCT,
I'm writing to say how much I've enjoyed using Philip Crawley's "Spectrum Big-Screen" program which appeared in your April issue. Using a friend's borrowed 48K Spectrum, I have put the program to good use both for displays and for interactive games for my friends' children which has been lots of fun, as well as being educational.

So many thanks to Philip Crawley and to you for an interesting magazine.
Yours faithfully,
David Carr
New Zealand



Dear PCT,
No doubt many people have already informed you that the program 'CHARACTER BUILDING' for the BBC micro, published in your August issue, works better if MEM(I) in line 740 is changed to MEM(I + 1), thus:

```
740 CHAR = (CHAR-224)
*8 + &COO:FORI = OTO7:?(CHAR + I) = MEM(I + 1)
:NEXT
```

I would also like to mention some of the alterations I have made, which may be of interest to others who use

this program.
I had two main objections to the program:
1) It always expected input from a database, which had to be created in command mode and saved after the main program, and
2) The databases created by the program were always called 'DATA-1'.
I have made the following modifications to overcome these objections. I altered two procedures (PROC-finish and PROC-load), added a new procedure (PROC-database), and changed line 10 to:

```
10 DIME CODE 30
```

These procedures are now as follows:

```
1110 DEFPROC-finish
1120 COLOUR1:PRINTTAB (0,25);"Do you wish to
save database (Y/N)":PROC-answer:IF A NS$
 = "No"ENDPROC
1130 PROC-database ("S. ")
1140 COLOUR1:PRINTTAB(0,30):"Database
recorded.":VDU7
1150 PROC-delay(200):VDU12
1160 ENDPROC
1540 DEFPROC-load
1550 VDU31,0,14,133:PRINT"Do you want to load a
database (Y/N)":PROC-answer
1560 IFANS$ = "No"FOR I = OTO256:?(&COO + I)
 = 0:NEXT:ENDPROC
1570 PROC-database ("L. ")
1580 VDU31,3,17,133:PRINT"  Turn cassette
recorder off  ":VDU7,7,7:PROC-cont
1600 ENDPROC
1610 DEFPROC-database(O$)
1620 INPUT"Name of databases";N$:N$
 = O$ = LEFT$(N$,10) + "COO":IFO$ = "S.
"N$ = N$ + " DOO"
1630 $CODE = N$
1640 X% = CODE MOD256:Y% = CODE DIV256
1650 CALL&FFF7:REM OSCL1
1660 ENDPROC
```

Lines 1120,1130, and 1550-1570 have been altered, and lines 1610-1660 added. To explain (very briefly) how this works:

The filename is entered in N$ and added to "S. "(for SAVE) or to "L. " (for LOAD). The start address (COO) is added to N$, followed by the end address if the database is being SAVEd.

This whole string is then sent to an area of memory reserved by the DIM statement in line 10 by use of $, the string indirection operator in line 1630. Line 1640 puts the low order address of the start of this string (CODE) in X%, and the high order byte in Y%, and line 1650 is a subroutine call to OSCLI, the command line interpreter. This enables the databases to be named by the user when the program is run.
(N.B. It might be a good idea to check for illegal filenames.) I hope that this is of interest to you.
Yours faithfully,
G.W. Collins
Hore

Dear PCT,
With a few exceptions playing video games holds little attraction for me. My enjoyment comes from keying in programs, debugging them and perhaps adding what I consider to be a few improvements.

'In a Maze' (December issue) proved to be one of these exceptions in that I was able to improve it slightly, remove a bug and, furthermore enjoy playing the game.

On starting the program the maze flashes onto the screen briefly before appearing static. This initial appearance can be prevented by making the following changes:
Line 600 change to GOSUB 840
Line 1070 change to IF FIRST = 1 THEN GOSUB 1890 ELSE GOSUB 1880
ADD Line 1885 CALL COLOR (6,14,1):FIRST = 1
Unwanted yellow squares appear in some pictures so to cure this change #S + 12,12 in line 1460 to #S + 12,15.
Thanks for a good game and a great magazine.
Yours faithfully
J Waller
Drayton

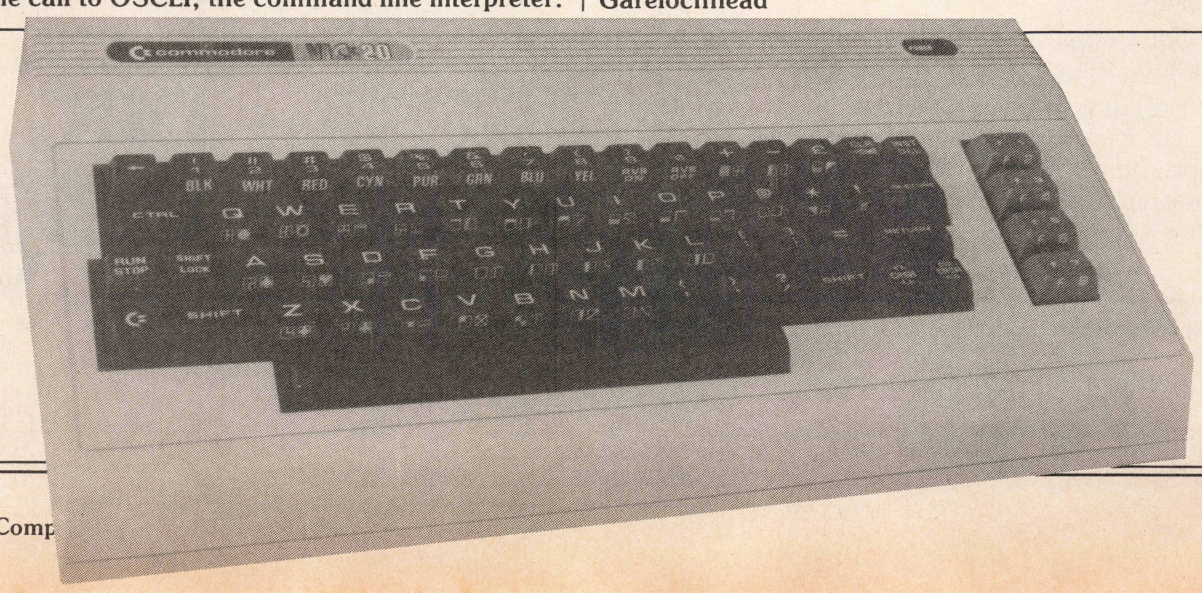
Editor's Reply: Many thanks for this useful letter. I'm sure readers who originally enjoyed this game will now get further amusement from it.

Dear PCT,
Your December issue contained a letter from N Vine of Hatfield about trying to link a VIC 20 to a ZX Printer. Contrary to what you replied, there does appear to be an interface on the market which can accomplish this.

I have seen a review of a Commodore/ZX Printerface, produced and marketed by a company called Softex Computers of 37 Wheaton Road, Bournemouth. I understand it retails at £29.95. I hope this is of some use to Mr Vine.

Finally, can I just say keep your magazine exactly the way it is. For the 'average' enthusiast it is by far the best in an ever increasing range, as well as being the easiest to read.

So, keep up the good work!
Yours sincerely,
M.J. Wooddissee
Garelochhead





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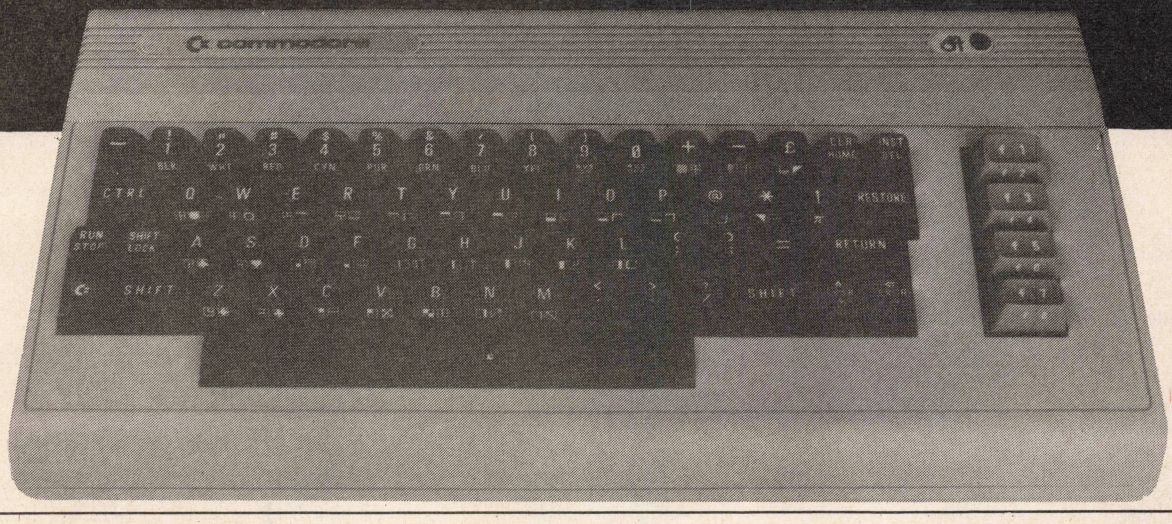
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MICROSPOT

CODE SAVER



Save the best of your codes in memory with this short program by John McHale

This is a routine for the CBM 64 which allows you to save an area of memory to tape. If for instance you have designed a sprite and want to save it you can load this BASIC program on top of the program already in the computer. When you RUN it and type in the name under which you have saved the data or sprite, they will be recalled.

Assembler listing of Machine Code Routine

```
LDA #1
LDX #1
LDY #1
JSR "set lfs" *
LDA(250),ZERO PRGE
LDX #0
LDY #80
JSR "set nam" *
LDX(253),ZERO PAGE
LDY(254),ZERO PAGE
LDA #251
JSR "save" *
RTS
```

"set lfs", "setnam" and "save" are all Kernal routines used by the CBM 64 and VIC 20. The starting addresses of these are as follows:

Set lfs = 65466 (Decimal)
Set nam = 65469 (Decimal)
Save = 65496 (Decimal)

* Note: any values used in the assembler listing are in decimal format The Kernals routines in this code may have to be changed to suit the VIC.

Variables Used

L = Length of file name
ADD = Starting address of SAVE
AH% = High byte of start and SAVE
AL% = Low byte of start of SAVE
A = Length of program (in bytes)
H% = High byte of end of SAVE
L% = Low byte of end of SAVE
A$ = Name of program to be saved

When loading programs saved by this routine, type L O A D ' ' ' ' , 1 , 1

PROGRAM LISTING

```
1 REM ------------------------
2 REM  COMMODORE-64 UTILITY
3 REM ------------------------
4 REM
5 REM    'CODE SAVER'
6 REM
7 REM BY  JOHN MC HALE
8 REM
9 REM SLIGO,EIRE.............
10 REM
11 REM
20 PRINT"■":PRINT"■■ENTER PROGRAM NAME (ALPHA CHARS ONLY) ■":PRINT:PRINT
30 INPUTA$:IFLEN(A$)>16THENA$=LEFT$(A$,16)
35 PRINT:PRINT
40 L=LEN(A$):POKE250,L
50 FORT=1TOL:P=ASC(MID$(A$,T,1))
60 IFP<65ORP>90THEN20
70 POKE20479+T,P:NEXT
100 FORT=0TOL-1:POKE1984+T,PEEK(20480+T)-64:POKE1984+T+54272,1:NEXT
102 PRINT"■IF THE TWO PROGRAM NAMES DO NOT MATCH   THEN REDO FROM START
 "
110 PRINT:PRINT"MATCHING (Y/N)":INPUTA$:IFA$="Y"THEN121
120 GOTO20
121 PRINT:INPUT"■STARTING ADDRESS OF SAVE";ADD:PRINT
125 AH%=(ADD/256):AL%=(ADD-(AH%*256)):POKE251,AL%:POKE252,AH%
130 PRINT"■LENGTH OF PROGRAM (BYTES) ";:INPUTA
140 H%=(ADD+A)/256:POKE254,H%
150 L%=((ADD+A)-(H%*256)):POKE253,L%
155 PRINT:PRINT"■END OF SAVE ADDRESS = ";H%*256+(L%-1):PRINT
160 FORT=0TO27:READA:POKE30720+T,A:NEXT
170 DATA169,1,162,1,160,1,32,186,255,165,250,162,0,160,80,32,189,255
180 DATA166,253,164,254,169,251,32,216,255,96
190 SYS(30720):PRINT:PRINT"■PROGRAM SAVED■"
200 PRINT:PRINT"■■ENDING ROUTINE":END
```

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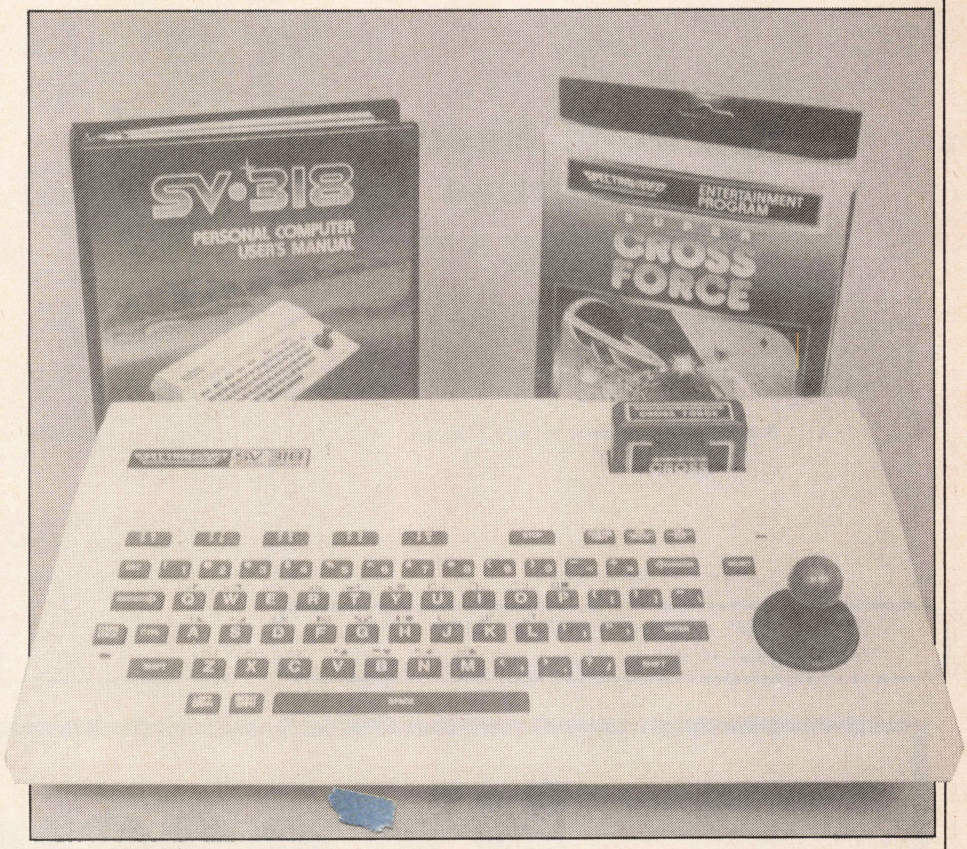
SPECTRAVIDEO SV-318 PERSONAL COMPUTER

Only recently available in the U.K. this fascinating games/personal computer will be given a detailed examination and test by our hardware team and a report published in our March issue.

Distributed exclusively by CK Computers of Weston Super Mare, the Spectravideo range comprises two stylishly designed models the SV-318 and SV-328. We have been looking at the 318, but both are CP/M compatible allowing users to take advantage of the comprehensive range of software programs written for this system, including Wordstar and Visicalc.

The SV-318 at £173, complete with data cassette, is extremely competitively priced for a personal computer with these features and with this memory capacity: 32K RAM expandable to an incredible 144K and 32K ROM expandable to 96K. The SV-318 also has a joy stick built into the keyboard, another unique feature in this price range.

Our reviewers were very impressed both with the machine and with the software with which we were supplied. Place your order with your newsagent now to make sure you see the March issue of Personal Computing Today and read about the latest home computer to hit the market.



Programs and Peripherals

As usual we'll be carrying out reviews of a comprehensive range of add-ons for your computer. Next month we will be looking at some speech synthesisers.

Following on from our special extended software review section this month we'll once again be bringing you news and views on a selection of the latest and enduring software on the market.

Games and utilities galore will flood the pages pf PCT. So order your March copy today by presenting your newsagent with the coupon below.

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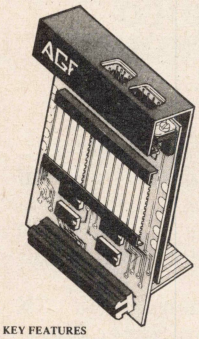
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EDUCATION

MAGIC MICRO MISSION



Central Television are pioneering the realms of time and space. Mark Webb dared to sit in on one of their missions.

Adrian Hedley is having great fun playing the captain of Central Television's Magic Micro Mission. Seated at the Mission control console, he jokes with the audience about the blow-up Space Shuttle he is playing with as an introduction to the fourth mission in the series. A moment later on air, the kids are shouting "We are with the Mission" and Adrian is conversing with PRUNE, the Mission's computer.

The show's set is a bizarre sight for an outsider although Central Television's Studio One has seen some strange scenes in its time, hosting programmes like Tiswas and Saturday Show. The Micro Mission's logo wouldn't look amiss at the Blackpool illuminations and co-presenter Joe Wheeler looks dashing in her silver outfit. More outrageous still are the audience. Their outfits reflect the imagination and effort of school children from Swindon, Hollywood and Sutton Coalfield. There are full quilted costumes, helmets made from plastic balls, papier maché and balloons and tin foil everywhere. All the space costumes have been created by the children in school projects.

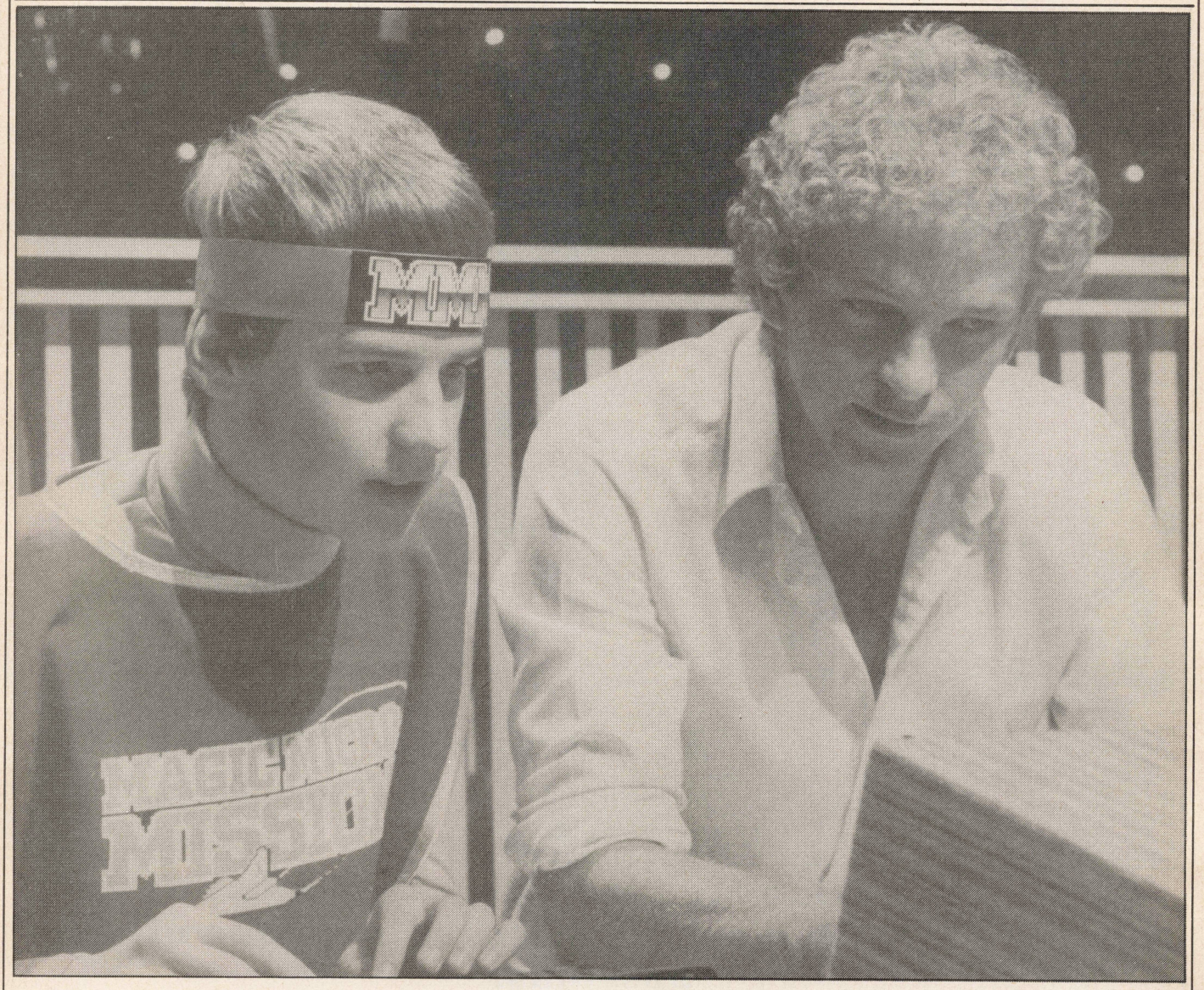
In the Green Room (which acted both as changing and coffee room) the teachers chink their cups and listen to studio sound, picking out the well known voices of their own children. The kids are cheering and applauding for the sound recordist to set his levels.

Behind The Scenes

In the background the 'experts' are threading cable and disappearing beneath desks. Clive the clown is warming them up to the sound of programs loading and a glissando of notes from a BBC Micro sound chip. 'Fierce Stan' the floor manager is maintaining order amongst all the bustle and technology. The children and crew get on well together and little rehearsal is necessary. The experienced eye of the cameraman is continually looking for good audience shots even while nothing in particular is happening on the floor. Nor are the presenters afraid to ad lib and new ideas are incorporated as the filming process goes on. Of course there is still a lot of skillfull editing to be done after the performers and audience have gone home.

The whole Micro Mission concept belongs to Geoffrey Negus, formerly of BBC's Nationwide, who came up with the idea during the summer. It caught on quickly and the Mission took off on its run of six consecutive shows, screened at 5.15pm on Wednesday afternoons in most areas. Silicon superstars appearing include Chris Sievey, Francis Monkman and John Walters (Landscape) from the world of music ▶

MAGIC MICRO MISSION



and sportsmen David Gower (playing Testmatch software) and Gary Bailey.

Rick Wakeman is loaded into programme four and introduces some micro musical keyboards. He also plays a piece with the help of two volunteers from the audience and a silicon chip or two. At home Rick also has a VIC 20 computer. He uses it to catalogue his music but hasn't as yet met with much success. His children however managed to outdo him by, among other things, making the computer animate the word 'bum' on the screen. Rick later decides to meddle with the MMM's controls and goes up in a puff of smoke.

PRUNE, the rather tetchy ship computer takes this opportunity to lambast rock stars in general. PRUNE is in the long tradition of invisible computers and it boasts a very animate voice (that of actor Hilary Minster). He delivers lectures to us humans and generally acts as if he knows it all.

Another lecturer on the show is Dr John Barker of Warwick University, alias Egg Head. He keeps up to date with the latest developments in the computer world. He also keeps things simple by disentangling the computerspeak. Egg Head is certainly a hit with the audience and gets a big cheer when he logs off.

Famous Five Ride Again

Meanwhile the Famous Five are busy playing this weeks games. The Five are a panel of very assured young people who sit in judgement on the latest software; and they don't pull any punches. Captain Dick York of Orion Airways flies 'Boeing 737' and finds many remarkable similarities to the real life experience, both in the graphic representation and the handling characteristics. The same, he says, goes for the big thick manual accompanying the cassette!

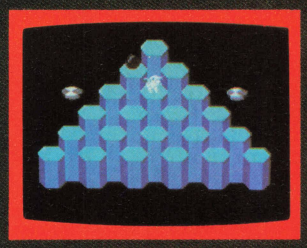
David Gunsworth, a real life air-traffic controller, plays 'Heathrow ATC' with his younger companion and thinks it an excellent simulation. Harrier Attack gets five out of five but the panel aren't afraid to say what they think with comments like 'dead boring' and 'I don't think much of this'. There are games for the BBC Micro, Sinclair Spectrum, Commodore 64 and Atari. The programme includes shots of the games as they are being played as well as comment.

It looks as though MMM is set to be a winner. It's certainly great fun and it may not be long before you can play a Magic Micro Mission on your own computer. The title sequence of the show is a graphics game written by Gus Chandler, which has you flying a mission through the television screen. Are you with the Mission?

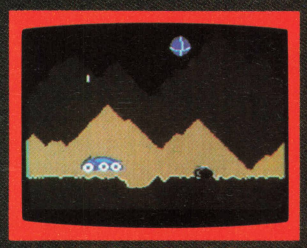
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PCT

GAMES

SOFTWARE REVIEWS

Each month PCT will be presenting pages of reviews of the computer programs currently available. We have engaged a team of reviewers, each of whom is a seasoned user of his/her particular machine — and has the crazy streak that means they enjoy playing computer games!

All types of software will, however, be reviewed in these pages; but with around 85% of all home-computer software being of the playful variety, you will be seeing more games than anything else!

Our 'Ratings Table' headings are:

Program Quality

Here we're looking to see how well written the program is, and how well it exploits the computer's capabilities. Also, how logical is the structure of the program? Does it require the user to make guesses to use it?

Crashproofing

We all hit the wrong key sometimes, do we not? Go on, admit it. If the program has been well written, all should not be lost. If, for example, the machine is asking you to enter "Yes" or "No", then any other key except Y or N should illicit no response whatsoever. In other words, how tolerant is the program of us humans?

Value For Money

Quite frankly, some software on sale today is vastly overpriced. With the low cost of cassette tapes, why *should* simple games cost up to £12 per tape? We judge this one on an overall basis — how much work have the suppliers put into the program and is the price reasonable?

Presentation On-screen

How good are the graphics used in the program? If the instructions are provided on screen, are they both readable and easy to understand? This section examines the visual aspects of the package — vital for games!

Ease Of Use

If the program is for, say, an 'action' game, then the author's choice of keys is very important. Try playing "Invaders" with the movement keys reversed, and the "Fire" button right next to 'Reset'! There are many, many ways in which life can be made easy for the program user. We want to see them *all* used!

Supplied Instructions

Regardless of whether the instructions come on sheets of paper, or are presented as text on-screen, they should be as clear and as concise as possible.

Ratings are done on a "Five stars is excellent, one is hopeless" basis, with the reviewer then scoring the supplied package as a whole on a percentage scale.

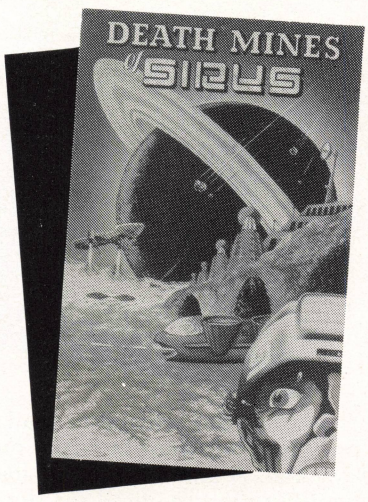
This month we have stretched ourselves again to bring you a whole eight pages of reviews. The second part of this special section is on page 69.

Title:	**Death Mines of Sirus**
Type:	**Tape**
Supplier:	**Phoenix Software Ltd**
Machine:	**Dragon 32**
Price:	**£9.99**

This is one of the first offerings from Phoenix, the company which rose out of the ashes of Romik.

The game consists of two programs, labelled 'The Action' and 'The Adventure', a novel and ingenious idea. Playing the action game enables you to score enough points to gather clues to be used in the second part of the sequence – the adventure game.

The action in this particular program takes the form of a lunar landing sequence which starts with a wonderfully over-the-top voice over from the television speaker backed up by the theme from 2001. Unfortunately after such a



good beginning, the program is rather a disappointment, being a poor version of Lunar Rescue.

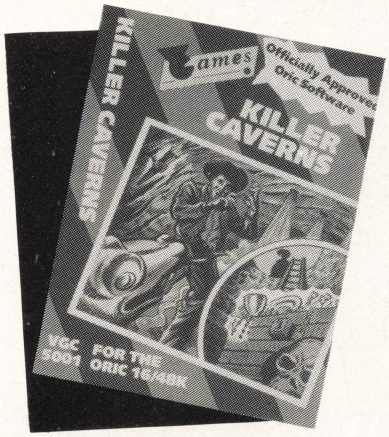
However, good fast brain and finger work is needed to score sufficient points to progress into the adventure game. This is much better and mixes text and graphics very well, and needs some deep thinking to survive the traps and perils.

Overall a very good idea which should appeal to arcade gamers and adventurers alike. Well presented and good value for money. **S.R.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * *
Presentation On-screen	* * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * * *
Overall	70%

SOFTWARE REVIEWS



Title: Killer Caverns
Type: Tape
Supplier: Virgin Games
Machine: Oric-1
Price: £5.95

You have control of Helpless Harold in his journey through the Killer Caverns in this BASIC program from Virgin Games. The aim of the game is to collect segments of a ladder and return them to a well, one at a time.

There are only two controls, LEFT and RIGHT, so the game is on a horizontal plane with a green floor and decorative stalactites on the roof. The display doesn't scroll sideways, but is redrawn each time Harold reaches the side.

There are obstacles blocking your path which include a scorpion, a red portcullis, a large giant that does the 'now you see me, now you don't' trick, a row of red spiders on the roof which rise and fall individually and a 'thing' which breaks through the floor below you. All of these move randomly (and slowly). So all you can do is pray for good luck and run from the foe. Skill on your part seems to play a minor role, success is dependent on luck.

Although original, the game is let down by the slow BASIC routines and lack of player options. Additional screen instructions and machine-code would make it a better buy. **D.T.W.**

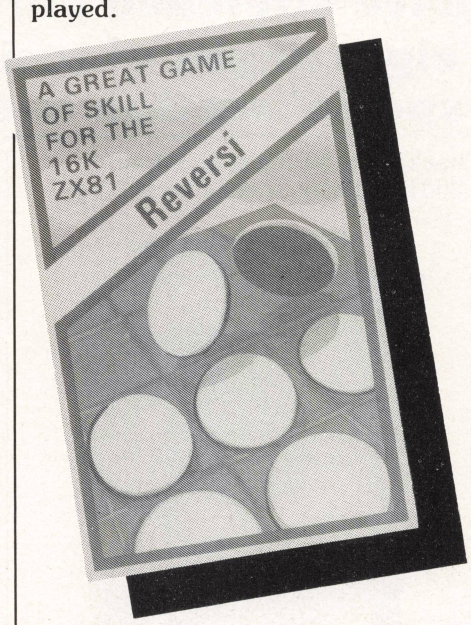
Ratings Table

Program Quality	* *
Value for Money	*
Presentation On-screen	* *
Ease of use	* *
Crashproofing	* * *
Supplied Instructions	* * * *
Overall	47%

Title: Reversi
Type: Tape
Supplier: Artic Computing
Machine: ZX81 /16K
Price: £5.90

This is an interesting release from Artic which uses the ZX81 to very good effect. Nothing special has been added to the program but even on the lowest levels the computer plays a very strong game. When loaded the player is asked if he wants to see the instructions, which give concise but sufficient guide lines on playing the game.

Next, the difficulty level is requested – there being four in all, – and finally you are asked whether or not you want the first move. The board is then drawn up, together with score and number of moves taken. Also indicated are the last co-ordinate chosen. When play commences the computer checks for illegal moves and continuously updates the scores. If during play you cannot see your next move, then the computer will give you a helping hand with the use of the help facility. There is also the ability to save the game at any point and re-play it when re-loaded. For those who wish to analyse their game they can see a listing of the moves previously played.



The program refused to load on one side, but went in easily on the reverse. A small criticism was the waiting time required for the computer to make its move, even on the lowest level its response time averaged about 30 seconds. However, the strength of game goes some way to counter balance this.

Although there isn't the facility for two people to play each other, this tape must be good value for the money. **G.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * * *
Presentation On-screen	* * * *
Ease of use	* * * * *
Crashproofing	* * * * *
Supplied Instructions	* * * *
Overall	80%

Title: Californian Gold Rush
Type: Tape
Supplier: Anik
Machine: Commodore 64
Price: £7.95

"Yippee, git yer picks an' shovels and join the Californian Gold Rush, now." That's how the advertisements introduce you to Anik's new offering.

Your purpose in this rootin' tootin' western type game is to help Prospector Jake peg his claim on all the 24 goldfields he knows are there. But, it's not as easy as it seems. While collecting your sacks of gold, you must dodge those darn Injuns with the help of a good pair of legs and a handy supply of dynamite sticks. But don't get too cocky if you think the Indians are slow on the first goldfield. Wait 'till they start to let you have it with their arrows on the twelfth.

Californian Gold Rush was written totally in machine code and can be played with either keyboard or joystick, but to enjoy this game to the full a joystick is recommended. The game is loosely based on 'Painter', as you have to run around squares making more dollars as each box is surrounded. Californian Gold Rush incorporates fine sound and graphics to make rather an outdated idea into a very enjoyable game. **R.A.B.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * *
Presentation On-screen	* * * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	73%

Title: Diyad
Type: Tape
Supplier: Timeless Software
Machine: TI 99/4A
Price: £6.95

The Diyad package contains a 16 page manual and two programs, Adventure Generator and Adventure Player, with which you may invent your own text adventure games.

The Generator program is used to create files which are then loaded into the data driven Adventure Player. In order that you learn how this is done the Generator has been programmed to write files for a Desert Island adventure. By first obtaining these files and playing the game it becomes easier to understand how the Generator program must be manipulated for your own use.

Although creating and loading the data files is a long and tedious process, the end result is very satisfying. The Generator program has been carefully prepared so that all data is double checked before being accepted into a file. By consulting the manual about any error messages, which are not TI BASIC but have been written into the program, it is possible to identify where mistakes have been made.

Since options are available to play either a standard or randomised game, there are many possibilities to be explored by the imaginative adventure player. **J.V.W.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * * *
Presentation On-screen	* * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	75%

Title: Corridors of Genon
Type: Tape
Supplier: New Generation Software
Machine: Spectrum 48K
Price: £5.50

Corridors of Genon is a well designed combination of maze and code-breaking game. The player has to find his/her way through a concentric series of circular corridors in the midst of which is (nicely drawn) computer. He or she must solve the computer's code when found and return to the starting place.

The code is solved in a fashion similar to the game Mastermind, by guessing a sequence of numbers and being told how many of those numbers are correct. Although this aspect plays rather well, all players should use the training mode first, because code-breaking appears rather daunting and is not very well explained in the documentation. Possibly the designers intended this in order to make breaking the code doubly difficult but if that is so I cannot see why there is a practice mode at all.



Use of the Spectrum's graphics is excellent, especially the impression of curving corridors and the sneaky villain Bogul who stalks through the corridors seeking to bogulize you – not a pleasant fate! As if these problems weren't enough you only have limited psychic power through which you can decode some of the doors. Each time you are bogulised your power goes down and each time it goes down you have less chance of guessing the next code.

I found controlling the keyboard a slight problem with this otherwise excellent game. Sometimes you have to time keyboard entry exactly or your efforts are wasted. The game does come with a template converting part of the keyboard into a numeric keypad for easy entry of codes (which is okay if you still have your original keyboard) but there is no facility for abandoning a code once you know it is wrong and the program does not give an indication of what you have successfully typed so far. If you are not sure if a key has registered this is not only frustrating but can be deadly.

Overall, however, a most enjoyable and interesting game. **N.W.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * *
Presentation On-screen	* * * * *
Ease of use	* * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	90%

Title: Beeb Art
Type: Tape
Supplier: Quicksilva Ltd
Machine: BBC Model B
Price: £14.95

Using Beeb Art one can draw and paint on the Beeb's screen using either the cursor keys or a joystick. There are a number of similar programs on the market but this must be in the top three. It enables choice of all colours and contains built-in options for drawing diagonals, squares, rectangles, triangles and circles. These can be drawn in outline or 'painted' i.e. filled with colour. It is also possible to draw 'invisible' lines to move the cursor around the screen without making a mark.

Lines can be drawn freehand or by specifying their beginning and end. However it is typical of the ease of use of this program that these points are specified by positioning the cursor rather than by typing in co-ordinates (a method used by some other systems). Similarly circles are drawn by positioning the cursor first at the circle's intended centre and then at the desired radius away from that centre.

All these options are selected from the keyboard, although if you use joysticks the fire button controls drawing. This means that you need to know the functions of 32 different keys. The program does disable keys which are not allowed at the necessary points in use but this does not aid memory. The eighth page of the manual does summarise the 32 functions and suggests that the user make a template to insert under the Beeb's transparent ruler.

Overall, a most useful application program. **N.W.**

SOFTWARE REVIEWS

Ratings Table

Program Quality	* * * *
Value for Money	* * *
Presentation On-screen	* * * * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	88%

Title:	**Pinball Wizard**
Type:	**Tape**
Supplier:	**Terminal Software**
Machine:	**VIC 20 (unexpanded)**
Price:	**£7.95**

Having seen quite a lot of VIC software I was wary of the claims made on the rather flashy packaging. However, on loading the game I was very surprised. The screen shows a pin table complete with bumpers, flippers and rollovers, all in HI—RES and good colour. The instructions supplied with the game are very clear and easy to follow. F1 selects one player, F3 two player, F5 pull back plunger, F7 release plunger. The Commodore Logo key activates the flippers. Once the ball is in motion it moves around the screen with flicker free precision, bouncing off bumpers with accuracy close on the laws of reflection.



A very nice touch to the program is the Nudge facility. As any good pinball player knows, a quick shove of the table can prevent the ball from shooting between the flippers at half the speed of light. This feature is supplied by hitting the space bar.

WARNING!!!, hitting the space bar too often will result in a tilt. The game has a two player facility, and makes a very pleasant change from the usual 'Blast the Alien' type of game. In my opinion a game well worthy of any software collection. **R.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * *
Presentation On-screen	* * * * *
Ease of use	* * * * *
Crashproofing	* * * * *
Supplied Instructions	* * * * *
Overall	95%

Title:	**3 Deep Space**
Type:	**Tape**
Supplier:	**Postern Ltd**
Machine:	**BBC Model B**
Price:	**£7.95**

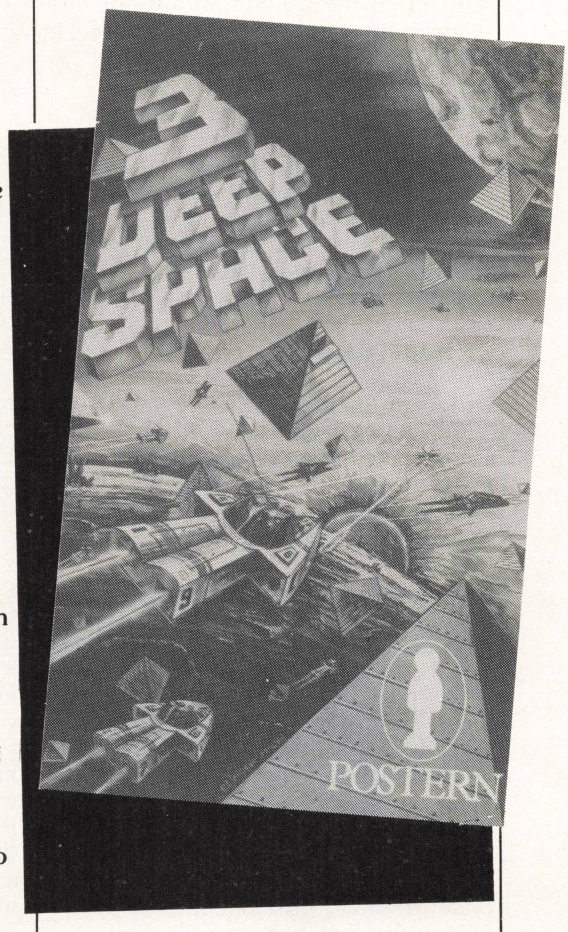
It's shoot the aliens in three dimensions time. A space game played in three dimensions? Did I hear laughter out there? The idea is quite sound. By a clever combination of red, blue and magneta graphics, two dimensional images on the screen can appear to be two sets of superimposed pictures of one thing. With the 3D spectacles (free with the game) the two images merge into one. And it almost works. However you do need to have your TV finely tuned, you must sit exactly the right distance from the screen and at the right angle, and you cannot wear your own spectacles. So for me the choice was between conventional 2D, with two sets of confusing images, or spectacular fuzz with a three-dimensional blur!

The idea is good and the programming excellent but I'm afraid it remains something of a gimmick. The problems involved in getting a 3D display cannot be compensated for by the type of game that results. This is nevertheless quite a fair game involving shooting down oncoming waves of alien ships in time honoured fashion, with the ships not moving up and down the screen and advancing from right to left, but also travelling at variable distances 'inside' the screen. Your gun can move up and down and in and out by using a sensible combination of keys (* and ? are up and down, Z and X are in and out) and the game is quite playable without 3D in the early stages because you can estimate the distance of the aliens by their size. However in the later stages the ships have 'image-distorters'. Roughly speaking this means that their size on screen does not change but their 3D representation does, so it is almost impossible to play without the optical aids.

Use of the BBC's sound is also quite dramatic, giving the necessary arcade flavour. So if you want a novelty and are prepared for a little extra work, this is probably worth the money. But for most people I think the addition of 3D is not sufficiently exciting to transform a rather conventional alien-blasting game. **N.W.**

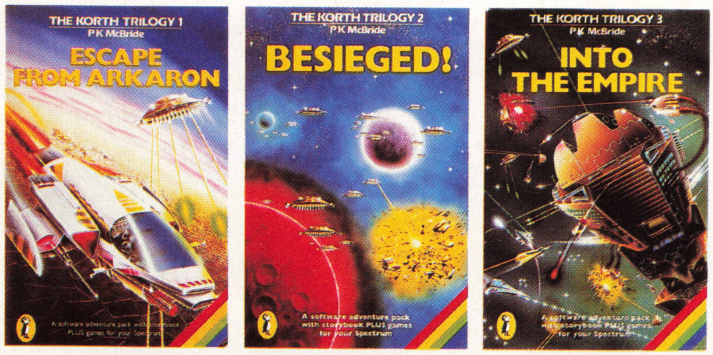
Ratings Table

Program Quality	* * *
Value for Money	* *
Presentation On-screen	* * * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	60%



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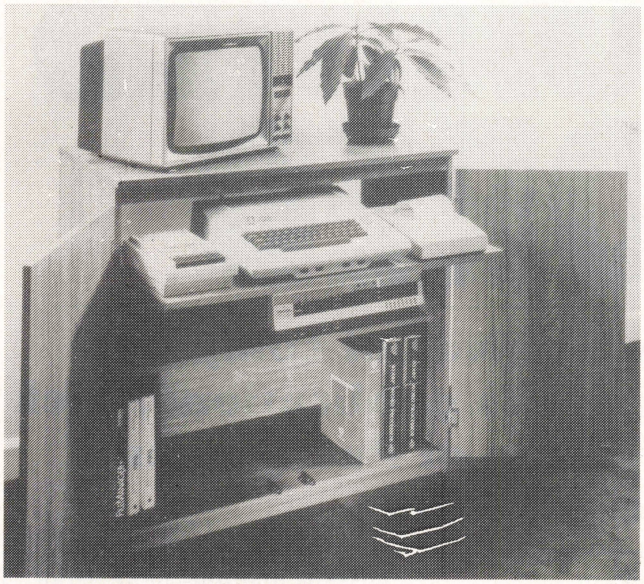
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MAZE GAMES EXPLORED

On looking through his archives of computer programs collected from various publications, Nick Wilcox came across a version of Pacman, and attempted to convert it . . .

The program is a 'back to basics' maze game to demonstrate the principles involved to make a 'Pacman type' game work.

I found the conversion from a Nascom to a VIC 20 particularly difficult, not only because of the different memory mapping but also because of the screen sizes.

The components of the program are:
a) the maze
b) monster movement
c) Pacman movement in response to keyboard input
d) various routines for noise, scoring, and ending.

The object of the game is for your man to be moved around the screen eating the dots. The man will be chased by monsters who are lethal. The program commences with an instruction page which is followed by production of the maze. The characters are then put onto the screen and the monsters begin their movement routine. This will continue until a key is pressed, bringing in the Pacman movement routine.

A basic understanding of animation is necessary. If a character is displayed on the screen, and then erased from that position and redisplayed in the next consecutive place on the screen, the illusion of movement takes place. Because this program is written in BASIC and does not employ high-resolution graphics, moving is slightly slower than is possible and thus more 'jerky'. This should not, however, greatly affect your enjoyment of the game.

The Maze

One of the hardest tasks in trying to convert the game was designing the maze. Without seeing a picture of what the maze looked like, the mass of data used was impossible to decipher.

In this program, the maze is produced line by line. The DATA statements should be read in pairs, e.g. 46,13. When these two data items are used the VIC is told to print the character which has a Poke value of 46 (a full stop) thirteen times. Each line of the maze is created by a number of these pairs of data values.

HOW IT RUNS

Line 5	Dimensions an integer array to hold the positions of the four monsters.
Lines 10 - 100	Display instructions
Lines 195 - 196	Clear screen and check number of lives remaining.
Lines 200 - 240	Read the DATA and pokes the maze shapes onto the screen
Lines 250 - 260	Define monster and pacman shapes and puts them in their start positions
Line 261	Checks to see that all the dots have not been eaten
Lines 262 - 350	This is the main working component of the program. First, a check is made to see if a key is being pressed. If not, then for each of the monsters in turn, a random number is generated to select the direction in which the monster is moved. This new position is checked in lines 320 to 322 against being a wall or another monster. The monster is erased at its old position and replaced by a dot or a space depending on which it currently sits on. The current score is updated and displayed, and the monster noise is produced. The program then returns to the beginning of this section to start all over again.
Lines 400 - 420	This routine is called when Pacman is eaten by a monster. The program recommences with the redrawing of the maze if there is a life left.
Lines 500 - 530	These two subroutines simply display and erase the Pacman shape.
Lines 540 - 580	This subroutine reads the key pressed and determines the displacement of the Pacman charcter: −22 −1 +1 +22
Lines 590 - 595	Check to see whether a wall, dot, or monster is encountered, and increment score accordingly.
Lines 596 - 630	Update Pacman position, and make Pacman noise.
Lines 1100 - 1550	DATA statements containing shape of maze
Lines 5000 - 5070	Lose end routine: the appropriate message is accompanied by a sound
Lines 5500 - 5590	Win end routine.

HINTS ON CONVERSION

As mentioned earlier, the difficulties of conversion lie mainly in screen size and memory mapping. As this program uses the 16K expansion on the VIC screen locations start at 4096, the screen size being 22 x 23 characters.

The poke values for the shapes used are as follows:

Poke Value	Shape	Character
32	space	space
160	maze wall	reversed space
46	dot	full stop
24	monster	x
42	pacman	an asterisk

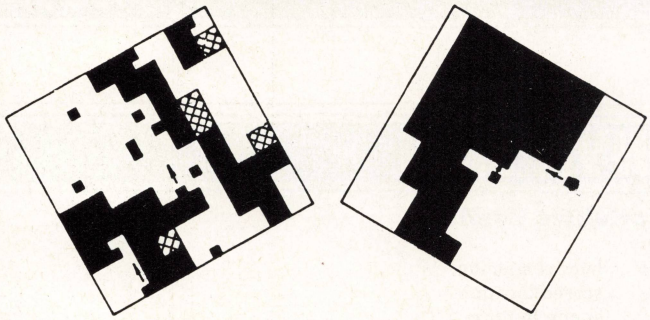
Other pokes used are to create sound and to change the screen and border colours. These may be changed to suit your own machine.

Variables Used

LR	lives remaining
I	screen location
A	shape in maze
P	number of times shape is to be printed
MO	monster shape
PM	pacman shape
PP	pacman position
MP%	monster position
SC	score
WA	maze wall shape

PROGRAM LISTING

```
5 DIM MP%(4)
10 POKE 36879,91
20 LR=5
30 PRINT"■■■EAT ALL THE DOTS"
40 PRINT"■BUT BEWARE OF XXX'S!"
50 PRINT"M=RIGHT"
60 PRINT"B=LEFT"
70 PRINT"F=UP"
80 PRINT"S=DOWN"
90 PRINT"HIT ANY KEY TO START"
100 GET F$:IFF$=""THEN100
195 PRINT"■";
196 IF LR=0THENGOTO5000
200 RESTORE:FOR I=4096TO4601
205 FOR J=1TO23
210 IFP=0THENREADA,P
220 POKE I,A
230 P=P-1
240 NEXTI
250 MO=24:WA=160:PM=42:PP=4525:SC=0
253 MP%(1)=4166:MP%(2)=4180:MP%(3)=4386:MP%(4)=4400
255 GOSUB 500
260 FORL=1TO4:POKEMP%(L),MO:NEXT
261 IFSC=129 THEN GOTO5500
262 FOR DD=1TO4
263 GET A$:IFA$=""THEN270
265 GOSUB 540
270 Y=INT(RND(1)*4+1)
280 IFY=1THENX=1:GOTO320
290 IFY=2THENX=-22:GOTO320
300 IFY=3THENX=-1:GOTO320
310 IFY=4THENX=22:GOTO320
320 IFPEEK(MP%(DD)+X)=WATHEN270
322 IFPEEK(MP%(DD)+X)=MOTHEN270
325 IFPEEK(MP%(DD)+X)=PMTHEN400
327 IFPEEK (MP%(DD)+X)=46THENPOKEMP%(DD),46
330 IF PEEK(MP%(DD)+X)=32THENPOKEMP%(DD),32
335 PRINT"■LIVES";LR;" SCORE ";SC
340 MP%(DD)=MP%(DD)+X
344 POKE 36878,15:FORQQ=1TO5 :POKE 36877,150:NEXT
345 POKE 36878,0:POKE36877,0
347 NEXTDD
350 GOTO260
400 PRINT:PRINT:PRINT:PRINT:PRINT"■C■H■O■M■P":LR=LR-1
410 FORT=1TO1000:NEXT
420 GOTO195
500 POKE PP,PM
510 RETURN
520 POKEPP,32
530 RETURN
540 IFA$="F"THENZ=-22:GOTO 590
550 IFA$="S"THENZ=22:GOTO590
560 IFA$="M"THENZ=1:GOTO590
570 IFA$="B"THENZ=-1:GOTO590
580 RETURN
590 IF PEEK(PP+Z)=WATHEN RETURN
593 IFPEEK(PP+Z)=MOTHENGOTO400
595 IFPEEK(PP+Z)=46THENSC=SC+1
596 FORAA=1TO5:POKE36878,15:
    POKE36876,250:NEXT:POKE36878,0:
    POKE36876,0
600 GOSUB 520
610 PP=PP+Z
620 GOSUB500
630 RETURN
1100 DATA32,22,32,22,32,3,160,17
1110 DATA32,2,32,3,160,1,32,1
1120 DATA46,13,32,1,160,1,32,2
1130 DATA32,3,160,1,46,1,160,1
1140 DATA32,1,160,4,46,1,160,4
1150 DATA32,1,160,1,46,1,160,1
1160 DATA 32,2,32,3
1170 DATA160,1,46,1,160,1,46,11
1180 DATA160,1,46,1,160,1,32,2
1190 DATA32,3,160,1,46,1,160,6
1200 DATA46,1,160,6,46,1,160,1
1210 DATA32,2,32,3,160,1,46,4
1220 DATA32,1,46,1,160,1,46,1
1230 DATA160,1,46,1,32,1,46,4
1240 DATA160,1,32,2,32,3,160,1
1250 DATA46,1,160,4,46,1,160,1
1260 DATA46,1,160,1,46,1,160,4
1270 DATA46,1,160,1,32,2,32,3
1280 DATA160,1,46,1,160,4,46,1
1290 DATA160,1,46,1,160,1,46,1
1300 DATA160,4,46,1,160,1,32,2,32,3
1310 DATA160,1,46,1,160,4,46,1
1320 DATA160,1,46,1,160,1,46,1
1330 DATA160,4,46,1,160,1,32,2
1340 DATA32,3,160,1,46,4,32,1
1350 DATA46,1,160,1,46,1,160,1
1360 DATA46,1,32,1,46,4,160,1
1370 DATA32,2,32,3,160,1,46,1
1380 DATA160,1,46,4,160,1,46,1
1390 DATA160,1,46,4,160,1,46,1
1400 DATA160,1,32,2,32,3,160,1
1410 DATA46,3,160,2,46,5,160,2
1420 DATA46,3,160,1,32,2,32,3
1430 DATA160,3,46,1,160,9,46,1
1440 DATA160,3,32,2,32,3,160,3
1450 DATA46,4,160,3,46,4,160,3
1460 DATA32,2,32,3,160,6,46,1
1470 DATA160,3,46,1,160,6,32,2
1480 DATA32,3,160,1,46,6,160,3
1490 DATA46,6,160,1,32,2,32,3
1500 DATA160,1,46,1,160,13,46,1
1510 DATA160,1,32,2,32,3
1520 DATA 160,1,46,7,32,1,46,7
1530 DATA160,1,32,2,32,3,160,17
1540 DATA32,3,32,22,32,21
1550 DATA32,0
5000 PRINT"■■■■■■■■■■■■■■■■YOU'RE DEAD..."
5010 PRINT"■■■HOW MANY CHANCES"
5020 PRINT"■■■DO YOU EXPECT?"
5025 POKE 36878,15
5030 FORPP=255TO128STEP-1
5040 POKE36876,PP
5050 NEXT
5060 POKE 36879,27:POKE36876,0:POKE36878,0
5070 END
5500 POKE 36878,15
5510 PRINT"■■■■■■■■■■■■■■■■■■WELL DONE:"
5520 PRINT"■■■YOU HAVE COMPLETED"
5530 PRINT "■■■THE MAZE WITH"
5540 PRINT"■■■";LR;"LIVES REMAINING"
5550 FOR TT=128TO255
5560 POKE36875,TT
5570 NEXT
5580 POKE 36879,27:POKE 36878,0:POKE36875,0
5590 END
```



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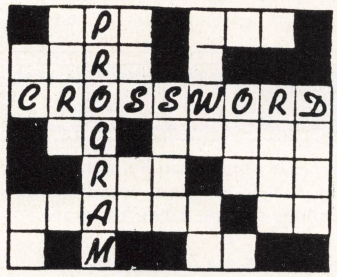
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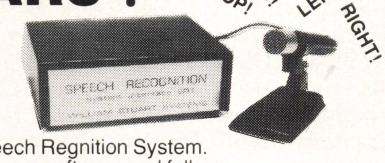
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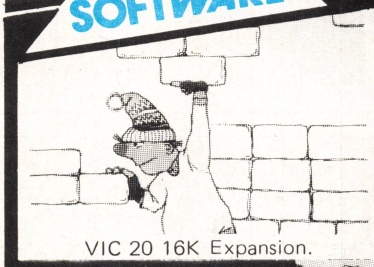
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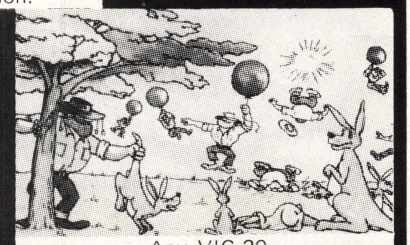
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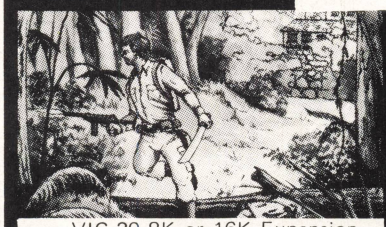
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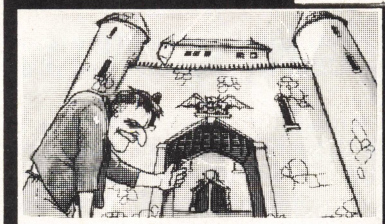
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Dear PCT,
I own a TI99/4A and recently bought a mini memory module to increase the machine's power. The cartridge comes with an assembler on cassette. Unfortunately, the manual gives no information on this or on machine code. The manual did suggest reference to the Editor/Assembler manual however. Since the Editor/Assembler costs £70 and needs approximately £880 worth of extra equipment to use, I am unwilling to buy this item just for the manual. Can you tell me of an alternative source of information for either TMS 9900 Assembler, or machine code for this machine?
Yours faithfully,
JM Lavis
Tiverton, Devon

Yes, it is possible to buy just the manual for the Editor/Assembler without the software, for the relatively cheap price of £9.95. It is obtainable from Texas Instruments, Manton Lane, Bedford.

Dear PCT,
I have acquired an Epson FX80 printer for word processing in conjunction with my CBM 64 computer and disk drive.

My problem is that, whilst the printer works excellently when driven from the internal commands from the processor package, I have not been able to discover how to instruct the printer to operate directly from the computer.

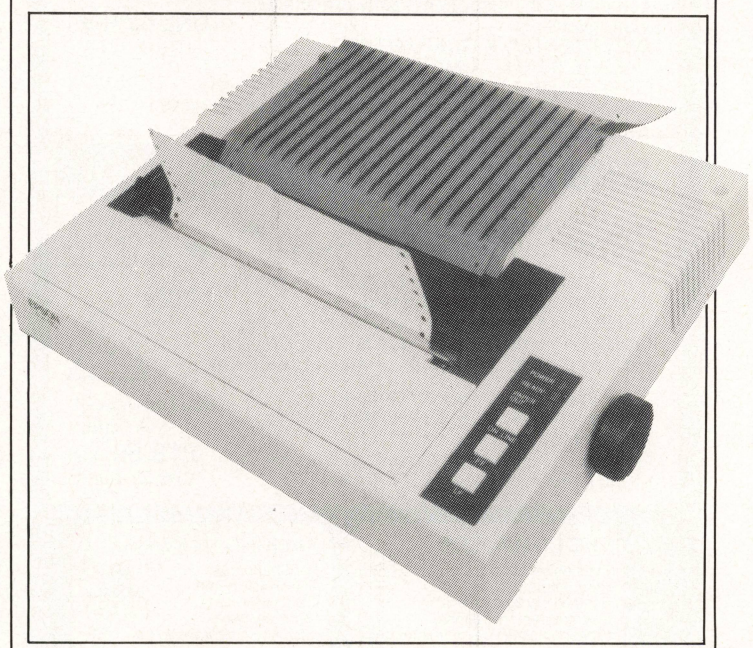
I can get no help from the Commodore User's Guide or Programmer's Reference Manual, nor does the Epson manual deal with this point. I will be grateful therefore if you will be good enough to advise me of the commands to make this combination print out from the screen.
Yours faithfully,
JH Mitchell
Wiltshire

Thank you for writing to us with this problem. You must be using some kind of interface such as the Interpod to link your CBM 64 to the FX80 printer because the latter does not come with the IEEE connection that the microcomputer uses. However, as the word processor works it is unlikely that this will obstruct you from using the printer from BASIC. If you just want to list the program use:

0PEN4,4:CMD4:LIST
and when it has finished:
PRINT #4:CLOSE 4 (note ?#will not work)
To use from a program:

```
10 OPEN 4,4
20 PRINT #4, "THIS IS ON THE PRINTER"
30 PRINT 'THIS IS ON THE SCREEN"
40 PRINT #4; CLOSE 4
```

To go into double pass (heavy print) mode use:
OPEN 4,4:PRINT#4, CHR$(27)CHR$(71)
This can be done for all the FX80 features. Remember that a listing will not show the colour or screen handling control codes.



Dear PCT,
I am considering buying a home computer. I have a fairly good knowledge of BASIC which I learned at school but have never had time to learn BBC BASIC. With this in mind, I am torn between buying an Acorn Electron or a Commodore 64. I would be extremely grateful if you could help me out of my dilemma.
Yours faithfully,
S Cameron
Leeds

I will try to answer your question from a purely personal point of view (your's not mine). It is extremely difficult to choose between the two machines you mention. They both have various

merits and represent exceptional value for money. BBC BASIC is one of the best BASIC languages around. The Electron also has high resolution graphics and eight colours plus eight flashing ones. The Commodore's BASIC 2 is a very ordinary, standard BASIC and requires a detailed knowledge of the machine. However, the Programmer's Reference Guide is excellent and you very soon learn all about the computer. The lack of a resident assembler in the Commodore 64 makes it harder to learn machine code.

In terms of ease of use, the Electron is probably superior — speed is won by the CBM64 but graphics and "computing power" are vague terms. The different graphic modes affect the free memory on the Electron while the CBM64 has 39K of easily accessible RAM with another 20K or so relatively east to access.'

I cannot recommend one machine over the other. Also, remember to look around at other micros on the market, escpecially the Sharp MZ-700 and the Atari 600 and 800 XL.

Dear PCT,
My husband and I recently purchased a VIC 20 in America. We are stationed in the U.K. at the present time, as my husband is in the U.S. Air Force and we will return to the States in two years time. Because of this we bought a computer which runs on U.S. current and television frequencies (our T.V. is convertible between the U.K. and U.S. frequencies).

My question is will cartridges and cassettes bought here work on the American VIC 20? Also will accessories such as the expansion RAMS work? We're anxious to start purchasing software and accessories and hope we'll be able to buy through a British dealer as it is much faster than sending to the States.
Yours faithfully
Jean Truffit

Providing that you use your American VIC 20 on 120V and your TV on NSTC (American T.V. Standards) you should have no problems in using your VIC with British bought cartridges and cassettes. This is because the U.S. and U.K. specifications and the VIC are the same.

It is worth noting that the same is not true of the BBC Micro which has undergone many changes for the U.S. market, although I understand that there are some U.K. specific Beebs working perfectly well in the States.

Dear PCT,
Readers who, like myself, have or have had difficulties in spotting data errors in the Disassembler program from November's issue or others who are curious to discover the 6809 mnemonics embedded in the data may find the attached listings of interest.

To check the data list, enter the Dis-Assembler program and RUN it. Next enter NEW then load LISTING 1 — RUN it and the mnemonics will be displayed page by page, making error spotting much easier.

To find out how Listing 1 works, simply reverse the procedure i.e. load Listing 1 and run it, then load 'Disassembler' and run it — the START ADDRESS is 7000h and the END ADDRESS is 701Eh. The result should be LISTING 2 if all is well.
Yours faithfully,
A.W. Smart
Newport-on-Tay

DATA CHECK

```
5 REM ***   DATA  CHECK   ***
6 REM **DIS-ASS:D.BERRY:PCT**
7 REM *P,36 NOV.83 DATA FILE*
8 REM * VIEW-DATA:A.W.SMART *
10 CLEAR200,&H6FFF:I=&H6FFF
20 I=I+1:READA$:V=VAL("&H"+A$):CS=CS+V:I
F A$<>"Z" THEN POKEI,V:GOTO20
30 IF CS<>3194 THEN CLS:PRINT@234,"DATA
ERROR":END
40 DATA 10,8E,6,0,4F,BD,80,6,81,59,26,F8
,8E,4,20,A6
50 DATA A0,A7,80,8C,5,FF,23,F7,10,8C,E,9
5,25,E6,39,Z
60 CLS:PRINT:PRINT" ENTER <Y> TO RUN PAG
E BY PAGE."
70 EXEC&H7000
80 PRINT@320,STRING$(128,32)
90 PRINT@437,"END OF RUN"
```

```
DATA CHECK (&H600-&HE95)

$ 7000    LDY      # 0600     *10 8E 06 00
$ 7004    CLRA                *4F
$ 7005    JSR      x 8006     *BD 80 06
$ 7008    CMPA     # 59       *81 59
$ 700A    BNE      * -8       *26 F8
$ 700C    LDX      # 0420     *8E 04 20
$ 700F    LDA      i ,Y+      *A6 A0
$ 7011    STA      i ,X+      *A7 80
$ 7013    CMPX     # 05FF     *8C 05 FF
$ 7016    BLS      * -9       *23 F7
$ 7018    CMPY     # 0E95     *10 8C 0E 95
$ 701C    BLO/BCS  * -1A      *25 E6
$ 701E    RTS                 *39
END OF RUN
```

Thanks for sending in this useful information. I'm sure many of our readers will find it invaluable in aiding their programming.

PRIORITY REPLY

February 1984

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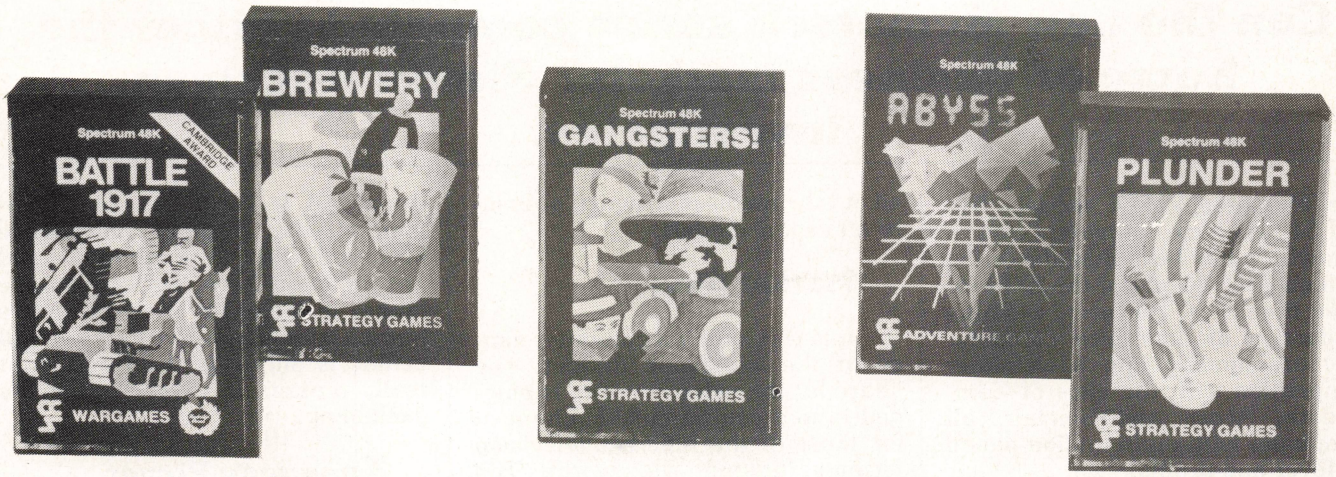
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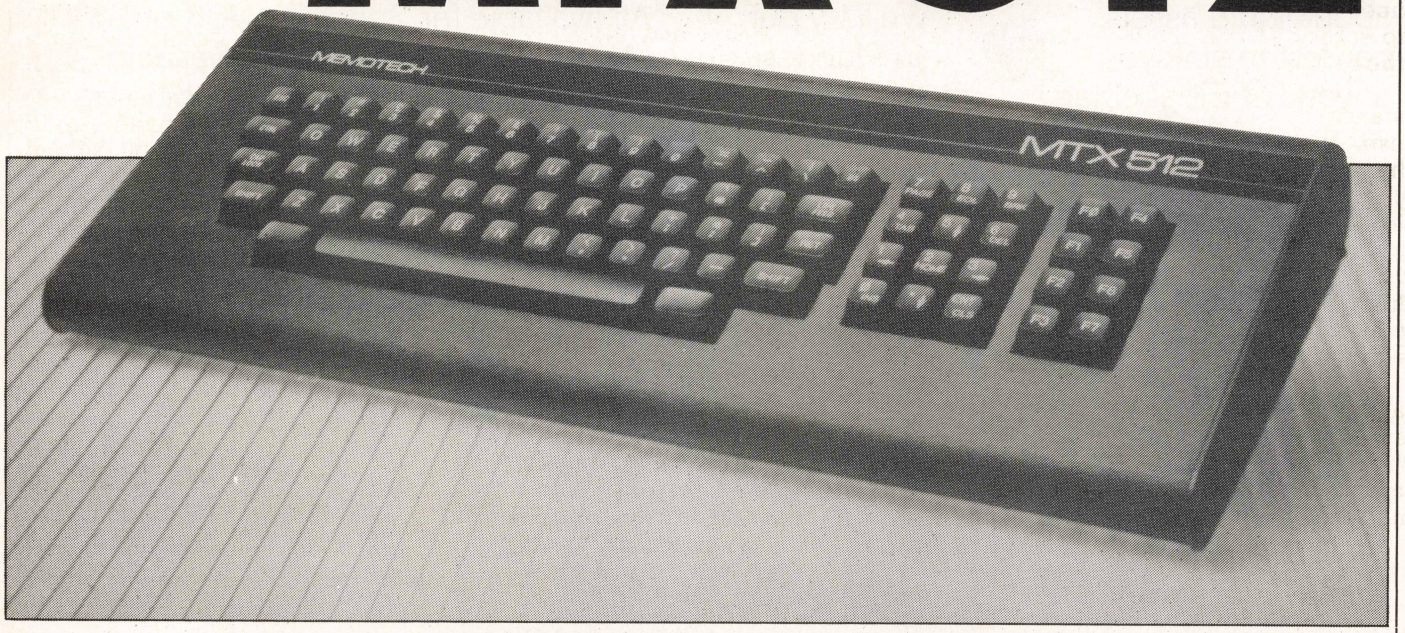
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HARDWARE REVIEW

MEMOTECH MTX 512



Can the new Memotech series compete in either the home or business markets? Simon Rockman investigates.

The Memotech MTX models 500 and 512 are new computers from a firm which has been manufacturing high quality add ons for the ZX81 for some time now. However, with the production of their own computer they are moving into a weightier competition with the likes of Commodore, Acorn and Sinclair, all companies with multi million pound turnover and profits.

Our review machine was the MTX 512 which differs from the 500 in that it has 64K as opposed to 32K of RAM. It comes nicely packed with all leads, power supply, and a good selection of tapes: two games, a demo cassette, a blank tape and a cassette head cleaner. This all makes for a neat ready-to-run package but it is a shame they missed out the mains plug which goes into all export models.

Market Aims

It is very much a computer aimed at the worldwide market. The board for the video circuitry is plugged in and can be quickly changed for most of the different television formats around the world. Big worldwide sales are good for the user as well as the manufacturer. The more people with an MTX, the better the software.

Professional Design

The computer is a very slick affair, the case being made of black aluminium giving it a solid, professional feel. It is very wide to accommodate the positive full stroke keyboard with a numeric keypad and function keys. Its appearance makes it one of the most attractive home computers I've seen. Still beauty is only skin deep and what really matters is what's inside the packaging.

Language Power

The MTX comes with three resident languages: Basic, Assembler and Noddy. Noddy is a new language and Memotech refer to it as a text LOGO. It only has eleven keywords, the mnemonic for which is "BIGEARS PLOD". Noddy has no line numbers and uses free format screens organised into a series of

pages which are named and can be called from one another. It's main use is for displaying text and I can see applications in the computer assisted learning (CAL) field. Writing in Noddy is like a mixture of LOGO and Forth.

The Z80 Assembler is very nice and a little like the BBC micro in that it is incorporated into the listing. It does not have BASIC line numbers but shows the memory locations as hexadecimal addresses within the listing. However, the editing is poor requiring you to set and list from pointers. The ease with which machine code can be written and merged with BASIC should lead to some very spectacular games in the future.

The BASIC interpreter is pretty standard, accepting abbreviations using a dot, e.g. 'P' is PRINT. String handling is a little odd, requiring you to specify the length of the string in a DIM, and having to use a two dimensional array to create a true string array. The BASIC is fussy about spaces – something which would annoy me until I got used to it.

The screen in which programs are written is divided up into three sub-screens, one for the listing, one for editing in and one line for error messages. The error messages are not very explicit but the cursor will appear over the error in the listing provided you do not use multi statement lines.

Editing is done with a good line editor. Not as pleasant to use as a full screen editor but you can use Noddy for any text work and call the information from BASIC with the command PLOD "progname". There is a PRINT AT equivalent CSR. Screen handling is powerful despite the lack of a memory mapped display because you can define



your own screens. The BASIC is fast and accurate, all the calculations being done in floating point maths so that you don't lose accuracy to gain speed. The processor's 4Mhz clock speed helps and Memotech are talking about offering an upgrade to 6Mhz. Slow screen scrolling makes the Memotech seem slower than it really is.

The graphics are good with a 192 by 256 resolution supported by lots of commands. As well as the usual line and plot there are turtle style angle and draw commands.

Spritely Sounds

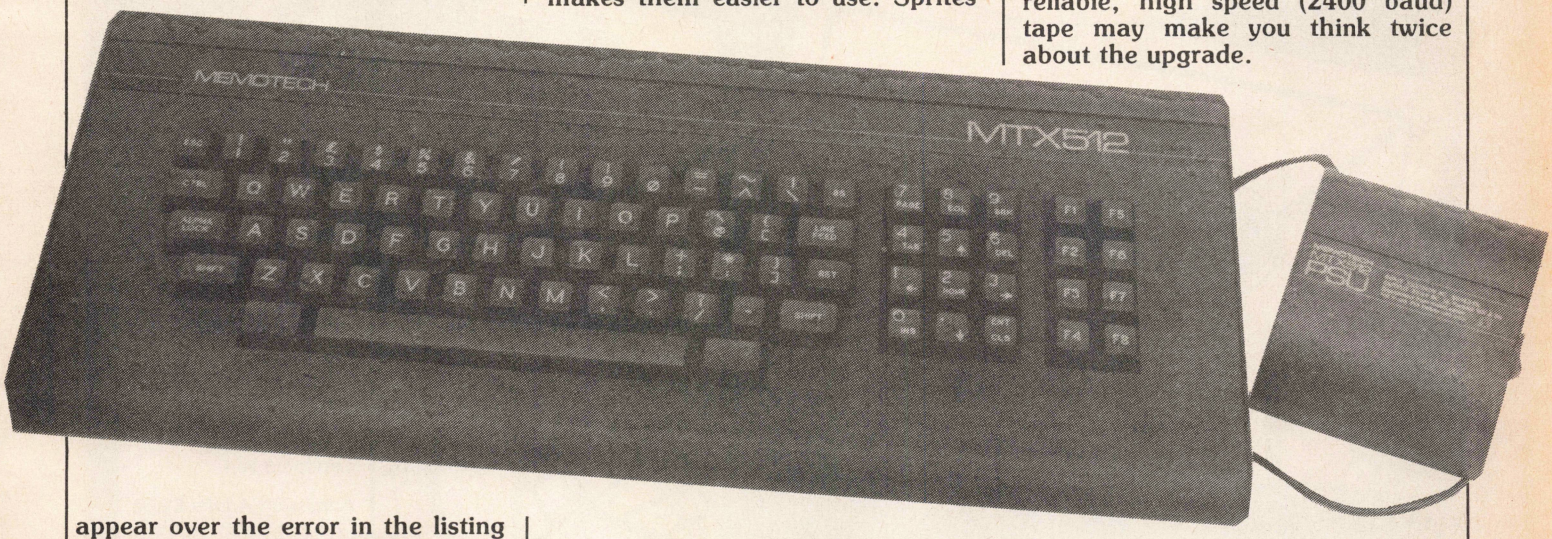
Thirty two sprites are supported either 8 by 8 or 16 by 16. They are easy to use and define and do not use extra memory as in the CBM 64 because they have their own area of RAM. This is slightly limiting but makes them easier to use. Sprites can be made to leave a trail on the HI RES screen and make for easy animation. Sound control is good with three normal and one "pink noise" channel and a wide range of frequency and volume controls. Sound can be channelled into a buffer so that it plays and does not interfere with the rest of the program. There are two levels of envelope control allowing both simple and complicated sound effects.

Educational Documentation

The documentation comes in the form of a large "Operators' Manual" but it is much more than that. The first section is a Basic tutorial. This is OK but it's not fun-to-read as are some basic books. The grass roots information is there and I could not find any major mistakes. The second part is on Noddy giving a good guide as to how it can be written but lacking examples of large applications. The third and fourth sections are on graphics and sound. Both are quite detailed and easy to follow. The fifth section is on how to interface assembler to Basic and not a tutorial for Z80 machine code. It shows you the rudiments however. The manual does lack a list of contents and this makes things difficult to look up.

Memorable Memotech?

There is plenty of room for expansion with the MTX and Memotech have planned a progression up to their small business machine with 80 column display (instead of the standard 40 x 24) floppy disks, silicon (or RAM) disks, and a hard disk under development. To use the disks you need CP/M. Expansion is expensive and the reliable, high speed (2400 baud) tape may make you think twice about the upgrade.



The MTX 512 is a fairly ordinary machine. It has no really excellent feature to outstar its rivals and it is quite pricey when compared with such machines as the Commodores and Spectrums. It will need to build up a good reputation quickly and to have software support from the big software houses to make it special. £315 for a 64K Z80 machine is a reasonable price. But no bargain.

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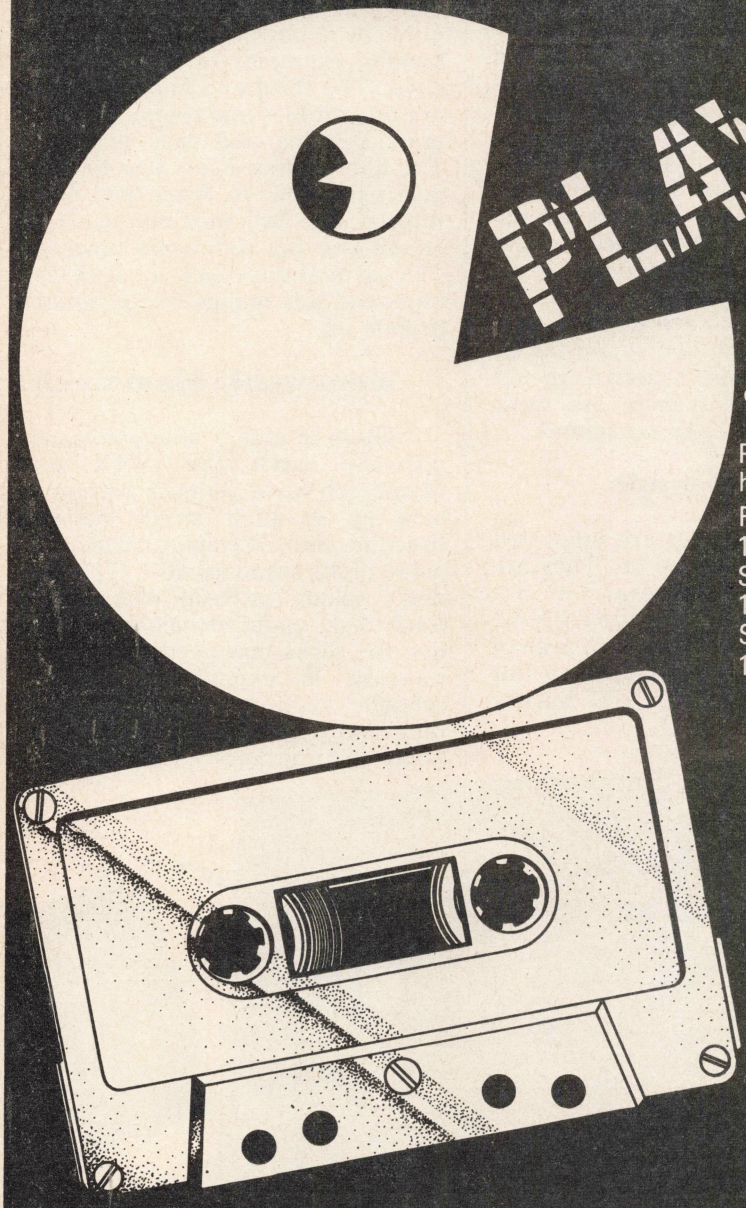
JANUARY 6th 7th 8th

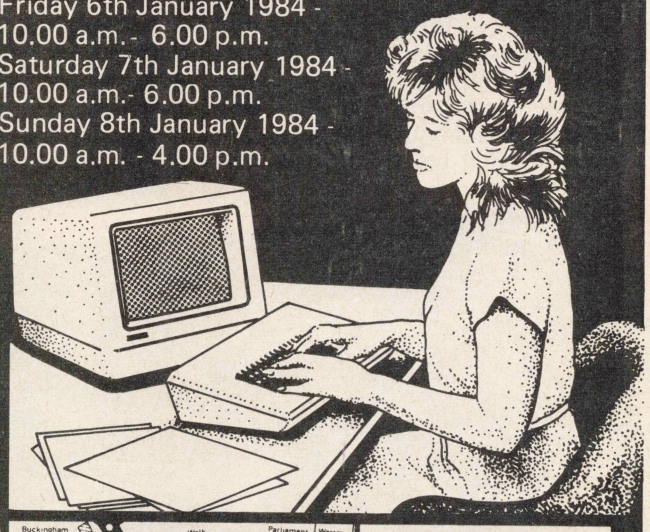
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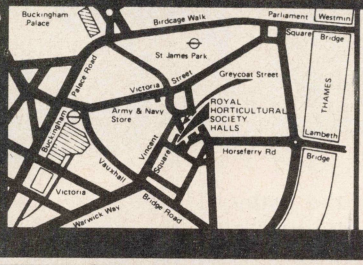
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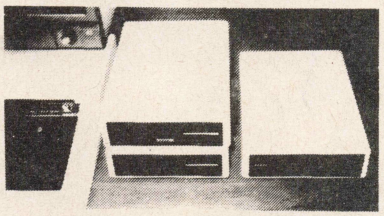


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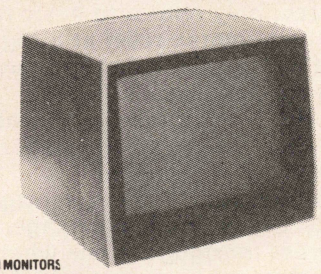
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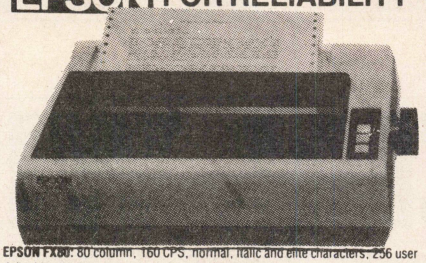
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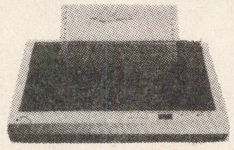
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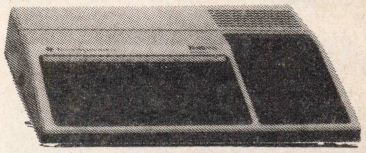
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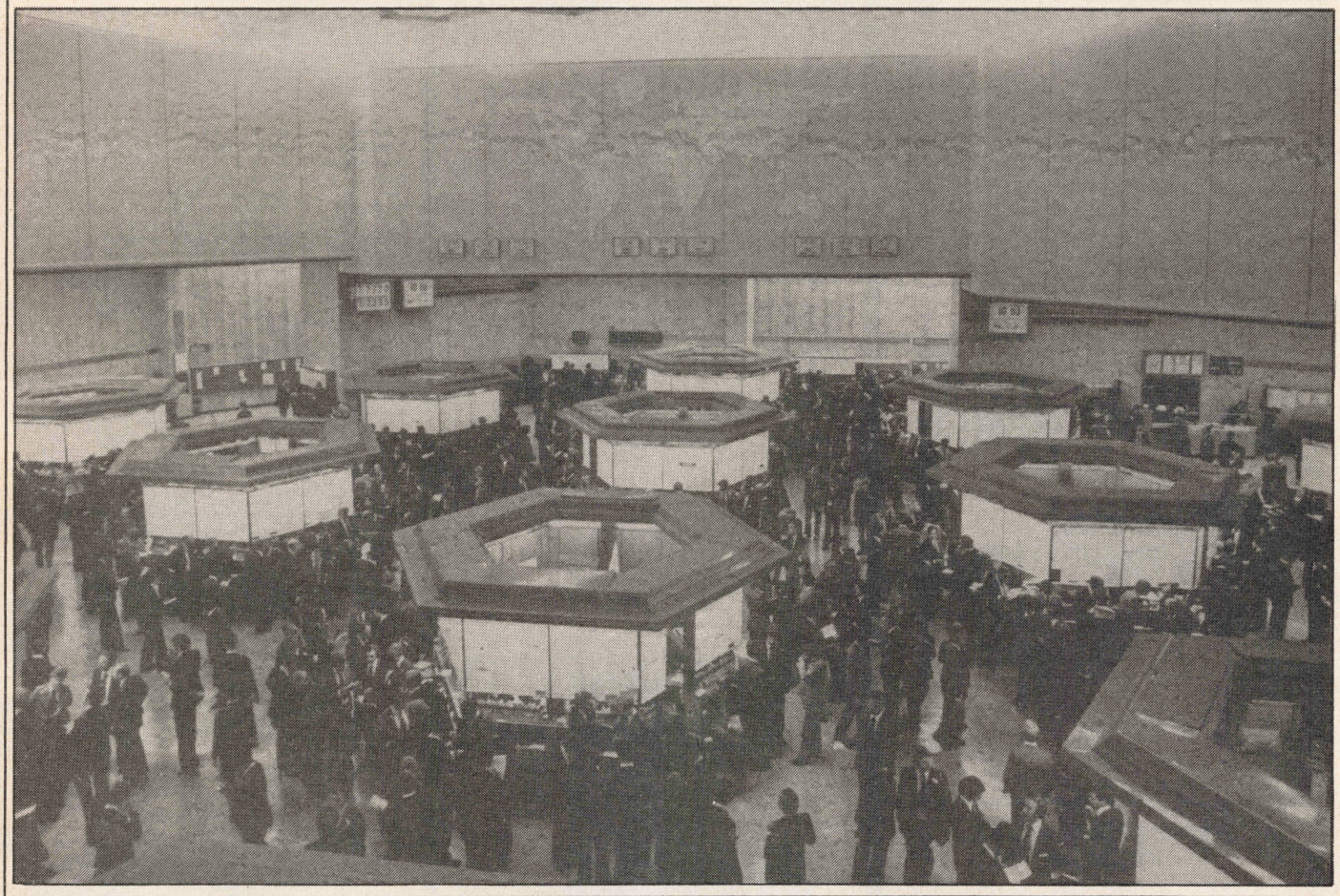
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SOFTWARE

FINANCIAL WIZARDRY



E.G. Faulkner and his computer unravel the mysteries of mortgage repayments.

This program is designed to enable people to cope with their finances. It will calcualte their mortgage repayments, the effects an increase or decrease in monthly payment would have on the remaining term of their mortgage and what the balance of their savings account might be, given that the interest rate remains constant with a regular monthly payment being maintained.

The main program is driven from a menu to which it returns on completion of its task each time. The program is written in extended BASIC.

For those who do not have the facility of display at or accept at, these can be changed to print at and input repectively. The main formulae which are required to enable the calculations to be effected are relatively short and for ease are shown at the end of the appropriate section.

Firstly, I should like to point out that there are in effect, two types of mortgages available from Building Societies:

One is an endowment mortgage and the other is a repayment mortgage. It is the latter which concerns this program.

On repayment mortgages interest and principal repayments must be made to the Society on a monthly basis. The formula for calculating this is complex especially since April of this year when the government introduced the deduction of tax relief at source for mortgages not exceeding £30,000.

I should point out that Miras which is the new name given to the deduction of tax relief at source, only relates to basic rate tax and any tax relief at a higher rate will continue through pay as you earn coding.

Repayment mortgages can be sub-divided into three categories:

A) Gross mortgage
B) Net Rate Annuity mortgage
C) Gross Profile mortgage.

A *gross mortgage* is one where the full payment is made to the Society and any tax relief obtained is through the borrower's salary.
Net rate annuity allows the amount payable by the borrower each month to be calculated so that it is a constant sum, the agreed term of the loan, subject to changes in the interest rate and the basic tax rate. It is more expensive to begin with than the previous system.
A *GROSS PROFILE* mortgage recreates exactly the previous system of tax relief.

However, because the amount of tax relief due reduces each year, your repayment will have to be increased each year and under this scheme only one change will be made annually to cover this and other changes caused by interest rate and tax rate variations.

If the rate of tax relief changes, then the appropriate adjustment should be made to lines 300 and 400 respectively.

In the program, all interest rates should be entered as normal, i.e. 11.25% should be entered and not 0.1125. Provision for the amendment has been made in the program.

HOW IT RUNS

Call Clear	This subprogram is used to clear the screen.
Call Screen (16)	The screen subprogram changes the colour of the screen. (16 = white)
On Error	When calculating the remaining term if the monthly payment being made does not at least equal the interest charged, the program would stop with an error message. However, with the aid of this command, if an error is detected, control of the program can be transferred to an appropriate part of the program to deal with it.
Call	Allows you to transfer control to a subprogram name. After execution of the subprogram control is returned to the statement after the call statement.
Accept at (X,Y)	The 'accept at' statement suspends program execution until data is entered from the keyboard. X = row number. Y = column number.
Display at (X,Y)	The display at statement displays information on the screen at (X,Y) where X = row number and Y = column number. With display at (X,Y) BEEP an audible tone (beep) is produced.
Int	Using this function the result of a calculation can be rounded off to any number of decimal places required. In this case two.
Call HCHAR (Row, Col, Code, Repetition)	This subprogram displays a character anywhere on the display and optionally repeats it horizontally. The code is the standard ASCII code.
Call Key (O,K,S)	This subprogram suspends all control until a key is pressed.
Subend	This indicates the end of a subprogram. When the subend is executed control is passed to the statement following the statement that called the subprogram.
Sub (subprogram name)	The sub statement is the first statement in a subprogram.
::	This is used in multiple statement lines to separate statements.
Line 110	Defines £ sign

PROGRAM LISTING

```
100 REM
110 REM FINANCIAL WIZARDRY
120 REM
130 REM BY ERNIE FAULKNER
140 REM 39 OAKWOOD AVE
150 REM MITCHAM
160 REM SURREY
170 REM
180 CALL COLOR(2,6,1):: CALL COL
OR(9,2,1)
190 ON ERROR 590
200 CALL CHAR(96,"0609081E081E08
1F")
210 ON WARNING NEXT
220 IMAGE ##.###
230 IMAGE ####.##
240 IMAGE #######.##
250 CALL TITLE
260 CALL KEY(0,K,S):: IF S=0 THE
N 260 :: IF K<49 OR K>51 THEN 26
0
270 IF K=49 THEN 310 :: IF K=50
THEN 680 :: IF K=51 THEN 890
280 REM  ********************
290 REM  * MONTHLY PAYMENT *
300 REM  ********************
310 CALL CLEAR :: DISPLAY AT(1,2
):"MONTHLY PAYMENT CALCULATION"
320 CALL HCHAR(2,4,42,27)
330 DISPLAY AT(5,3)BEEP:"ADVANCE
?" :: ACCEPT AT(5,20):A
340 DISPLAY AT(8,3)BEEP:"INTERES
T RATE?" :: ACCEPT AT(8,20):I
350 DISPLAY AT(11,3)BEEP:"NUMBER
 OF YEARS?"
360 ACCEPT AT(11,20):Y
370 DISPLAY AT(14,3)BEEP:"MONTHS
 IN TERM?" :: ACCEPT AT(14,20):M
 :: IF M<0 OR M>12 THEN 370
380 N=I*.7 :: I=I/100 :: N=N/100
390 Z=N*A*(1+M*N/12)*(1+N)^Y
400 W=(1+M*N/12)*(1+N)^Y-1
410 RA=Z/W*(1/12):: RA=INT((RA+.
005)*100)/100
420 IF A>30001 THEN RA=NIL
430 Z=I*A*(1+M*I/12)*(1+I)^Y
440 W=(1+M*I/12)*(1+I)^Y-1
450 R=Z/W*(1/12)
460 R=INT((R+.005)*100)/100 :: C
ALL CLEAR :: DISPLAY AT(1,2):"MO
NTHLY PAYMENT CALCULATION" :: CA
LL HCHAR(2,4,42,27)
470 DISPLAY AT(4,2):"DEBT" :: CA
LL HCHAR(4,14,96):: DISPLAY AT(4
,13):A :: DISPLAY AT(6,2):"TERM"
 :: DISPLAY AT(6,11):Y;"YEARS";M
;"MTHS"
480 DISPLAY AT(8,2):"INT RATE" :
```

FINANCIAL WIZARDRY

```
: DISPLAY AT(8,11):USING 220:I*1
00 :: CALL HCHAR(8,19,37):: DISP
LAY AT(8,19):"(GROSS)"
490 DISPLAY AT(10,11):USING 220:
I*70 :: CALL HCHAR(10,19,37):: D
ISPLAY AT(10,19):"(NET)" :: DISP
LAY AT(14,1):"MONTHLY PAYMENTS"
:: DISPLAY AT(16,2):"GROSS"
500 CALL HCHAR(16,21,96):: DISPL
AY AT(16,20):USING 230:R :: DISP
LAY AT(18,2):"NET ANNUITY" :: CA
LL HCHAR(18,21,96)
510 DISPLAY AT(18,20):USING 230:
RA :: DISPLAY AT(20,2):"GROSS PR
OFILE" :: CALL HCHAR(20,21,96)
520 GP=R-(A*I)/12*(30/100):: GP=
INT((GP+.005)*100)/100 :: IF A>3
0001 THEN GP=NIL
530 DISPLAY AT(20,20):USING 230:
GP
540 REM *********************
550 REM * END OF M.P. CALC *
560 REM *********************
570 GOTO 630
580 REM *********************
590 REM *  EXCESSIVE TERM  *
600 REM *********************
610 CALL CLEAR :: CALL HCHAR(9,1
1,42,16):: CALL HCHAR(11,11,42,1
6)
620 DISPLAY AT(10,9)BEEP:"*EXCES
SIVE TERM*"
630 CALL CONTINUE
640 GOTO 190
650 REM *********************
660 REM *  REMAINING TERM  *
670 REM *********************
680 CALL CLEAR :: DISPLAY AT(1,2
):"REMAINING TERM CALCULATION"
690 CALL HCHAR(2,4,42,26)
700 DISPLAY AT(5,3)BEEP:"MONTHLY
 PAYMENT?" :: ACCEPT AT(5,20):R
710 DISPLAY AT(8,3)BEEP:"ADVANCE
?" :: ACCEPT AT(8,20):A
720 DISPLAY AT(11,3)BEEP:"INTERE
ST RATE?" :: ACCEPT AT(11,20):I
730 I=I/100
740 L=(12*R)/(12*R-I*A)
750 K=(1+I)
760 L1=LOG(L):: K1=LOG(K)
770 T=L1/K1
780 T1=INT(T*1)/1
790 T2=T-T1 :: T2=T2*1.2 :: T2=T
2*10 :: T2=INT(T2*1)/1
800 DISPLAY AT(20,1):"TERM=";T1;
" YEARS  ";T2;" MONTHS"
810 REM *********************
820 REM *END REMAINING TERM*
830 REM *********************
840 CALL CONTINUE
850 GOTO 190
860 REM *********************
870 REM * MONTHLY  SAVINGS *
880 REM *********************
890 CALL CLEAR :: DISPLAY AT(1,2
):"MONTHLY SAVINGS CALCULATION"
900 CALL HCHAR(2,4,42,27)
910 DISPLAY AT(5,3)BEEP:"MONTHLY
 PAYMENT?" :: ACCEPT AT(5,20):M
920 DISPLAY AT(8,3)BEEP:"INTERES
T RATE?" :: ACCEPT AT(8,20):I
930 DISPLAY AT(11,3)BEEP:"TERM?"
 :: ACCEPT AT(11,20):N
940 I=I/100 :: N=N*2
950 Z=M*(7*I+24)*((1+I/2)^N-1)
960 W=2*I
970 B=Z/W
980 B=INT((B+.005)*100)/100
990 DISPLAY AT(20,3):"BALANCE OF
 A/C = ";B
1000 CALL HCHAR(20,20,96)
1010 REM *********************
1020 REM * END MONTHLY SAV *
1030 REM *********************
1040 CALL CONTINUE
1050 GOTO 190
1060 SUB TITLE
1070 CALL CLEAR
1080 CALL SCREEN(16)
1090 DISPLAY AT(1,7):"FINANCIAL
WIZARDRY"
1100 CALL HCHAR(2,9,42,18)
1110 DISPLAY AT(7,5):"1) MORT MO
NTHLY PAYMENT"
1120 DISPLAY AT(10,5):"2) REMAIN
ING TERM"
1130 DISPLAY AT(13,5):"3) MONTHL
Y SAVINGS"
1140 CALL HCHAR(16,14,42,7)
1150 DISPLAY AT(20,5):"WHAT SERV
ICE DO YOU REQUIRE?"
1160 DISPLAY AT(24,7):"PRESS 1-3
 AS REQD"
1170 SUBEND
1180 SUB CONTINUE
1190 DISPLAY AT(23,2):"-PRESS AN
Y KEY TO CONTINUE-"
1200 CALL KEY(0,K,S):: IF S=0 TH
EN 1200
1210 SUBEND
```

SURVEYING THE FIELD

Help us to produce a magazine tailored to your needs by completing this simple questionnaire and returning it to us.

This month we are including a questionnaire to find out precisely what uses our readers put their computers to. Sounds odd? Well, of course we know you compute with them but how? By playing video games, for education, for home economics, for business uses or for learning even more about the subject of computing?

The results of these questionnaires will be collated by a Business Studies' student at Heriot-Watt University in Edinburgh. As well as being a valuable contribution to his survey we hope that your completed forms will give us at *Personal Computing Today* further insight into just what you require from the magazine. This means that in the future we will be able to produce a better magazine which is even more to your liking and containing programs and articles which will interest you.

So, grab your pens and complete this short and simple questionnaire and send it off to us today at *Personal Computing Today*, Argus Specialist Publications, 1 Golden Square, London W1R 3AB. We hope to publish the results of this reader survey in the April issue of the magazine.

Background information

The study being carried out by Iain Peacock of Heriot-Watt University is an investigation into what the computer owner uses his computer for, how often he uses his computer, whether much upgrading and trading in occurs and other fascinating facts about this rapidly growing hobby. From the information obtained it is hoped that conclusions can be drawn on computer-user characteristics and from this, predictions made as to the future course of the home computer market.

General interest

Collecting information on the home computer market seems to be almost as popular a hobby as home computing itself. How accurate any survey can be said to be is debatable, and the information presented here is only meant as a guide.

In the summer of 1983 it was estimated that there were about one million home computers in the U.K., i.e. just over one in 20 households owned one. This compares with the figure for the U.S.A. of one in 40 households. Figures on the size of the market vary but it is estimated that about £100m was spent on home computers worldwide in 1982 and that this figure had trebled by the end of 1983.

It is thought that last year the British bought more home computers than the rest of Western Europe put together. Another report would suggest that 1984 will see the number of home computers in Britain reach a figure of one in every ten households.

Here in Britain, consumer demand seems buoyant enough to cause companies such as Sinclair and Acorn to have their production outstripped by demand. In Germany the proportion of home computers out of the total micro-computer sales is much smaller than in Britain and is also smaller than the U.S.A. The reason for this is that the general feeling in Germany is that the computer is a business machine and it has not yet found the popularity it enjoys in Britain and America. France, likewise, is not as computer-orientated as Britain, total computer sales being about 10-20% of those in Britain in 1982. Another factor unique to Britain is the massive seasonal trend for high Christmas sales when it is estimated that half of the year's total sales take place.

Looking at the home computer industry as a whole, it is interesting to note that in the U.S.A., which accounts for about 60% of the world production of machines, dominance is found in a few large and well-established corporation. Here in Britain, manufacturers have often been late starters in the computer industry (having turned to this from allied fields such as electrical engineering) and are conspicuous for the small size of their manufacturing base and marketing organisation. Yet of the top ten producers of home computers bought in the U.K., five are British and of the top three, one is British (Sinclair Research).

Software selections

It is estimated that the market for video games reached £150m in the summer of 1983. By August 1984 it is expected to be twice this figure. The major change in this area is that the big software names are giving way to the smaller houses and individuals who are flooding the market with their own programs.

Looking to the future

It seems likely that in spite of the predicted demand there will be a drop in the number of companies producing home computers in the future. Witness the cash flow problems of so many manufacturers late in 1983. Industry analysts have also indicated that the current price cutting war between the manufacturers will not continue, since even the large companies can only sustain a limited financial loss.

The trend among software manufacturers may well move towards a direct means of distribution, as is already happening with the Micronet 800 system, which offers owners of BBC micros and Spectrum machines fitted with a modem, the facility for downloading programs from the Prestel network. Because of the ease of distribution this may become a popular method of purchasing software from the consumer's point of view, although it is unlikely to be popular with software dealers.

Well, that briefly is the state of the home computer market today. With the help of *Personal Computing Today* readers, Iain Peacock hopes to clarify the situation further and to present us with his results in the near future. We look forward to receiving your questionnaires.

QUESTIONNAIRE

FOR OFFICAL USE ONLY

CODE	CODE
	4,5
	6,7
	8,9
	10,11
	12,13
	14,15
	16
	17
	18
	19

1 What make is your present home computer?

_____

2 Please name any other makes/models of home computers which you have owned or still own.

_____

_____

_____

3 Date of purchase of present home computer (please tick)

YEAR	MONTH
BEFORE 1979	JAN or FEB
1979	MAR or APR
1980	MAY or JUN
1981	JUL or AUG
1982	SEP or OCT
1983	NOV or DEC

4 What equipment, add-ons, have you purchased for use principally with your computer? (please tick)

CASSETTE RECORDER	MONITOR	MINI-PRINTER
DISC/MICRO-DRIVE	LIGHT PEN	LETTER-QUALITY PRINTER
RAM EXTENSION	EPROM	PLOTTER FOR GRAPHICS
TELEPHONE MODEM	GRAPHICS EXTENSION	OTHER
RS 232 INTERFACE	MUSIC SYNTHESISER	

5 How much do you use your home computer on average during a full week? (eg last week) (please tick)

LESS THAN 1 HOUR
1-2 HOURS
3-5 HOURS
6-8 HOURS
MORE THAN 9 HOURS

6 Number of software programs purchased on either cassette or disc (please tick)

0	11-20
1-5	21-30
6-10	30 +

7 Which category (or categories) of software do you use most frequently with your home computer? (please tick)

ARCADE OR ADVENTURE GAMES
EDUCATION
HOME-ECONOMICS
GRAPHICS
BUSINESS
ASSEMBLERS/UTILITY
OTHER

8 What proportion of the total time you spend with your home computer are you doing programming of your own? (please tick)

0%	31-50%
0-10%	51-70%
11-30%	71% +

QUESTIONNAIRE

FOR OFFICAL USE ONLY

	CODE	CODE
9 Are you actively considering, or in the process of choosing, a new home computer to replace or use in addition to your present one? (please tick) YES NO		20
If so what makes/models are you considering? _____		21,22
_____		23,24
_____		25,26
10 Please state where you bought your present home computer? _____		27,28
Was it through: (please tick) MAIL ORDER SPECIALIST COMPUTER SHOP NEITHER OF THE ABOVE		29
11 How many books have your purchased that are concerned with home computing or with your home computer? (please tick) 0 1 2-3 4-5 6 +		30
12 Please list below the names of those computing magazines which you have read within the last 7 days or which you normally purchase. _____		31,32
_____		33,34
_____		35,36
_____		37,38
13 Please state your position within household (please tick) FATHER/HUSBAND SON WIFE/MOTHER DAUGHTER		39
14 Please state your age (please tick) UNDER 12 31-40 13-19 41-50 20-24 51-60 25-30 61 +		40
15 Are you a member of any computer club? YES NO If so please state _____		41
_____		42,43
_____		

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MICRO MART

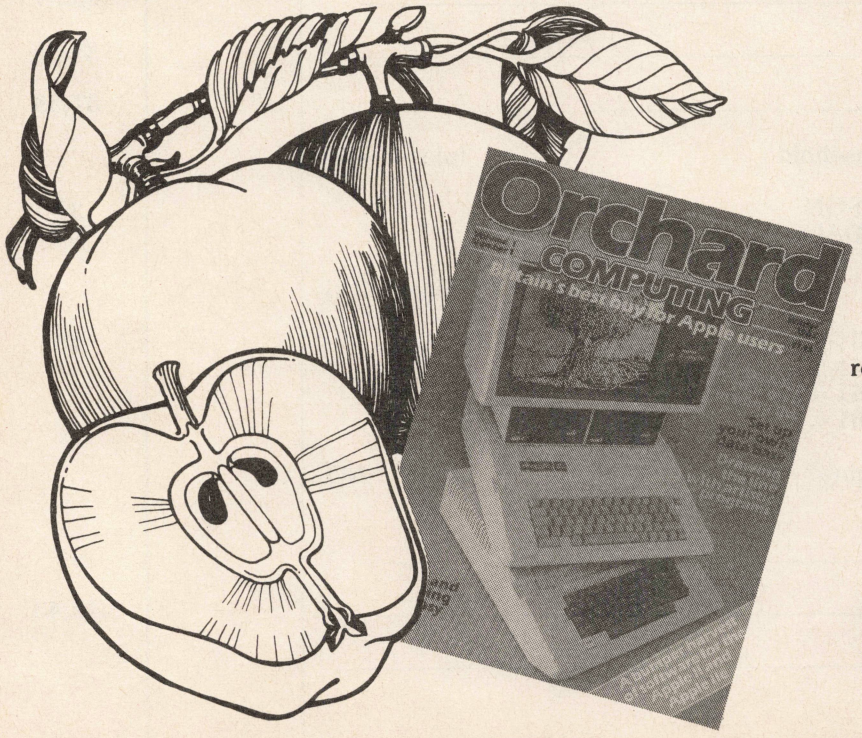


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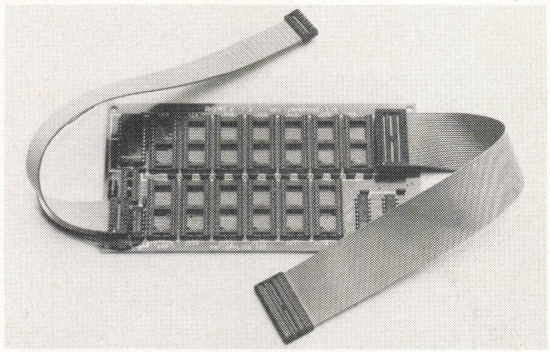
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BABY BROTHER?



Portable typewriter, computer printer or calculator? A small machine with big ideas for under £170.

One contestant for a Design Council Award this year must surely be the EP-22 Typewriter/Printer from Brother.

This neat machine, weighing in at under 5lb, and costing less than £170, measures an incredible 31 x 23 x 5.5 cm. Encased in durable black plastic, the slim unit, complete with foldaway carrying handle, resembles a very small briefcase; a feature intended I would presume for its use as a portable typewriter. Indeed the typewriter would not look out of place on some commuter's knee on the train. It's versatility is emphasised by the fact that it works on battery or mains current.

Hidden delights

Opening the lid reveals a very comprehensive keyboard incorporating the full set of Qwerty characters and lots more besides. A second shift key has enabled Brother to get in a wide range of scientific and linguistic symbols, generally seen only on the specialised and more expensive typewriters and printers.

The On/Off switch is well positioned on the top of the case and has a very positive rocking action. The only indication, however, that the machine is switched on is light in the LCD display. A red light might be an advantage here. One striking feature of the EP-22 is the three inch wide LCD display above the keys. In a selected mode this displays 16 characters of type enabling editing before print out — a boon for the less accurate typists among us. Thoughtful designers have even included a brightness control switch.

Getting started

The EP-22 takes standard A4 sized (or at a pinch foolscap) paper which is inserted mechanically by the use of two paper feed buttons. Once fed in, the paper can be released and repositioned by means of a paper release key on the side.

A smoked perspex cover encloses the dot matrix print head and ribbon cassette. This is unique as the cassette is the size of the audio microcassettes used in dictaphones. The ribbons are carbon based and single strike (i.e. each area of the ribbon is struck only once). The unit comes complete with three ribbons and there are special attachments for the two spare ones in the lid of the case. I have a criticism of these cassettes. Of all the ones we tried we had trou-



ble with snagging where the ribbons wound round the edge of the plastic area.

Thermal paper can be used in the absence of the ribbon to give a thermal printout. This printing is in blue and doesn't photocopy as well as the carbon printed version. Carbon copies are not possible, nor are they necessary as the 2K of memory enables storage and reprinting of documents up to the number required.

In the Correct Print mode, insertion and deletion of characters is possible before printout. This removes the need for messy correction fluids, which in any case couldn't be used with this type of print head. Margins are set as desired by the use of two keys. Theoretically it is possible to have a 75 character line but more practically, allowing for margins, a 65 character width gives ample scope for most jobs.

Multiple modes

The Ep-22 has three basic printing modes. Non Printing, which enables you to store up to a page of A4 text in memory, Corrected Printing (which stores 16 characters at a time and prints out the first when you type in the 17th) and Direct Printing where the machine acts like a normal typewriter.

All these modes are clearly explained in the easy to read manual. One point to remember, however, is that there is no automatic carriage return in any of the modes and you must listen for the beep to warn you that the end of the line has been reached. The printout itself is a little disappointing in that it is not legible or neat enough for word processing use. A double strike facility would have been advantageous, though of course would slow down the printout to an unacceptable level. Printing onto thermal paper with the ribbon removed gives a darker, clearer print but would work out expensive.

Storage of text is clearly described in the handbook but you must make doubly sure that you have pressed all the correct switches as the EP-22 won't tell you which mode you are in. Simple editing facilities such as insertion and deletion are possible and carried out by means of a two key action; movement of the cursor to a position underneath the character in question, then press delete or insert, followed by the chosen character. For longer deletions there is a quicker method by means of the CODE key situated by the space bar.

Printer power

One would presume that Brother are trying to interest the home computer enthusiast in the use of EP-22 as an interfaced printer. We therefore tested it out with a BBC micro. In order to connect the two you need the correct cable for the micro you are using. Lowe Electronics, the main distributor for the EP-22 is currently making cables for the Colour Genie (which they also distribute) and the increasingly popular BBC. So before you buy check that you can get hold of the cable you require.

When used as a printer the machine has a transfer rate of 300 and 75 baud with a 78 byte buffer. Information on its use as a printer is sketchy. However, we had little difficulty in setting it up and getting a print out from it.

Grown-Up Printer?

The EP-22 must be considered cheap in printer terms. It is comparable to the Sekioshia GP80/GP 100 printers in that the print quality is similar, although lighter and slightly clearer. Running costs of this machine would be quite high — the ribbon costs £1.40 and lasts for up to 16,000 characters and thermal paper is approximately £3.00 for 100 sheets. However, power costs using a mains adaptor are low.

The baud value for running is selected using the return key and this is much easier than the usual fiddling with DIP switches. Switching on and off line is easily achieved with the CONT and STOP keys. The display window constantly shows the state of the printer, which means that at a glance you can check whether the machine is on or off line and whether 300 or 75 baud.

Verdict

The EP-22 works well as a typewriter and a printer. It is almost silent in operation and extremely sturdy. Quite honestly the price is amazing for such a versatile product of this high quality, and the EP-22 must be a consideration for any home computer owner needing a printer. Although the recommended retail price is £169.95 the machine has been spotted selling cheaper! Details from Lowe Computers, Tel: (0629) 4995. Distributed through office equipment suppliers, Colour Genie dealers and some High Street Stores.

BROTHER EP-22 CHARACTER SET

"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
mnopqrstuvwxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥ ƒáíóúñÑªº¿⌐¬½¼¡«»>L.


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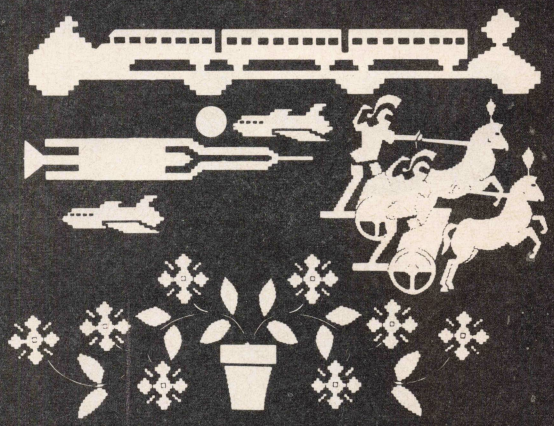
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PROGRAMS 5-8



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FROM 7 YEARS

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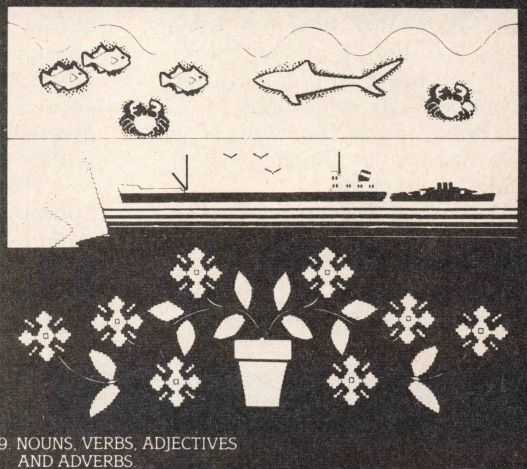
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TELETEXT SCREEN DESIGNER



Design your own Teletext pages using Jeremy Bullock's program.

This program makes it easy to design pictures in MODE 7 (Teletext) graphics. To use the program type it in and RUN. You will be presented with a list of options. Press 3 to design a screen or press 2 to load a screen from tape. If you press 3, you will then be asked whether you need instructions. If you then type Y you will be given a list showing what the function keys do.

Drawing A Picture:

Move the cursor with the four cursor control keys. When it is at the correct place press the key bearing the symbol that you wish displayed. The function keys give (a) double height, background etc. (b) text colours and (c) graphics colours. Remember that (a) all colour codes take up one space (b) lower case letters, numbers, and some symbols appear as block graphics, after a graphic colour code.

The instructions show three columns. The first is the text colour that appears after pressing SHIFT and the appropriate function key; the second shows the graphics colour that appears after pressing CTRL and the appropriate key; the third shows the 'functions' e.g. double height etc. that are produced by pressing the appropriate function key.

Notes

Double height just affects one line. To get double height letters, a code is necessary on each double height line.

The screen does not scroll
Errors are deleted using the delete key
The copy key does not work.

HOW IT RUNS

Lines 10-60	Switch off cursor, change HIMEM, jump to intro, then to main loop.
Lines 70-90	Error section
Lines 100-180	Set up defined keys, make cursor keys produce ASCII codes and set variables.
Lines 190-260	Get character to be displayed. If it is RETURN jump to main loop, having set a flag.
Lines 270-280	Move cursor to new position.
Lines 290-320	Stop cursor going off the screen.
Lines 330-340	Beep.
Lines 350-390	Jump to procedures, until COM is false.
Lines 400-410	Switch off cursor and transfer the screen to another part of the memory.
Lines 420-550	Display menu. Get command and act appropriately.
Lines 560-570	Print headings in double height.
Lines 580-590	Cursor On/Off.
Lines 600-680	Screen Save.
Lines 690-770	Load Screen.
Lines 780-830	Intro for creating a screen.
Lines 840-910	Retrieve a stored screen.
Lines 920-940	End of program.
Lines 950-1000	Intro for displaying screen.
Lines 1010-1140	Instructions.
Lines 1150-1190	Introductory sequence.

The screen is stored just below the screen map and is saved from and loaded into this section.

?(&25A) turns CAPS LOCK on/off
?(&25A) = 40 turns it on
?(&25A) = 50 turns if off

HINTS ON CONVERSION

The program needs alteration to work on a model A and will only work with O.S. 1.0 onwards because (a) it is not possible to set a 'base value' for CTRL + function keys, (b) effects such as switching on CRPS/LOCK from inside the program and switching on and off the cursor won't work.

The only other computer the program can be used on is the Model A. It won't work on the Oric, even though it has TELETEXT graphics. The program uses function keys a lot as all the other keys are used in creating pictures.

To use the program on a Model A

1. Line 630 must be changed to: *SAVE"SCREEN" 3800 3BFF
2. Line 720 must be changed to; *LOAD"SCREEN" 3800

The rest works on both models.

PROGRAM LISTING

```
   10 REM*******************************          * TELETEXT
GRAPHICS DESIGNER *          *                              *
         *    (C) 1983 J.C.BULLOCK    *          *
                   *          *******************************
   20 *********************************
   30 ON ERROR IF ERR=17 THEN VDU6:RUN ELSE IF ERR<>17 THEN
70
   40 DIM USED(2):USED(1)=0:USED(2)=0
   50 MODE 7:HIMEM=HIMEM-1023
   60 PROCOFF:PROCINTRO:GOTO 420
   70 *FX4
   80 VDU6:REPORT:PRINT" at line ";ERL
   90 END
  100 DEF PROCINIT
  110 *KEY0 "!!!L"
  120 *KEY1 "!!!M"
  130 *KEY2 "!!!\"
  140 *KEY3 "!!!]"
  150 *FX227,144
  160 *FX4,1
  170 COM=0:X%=1:Y%=1
  180 ENDPROC
  190 DEF PROCget
  200 A=GET:IF A=13 THEN COM=-1:ENDPROC
  210 IF A=136 AND X%>0 THEN X%=X%-1:PROCCUR:GOTO 260 ELSE I
F A=137 AND X%<39 THEN X%=X%+1:PROCCUR:GOTO 260
  220 IF A=139 AND Y%>0 THEN Y%=Y%-1:PROCCUR:GOTO 260 ELSE I
F A=138 AND Y%<24 THEN Y%=Y%+1:PROCCUR:GOTO 260
  230 IF A=127 THEN VDU 127:X%=X%-1:GOTO 250
  240 PROCCUR:VDU A:X%=X%+1
  250 PROCCHECK
  260 ENDPROC
  270 DEF PROCCUR
  280 VDU 31,X%,Y%:ENDPROC
  290 DEF PROCCHECK
  300 IF X%>39 THEN X%=0:Y%=Y%+1 ELSE IF X%<0 THEN X%=39:Y%=
Y%-1
  310 IF Y%<0 THEN Y%=0 ELSE IF Y%>23 THEN Y%=23:X%=0
  320 ENDPROC
  330 DEF PROCERROR
  340 SOUND 1,-15,100,6:ENDPROC
  350 REM JUMP TO PROCS
  360 VDU 26:CLS:PROCON:PROCINIT
  370 REPEAT:COM=0
  380 PROCget
  390 UNTIL COM
  400 PROCOFF
  410 FOR A%=0 TO 24:FOR B%=0 TO 39:?(HIMEM+B%+A%*40)=?(HIME
M+B%+A%*40+1023):NEXT B%,A%
  420 CLS:PROCDBL("MENU")
  430 VDU 26:*FX4,1
  440 PRINT'CHR$ 129;"Do you wish to:"'CHR$130;"1. Save the
 screen on tape"'CHR$ 130;"2. Load a screen from tape"'CHR$
130;"3. Start a new screen"'CHR$ 130;"4. Continue with old s
creen"'CHR$ 130;"5. Exit program"
  450 PRINTCHR$130;"6. Display screen"
  460 PRINT'CHR$ 129;"Enter 1,2,3,4,5 or 6"
  470 PRINT'SPC(11);CHR$134;"Current Operation"
  480 PRINT TAB(0,21);CHR$ 134;"#BBC Teletext Graphics Edito
r Program#"
  490 PRINT TAB(0,23);CHR$134;SPC(4);"Press ESCAPE to return
 to menu."
  500 VDU 28,0,20,39,14
  510 REPEAT:A$=GET$:UNTIL A$>"0" AND A$<"7"
  520 OP=VAL A$
  530 CLS
  540 ON OP GOTO 600,690,780,840,920,950
  550 GOTO 440
  560 DEF PROCDBL(PR$)
  570 LOCAL A%:FOR A%=VPOS TO VPOS+1:PRINT TAB((39-LEN PR$)/
2,A%);CHR$141;PR$:NEXT:ENDPROC
  580 DEF PROCON:VDU 23,1,1;0;0;0;:ENDPROC
  590 DEF PROCOFF:VDU 23,1,0;0;0;0;:ENDPROC
  600 PROCDBL("SCREEN SAVE")
  610 PRINT'CHR$134;"        Press Record then RETURN"
  620 VDU 21
  630 *SAVE"SCREEN" 7801 7BFF
  640 VDU 6:PRINT'CHR$ 129;CHR$ 136;"  PRESS STOP ON THE TAP
E RECORDER"
  650 PROCERROR
  660 TIME=0:REPEAT:IF TIME MOD 100=0 PROCERROR
  670 UNTIL TIME=205
  680 CLS:GOTO 510
  690 PROCDBL("SCREEN LOAD")
  700 PRINT'CHR$ 134;SPC(6);"Press RETURN and start tape":RE
PEAT UNTIL GET=13
  710 VDU 21
  720 *LOAD"SCREEN" 7801
  730 VDU 6:PRINT'CHR$ 129;CHR$ 136;"  PRESS STOP ON THE TAP
E RECORDER"
  740 PROCERROR
  750 TIME=0:REPEAT:IF TIME MOD 100=0 PROCERROR
  760 UNTIL TIME=205
  770 CLS:GOTO 510
  780 PROCDBL("CREATE PICTURE")
  790 ?(&25A)=40
  800 PRINT'CHR$134;"    Do you want instructions?(Y/N)":REP
EAT:A$=GET$:UNTIL A$="Y" OR A$="N"
  810 ?(&25A)=50
  820 IF A$="Y" THEN PROCINST
  830 GOTO 360
  840 PROCDBL("RETRIEVE SCREEN")
  850 PRINT'CHR$134;"    Do you want instructions?(Y/N)":?(&
25A)=40:REPEAT:A$=GET$:UNTIL A$="Y" OR A$="N":?(&25A)=50:IF
A$="Y" THEN PROCINST
  860 VDU 26:PROCON:CLS
  870 FOR A%=0 TO 24:FOR B%=0 TO 39
  880 ?(HIMEM+B%+A%*40+1023)=?(HIMEM+B%+A%*40)
  890 NEXT B%,A%
  900 PROCON:PROCCUR
  910 GOTO 370
  920 PROCDBL("END OF PROGRAM")
  930 TIME=0:REPEAT:UNTIL TIME=200
  940 END
  950 PROCDBL("DISPLAY SCREEN")
  960 *FX4,1
  970 PRINT CHR$ 134;"When picture is on screen,press any"'C
HR$134;"key to return to menu"
  980 PRINT 'CHR$ 134;SPC(9);"Press RETURN":REPEAT UNTIL GET
=13
  990 VDU 26:CLS:FOR A%=0 TO 24:FOR B%=0 TO 39:?(HIMEM+B%+A%
*40+1023)=?(HIMEM+B%+A%*40):NEXT B%,A%
 1000 REPEAT UNTIL GET=13:CLS:GOTO 420
 1010 DEF PROCINST
 1020 VDU 26:CLS:PROCDBL("INSTRUCTIONS")
 1030 PRINT'CHR$ 130;"Cursor keys move the print cursor"'CHR
$130;"around"
 1040 PRINT'CHR$ 129;"Function keys"'CHR$131;"_____"
 1050 PRINTCHR$131;"Alpha      Graphics  Functions"
 1060 PRINTCHR$130;"Shift+       Ctrl+      Alone"
 1070 RESTORE 1090
 1080 FOR A%=1 TO 3:FOR B%=0 TO 9:READ A$:PRINT TAB((A%-1)*1
0,B%+11);CHR$129;"f";B%;CHR$131;A$:NEXT B%,A%
 1090 DATA -,red,green,yellow,blue,magenta,cyan,white,flash,
steady
 1100 DATA -,red,green,yellow,blue,magenta,cyan,white,-,-
 1110 DATA normal height,double height,background on,no back
ground,-,-,-,-,-,-,-,-
 1120 PRINT'CHR$134;"Press RETURN when picture is finished."
 1130 PRINT CHR$134;SPC(14);"Press RETURN":REPEAT UNTIL GET=
13:CLS
 1140 ENDPROC
 1150 DEF PROCINTRO
 1160 VDU 31,5,10,133,141:PRINT"BBC TELETEXT GRAPHICS EDITOR
":VDU 31,5,11,133,141:PRINT"BBC TELETEXT GRAPHICS EDITOR"
 1170 VDU 31,8,15,130,136,141:PRINT"(C) 1983 J.C.BULLOCK":VD
U 31,8,16,130,136,141:PRINT"(C) 1983 J.C.BULLOCK"
 1180 VDU 31,6,18,129:PRINT"For the model A or B micros"
 1190 TIME=0:REPEAT UNTIL TIME=300:CLS:ENDPROC
```

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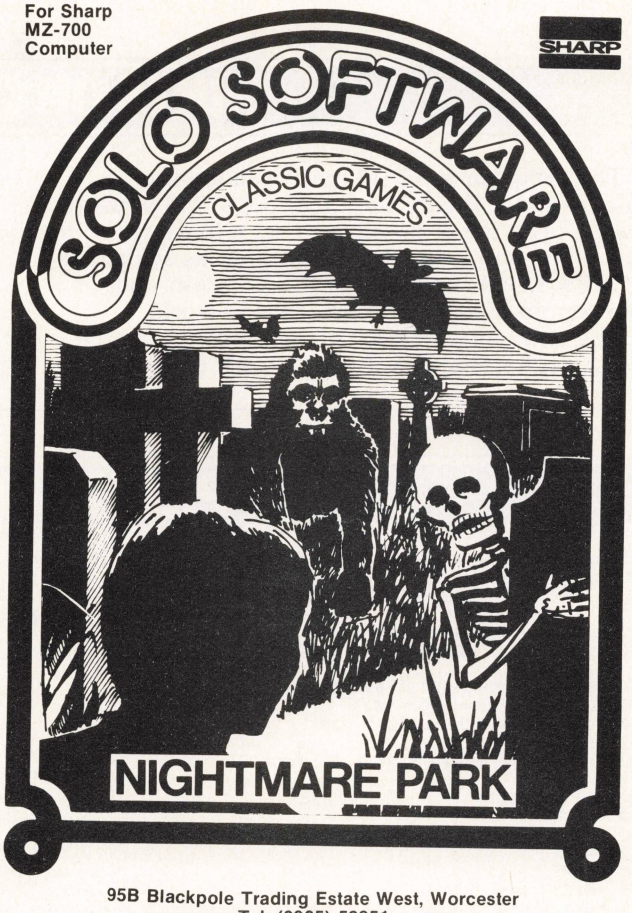
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PERIPHERALS

ADD ONS

This month we take a look at a selection of additional units for your computer.

SPECTRUM STICK

Manufacturer: Grant Design Ltd.
Price: £9.95

The number of add-ons being produced for the Spectrum is quite astounding and this is the latest in the 'what-will-they-think-of-next?' category.

The Spectrum-stick clips onto the top of the Spectrum case and presses the numbers 5,6,7, and 8 digit keys to simulate the pressing of the cursor keys. The manufacturer claims it uses 'the latest engineering materials to achieve excellent "feel" and precise control without sacrificing strength'. To me it looks rather shoddy, made of cheap injection moulded plastic which is not at all robust or positive to the feel. I would not envisage it lasting very long and I feel it is an expensive gadget to buy merely to push four buttons. Available from Bank House, Reepham, Norwich. Tel: (0603) 870852.



ZX LPRINT INTERFACE

Manufacturer: Euroelectronics
Price: £41.40 + £12.08 for cassette.

KEMPSTON PRINTER INTERFACE

Manufacturer: Kempston Micro Electronics
Price: £45

I thought a comparative review of these two printer interfaces might be interesting.

I have been using both interfaces for a while now and have not settled on my choice of favourite. Both have their weaknesses.

One general criticism is that neither of them mirror the edge connectors so that you cannot have anything else on the back of the connector. This is particularly surprising with the Kempston product because the same is true of their joystick interface and I would have expected the two to be compatible.

The Kempston interface is the more attractive of the two units, being made of a softer black plastic than the ZX LPRINT. The LPRINT has the wonderful advantage that it does not require you to load any software from tape for it. It is just as though your Spectrum had a centronics interface inherent in it. The Kempston interface does require a tape and it needs different programs for different printers. This makes it more awkward to use but has the advantage that it will not only LPRINT but also COPY, although the latter is achieved with a RAND USR 23370, not just by pressing the COPY key.

I found it impossible to send control codes through the ZX LPRINT and so could not write a copy for it. Nor could I switch over the printer (an Epson FX80) to do any clever things such as re-setting the margin or printing bold characters. With the Kempston interface I had no such problems.

However, one problem with the Kempston interface was its unreliability. It only worked periodically and I could not find the fault.

I use a printer for listings, screen

dumps etc. and require flexibility. Because of this I came to prefer the Kempston product which I found easy to use and which did everything I wanted it to and well. The LPRINT has some limitations with regards what it will do, but it is easy to use due to the absence of a tape — one just plugs it in and away you go. This is ideal for listings which are sometimes needed quickly.

In the end the choice is purely personal — flexibility or ease of use? It's up to you. The ZX LPRINT is available from Eurelectronics, 26 Clarence Square, Cheltenham, Glos. Tel: (0242) 582009.

INTELLIGENT JOYSTICK for the Sinclair Spectrum

Manufacturer: Cambridge Computing
Price: £34.95

Sinclair have only recently announced a joystick interface (the ZX Interface 2 reviewed on these pages previously) and so prior to this there was a rush to fill the gap. If at the launch of the Spectrum, Sinclair had announced the codes that their interface would return, a standard would have been written to work with the ZX Interface 2.

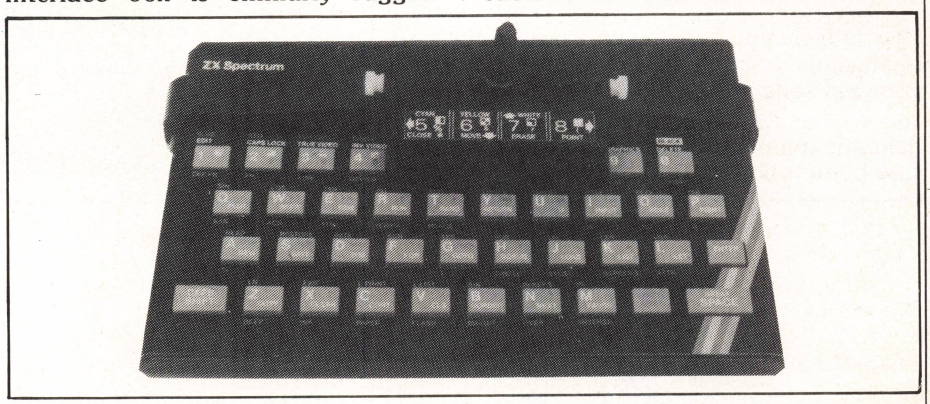
Having left it so late they may have missed the boat and left the world without a standard for Spectrum joysticks. This lack of a standard has made life really difficult for both software houses and joystick manufacturers.

There have been two major approaches to solving this problem. The first was to produce an interface which fixes the codes and then to go around to the software houses persuading them to use your "standard" — something Kempston have done with some success. The second is to make your interface flexible enough to cope with all the different games on the market. This involves some element of programming. Either hardware (moving switches) such as with the AGF, or software as with the Cambridge Computing intelligent joystick.

The way Cambridge achieve this flexibility is to have a program which you have to run to configure the joystick before loading your game. The program, called "JOY", loads quickly and reliably so it is not as awkward as it may first appear. You then have to specify which keys you want to mimic for left, right, up, down and each of the two buttons. This specification can be added to a library of selections so that you don't have to re-specify each time you want to play a particular game. You can save, add to or delete from the library as well as playing a game from it.

To play a game you type in the name of the library selection, confirm that is the one you want and the program NEWS itself, leaving the joystick set up. You can then load your game. Playing a game you've only ever played with a keyboard before makes it much easier. This is where the quality of the 'stick' itself comes into play.

Normally an interface comes without the joystick and has a standard Atari-type socket. The Cambridge Computing joystick is dedicated to the interface, which is nice because it allows you to have two fire buttons. The stick is small, fast and precise allowing accurate positioning with strong springs to centre the stick when released. The construction is good and solid and will stand the onslaught of many hordes of alien invaders or help many frogs to cross the road. The interface box is similarly rugged with a strong edge connector socket on the front and mirrors the Spectrum's port on the back. Altogether a nice little add-on for the games freak. Available from 40-42 Hobson St, Cambridge (0223) 322905.



HITACHI DISC SYSTEM

Supplier: Advanced Memory Systems Ltd
Price: £225

When I first came to use the Hitachi 3″ disc drive I was very sceptical. I felt that the last thing the world needed was a new disc standard for the BBC. Acornsoft had only got around to releasing products for 80 track disc drives. However, the recent releases of these easy to use disc drives from the Japanese company does nothing to overload the market.

Five and a quarter inch discs are fragile things and bend easily and are very prone to becoming corrupted simply by leaving them 'lying around'. The micro discs, in their hard plastic shell, can be dropped into a pocket or stand the weight of books or even, the advertisers would have us believe, a two and a half tonne truck!! They are thus ideal for school or scientific data capture environment where there may be chalk, prying fingers or chemicals lying about. All the factors which would destroy data on floppy discs are of no consequence to these toughies, and peace of mind is thus maintained throughout use.

The mechanical operation is quiet and smooth and gives no advantage to the 5¼ inch system. Write protect is achieved with two switches on the micro disc so that you can protect discs far more easily and efficiently than by the sticky label practice on the floppies.

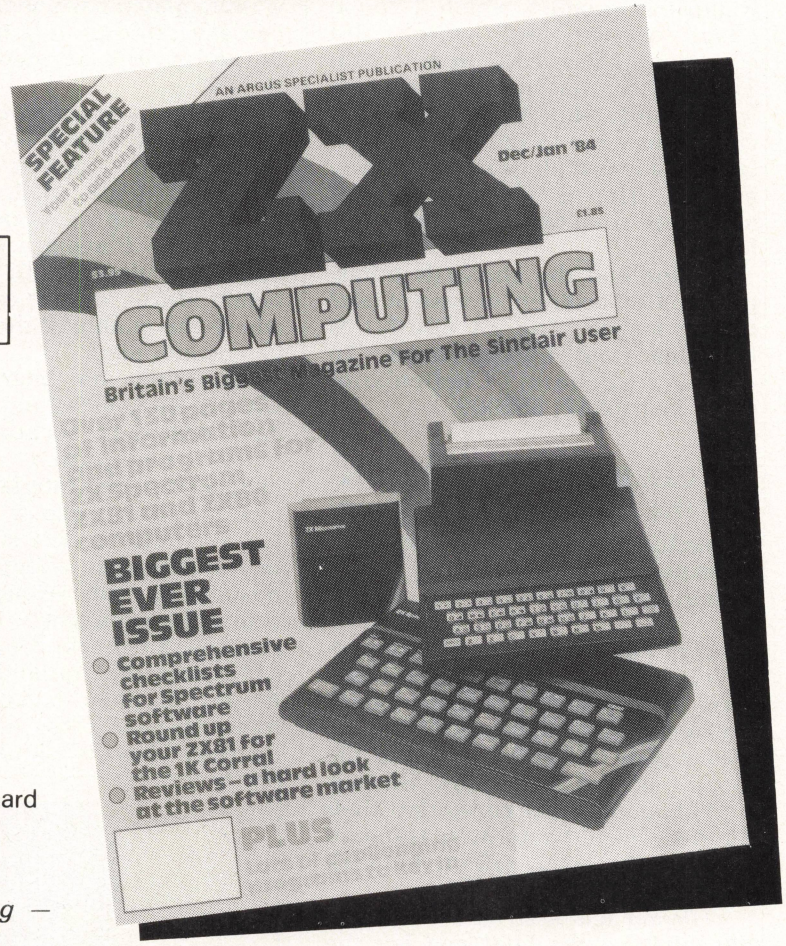
The manual which is supplied with the disc drive is excellent and installation is easy, a matter of simply connecting the 36 way ribbon cable to the disc drive slot and the power cable to the outlet under the BBC machine. The utility eprom is not so easy to fit but with caution and a little patience it can be done.

This eprom is good in that it contains a disc formatter so that you don't get caught without a formatted disc and nowhere to save your carefully typed in program.

At £225 the micro disc drive system is not significantly cheaper than the 5¼ inch drives. You must decide between compatible 40 or 80 track floppy disc drives, which will run commercial software, or these new easier to use 3 inch drives,which will do anything that a normal drive can except perhaps accept transfer of conventional tape to disc stored software. Details from Advanced Memory Systems Ltd., Woodside Technology Centre, Green Lane, Appleton, Warrington. Tel: (0925) 62682.

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SOFTWARE REVIEWS

Part two of our software marathon begins here.

Title: Oricade
Type: Tape
Supplier: Severn Software
Machine: Oric-1 48K
Price: £8.50

Oricade is a utility package designed with the more serious programmer in mind. It provides a combined assembler, disassembler and editor for machine code together with utility routines which enable you to save, load or run your programs or view the contents of any part of memory. It is written entirely in BASIC and so leaves free all of the locations you are likely to want to use for your own machine code programs. The only drawback of this is the slow speed of operation, most noticeable during the string search routines when assembling code. The basis of the program is a two-dimensional string array which contains the mnemonics combining instruction and addressing mode and the number of bytes of memory associated with each instruction.

In operation the program provides a menu selection page from which you can enter any one of eight routines. The best starting point is to list the mnemonics to familiarise yourself with their format. Failure to use the correct characters will invalidate the string comparisons used to produce the object program. Having done this proceed via the menu to the main routines. Each of the options is described in the instructions provided and further details and guidance are presented on screen.

Severn Software have made use of ORIC's colour capabilities by using a variety of background and foreground combinations but on my TV I found that the poor contrast between some of the colours made it difficult to read the text, particularly in the dis-assembly routine.

The assembly routine allows the use of labels but they must be defined in advance as the code is assembled in a single pass. A second EDIT facility is provided within this routine and is used both to set the labels and to make any program alterations.

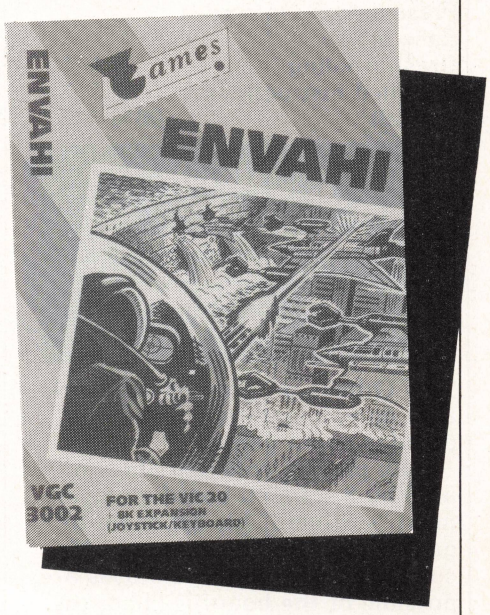
I found the program crashproof provided, of course, that care is exercised to ensure that the machine code does not overwrite the BASIC program or important areas of pages one to three. On the whole good value and a very useful aid. **P.W.**

Ratings Table

Program Quality	* * *
Value for Money	* * *
Presentation On-screen	* * *
Ease of use	* * *
Crashproofing	* * * *
Supplied Instructions	* * * *
Overall	68%

Title: Envahi
Type: Tape
Supplier: Virgin Games
Machine: VIC 20 + 8K Expansion
Price: £5.95

"High above the City of Envahi stands the giant dam . . . You are controlling a Helicopter Gunship which patrols the skies above the city, protecting it against the zany invasion force . . ."



Unfortunately, your helicopter is very fragile. The slightest touch of a building or dam will completely destroy you. Even the rain will disolve your flimsy craft. As you try to shoot up (yes, that's right, up) the munchers, to stop them eating away the walls of the dam, nasties are dropped from a space-craft to invade the city. Your life ends when either the dam bursts or the meanies invade. If you survive the early onslaught, then slidey zooms into action and must be rapidly shot down. The bailiff occasionally swoops down to steal your helicopter, and as if that ▶

were not bad enough, rain storms blow in to bring you crashing from the sky.

I am most impressed with the standard of graphics and sound used in this program. An interesting feature included is a sideways scrolling advert of Virgin programs which operates during the Game over sequence.

Control of the program is either by keyboard or joystick. With keyboard control the Z and X keys are used for LEFT and RIGHT, with ; and / being used for UP and DOWN. The space bar is sued for FIRE. This arrangement works well, although the close proximity of FIRE and DOWN have on occasion led to my crashing into buildings.

This game is exciting and demanding and an absolute must for any serious computer-games player. **N.C.M.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * *
Presentation On-screen	* * * * *
Ease of use	* * * *
Crashproofing	* * * * *
Supplied Instructions	* * * *
Overall	90%

Title:	**Othello**
Type:	**Tape**
Supplier:	**Timeless Software**
Machine:	**TI 99/4A**
Price:	**£4.95**

This Othello program is a remarkably good adaptation of the popular board game.

By placing coloured chips on an 8 by 8 squared board a player must "surround" his opponent to gain control of his counters. This continues until no more moves are possible or the board is filled, the winner being the player with most chips.

Options are provided to play against the computer at one of five skill levels, or a friend. There is also a demonstration game in which the computer plays against itself. In the one player game, level 4 is the most challenging as the computer considers the next *two* possible moves that can be made by each player. All the moves it examines are displayed on the board. Naturally this makes the computer's moves very slow, but if you do become bored the manual explains how the program can be modified to run faster.

Beginners more uncertain of their moves will find the program very useful. There is an option to pass when a legal move cannot be found. Should there be legal moves, however, the computer will show where these are. **J.V.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * * *
Presentation On-screen	* * * *
Ease of use	* * * * *
Crashproofing	* * * *
Supplied Instructions	* * * * *
Overall	98%

Title:	**Panic 64**
Type:	**Tape**
Supplier:	**Interceptor Micros**
Machine:	**Commodore 64**
Price:	**£5.95**



Commodore 64 games are coming in thick and fast. Some are a waste of money and memory, but some are good stuff.

This one is borderline, and once you see the inlay card cover you will know exactly what the whole thing is about. As usual, you are a lonely human being battling it out with blob like creatures who are determined to catch you and eat you alive. The way to stop these two-legged jelly monsters is by creating holes with your exhaustible supply of bombs, which they obligingly fall through hitting the ground with a rather pleasing splat and leaving a small purple patch of squashed beast. Beware of the bombs though, as they are so placed as to be liable to knock you out with flying shrapnel unless you shin quickly up or down a ladder.

This game incorporates fine colour, sound and graphics, which make it quite enjoyable to play. It is written totally in machine code and can be played with either keyboard or joystick, although as usual a joystick is preferable. Panic 64 is a quite basic game which does not require too much brain work to figure out, but all things considered is an enjoyable piece of software. **R.A.B.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * *
Presentation On-screen	* * *
Ease of use	* * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	70%

Title:	**Hungry Horace**
Type:	**Tape**
Supplier:	**Melbourne House**
Machine:	**Commodore 64**
Price:	**£5.95**

Hungry Horace which has foiled many a Spectrum owner in the past, has now come to try its luck with Commodore 64 owners. Mr. Horace (who is more like a juvenile delinquent) goes around a park creating utter havoc causing some poor park-keepers to forfeit their own lunches in order to catch young Horace eating their precious flowers.

If you like to see what you've let yourself in for with Hungry Horace you can lay back and watch the computer (rather feebly) take on the pursuing Parkies. Hungry Horace is written completely in machine code language as are most good games these days. Much like Pac-Man you must run around a maze of paths, bridges and tunnels, gobbling up flowers as you go. If you cannot take the constant harassment from your park preserving foe, you can continue to the next stage as long as you go out of the correct gates. There are four stages, the completion of the fourth stage bringing you back to the first.

One of the good things about Hungry Horace is that it has the unique feature of enabling you to design your own mazes. This is quite comlicated but is well worth while as the four already available become slightly tedious. Even with

the do-it-yourself mazes, this game did not appeal to me very much as I am not a Pac-Man freak, but if you enjoy Pac-Man this might be a good buy. **R.A.B.**

Ratings Table

Program Quality	* * *
Value for Money	* * *
Presentation On-screen	* * *
Ease of use	* * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	60%

Title: Filestar
Type: Tape
Supplier: Kenema Associates Ltd
Machine: ORIC-1
Price: £12.00

A utility program for home use, Filestar can be likened to a card-index system for storing and retrieving information.

The program is written in BASIC and is simple to list despite the built in safeguards to discourage prying eyes. The program structure seems fairly straightforward though lacks REM statements to separate the subroutines. The data storage, sorting and retrieval makes use of the Oric's string handling routines, being centred on a two-dimensional string array. Various control options allow for the manipulation of the string data plus dumping and loading to and from cassette for permanent storage. The program also provides for direct output to a printer or for VDU display and so is fairly versatile in use.

The written instructions are very detailed and instructions presented on-screen are adequate to jog the memory. However, I found it necessary to refer back to the written version initially until I became more accustomed to the program. It took me some time to figure out the difference between KEYFIELDS, RECORDS, LINES etc., and I still do not understand quite why any string can be changed, even the File Name, except for the KEYFIELD. If you want to change that you must start again from square one and retype all the data – so be sure to get it right first time.

Having created several trial files I eventually found that the program was reasonably easy to use and generally fairly friendly although it did crash on one occasion with an *illegal quantity error* and I was unable to determine why it had happened.

I would have preferred a little more flexibility with longer strings (16 characters is the maximum) and a third dimension in the string array. However I was able to create useful files for accounts and a personal data file to include names, addresses, telephone numbers, etc., and so dispose of a rather ragged address book.

Quite a useful program but at the price I would suspect that the market will be fairly small. However if you want a file system and have £12 to spare this one is quite good value.

Ratings Table

Program Quality	* * * *
Value for Money	* * *
Presentation On-screen	* * * *
Ease of use	* * *
Crashproofing	* * *
Supplied Instructions	* * *
Overall	65%

Title: Tutankhamun
Type: Tape
Supplier: Micromania
Machine: Spectrum 48K
Price: £5.95

When playing this game you begin to realise just why the Pyramids have hung onto their treasures for so long, you certainly wouldn't catch me in one without my trusty laser.

The scene is set at the beginning of one of five different tombs. From here you are required to work your way towards the right hand side collecting as many of the treasures as possible and also getting various keys that are required for passage through doors into the next section. Trying to prevent you from doing this is a multitude of nasties, ranging from a Skull, complete with flapping jaw, to an unfriendly version of E.T. Your only defence is a rapid fire laser, which for some obscure reason fires on alternate sides, and a single Smart Bomb per life. You are also hampered by the fact that you cannot fire up or down, so don't get caught in a vertical shaft!

This game contains some nice touches such as depicting you as a skull and crossbones when you are killed. Also the chalices and gold masks you find show their points value as they are collected.

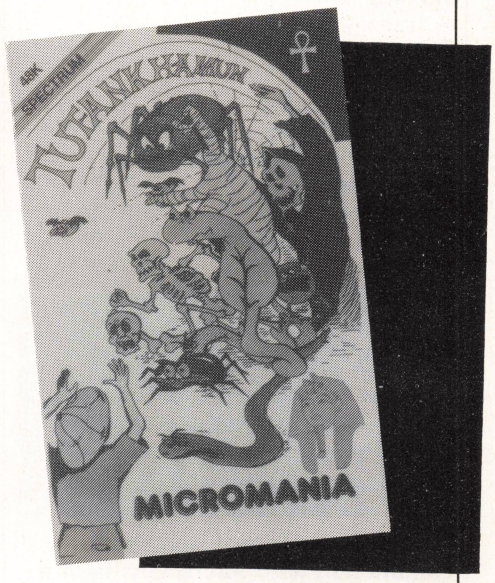
One minor drawback is the rather jerky scrolling of the maze when entering a new section. As with other games of this type, the action is fast and furious as aliens rush to their destruction, in fact it is so fast and furious I recommend plugging in your Joystick if you have one as a couple are catered for!

The screen display is very comprehensive showing everything from time left to a miniature map of the complete maze. Minimal sounds are included being just enough to keep your interest.

This program from Micromania uses the Spectrum to good effect and is good value. **G.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * *
Presentation On-screen	* * * *
Ease of use	* * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	70%



Title: Toad Graphics
Type: Tape
Supplier: Timeless Software
Machine: TI 99/4A
Price: £6.95

Toad Graphics is a fun program for introducing the novice to a computer. The accompanying manual states that it is not meant to be a full implementation of the LOGO language, but is intended to, and certainly does, give some

SOFTWARE REVIEWS

insight. Considering the expansions required to add LOGO to the TI, the price of this cassette is very reasonable.

Using up to 19 simple commands, patterns may be created by moving a toad around the graphics screen, leaving footprints, making 45° stepwise turns and exploring different colour combinations. You are also introduced to simple concepts of using commands in loops and subroutines so that you may write "programs" to produce more sophisticated effects. Examples in the manual include building a maze for your toad and a test program for him to find his own way out, but your own imagination is the only limit to what may be done.

I found the program very easy and entertaining to use, but although the manual covers every aspect of Toad Graphics, I did feel that some explanations of procedure were overcomplicated. Fuller and simplified examples of these aspects would make the instructions more user friendly. **J.V.W.**

Ratings Table

Program Quality	* * * * *
Value for Money	* * * * *
Presentation On-screen	* * * * *
Ease of use	* * * * *
Crashproofing	* * * *
Supplied Instructions	* * *
Overall	95%

Title:	**Super Glooper**
Type:	**Tape**
Supplier:	**Psion with Micro Gen**
Machine:	**ZX81 / 16K**
Price:	**£7.00**

This cassette from Psion, in conjunction with Micro Gen is of a good standard and good value – 2 games for the price of one.

The main program is a Pac-Man style game in which the player has to paint a maze, instead of eating pills. There are four shields which enable "Glooper" to destroy the aliens and the program has five levels of difficulty. After successfully painting one maze, a more complex one will appear. The "Glooper", shown as a reversed O moves easily around the maze, especially on the faster levels. On screen scoring consists of high score, player's score, screens completed and points for painted area. Also included are lives left and nasties captured. Considering the limitations of the machine this game is put to good effect.

The second game is a Frogger type in which the frog, again a reversed O, must leap from log to log and reach the jetties on the far side of the river without landing in the water. . . Another frog that cannot swim!!! Again the movement is smooth, especially considering the amount of objects in motion. At the end of each game the Hall of Fame is shown and an entering option is given if your score is sufficient. Strangely enough this game held more attraction than the "Glooper", possibly due to the slightly better graphics. There are nine levels of play altogether, with level nine being the slowest. Both games were presented very well and used the same keys for movement, which gave an easy configuration in play. The programs in each case loaded first time and autoran when loaded giving all the required prompts for play. **G.W.**

Ratings Table

Program Quality	* * * *
Value for Money	* * * *
Presentation On-screen	* * *
Ease of use	* * *
Crashproofing	* * * * *
Supplied Instructions	* * *
Overall	65%

Title:	**Tank Battle**
Type:	**Tape**
Supplier:	**Artic**
Machine:	**VIC 20 (unexpanded)**
Price:	**£5.95**

This game is the normal tank versus tank game, each player having his own tank. The game is fought out in a maze with bricks that can be destroyed by shelling. Beware when playing – shells can ricochet onto the firing tank. There are nine skill levels, ranging from superslow to superfast.

In play you are presented with unimaginative graphics and tedious sound effects, though the game can be enjoyed when the tanks go fast. The control keys are awkwardly positioned and there is no joystick provision for either player.

All in all though this is a reasonable game remembering the limitations of the Vic's memory. **M.R.**

Ratings Table

Program Quality	* * *
Value for Money	* * * *
Presentation On-screen	* * * *
Ease of use	* * *
Crashproofing	* * * * *
Supplied Instructions	* * * *
Overall	75%

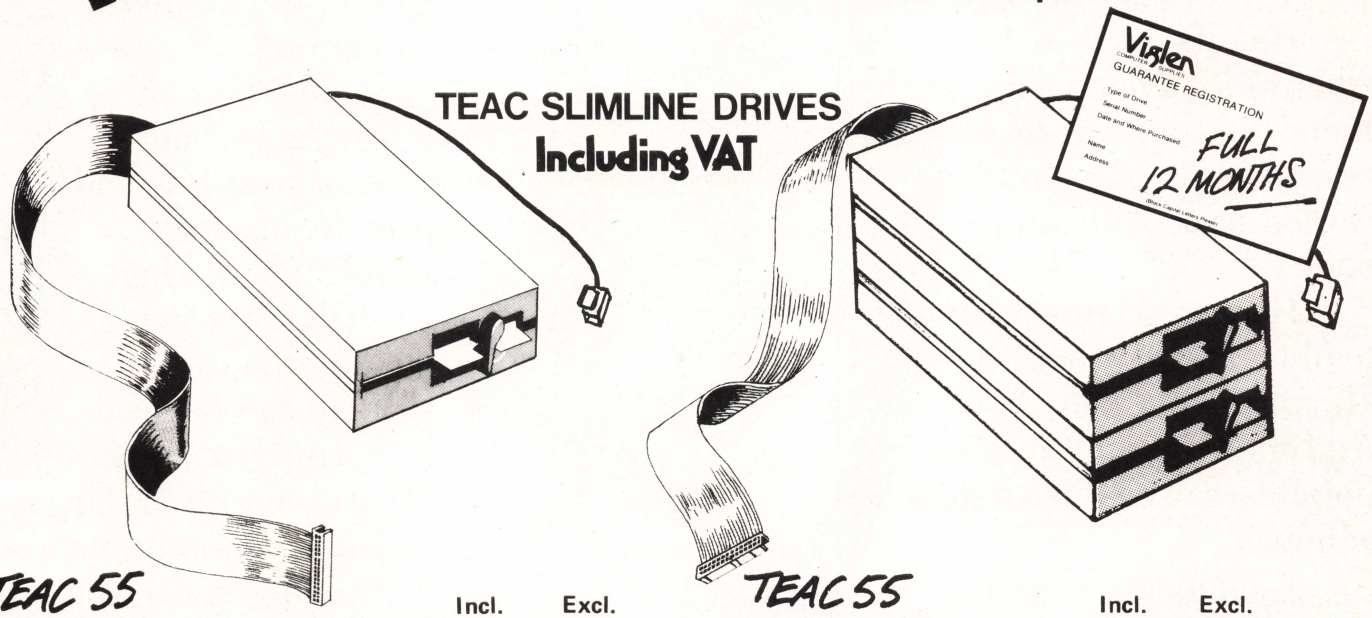


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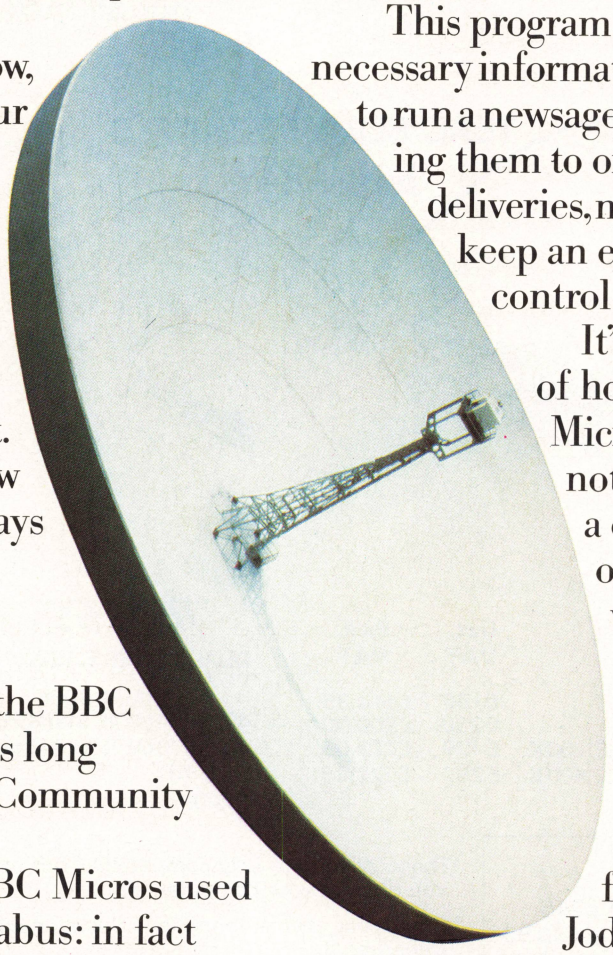
EMS

Not all home computers stay at home.

The BBC Micro is the ideal family computer–simple to operate, yet fast, powerful, with enormous potential.

But it's nice to know, when you buy one for your home, that the business, educational and scientific worlds agree with your choice.

Here are a few stories to illustrate how the BBC Micro gets out and about. And one to remind you how helpful it can be when it stays at home.



A practical lesson in business admin.

The contribution of the BBC Micro in the classroom has long been recognised at Perins Community School in Hampshire.

The School has 12 BBC Micros used extensively across the syllabus: in fact some pupils are using them to study for their GCE O Levels in computing.

One of the programs available to Perins teachers such as David Beck, pictured below with his class, is "Newsagent."



This program contains all the necessary information for the class to run a newsagent's shop; allowing them to organise daily deliveries, make up bills and keep an eye on stock control and ordering.

It's a nice example of how the BBC Micro can be used not only to acquaint a class with the language of computers, but also with some of the realities of the community in which they live.



Correcting Jodrell Bank.

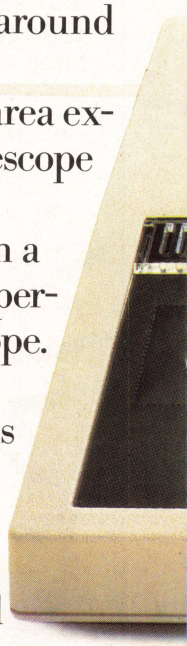
The BBC Micro is a familiar worker around Jodrell Bank.

You'll find it in the reception area explaining the workings of a radio telescope to visitors, for example.

But it's also been helping in a more testing task: to improve the performance of the Defford telescope.

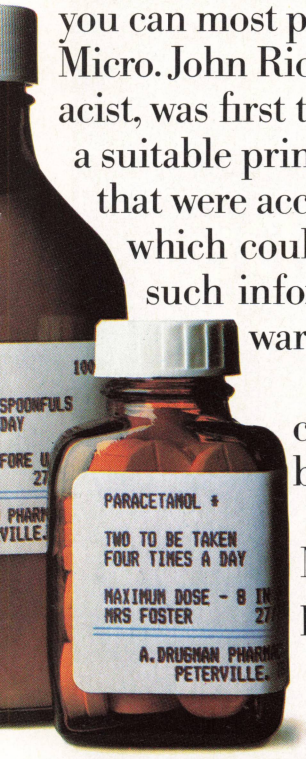
In this application it has been used to make calculations necessary to determine the precise parabolic shape of the dish.

Theodolites are used to do the measuring–then the BBC Micro works out the necessary corrections.



The end of the scrawl.

If any of you have noticed how much easier it is to read and understand labels on drugs and medicines these days, then you can most probably thank the BBC Micro. John Richardson, a Preston pharmacist, was first to realise how a micro with a suitable printer could produce labels that were accurate and legible and which could include, automatically, such information as drug reaction warnings.



At the same time it could record drug usage for better stock control.

He chose the BBC Micro for its versatility and potential for expansion.

John Richardson believes that this system will be recognised as standard in the profession and be used in hospitals, health centres and pharmacies throughout the UK.

Meanwhile back at home.

Dr. & Mrs. Yarwood bought a BBC Micro as a birthday present for their 12 year old daughter.



However, it quite quickly became common property.

All three can now write their own programs. Mrs. Yarwood is particularly proud of one program she has compiled to help teach her daughter French vocabulary.

They all agree that although the Micro is fast and powerful enough to be at home in Jodrell Bank, it is also the ideal computer at the Yarwood home: simple to set up (virtually any TV set and cassette player is all you need) and simple to use.



All this for only £399.

The BBC Micro comes with a comprehensive, step-by-step User Guide which introduces you to your micro and shows you how to construct useful programs of your own.

You will also receive a free "Welcome" cassette which contains 15 different programs for you to experiment with, ranging from music and graphics to games like Kingdom and Bat 'n' Ball.

The BBC Micro is available from W H Smith Computer Shops, Boots, John Lewis and local Acorn stockists.

Alternatively if you would like to order one with your credit card or if you want the address of your nearest supplier just phone 01-200 0200 or 0933-79300.

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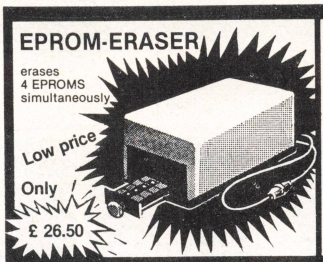
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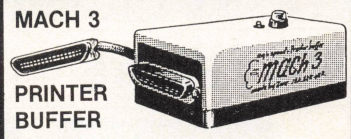
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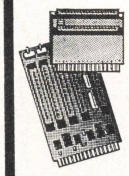


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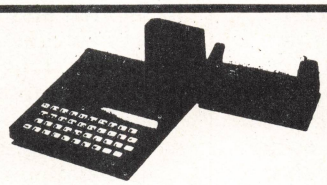
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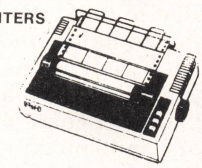
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TYPEFACE TRAUMA

The Spectrum allows for user programmable characters. Allister Dann shows you how to turn your world upside down.

Here are two routines integrated into one program which are interesting and could be expanded.

The routines are designed to run on a 48K Spectrum but 16K users need only alter a few lines. The routines require about 770 bytes so move RAMTOP to the most suitable level and alter the relevant lines. You will also have to re-calculate the POKEs in lines 180 and 385. Use page 173 of the User Manual and remember that the value to be POKED is 256 less than the actual memory location that you have chosen.

Type RUN 10 and wait for the report code to come up. List the program and you should discover that the entire Spectrum character set has been turned upside down and back to front. All the characters and keywords will be like this and to program you'll need to use a mirror! Admittedly, not very useful but very impressive to laymen and try to run a word processor now! To restore normality, type GOTO 200 and GOTO 180 to bring back mayhem. The character sets can be mixed within a program.

Assuming all is normal, try

```
1000 POKE 23606,112:
POKE 23607,250
1010 PRINT "upside down"
1020 POKE 23606,0:
POKE 23607,60
```

Once you have exhausted the endless uses (?) of this program try the next. Type RUN 300 and wait for half a minute. This routine re-defines the lower case letters and turns them into attractive "space-style" print face. This enables you to program in the normal character set with CAPS LOCK on, and to revert to lower case letters inside PRINT statements to liven up games etc.

Of course, you can alter the DATA statements and change the lettering if you have a penchant for programing in gothic letters. You could also use the Horizons character generator to work out the codes. You are not limited to lower case letters. Change the 520 in line 350 to 264, and re-RUN 300 to change the upper case letters.

HOW IT RUNS

Lines 10-50	Copy the character set held in ROM to an area in RAM
Line 60	Starts main loop
Lines 80-100	Copy eight bytes at a time into an array
Lines 110-130	Copy the bytes from one array into another in reverse order
Lines 140-160	POKE the bytes into memory in the now reversed order
Lines 180	Points system variable CHARS to new character set
Line 200	Returns mode to normal
Lines 300-340	Copy character set to RAM
Lines 350-380	READ the data into area of lower case letters
Line 385	Points CHARS to new character set
Lines 390-410	Data for re-defined alphabet

HINTS ON CONVERSION

This is a rather machine-dedicated program and is not suitable for any other micros as its stands. However, there is no reason why the principle and the programming method should not be transferred to another machine.

It would be necessary to find out where in memory the character set starts and where to place the new character set. Also you'll have to find out how to make the new characters be recognised and used by the machine, otherwise they will simply be a series of memory consuming digits.

Read your manuals thoroughly and analyse the program and it should be possible to alter it for your machine.

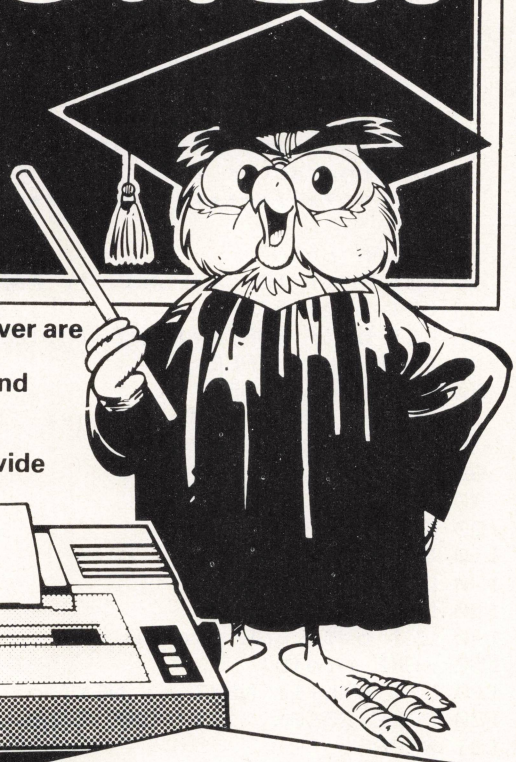
The CLEAR statement reserves an area of memory and the three long DATA statements may have to be broken up into smaller ones if your machine places a limit on the number of characters per line.

PROGRAM LISTING

```
   2 PRINT "TYPE ""GO TO 10"" TO DEMONSTRATE "'"INVERSION ROUTINE."'"TYPE ""GO
TO 200"" TO REVERT"'"TO NORMAL."'"TYPE ""GO TO 300"" TO DEMONSTRATE"'"ALTERNATI
VE LOWER CASE."'"TYPE ""GO TO 200"" TO REVERT "'"TO NORMAL."'"TYPE ""GO TO 100
0"" TO "'" DESTROY PROGRAM."
   3 STOP
   4 REM ************************
   5 REM character invert
   6 REM ************************
   7 REM
  10 CLEAR 64367
  15 PRINT AT 10,5; FLASH 1; PAPER 1; INK 7;"PLEASE WAIT A MINUTE."
  20 LET mem=64368
  30 LET b=0: FOR a=15616 TO 16384
  40 POKE mem+b,PEEK a
  50 LET b=b+1: NEXT a
  60 FOR a=32 TO 127: LET q=a-32:: LET b=q*8: LET c=mem+b
  70 DIM d(8): LET b=1
  80 FOR e=c TO c+7
  90 LET d(b)=PEEK e
 100 LET b=b+1: NEXT e
 110 DIM e(8): FOR e=1 TO 8
 120 LET e(e)=d(9-e)
 130 NEXT e
 140 LET b=1: FOR e=c TO c+7
 150 POKE e,e(b)
 160 LET b=b+1: NEXT e: NEXT a
 180 POKE 23606,112: POKE 23607,250
 181 STOP
 182 REM ************************
 183 REM revert to normal
 184 REM ************************
 185 REM
 200 POKE 23606,0: POKE 23607,60
 210 STOP
 220 REM ************************
 221 REM alternative alphabet
 222 REM ************************
 223 REM
 300 CLEAR 64367
 305 PRINT AT 10,5; FLASH 1; PAPER 1; INK 7;"PLEASE WAIT 20 SECS."
 320 LET b=0: FOR a=15616 TO 16384
 330 POKE 64368+b,PEEK a
 340 LET b=b+1: NEXT a
 350 LET x=64368+520
 360 FOR a=x TO x+206
 370 READ b: POKE a,b
 380 NEXT a
 385 POKE 23606,112: POKE 23607,250
 390 DATA 0,124,76,76,124,76,76,0,0,124,100,100,124,100,124,0,0,124,76,64,76,76,
124,0,0,124,76,76,76,76,124,0,0,124,96,96,124,96,124,0,0,124,96,96,124,96,96,0,0
,124,76,64,92,76,124,0,0,100,100,100,124,100,100,0,0,24,24,24,24,24,24,0,0
 400 DATA 12,12,12,12,12,60,0,0,100,100,100,124,76,76,0,0,96,96,96,96,120,0,0
,126,90,90,90,90,90,0,0,124,76,76,76,76,0,0,124,100,100,100,124,0,0,124,1
00,100,124,64,64,0,0,124,100,100,100,100,126,0,0,124,100,100,124,76,76,0,0,124,1
00,96,28,76,124,0,0,126,24,24,24,24,24,0,0
 410 DATA 100,100,100,100,100,124,0,0,100,100,100,100,100,56,0,0,90,90,90,90,90,
126,0,0,100,100,100,124,92,92,0,0,104,104,104,120,16,16,0,0,124,100,28,32,76,124
1000 STOP
1001 REM ********************
1002 REM WIPE OUT PROGRAMS
1003 REM ********************
1004 RANDOMIZE USR 0
3901 DATA 0,124,76,76,124,76,76,0,0,124,100,100,124,100,124,0,0,124,76,64,76,76,
124,0,0,124,76,76,76,76,124,0,0,124,96,96,124,96,124,0,0,124,96,96,124,96,96,0,0
,124,76,64,92,76,124,0,0,100,100,100,124,100,100,0,0,24,24,24,24,24,24,0,0
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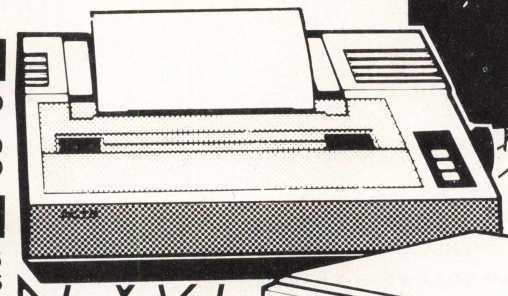
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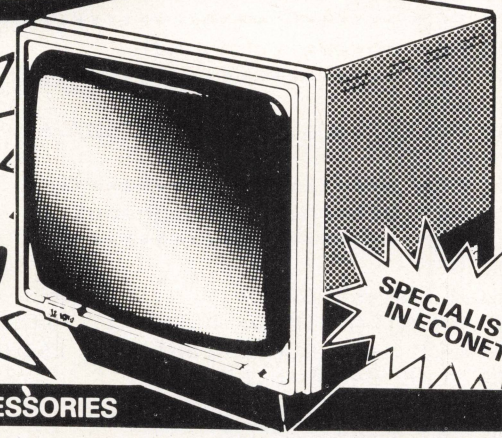
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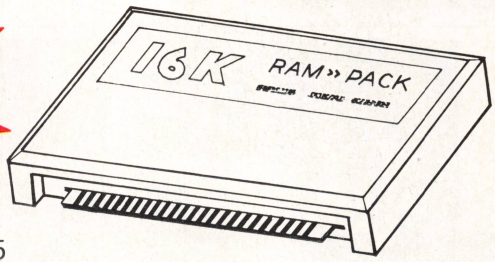
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HIGH SCORES



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A high score table in any games program greatly adds to the challenge and interest of the game, making play more competitive. When RUN, this program generates random scores up to 999999, the maximum allowed. This facility is to demonstrate the program.

The score is then sent to the subroutine which sorts the table to allow for the new score. A blank is left opposite the added score, and the scorer then inputs his or her name.

RETURN finishes the input. The back space key can also be used to delete errors.

HOW IT RUNS

Lines 29930-29940	Demonstration program. Subroutine initialisation. The generation of random scores takes place and these are sent to the subroutine.
Line 29980	Initialises the program.
Line 30000	Checks the score to see if it qualifies for the High Score Table. If it does not it will return you to program.
Line 30010	Places new score at the bottom of the table deleting the lowest score.
Lines 30020-30030	Print out scores, putting the new score in the right place.
Lines 30040-30080	Print out scores and scorers, leaving the scorers name blank opposite new score.
Lines 30090-30120	This section handles the scorer's input, printing each letter on the screen and placing it in F$. The RETURN key ends the input and the back space key deletes errors.
Line 30130	Sounds the end of the input and makes a short pause.
Line 30140	Closes the channel to the keyboard, clears the error trap, and returns to the main program.

All REMS may be omitted if desired. A minimum score may be out in place of the 00000 in Line 29980.

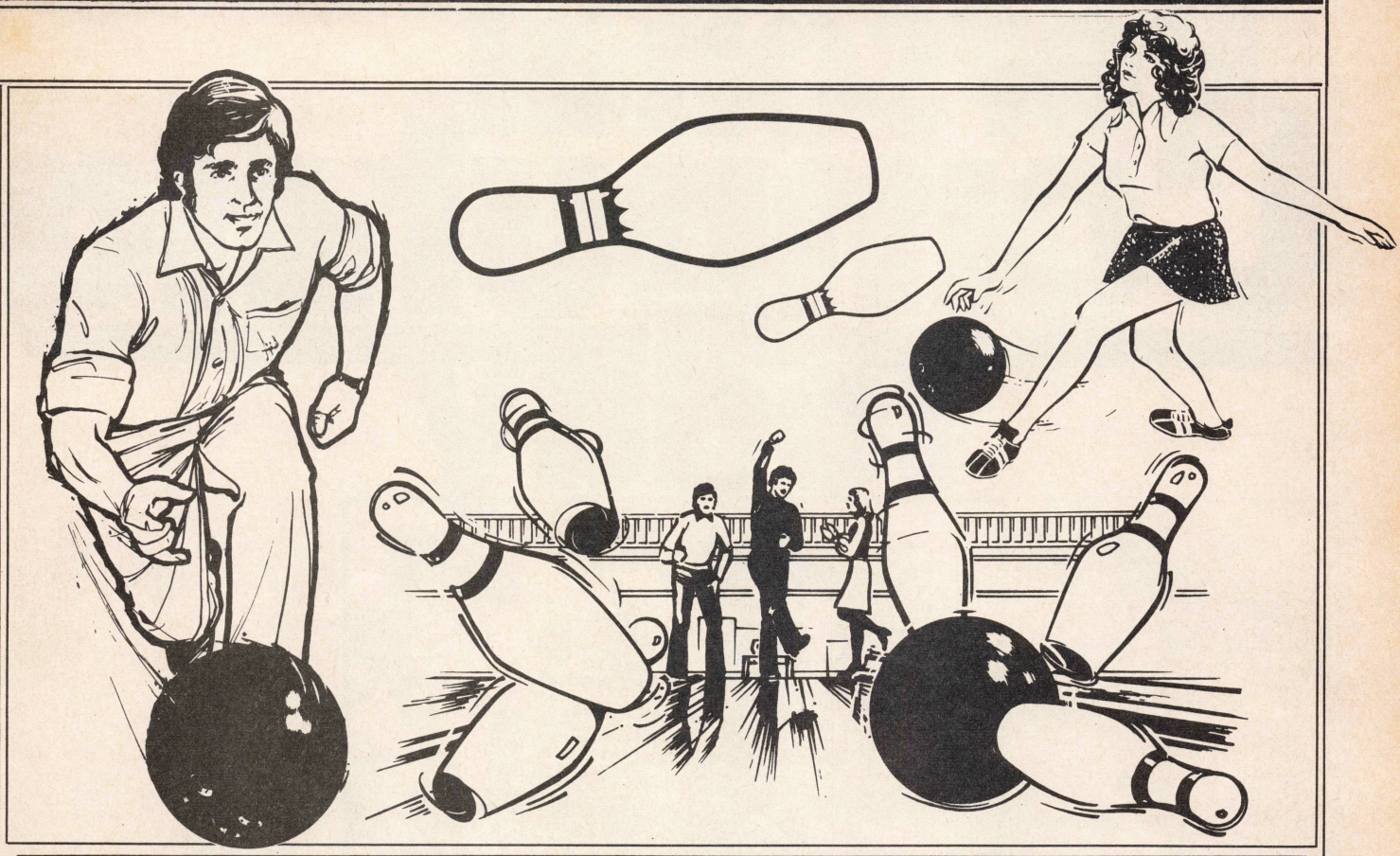
PROGRAM NOTES

OPEN 1,4,0,"K:"	Opens a channel to the keyboard for input.
GET 1,L	Gets one character from the keyboard, and returns it in the variable L.
CLOSE 1	This closes the keyboard channel.
TRAP X	This specifies which line to go to on encountering an error.
TRAP 4000	4000 is a non-existent line which clears the error tape.
GRAPHICS 17	This specifies a screen with double-width characters.

The Atari uses one dimensional strings, so the whole table is contained in F$. Converting to multi-dimensional string handling should pose no great problems.

Variables Used

F$ contains the whole ten-entry table
H$ holds one entry temporarily during sorting.
S$ Contains the new score
SCORE The new score should be sent to the sub-routine in the variable score.



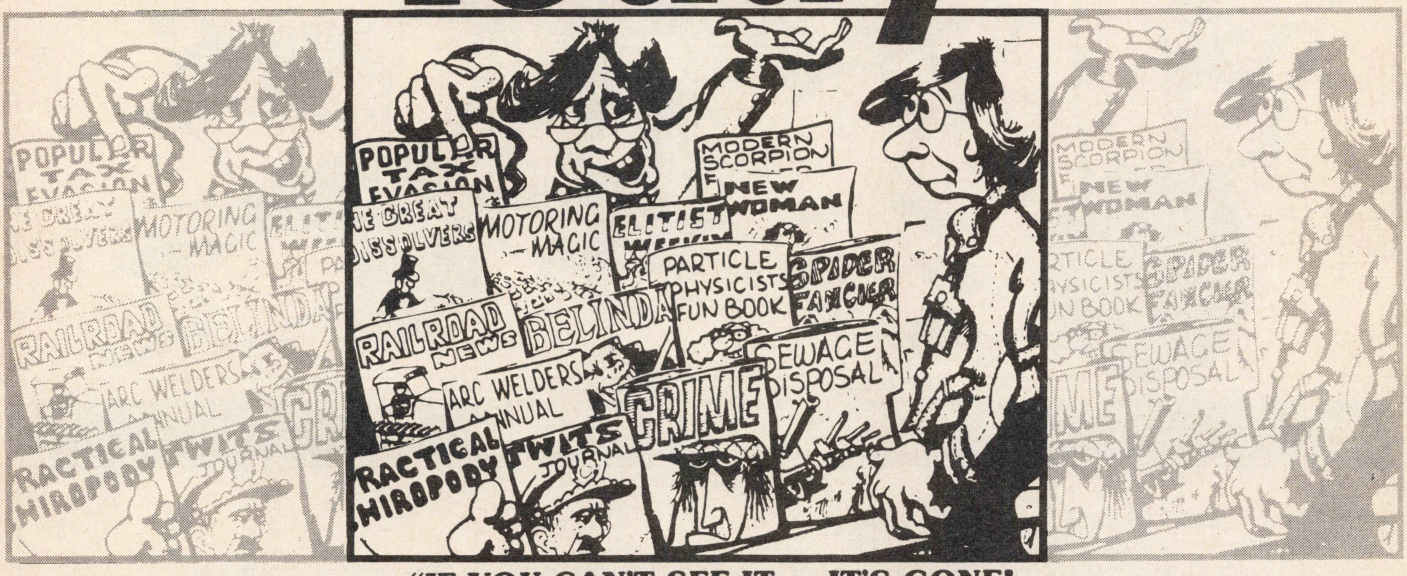
PROGRAM LISTING

HIGH SCORE TABLE

```
29930 GOSUB 29980:REM INITIALISE
29940 SCORE=INT(RND(0)*1000000):GOSUB 30000:GOTO 29940:REM MAIN ROUTINE
29950 REM ¥ネ/ヌネュモテマメナ¥ヤチツフナ¥モユツメマユヤ/ホナ¥¥
29960 REM ¥¥S.O'BRIENDUBLIN,IRELAND¥¥¥¥
29970 REM
29980 DIM F$(160),H$(16),S$(6):H$="¥¥¥¥¥¥¥¥¥¥000000":FOR A=1 TO 160 STEP 16:F$(A
,A+15)=H$:NEXT A:RETURN
29990 REM MAIN ROUTINE
30000 IF SCORE(=VAL(F$(155,160)) THEN RETURN
30010 S$=STR$(SCORE):F$(161-LEN(S$))=S$:A=145:PASS=0
30020 IF VAL(F$(A+10,A+15)))VAL(F$(A-6,A-1)) THEN H$=F$(A-16,A-1):F$(A-16,A-1)=F
$(A,A+15):F$(A,A+15)=H$:PASS=1
30030 IF PASS=1 AND VAL(S$)()VAL(F$(11,16)) THEN PASS=0:A=A-16:GOTO 30020
30040 GRAPHICS 17:POSITION 0,0:? #6;"  HIGH SCORE TABLE ":A=1:FOR Y=3 TO 21 STEP
 2
30050 POSITION 1,Y:? #6;F$(A,A+9):POSITION 13,Y:? #6;F$(A+10,A+15):A=A+16:NEXT Y
:A=1
30060 IF VAL(S$)=VAL(F$(A+10,A+15)) THEN 30080
30070 A=A+16:GOTO 30060
30080 X=1:Q=A:A=(A+15)/16:Y=A*2+1:F$(Q,Q+9)="¥¥¥¥¥¥¥¥¥¥":POSITION X,Y:? #6;F$(Q,
Q+9):N=0
30090 POKE 764,255:TRAP 30090:OPEN #1,4,0,"K:"
30100 GET #1,L:IF L=155 THEN 30130
30110 IF L=126 THEN X=X-(1*(X)1)):N=N-(1*(N)0)):POSITION X,Y:? #6;" ":F$(Q+N,Q+N
)="¥":GOTO 30100
30120 POSITION X,Y:? #6;CHR$(L);:F$(Q+N,Q+N)=CHR$(L):X=X+1:N=N+1:IF N(10 THEN 30
100
30130 FOR R=1 TO 150:SOUND 0,100,10,10:NEXT R:SOUND 0,0,0,0
30140 TRAP 40000:CLOSE #1:RETURN
```

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FACTFILE

MICRO FACTFILE

Factfile is our regular buyer's guide to microcomputers. Herein you will find all the important facts and figures on 28 of the most important micros on the market under £1000. The idea is that you are able to directly compare what different manufacturers are offering you and how much they are charging you for it. Many brochures and adverts bury the reader in a mass of irrelevant facts and figures, which make it difficult to judge one against the other.

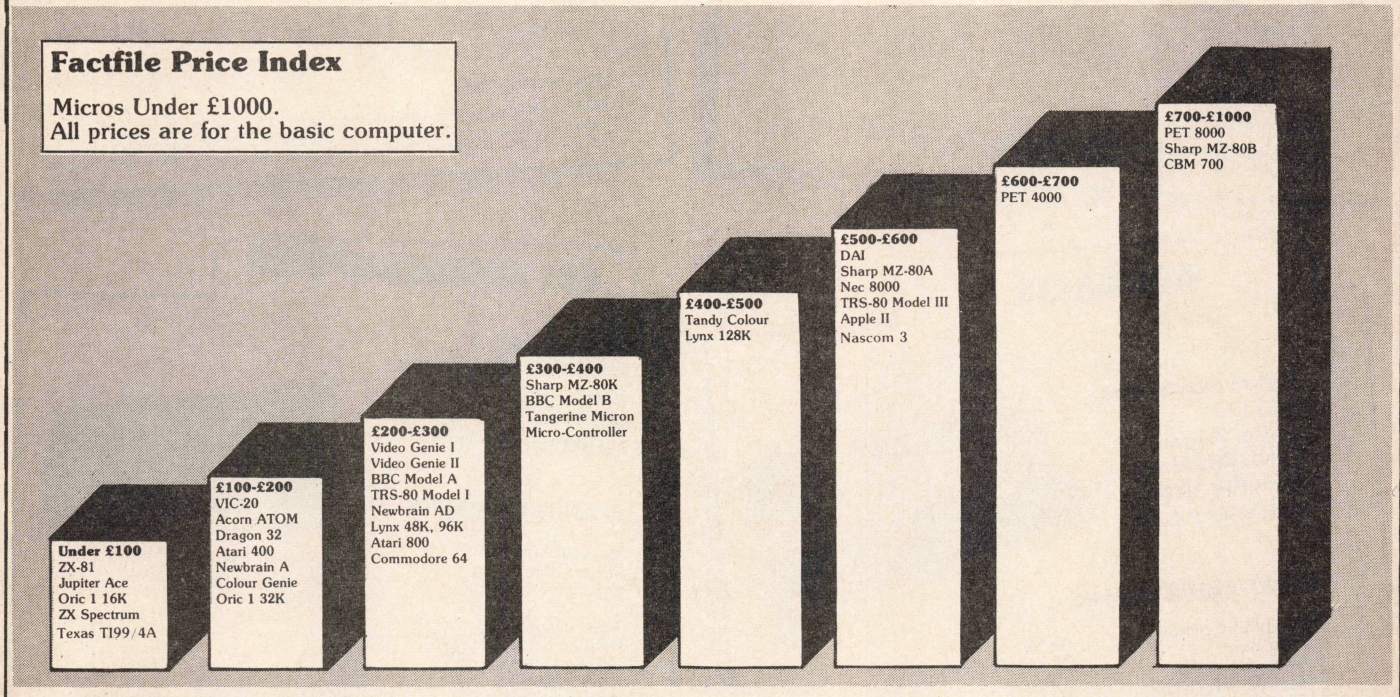
Factfile sorts it all out for you!

Just look down the price index to discover which machines are in your price-range and then consult the 'cards' on each. All the information is in a standard form and has all been checked by our technical staff. The section is presented alphabetically.

As new machines become available, we will add them into the FACTFILE as soon as we can.

Factfile Price Index

Micros Under £1000.
All prices are for the basic computer.



Factfile

RAM: Stands for Random Access Memory and it is in there to accept the user's programs. Amount of memory is measured in "thousands of bytes" or "K" ie, 8K. A byte is a computer 'word' or single piece of information, made up of eight 'bits' which are just 1 or 0. Hence you need thousands of bytes to store a reasonable size program, since each letter, number, full stop, comma, line number, etc, uses up computer 'words' quite rapidly.

As a guideline – you can get about 50 program lines into 1K and 250 into 8K. This is a rough estimate – don't take it literally! The figures are not straight multiples, because you need to allow the machine space to work on your listing, once you've typed it in.

ROM: Read Only Memory. The machine can look and see what is stored in the memory, but it cannot alter the contents, nor store anything new. Generally used for control programs, where the micro consults the memory to see what to do next at various points in the program. Languages, such as BASIC, are stored in ROM and allow the machine to interpret what you type in, in terms of its own 'machine code'.

SIZE OF BASIC: The number of bytes occupied by the BASIC language is important, as it is an approximate guide to the BASICs versatility. The more powerful the language, the easier it should be to use.

BUS CONNECTION: A socket on the micro which allows it to be linked up to various add-ons. This can take the form of many various items, ie, expansion box, printer, disc drives, plotting device. In short a BUS is an information 'window' through which the micro communicates with the outside world.

SERIAL/PARALLEL OUTPUT: This refers to the manner in which the micro transmits data to other units. If it puts out information in a long string, one bit after another, down a single wire or connector, it is a serial output. Parallel output is where pins or wires carry information simultaneously and are 'read' together as a block by whatever it is the micro is communicating with.

VIDEO OUTPUT: an output which will drive a monitor, as opposed to a TV set, allowing it's use as a screen for the computer.

FACTFILE

ATARI 400

**Atari UK Ltd,
Atari House,
Railway Terrace,
Slough, Berks
SL2 5BZ.**



STANDARD PACKAGE

Memory Size (RAM)	16K
Screen Size	24 lines of 40 characters
Expansion Sockets	Serial output, BUS connector
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£149.99**

MANUFACTURER'S EXPANSIONS

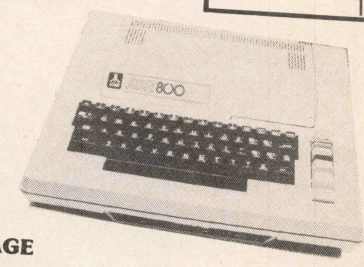
	DETAILS	PRICE
RAM	No	—
Printer	Yes	£199.90
Monitor	No	—
Disc Drives	Yes	£299.99
Other Languages	Yes	£39-79
Multi-user		—
Capabilities	No	TBA
BASIC extensions (Toolkits)	Yes	

OTHER ADD-ONS:

TMS 5100 Talking Board, GM Microctonics Ltd, Unit 14, Godinton Way Industrial Estate, Godinton Road, Ashford, Kent, £82.95

ATARI 800

**Atari UK Ltd,
Atari House,
Railway Terrace,
Slough, Berks
SL2 5BZ.**



STANDARD PACKAGE

Memory Size (RAM)	48K
Screen Size	24 lines of 40 characters
Expansion Sockets	Serial output, BUS connector
Tape Included?	Yes
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£299.99**

MANUFACTURER'S EXPANSIONS

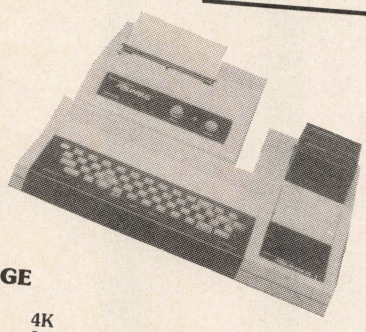
	DETAILS	PRICE
RAM	Yes	£199.99
Printer	No	—
Monitor	Yes	£299.99
Disc Drives	Yes	£39.79
Other Languages		—
Multi-user	No	TBA
Capabilities	Yes	
BASIC extensions (Toolkits)		

OTHER ADD-ONS:

TMS 5100 Talking Board, GM Microtonics Ltd, Unit 14, Godinton Way Industrial Estate, Godinton Road, Ashford, Kent, £82.95; **Carrying case,** CJE Microcomputer, 25 Henry Avenue, Rustington, W. Sussex, BN16 2PA, £18.50

AQUARIUS

**Mattel Electronics
(UK) Ltd
Mattel House
North End Road
Wembley Park,
Middx HA9 0AB**



STANDARD PACKAGE

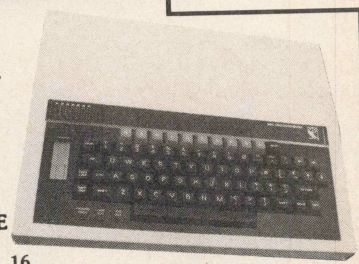
Memory Size (RAM)	4K
Screen Size	24 lines of 40 characters
Expansion Sockets	Yes
Display Unit Included?	No
Tape Included?	No
Usable Domestic TV?	Yes
Size of BASIC	2K
Average Price	**£79.95**

MANUFACTURERS EXPANSIONS

	DETAILS	PRICE
RAM	4K or 16K to 52K	£19.95, £30
Printer	Yes	
Monitor	No	£139.95
Disc Drives	No	
Other Languages	Logo	
Multi-user		
Capabilities	No	
BASIC Extensions (toolkits)	Yes	£29.95

BBC MICROCOMPUTER

**BBC Model A,
BBC Microcomputer
Systems,
PO Box 7,
London W3 6JX.**



STANDARD PACKAGE

Memory Size (RAM)	16
Screen Size	32 lines of 40 characters (max)
Expansion Sockets	Parallel serial output, analogue output, Bus connection
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	16K
Average Price	**£299**

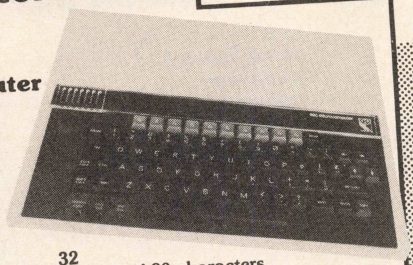
MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	up to 32K	£100
Printer	TBA	—
Monitor	Yes	£200
Disc Drives	TBA	—
Other Languages	TBA	—
Multi-user		—
Capabilities	Yes	—
BASIC extensions (Toolkits)	TBA	

OTHER ADD-ONS:

Disc drives, single and dual, Cumara Ltd, 35 Walnut Street Close, Guildford, Surrey GU1 4UN, Tel: 0483 50321, £199-799; **BBC Cassette Recorder,** Microage Electronics, 135 Hale Lane, Edgeware, Middx, £28; **Colour Monitor,** PortaTel Conversions Ltd, 25 Sunbury Cross Centre, Staines Roach West, Sunbury-on-Thames, Middx, TW16 7BB, £299; **Floppy Disc Controller Kit,** Midwich Computer Co Ltd, Newitt House, Northgate Street, Bury St. Edmunds, Suffolk IP33 1HQ, £95.00; **Analogue Joystick, Light Pen,** Stack Computers, 290-298 Derby Road, Bootle, Liverpool.

BBC MICROCOMPUTER



BBC Model B
BBC Microcomputer Systems,
PO Box 7,
London W3 6JX

STANDARD PACKAGE

Memory Size (RAM)	32
Screen Size	30 lines of 80 characters
Expansion Sockets	Serial and parallel output, analogue output, printer BUS connection
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	16K
Average Price	**£399**

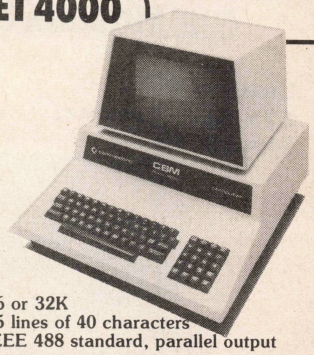
MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	No	—
Printer	TBA	TBA
Monitor	No	—
Disc Drives	TBA	TBA
Other Languages	TBA	TBA
Multi-user Capabilities	Yes	—
BASIC extensions (Toolkits)	TBA	TBA

OTHER ADD-ONS:

Disc drives, single and dual, Cumara Ltd, 35, Walnut Tree Close, Guildford, Surrey GU1 4UN, Tel: 0483 503121, £199-799; **BBC Cassette recorder,** Microage Electronics, 135 Hale lane, Edgware, Middx, HA8 9QP, £28; **Colour Monitor,** Portatel Conversions Ltd, 25 Sunbury Cross Centre, Saires Road West, Sunbury-on-Thames, Middx, TW16 7BB, £299; **Floppy Disc Controller Kit,** Midwich Computer Co Ltd, Hewitt House, Northgate Street, Bury St. Edmunds, Suffolk, IP33 1HQ, £95.00; **Carrying Case,** CJE Microcomputers, 25 Henry Avenue, Rustington, W. Sussex, BN16 2PA, £18.50.

COMMODORE PET 4000



Commodore,
675 Ajax Avenue,
Slough, Berks

STANDARD PACKAGE

Memory Size (RAM)	16 or 32K
Screen Size	25 lines of 40 characters
Expansion Sockets	IEEE 488 standard, parallel output
Tape Included?	Yes
Display Unit Included?	Yes
Usable Domestic TV?	No
Size of BASIC	12K
Average Price	**£632.50, £799.25**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	No	—
Printer	Yes several	£454-1604
Monitor	N/A	—
Disc Drives	Yes	£396
Other Languages	Yes, single or dual	£454-1029
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Universal Interface, Technomatic Ltd, 17 Burnley Road, London NW10, £149; **TMS 5100 Talking Board,** GM Microtronics Ltd, Unit 14, Godinton Way industrial Estate, Ashford, Kent, £82.95; **64K DRC Module,** Audio Computers, 87 Bournemouth Park Road, Southend-on-sea SS5 2JJ, £70 kit, £80 built.

COMMODORE PET 8000



Commodore,
675 Ajax Avenue,
Slough, Berks

STANDARD PACKAGE

Memory Size (RAM)	32K or 96K
Screen Size	25 lines of 80 characters
Expansion Sockets	IEEE 488 standard, parallel output
Tape Included?	Yes
Display Unit Included?	Yes
Usable Domestic TV?	No
Size of BASIC	12K
Average Price	**£980, £1374**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	No	—
Printer	Yes various	£454-1604
Monitor	N/A	—
Disc Drives	Yes single or dual	£454-1029
Other Languages	Yes	—
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Universal Interface, Technomatic Ltd, 17 Bunley Road, London NW10, £149; **TMS 5100 Talking Board,** GM Microtronics Ltd, Unit 14, Godinton Way industrial Easte, Godinton Road, Ashford, Kent, £82.95; **64K DRC Module** Audio Computers, 87 Bournemouth Park Road, Southend-on-sea SS5 2JJ, £70 kit, £80 built.

COMMODORE VIC20 STARTER PACK



Commodore,
675 Ajax Avenue,
Slough, Berks

STANDARD PACKAGE

Memory Size (RAM)	5K
Screen Size	23 lines of 22 characters
Expansion Sockets	BUS connection, Disc, Printer, Serial output, joystick
Tape Included?	Yes
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£139.99**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	3K,8K,16K expansion options	£30,£45,£75
Printer	Yes	£270
Monitor	No	—
Disc Drives	Yes	£396
Other Languages	Yes	£38.95
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

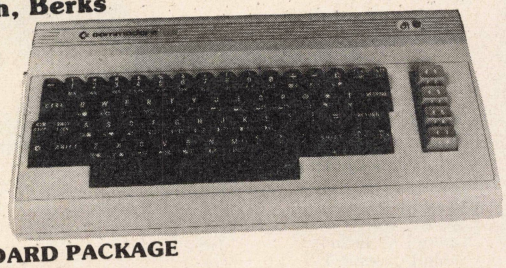
OTHER ADD-ONS:

VCR-20,
20K RAM cartridge, Audio Computers, 87 Bournemouth Park Road, Southend on Sea SS5 2JJ, £39 kit, £45 built; **Expansion Board,** 3K-16K, Arfon Microelectronics Ltd, Gibyn Industrial Estate, Caernafon, Gwynedd, Wales LL55 2BD, £220. Languages: VIC Forth, Adda Computers, 154 Victoria Road, Acton, London, W3.

FACTFILE

COMMODORE 64

Commodore,
675 Ajax Avenue,
Slough, Berks



STANDARD PACKAGE

Memory Size (RAM)	64K
Screen Size	25 lines of 40 characters
Expansion Sockets	BUS, Serial, Video
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£229.**

MANUFACTURER'S EXPANSIONS

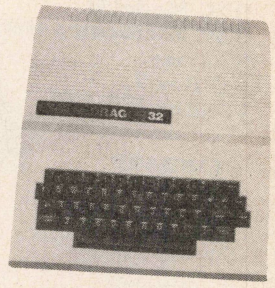
	DETAILS	PRICE
RAM	No	–
Printer	Yes	£230-276
Monitor	No	–
Disc Drives	Yes	£229
Other Languages	Yes	–
Multi-user Capabilities	Yes	–
BASIC Extensions	Yes	–

OTHER ADD-ONS:

Light Pen, 4 slot motherboard, Joystick, RS232 Interface, Stack Computers, 290-298 Derby Road, Bootley Liverpool. 051-933 5511.

DRAGON 32

Dragon Data Ltd
Queensway,
Swansea
Industrial Estate,
Swansea, SA5 4EH



STANDARD PACKAGE

Memory Size (RAM)	32K
Screen Size	16 lines of 32 characters
Expansion Sockets	Yes
Display Unit Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	16K
Average Price	**£199**

MANUFACTURER'S EXPANSIONS

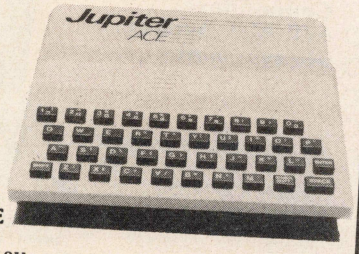
	DETAILS	PRICE
RAM	–	–
Printer	No	–
Monitor	No	–
Disc Drives	No	–
Other Languages	Yes	–
Multi-user Capabilities	No	–
BASIC extensions (Toolkits)	No	–

OTHER ADD-ONS:

Joystick, Light Pen, 4 slot motherboard, Stack Computers 290-298 Derby Road, Bootle, Liverpool. 051-933 5511.

JUPITER ACE

Jupiter Cantab
22 Foxhollow
Bar Hill
Cambridge
CB3 8EP



STANDARD PACKAGE

Memory Size (RAM)	3K
Screen Size	24 lines of 32 characters
Expansion Sockets	Not known
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	Resident language is FORTH at 8K
Average Price	**£89.95**

MANUFACTURER'S EXPANSIONS

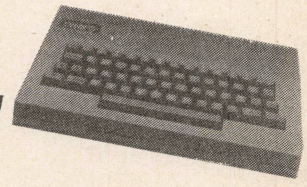
	DETAILS	PRICE
RAM	TBA	–
Printer	TBA	–
Monitor	TBA	–
Disc Drives	TBA	–
Other Languages	TBA	–
Multi-User Capabilities	TBA	–
BASIC extensions (toolkits)	TBA	–
	N/A	–

OTHER ADD-ONS:

None Reported.

LYNX

Camputers
33a Bridge Street,
Cambridge CB2 1UW



STANDARD PACKAGE

Memory Size (RAM)	48K,96K,128K
Screen Size	24 lines of 40 characters
Expansion Sockets	BUS connections
Tape Included?	Yes
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	1.5K
Average Price	**£225, £299, £445**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	96K for 48K version	£89.95
Printer	Yes	–
Monitor	Yes	–
Disc Drives	Yes	–
Other Languages	Yes	–
Multi-user Capabilities	Yes	–
BASIC extensions (Toolkits)	Yes	–

OTHER ADD-ONS:

ORIC 1

Oric Products International,
Coworth
Mansion,
Coworth Park,
London Road,
Sunninghill, Ascot,
Berkshire, SL5 7SE.



STANDARD PACKAGE

Memory Size (RAM)	16K, 48K
Screen Size	28 X 40
Expansion Sockets	Yes
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£99.95, £139.95**

MANUFACTURER'S EXPANSIONS

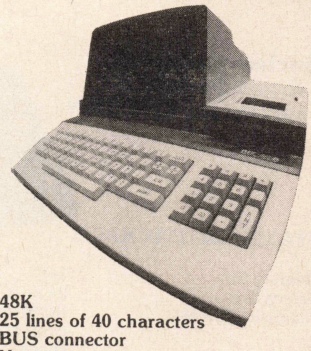
	DETAILS	PRICE
RAM	N/A	–
Printer	Yes	£169.95
Monitor	Yes	–
Disc Drives	TBA	–
Other Languages	FORTH	
Multi-user Capabilities	No	–
BASIC extensions	TBA	–

OTHER ADD-ONS:

Joystick/Interface, Speech Synthesiser, Modem, Light Pen.

SHARP MZ-80A

Sharp UK Ltd,
Thorn Road,
Newton Heath,
Manchester
M10 9BE
Tel: 061-205 2333



STANDARD PACKAGE

Memory Size (RAM)	48K
Screen Size	25 lines of 40 characters
Expansion Sockets	BUS connector
Tape Included?	Yes
Display Unit Included?	Yes
Usable Domestic TV?	No
Size of BASIC	12K
Average Price	**£549**

MANUFACTURER'S EXPANSIONS

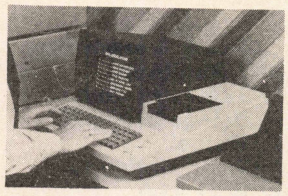
	DETAILS	PRICE
RAM	No	–
Printer	Yes	£450-800
Monitor	N/A	–
Disc Drives	Yes, dual	£600
Other Languages	Yes	£45
Multi-user Capabilities	No	–
BASIC extensions (Toolkits)	No	–

OTHER ADD-ONS:

None Reported

SHARP MZ-80K

Sharp UK Ltd,
Thorn Road,
Newton Heath,
Manchester
M10 9BE



STANDARD PACKAGE

Memory Size (RAM)	48K
Screen Size	25 lines of 40 characters
Expansion Sockets	BUS connector
Tape Included?	Yes
Display Unit Included?	Yes
Usable Domestic TV?	No
Size of BASIC	12K
Average Price	**£350**

MANUFACTURER'S EXPANSIONS

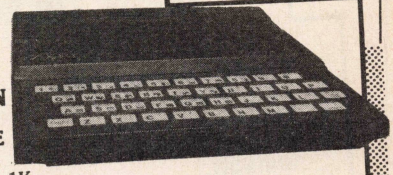
	DETAILS	PRICE
RAM	No	–
Printer	Yes	£450-800
Monitor	N/A	–
Disc Drives	Yes, dual	£600
Other Languages	Yes	£45 upwards
Multi-user Capabilities	No	–
BASIC extensions (Toolkits)	No	–

OTHER ADD-ONS:

None Reported

SINCLAIR ZX 81

Sinclair Research,
6 Kings Parade,
Cambridge CB2 1SN



STANDARD PACKAGE

Memory Size (RAM)	1K
Screen Size	24 lines of 32 characters
Expansion Sockets	BUS connections
Tape Included?	Yes
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8K
Average Price	**£49.95 built**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	16K RAM pack	£29.95
Printer	ZX Printer	£59.95
Monitor	No	–
Disc Drives	No	–
Other Languages	No	
Multi-user Capabilities	No	–
BASIC extensions (Toolkits)	No	–

OTHER ADD-ONS:

Memory expansion unit 16K or 64K, Memotech Ltd, 3 Collins St, Oxford OX4 1XL, £39.95-79; Memory Expansion 64K, Downsway Electronics (UK) Ltd, Dept M, Downsway House, Epsom Road, Ashtead, Surrey; £59.95; **Key Bleep Unit,** Microtronix, 3 Buxton Avenue, Coulton, Nottingham, N94 3RR, £8.85 kit, £9.95 built; **Maximem 1.1,** East London Robotics, Finlandia House, 14 Darwell Close, East Ham, London, EB4 BT, £93.50; **Music Synthesiser + 16 line control port,** William Stuart Systems Ltd, Dower House, Billicicay Road, Herongate, Brentwood, Essex CM13 3SD, £19.50; **Full-size keyboard,** Protos Computer Systems, Frome Computing, 20 Ashtree Road, Frome, Somerset, BA11 2SF, £64.95; **ZX99 Automatic tape control,** Data-cassette, 44, Shroton Street, London NW1 6UG, £59.95.

FACTFILE

SINCLAIR ZX SPECTRUM

Sinclair Research,
6 Kings Parade,
Cambridge, CB2 1SN



STANDARD PACKAGE

Memory Size	16K
Screen Size	24 lines of 32 characters
Expansion Sockets	ROM pack, Bus connector, joystick, socket
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	14K
Average Price	**£99.95**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	48K RAM for 16K version	£60
Printer	ZX Printer	£59.95
Monitor	No	—
Disc Drives	ZX Microdrive	TBA
Other Languages	No	—
Multi-user Capabilities	No	TBA
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Memory Expansion 32K, Downsway Electronics (UK) Ltd, Dept M, Downsway House, Epsom Road, Ashtead, Surrey: £42.50

TANDY TRS 80 I

Tandy Corporation,
12th Floor,
Tameway Tower,
Walsall,
West Midlands
WS1 1LA.



STANDARD PACKAGE

Memory Size (RAM)	4 or 16K
Screen Size	16 lines of 32 or 64 characters
Expansion Sockets	BUS connection
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8 or 12K
Average Price	**£229 or £339**

MANUFACTURER'S EXPANSIONS

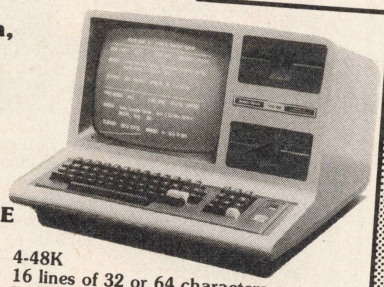
	DETAILS	PRICE
RAM	32K extra in expansion unit	£349
Printer	Yes	
Monitor	Yes	£239-1200
Disc Drives	Yes	£100
Other Languages	Yes	£369
Multi-user Capabilities	No	£100
BASIC extensions (Toolkits)	Yes	— £100

OTHER ADD-ONS:

Disc drives, single and dual, Cumana Ltd, 35 Walnut Tree Close, Guildford, Surrey GU1 4UN, £199-799; **Olivetti disc drives single and dual,** Kran Electronics, Victoria House, 17 Highcross St., Leicester LE1 4PF, £179-349; **48K internal RAM,** General Northern Microcomputers, (GNOMIC) 46 Middle Street, Blackhall, Marlepool, Cleveland, £70 + VAT; **32K RAM card,** Audio Computers, 87 Bournemouth Park Road, Southend on Sea, SS5 2JJ, £40 kit, £46 built.

TANDY TRS 80 III

Tandy Corporation,
12th Floor,
Tameway Tower,
Bridge Street,
Walsall,
West Midlands,
WS1 1LA



STANDARD PACKAGE

Memory Size (RAM)	4-48K
Screen Size	16 lines of 32 or 64 characters
Expansion Sockets	BUS connection, parallel & serial output
Tape Included?	No
Display Unit Included?	Yes
Usable Domestic TV?	No
Size of BASIC	16K
Average Price	**£599-1799**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	16K modules	£70
Printer	Yes various	£239-1200
Monitor	N/A	—
Disc Drives	Yes	£600
Other Languages	Yes	£100
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	Yes	£100

OTHER ADD-ONS:

Disc drives, Cumara Ltd, 35, Walnut Tree Close, Guildford, Surrey GU1 4UN, £199-799; **Olivetti disc drives single and dual,** Kram Electronics, Victoria House, 17, Highcross St, Leicester LE1 4PF, £179-349; **48K internal RAM,** General Northern Microcomputers, (GNOMIC), 46 Middle Street, Blackhall, Hartlepool, Cleveland, £70 + VAT; **32K RAM card,** Audio Computers, 87 Bournemouth Park Road, Southend on Sea, SS5 2JJ, £40 kit, £46 built.

TANDY COLOUR

Tandy Corporation,
12th Floor,
Tameway Tower,
Bridge Street,
Walsall,
West Midlands
WS1 1LA



STANDARD PACKAGE

Memory Size (RAM)	16-32K
Screen Size	16 lines of 32 characters
Expansion Sockets	Serial output, ROM pack, joystick socket
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	8-16K
Average Price	**£499**

MANUFACTURER'S EXPANSIONS

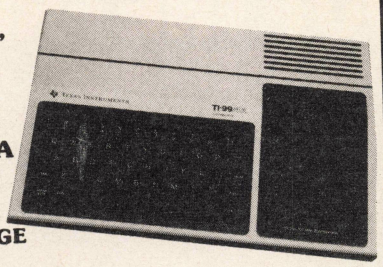
	DETAILS	PRICE
RAM	No	—
Printer	Yes various	£239-1200
Monitor	No	—
Disc Drives	Yes	£439
Other Languages	No	—
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Olivetti disc drives single and dual, Kram Electronics, Victoria House, 17 Highcross St., Leicester LE1 4PF, £179-349.

TEXAS TI 99/4A

Texas Instruments,
European
Consumer
Division,
Manton Lane,
Bedford MK41 7PA



STANDARD PACKAGE

Memory Size (RAM)	16K
Screen Size	24 lines of 32 characters
Expansion Sockets	ROM pack, Bus connector, joystick, socket
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	14K
Average Price	**£99.95**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	up to 48K (max)	£300
Printer	Yes	£550
Monitor	No	—
Disc Drives	Yes	£320
Other Languages	Yes	£50-£100
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	Yes	£75

OTHER ADD-ONS:

Speech Synthesiser, Texas Instruments, £50.00; **Terminal Emulator II,** Texas Instruments, £45.00; **RS232 Interface,** Texas Instruments.

COLOUR GENIE

Lowe Computers,
Bently Bridge,
Chesterfield Road,
Matlock
Derbyshire DE4 5LE
Tel: 0629 4995/4057



STANDARD PACKAGE

Memory Size (RAM)	32K
Screen Size	24 lines of 40 characters
Expansion Sockets	Parallel & serial output, expansion BUS
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	16K
Average Price	**£168**

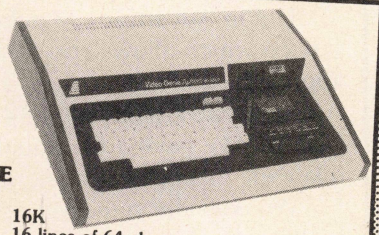
MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	16K	£38.56
Printer	Yes	£220
Monitor	No	—
Disc Drives	No	—
Other Languages	No	—
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

VIDEO GENIE I

Lowe Electronics,
Bentley Bridge,
Chesterfield Road,
Matlock,
Derbyshire,
DE4 5LE



STANDARD PACKAGE

Memory Size (RAM)	16K
Screen Size	16 lines of 64 characters
Expansion Sockets	BUS connector
Tape Included?	Yes
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	12K
Average Price	**£279**

MANUFACTURER'S EXPANSIONS

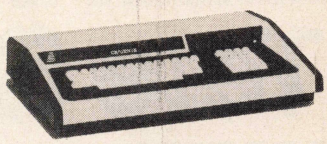
	DETAILS	PRICE
RAM	optional 48K in expansion unit	£200
Printer	Yes	£210
Monitor	Yes	£69-99
Disc Drives	Yes, single and dual	£220-375
Other Languages	No	—
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Disc drives, single and dual, Cumara Ltd, 35 Walnut Tree Close, Guildford, Surrey GU1 4UN, £199-799; **Olivetti disc drives single and dual,** Kram Electronics, Victoria House, 17 Highcross St, Leicester LE1 4PF, £179-349; **EG3014 Expansion box with 16K/32K RAM,** Swanley Electronics, 32 Goldsel Road, Swanley, Kent BR8 8EZ, £199-213 **48K Internal RAM,** General Northern Microcomputers, GNOMIC, 46 Middle Street, Blackhall, Martlepool, Cleveland, £70 + VAT: **32K RAM Card** Audio Computer, 87 Bournmouth Park Road, Southend-on-sea, SS5 2JJ, £40 kit, £46 built.

VIDEO GENIE II

Lowe Electronics,
Bentley Bridge,
Chesterfield Road,
Matlock,
Derbyshire DE4 5LE



STANDARD PACKAGE

Memory Size (RAM)	16K
Screen Size	16 lines of 32 or 64 characters
Expansion Sockets	BUS connector
Tape Included?	No
Display Unit Included?	No
Usable Domestic TV?	Yes
Size of BASIC	13K
Average Price	**£299**

MANUFACTURER'S EXPANSIONS

	DETAILS	PRICE
RAM	optional 48K in expansion unit	£200
Printer	Yes	£210
Monitor	Yes	£69-99
Disc Drives	Yes, single and dual	£220-375
Other Languages	No	—
Multi-user Capabilities	No	—
BASIC extensions (Toolkits)	No	—

OTHER ADD-ONS:

Disc drives, single and dual, Cumana Ltd, 35, Walnut Tree Close, Guildford, Surrey, Gul 4UN, £199-799; **Olivetti disc drives single and dual,** Kram Electronics, Victoria House, 17 Highcross St, Leicester LE1 4PF, £179-349; **EG3014 Expansion box with 16K/32K RAM,** Swanley Electronics, 32 Goldsel Road, Swanley, Kent BR8 8EZ, £199-213; **48K internal RAM,** General Northern Microcomputers, GNOMIC, 46 Middle Street, Blackhall, Hartlepool, Cleveland, £70 +VAT; **32K RAM Card** Audio Computers, 87 Bournemouth Park Road, Southend-on-sea, SS5 2JJ, £40 kit, £46 built.

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Machine Type:_____ Memory Size:_____

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DEPT: PCT 32 - 33 LANGLEY CLOSE, REDDITCH, WORCESTERSHIRE. B98 0ET. TELEPHONE: (0527) 21429 (21439 Answerphone)

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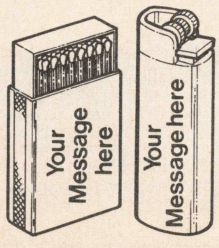
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SOFTWARE LISTING

Looking for a program to buy? Look no further! If it's available, it's listed here in our exclusive and comprehensive software checklists.

Looking through any computer magazine can be a bewildering experience if you're in search of a program. Count the hundreds of ads and thousands of titles on sale and it would be easy to lose heart!

We've tried to sort out the confusion, and the sheer numbers, to present an easily understood list for each machine. Where possible, we have eliminated duplications, so that the same tape with a different label is not listed twice. Rather it should be credited once, with as many suppliers as we could find.

Table Codes

In order to fit as many programs as possible into our pages, we have had to use codes for some columns, considerably shortening the wording.

The information given for each program is: Title, memory required to run it, company producing it, whether tape/cartridge or disk, type and supplier and price.

The codes we have used are:

Program Type

GM = Game
BS = Business routine
UT = Utility (ie. programming aid)
DO = Domestic
ED = Educational

How Sold

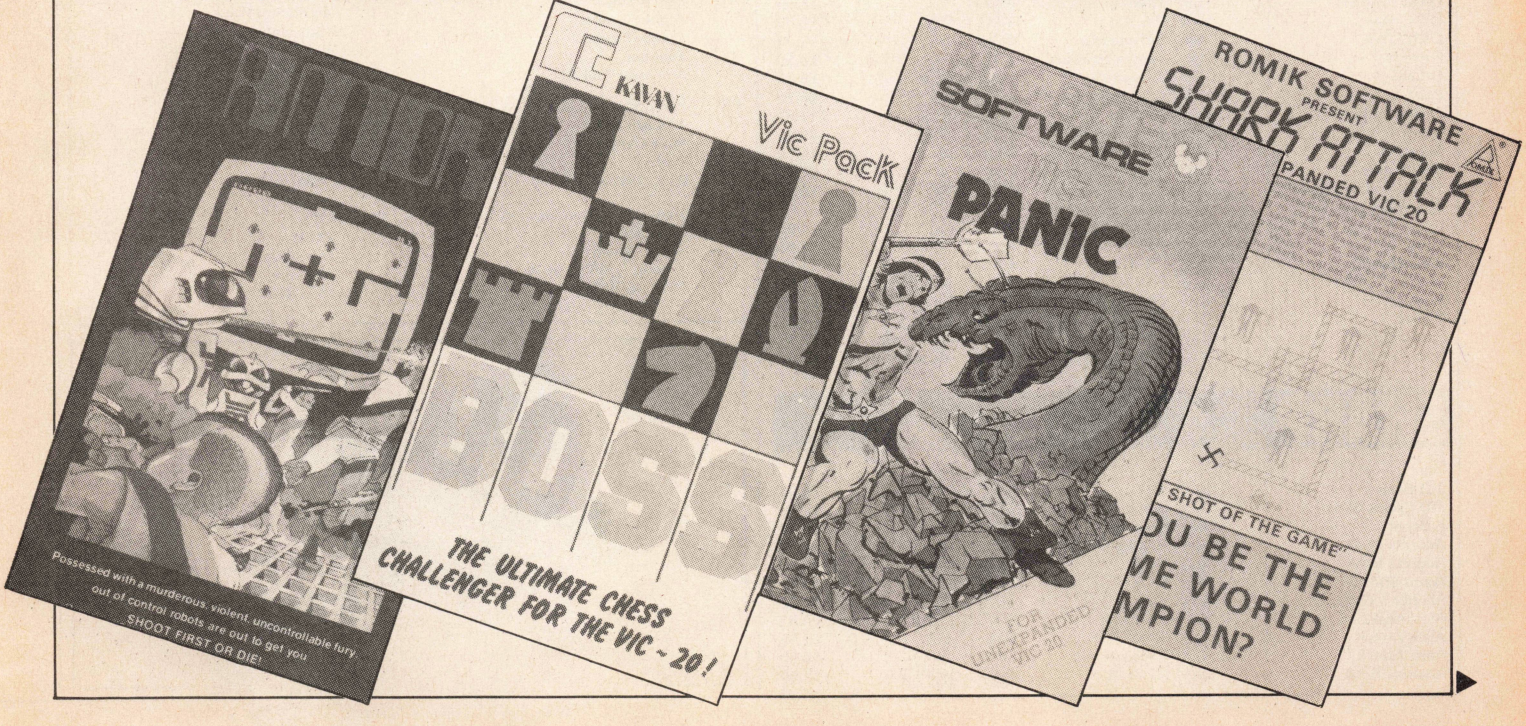
R = Cartridge (may include memory)
C = Tape (cassette)
D = Disc (for expanded systems)
L = Listing (sold as print-out)

Due to overwhelming response we have been forced to alternate machines included in our checklist each month.

This month, we have recoded all the dealers, and their names and addresses will now appear in the section to which they refer. This should lead to clearer referencing and help your search.

Not Here?

To companies whose products are not listed herein we can only say TELL US ABOUT IT! This applies particularly to the smaller retailer who may sell only half a dozen or so programs for one machine. If you produce software for *any* of the machines on the market today, then we would love to include your wares in our checklists. Send it in to us, marked for the attention of the Editor (in our format *Please!*) or ring Jane Price on 01-437 1002 as soon as possible.



REFERENCE

SOFTWARE LISTING

ORIC

Title	Program Type	Program Produced By	Memory Req'd	How Sold	Supplier Codes	Prices
Adventureland	Gm	Kenema	48K	C	KEn	£4.99
Airline	Gm	CCS	48K	C	CCs	£7.95
Assembler & Disassembler	Ut	Durell	48K	C	DU	£9.95
Awari	Gm	Kenema	48K	C	KEn	£3.83
Backgammon	Gm	J Edwards	12K	C	JE	£5.50
Base	Gm	Tansoft	48K	C	TA	£9.95
Battleship Patrol	Gm	J Edwards	12K	C	JE	£5.50
Biorythms	Do	Tomorrows World	48K	C	TO	£5.95
CB/Ham Log	Do	Kenema	48K	C	KEn	£3.83
Centipede	Gm	PSS	48K	C	PSs	£6.95
Character/Graphic Generator	Ut	Headfiled Technology	48K	C	HEa	£4.95
Chess	Gm	Tansoft	48K	C	TA	£9.99
Code Breaker	Gm	Headfield Technology	48K	C	HEa	£4.95
Compendium	Gm	Salamander S/W	48K	C	SA	£7.95
Dallas	Gm	CCS	48K	C	CCs	£7.95
Death Satellite	Gm	A & F Software	16K	C	AA	£6.90
Death Trap	Gm	Headfield Technology	48K	C	HEa	£4.95
Design Aid	Ut	Kenema	48K	C	KEn	£3.83
Dinky Kong	Gm	Adrian Shepherd	16K	C	SE	£6.95
Dungeons of Intrigue	Gm	ASL Software	48K	C	ASl	£5.50
Family Records	Do	Kenema	48K	C	KEn	£3.83
Fishermans Log	Gm	Kenema	48K	C	KEn	£3.83
Five Alike	Gm	Pase	48K	C	PA	£4.99
Flight	Gm	Tansoft	48K	C	TA	£4.95
Forth	Ut	Tansoft	48K	C	TA	£4.95
Franklin's Tomb	Gm	Salamander	48K	C	SA	£9.95
Fruit Machine/Pontoon	Gm	Computamaster	48K	C	COt	£4.95
Gail	Gm	Severn Software	48K	C	SE	£6.95
50 Games	Gm	Cascade Software	48K	C	CAs	£9.95
50 Games	Gm	U.T.S.	48K	C	UT	£9.95
3 Games for Children	Ed	Burslem	48K	C	BU	£7.95
Graphics	Ut	Basic Concepts	48K	C	BA	£6.95
Happy Landings	Gm	Basic Concepts	48K	C	BA	£6.95
Hopper	Gm	P.S.S.	48K	C	PSs	£6.95
Invaders	Gm		48K	C	AR,PSs	£5.50
						£6.95
Key Trainer	Ed	Kenema	48K	C	KEn	£3.83
Knights	Gm	Headfield Technology	48K	C	HEa	£4.95
Light Cycle	Gm	PSS	48K	C	PSs	£6.95
Lunar Lander/Asteroids	Gm	Durell Software	48K	C	DU	£5.95
Mastermind	Gm	Tomorrows World	48K	C	TO	£5.95
Mastermynde	Gm	Headfield Technology	48K	C	HEa	£4.95
M/Code Monitor	Ut	PASE	48K	C	PA	£4.99
Mushroom Mania	Gm	Arcadia Software	48K	C	AR	£5.50
3D Noughts and Crosses	Gm	J Edwards	8K	C	JE	£5.50
ORIC Base	Do	Tansoft	48K	C	TA	£14.50
ORIC Chess	Gm	Tansoft	48K	C	TA	£9.99
ORIC Flight	Gm	Tansoft	48K	C	TA	£4.50
ORIC Forth	Ut	Tansoft	48K	C	TA	£15.00
ORIC Invaders	Gm	Titan	48K	C	TI	£6.95
ORIC Man	Gm	P.S.S.	48K	C	PSs	£8.95
ORIC Trek	Gm	Salamander	48K	C	SA	£9.95
Oricade	Ut	Severn Software	48K	C	SE	£8.50
Othello	Gm	J Edwards	10K	C	JE,KEn	£5.50
Painter	Gm	A&F Software	48K	C	AA	£6.90
Personnel Files	Bs	Kenema	48K	C	KEn	£17.39
Quest	Gm	J Wolstencroft	48K	C	JW	£6.95
Startrek	Gm	J Edwards	48K	C	JE	£5.50
Synthesiser	Do	Tomorrows World	48K	C	TO	£7.95
Teach Yourself Basic	Ed	Basic Concepts	48K	C	BA	£6.95
The Word	Gm	Headfield Technology	48K	C	HE	£4.95
Ultra	Gm	PSS	48K	C	PSs	£6.95
West Quest	Gm	PASE	48K	C	PA	£4.99
Worm	Gm	PASE	48K	C	PA	£4.99
Wriggler	Gm	FBC Systems Ltd	48K	C	FB	£5.50
Zodiac	Do	Tansoft	48K	C	TA	£9.99
Zodiac	Do	A&F Software	16K	C	AA	£6.90
Zrim	Gm	J Wolstencroft	48K	C	JW	£7.50

SHARP

3-D Basic	Gm	Kuma	6K	C	KU,XI,MI	£6.32
3-D Space Battle	Gm	Sumlock	48K	C	SUm	£8.00
Acrobat	Gm	Sumlock	48K	C	SUm	£6.33
Address Book	Gm	Highlight S/W	4K	C	HI,MI	£4.60
Address Book	Do	DCS	48K	C	DAv	£3.00
Agent 007	Gm	DCS	24K	C	DAv	£3.00
Aladdin's Cave	Gm	Kuma	48K	C	KU,BR	£6.32
Aldebaren I	Gm	Sharpsoft	20K	C	BR	£5.85
Alien Attack	Gm	Sumlock	48K	C	SUm	£6.50
Alien Attack	Gm	J Wolsencroft	24K	C	JW	£4.60
Analysis Book	Bs	Microtek	48K	C	ML	£95.00

ORIC DEALERS

Supplier Code

AA A & F Software
10 Wilpshire Avenue
Longsight
Manchester
061 320 5482

AR Arcadia Software
Freepost
Swansea
SA3 4ZZ

ASl ASL Software
66 Fford Llywellyn
Little Acton
Wrexham
Clwyd

BA Basic Concepts
PO Box 46
Leatherhead
Surrey KT22 7XF
0372 378694

BU Burslem Computer Centre
74 Waterloo Road
Burslem
Stoke on Trent
Staffs ST6 3EX
0782 825555

CAs Cascade Software
Cascades House
Bargans Lane
Llandogo
Gwent NP5 4PA

CCs C.C.S.
14 Langton Way
Blackheath
London
SE3 7TL
01 858 0763

COt Computamaster
17 New Belt Avenue
Cheam
Surrey SM3 8ED

COv Computasolve Ltd
8 Central Parade
St Marks Hill
Surbiton
Surrey KT6 4PJ
01 390 5135

DU Durell Software
Higher Combe
Combe Florey
Taunton
Somerset TA4 3JF

FB FBC Systems Ltd
10 Castelfields
Main Centre
Derby
0332 365280

HEa Headfield Technology Ltd
Lock Street
Saville Town
Dewsbury WF12 9BW
0924 461327

JE J Edwards
20 Southern Road
West End
Southampton

JU Juniper Computing
8 Pembroke Green
Lea
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06662 2689

JW J Wolstencroft
Sagar Fold
Blecsdale
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PA PASE
213-215 Market Stret
Hyde
Cheshire
061 366 5935

PSs PSS
452 Stoney Stanton Road
Coventry
0203 667556

SA Salamander Software
17 Norfolk Road
Brighton
W Sussex
0273 771942

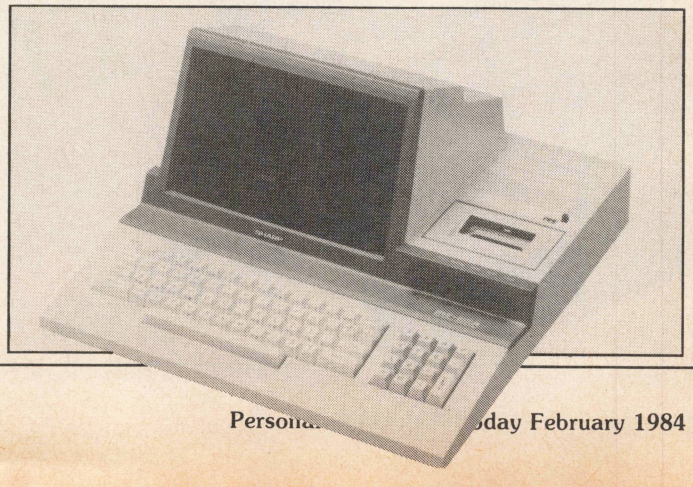
SE Severn Software
5 School Crescent
Lydney
Glos GL15 5T

TA Tansoft
3 Club Mews
Ely
Cambridge
0353 2271

TI Titan Programs
The Computer Palace
46 Market Place
Chippenham
Wilts
0249 653824

TO Tomorrows World
118 Worcester Road
Malvern
Worcs
06845 62467

UT UTS
PO Box 96
Harrogate
N Yorks
HG3 2UZ



Animate	Gm	Kuma	48K	C	KU,XI,MI	£9.20
Apollo Front Panel	Bs	Kuma	20K	C	KU	£14.35
Apolloword	Bs	Kuma	48K	C	KU,XI,LS	£28.70
Apolloword	Bs	Kuma	48K	D	KU,XI,LS	£63.25
Ardensoft Toolkit	Ut	Kuma	20K	C	KU	£40.25
Artillery/Biorythms	Gm	DCS	24K	C	DAv	£3.00
Asteroids	Gm	Sharpsoft	20K	C	BR	£5.85
Astor Dodge	Gm	Kuma		C	KU,BR	£6.32
Astor Shoot	Gm	Sumlock	48K	C	SUm	£6.33
Auto Cross	Gm	Highlight S/W	6K	C	HI,MI	£4.60
Backgammon	Gm	Highlight S/W	10K	C	HI,MI	£5.75
Bank Account	Do	Highlight S/W	6K	C	HI,MI	£4.60
BASIC-C	Ut	DCS	24K	C	DAv	£16.00
BASIC-B	Ut	DCS	24K	C	DAv	£12.00
Basic Compiler	Ut	Sharp	48K	C	MI	£34.50
Basic Extensions	Ut	Kuma	20K	C	KU,XI,MI	£14.95
Basic Mod	Ut	DCS	20K	C	DAv	£5.00
Basic Plus	Ut	Kuma		C	KU	£13.80
Battleships	Gm	DCS	24K	C	DAv	£3.00
Bean Feast	Gm	DCS	24K	C	DAv	£3.00
Bingo Caller	Gm	DCS	48K	C	DAv	£3.00
Bio-Rhythm	Gm	Highlight S/W	6K	C	HI,MI	4.60
Block QC	Gm	Sharpsoft	20K	C	MI	£3.50
Block Stop	Gm	J Wolstencroft	24K	C	JW	£4.60
Blockade	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Bomb Run	Gm	Sumlock	48K	C	SUm	£7.50
Bomber	Gm	Kuma	6K	C	KU,MI,XI	£6.32
Breakout	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Breakout	Gm	Sharpsoft	20K	C	MI	£5.75
Bridge	Gm	Highlight S/W	22K	C	HI	£12.95
Broadwater Economic Simulations	Ed	BES	16K	C	BRo	£28.75
Brownian Motion	Ed	Kuma	48K	C	KU	£12.00
Bytesaver	Ut	DCS	20K	C	DAv	£4.00
CPM	Ut	Chrystal	48K	C	XI,KU	£172.50
Calc II	Bs	Kuma	20K	C	XI,KU,MI	£39.65
Camelot	Gm	Kuma	48K	C	KU,LS,MI, XI,SU	£6.32
Carols	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Cash Book	Bs	Microtek	48K	C	ML	£95.00
Cash Flow Projection	Bs	NCG Ltd	36K	C	WC	£95.00
Castle Bloodstone Adventure	Gm	Sumlock	48K	C	SUm	£17.25
Casino	Gm	Kuma		C	KU	£6.32
Catch 2000/Invader	Gm	Kuma	12K	C	KU,XI,MI	£6.32
Cesil III	Ed	Kuma	20K	C	KU	£17.20
Chase	Gm	Highlight S/W	6K	C	HI,MI	£5.75
Chess	Gm	Kuma	12K	C	KU,XI,SU,BR	£12.00
Children's Maths	Ed	Kuma		C	KU	£6.32
Chrystal Basic	Ut	Chrystal	48K	C	KU,XI	£46.00
Colditz	Gm	Sharpsoft	20K	C	BR	£8.46
Combat	Gm	Highlight S/W	6K	C	HI,MI	£5.75
Combat	Gm	Kuma	12K	C	XI,KU,MI	£6.32
Commands	Gm	Sharpsoft	20K	C	MI	£5.85
Composer	Gm	Highlight S/W	6K	C	HI,MI	£5.75
Concentration	Gm	Kuma	12K	C	XI,KU,MI	£6.32
Conflict	Gm	Sumlock	48K	C	SUm	£6.33
Connect 4	Gm	Highlight S/W	6K	C	HI,MI	£4.60
Connect Four	Gm	DCS	24K	C	DAv	£3.00
Cosmiad	Gm	Highlight S/W	10K	C	HI,MI	£5.75
Cosmiad	Gm	Kuma	12K	C	XI,LS,MI,KU	£9.20
Count and Add	Ed	Highlight S/W	22K	C	HI,MI	£5.75
Cribbage	Gm	Kuma	12K	C	KU,XI	£12.00
Critical Path Analysis	Bs	NCG Ltd	36K	C	WC	£40.00
Cricket	Gm	Kuma		C	KU	£6.32
Cursed Chambers	Gm	J Wolstencroft	48K	C	JW	£5.75
Data Bank	Ut	DCS	48K	C	DAv	£6.00
Data Base	Bs	Kuma	48K	C	KU,XI	£33.95
Data File	Gm	Gamer	48K	C	JW	£29.95
Deferment Allowances	Bs	DCS	32K	C	DAv	£3.00
Demons Castle	Gm	DCS	48K	C	DAv	£3.00
Demon Drive	Gm	DCS	24K	C	DAv	£3.00
Disassembler	Ut	Kuma	20K	C	XI,KU,MI	£12.00
Donky Derby	Gm	Kuma	12K	C	XI,KU,MI	£6.32
Double Precision Basic	Ut	Sharp	48K	C	MI	£28.75
Double Precision Basic	Ut	Sharp	48K	D	KU	£46.00
Drunken Driver	Gm	Highlight S/W	6K	C	HI,MI	£5.75
Dybug	Ut	Kuma		C	KU	£16.65
Editor Assembler	Ut	Sharp	48K	C	MI	£15.50
Editor Assembler	Ut	Sharp	48K	D	KU	£51.75
Editor/Disassembler	Ut	DCS	20K	C	DAv	£12.00
Election '84	Gm	Sharpsoft	20K	C	BR	£8.45
Electronic Organ	Gm	Kuma	12K	C	KU	£6.32
Electronic Organ	Gm	DCS	48K	C	DAv	£3.00
Empire II	Gm	Sharpsoft	20K	C	MI	£5.85
Enigma	Gm	Kuma	12K	C	KU	£6.32
Escape Forth	Gm	J Wolstencroft	24K	C	JW	£4.60
Evasion	Gm	Kuma	6K	C	KU,XI	£6.32
Executive	Gm	Kuma	6K	C	KU,MI	£9.20
Exploring Africa	Gm	Kuma	6K	C	KU,MI	£6.32
F DOS	Ut	Sharp	48K	C	MI	£57.50
Fall Out	Gm	Kuma	6K	C	KU,XI	£6.32
Finance	Bs	DCS	20K	C	DAv	£3.00

SHARP DEALERS

Supplier Code

BI Bar Instrument Company
Flixton Road
Manchester M31 3BG

BR Brighton Gamer
24 Gloucester Rd
Brighton
Sussex
0273 698424

BRo Broadwater Economic Simulations
24 Hill Barn Lane
Worthing
W Sussex

CA Carswell Computers
Carswell Barn
Faringdon
Oxon SN7 8JN

DAv David Computer Software
38 South Parade
Bramhall
Stockport SK7 3BJ
061 439 4841

EP Epsom Computers
25 Chartwell Place
Epsom
Surrey

HI Highlight Software
3 Nether Court
Halstead
Essex
0787 475714

JW J Wolstencroft
Sagar Fold
Preston
Lancs
09956 327

KU Kuma Computers
11 York Road
Maidenhead
Berks
0628 71778

LS Laskys
7-9 Queensway
London W2 3RX
200 0444

MI Micro & Video Palace
652-64 Kensington High St
London W8
01 637 0366

ML Microtek Ltd
15 Lower Brook Street
Ipswich
Suffolk
0473 50512

SOl Solo Software
51 Broad Street
Worcester WR1 3LR
0905 26524

SUm Sumlock Electronic Services
Royal London House
198 Deansgate
Manchester M3 3NE
061 834 4233

SU Superior Systems Ltd
178 West Street
Sheffield
0742 755005

TR Tridata Micros Ltd
Smithfield House
Digbeth
Birmingham
B5 6BS
021 662 6085

UR Urmston Computer Centre
Flixton Road
Urmston
Manchester

WC WCG Ltd
Lettergesh
Renvyle
Co. Galway
Republic of Ireland

WO Work Force
140 Wilsden Avenue
Luton
Beds LU1 5HR

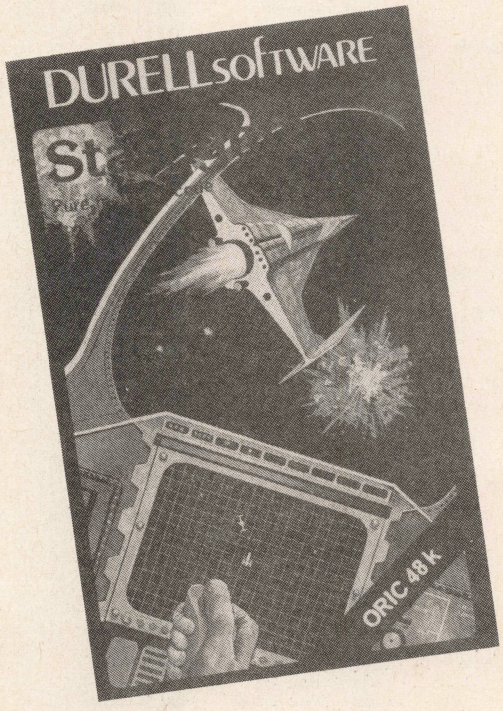
YO Youngs of Leicester
40/42 Belvoir Street
Leicester



SOFTWARE LISTING

SHARP

Title	Program Type	Program Produced By	Memory Req'd	How Sold	Supplier Codes	Prices
Fireballs	Gm	Kuma	6K	C	KU,MI	£6.32
Fishing	Gm	Sumlock	48K	C	SUm	£8.50
Football Manager	Gm	Highlight S/W	10K	C	MI,HI	£5.75
Forth	Ut	Kuma		C	KU	£40.20
Foundry Package	Bs	Microtek	48K	C	ML	POA
Four in a Row	Gm	Kuma	6K	C	XI,KU,MI	£6.32
Fox and Geese	Gm	Highlight S/W	6K	C	MI,HI	£4.60
French Vocab	Ed	DCS	20K	C	DAv	£3.00
Fruit Machine	Gm	Kuma	6K	C	XI,KU,MI	£6.32
Fruit Machine	Gm	DCS	20K	C	DAv	£3.00
Full Accounting	Bs	Microtek	48K	C	ML	POA
Games Pack 1	Gm	Sumlock	48K	C	SUm	£8.50
Games Pack 2	Gm	Sumlock	48K	C	SUm	£8.50
Gamestape 1	Gm	DCS	48K	C	DAv	£8.00
Gamestape 2	Gm	DCS	48K	C	DAv	£8.00
Gamestape 3	Gm	DCS	48K	C	DAv	£8.00
Gamestape 4	Gm	DCS	48K	C	DAv	£8.00
Geography	Ed	DCS	20K	C	DAv	£3.00
Guess Word	Gm	Kuma	6K	C	KU,MI	£6.32
Hangman	Gm	Kuma	6K	C	KU,MI,XI	£6.32
Hangman	Gm	DCS	20K	C	DAv	£3.00
Head On	Gm	Highlight S/W	10K	C	MI,KU	£6.90
Head On	Gm	Kuma	6K	C	MI,KU,XI	£6.32
Head On	Gm	Sharpsoft	20K	C	BR	£5.85
Hissing Sid	Gm	Kuma		C	KU	£6.32
Home Budget I	Do	Kuma	6K	C	KU,LS,XI,MI	£6.32
Hunter Killer	Gm	Kuma	48K	C	KU,MI	£6.32
I Spy	Ed	Highlight S/W	22K	C	HI	£5.75
Instant Addition And The Four Rules	Ed	Kuma	48K	C	KU	£6.32
Intruder	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Invaders	Gm	Kuma	20K	C	SU	£6.30
Invoice Control	Bs	David Computer Software	48K	C	DAv	£6.00
J S Line 4	Gm	Kuma	48K	C	KU,MI	£6.32
Junior Maths and Stepping Stones	Ed	Kuma	48K	C	KU	£6.32
Juntori	Gm	Sharpsoft	20K	C	MI	£5.85
Kentucky Derby	Gm	Kuma		C	KU	£6.32
Knights Commander	Ut	Knights	48K	C	KU	£28.75
Knights Commander	Ut	Knights	48K	D	KU	£74.75
Knights Fortran	Ut	Knights	48K	C	KU	£34.50
Knights Wee Pascal	Ut	Knights	48K	C	KU	£23.00
Large Display	Gm	Kuma	48K	C	KU	£6.32
Las Vegas	Gm	Sharpsoft	20K	C	MI	£5.85
Ledger	Bs	NCG Ltd	40K	C	WC	£90.00
Letterwriter WP	Bs	David Computer Software	48K	C	DAv	£10.00
Life	Gm	Kuma	48K	C	KU,XI,MI	£9.20
Linear Programming	Bs	NCG Ltd	20K	C	WC	£45.00
LP Gas Flow	Bs	DCS	20K	C	DAv	£3.00
Lunar	Gm	Kuma	48K	C	KU,XI,MI	£6.32
Lunar Lander	Gm	Kuma	48K	C	KU,XI,MI	£6.32
MZ Othello	Gm	Kuma	48K	C	KU	£12.00
Machine Code Editor	Ut	DCS	24K	C	DAv	£14.00
Machine Code Editor	Ut	DCS	48K	C	DAv	£14.00
Madness	Gm	J Wolstencroft	24K	C	JW	£4.60
Mailing List	Bs	DCS	48K	C	DAv	£6.00
Maniac	Gm	Highlight S/W	6K	C	MI,HI	£5.75
Man on the Run	Gm	Sumlock	48K	C	SUm	£6.33
Map of England	Gm	Kuma	48K	C	XI	£6.32
Map of Englad	Gm	Kuma	48K	D	KU	£12.00
Mastermind	Gm	Highlight S/W	6K	C	HI,MI	£4.60
Masternind	Gm	Kuma	48K	C	KU,LS,XI,MI	£6.32
Match the Character	Ed	Highlight S/W	22K	C	MI,HI	£4.60
Match the Word	Ed	Highlight S/W	22K	C	MI,HI	£5.75
Maths	Ed	Highlight S/W	22K	C	MI	£5.75
Maths 1	Ed	DCS	48K	C	DAv	£3.00
Maths 2	Ed	DCS	48K	C	DAv	£3.00
Maths 3	Ed	DCS	48K	C	DAv	£3.00
Maths 4	Ed	DCS	48K	C	DAv	£3.00
Maths 5	Ed	DCS	48K	C	DAv	£3.00
Maths 6	Ed	DCS	48K	C	DAv	£3.00
Melody	Gm	Kuma	48K	C	KU	£6.32
Memory Tests	Ut	Kuma	20K	C	KU,MI,XI	£6.32
Minefield	Gm	Kuma	48K	C	KU	£6.32
Missle Defence	Gm	Sumlock	48K	C	SUm	£8.50
Miz-Maze	Gm	Kuma	48K	C	KU,XI	£6.32
Monkey Climb	Gm	Kuma	48K	C	KU,XI	£6.32
Moonlander	Gm	Highlight S/W	10K	C	HI,MI	£5.75
Mortar Attack	Gm	Kuma	48K	C	KU,XI	£6.32
Music Composer/Editor	Ed	Kuma	48K	C	KU,XI,LS	£12.00
Multiple Regression	Ed	NCG Ltd	24K	C	WC	£65.00
Navex	Ed	Kuma	48K	C	KU	£28.70
Pac Man	Gm	Kuma	48K	C	KU	£9.20
Pascal	Ut	Sharp	48K	C	MI	£34.50
Patience	Gm	Kuma	48K	C	KU,XI	£6.32
Payroll	Bs	Microtek	48K	C	ML	£65.00
Payroll	Bs	NCG Ltd	40K	C	WC	£150.00
Payroll 81-C	Bs	Sumlock	48K	C	SUm	£74.75
Payroll 81-D	Bs	Sumlock	48K	D	SUm	£74.75
Payroll	Bs	Tridata	48K	D	TR	£170.00
Pelmanism	Gm	Sumlock	48K	C	SUm	£5.75
Physics 1	Ed	DCS	48K	C	DAv	£3.00
Physics 2	Ed	DCS	48K	C	DAv	£3.00
Picture Count	Ed	Highlight S/W	22K	C	MI,HI	£5.75
Pilot	Ut	Kuma	48K	C	KU	£17.25
Poker	Gm	Kuma	48K	C	KU,HI,XI	£6.32
Polaris	Gm	Sumlock	48K	C	SUm	£6.50
Pontoon	Gm	Kuma	48K	C	KU,HI,XI	£6.32
Poseidon	Gm	Highlight S/W	6K	C	MU,HI	£5.75
Poster Printer	Bs	DCS	48K	C	DAv	£3.00
Princess & Monster Maze	Gm	Kuma	48K	C	KU,MI	£6.32
Program Filing Index	Bs	Kuma	20K	C	KU	£6.32



Quadrax	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Quest	Gm	J Wolstencroft	48K	C	JW	£4.60
Race Track	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Racing	Gm	Kuma	48K	C	KU	£6.32
Raider	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Ram Test	Ut	DCS	48K	C	DAv	£3.00
Reactor	Gm	Kuma	48K	C	KU,MI	£6.32
Reportwriter WP	Bs	David Computer Software	48K	C	DAv	£8.00
Rhymes	Gm	Kuma	48K	C	KU,MI	£6.32
Road Hunter	Gm	Kuma	48K	C	KU,MI,XI	£6.32
Rocket	Ed	Kuma	48K	C	KU	£6.32
Roulette	Gm	Sumlock	48K	C	SUm	£6.33
Tank Wall	Gm	Kuma	48K	C	KU,XI	£6.32
Tank Practice	Gm	DCS	48K	C	DAv	£3.00
Target Practice	Gm	DCS	48K	C	DAv	£3.00
Tape Copier	Ut	DCS	20K	C	DAv	£4.00
Tenpin Bowling	Gm	Kuma	48K	C	KU,XI	£6.32
Timetabling Aid	Ed	Kuma	20K	C	KU	£22.45
Towering Inferno	Gm	Sharpsoft	20K	C	MI,BR	£5.85
Towers	Gm	DCS	48K	C	DAv	£3.00
Towers of Hanoi	Gm	Kuma	48K	C	KU	£6.32
Track Layer	Gm	Kuma	48K	C	KU,BR	£6.32
Trader Smith	Gm	Kuma	48K	C	MI	£6.32
Tudor Village	Gm	DCS	48K	C	DAv	£3.00
Trench Mortars	Gm	DCS	48K	C	DAv	£3.00
Tycoon	Gm	Kuma	48K	C	KU,XI	£6.32
Typewriter	Do	DCS	48K	C	DAv	£3.00
Typing Test/Tutor	Bs	DCS	20K	C	DAv	£6.00

UFO	Gm	Kuma	6K	C	KU,LS	£6.32
Video Draughts	Gm	DCS	48K	C	DAv	£3.00
War at Sea	Gm	DCS	48K	C	DAv	£3.00
Wizards Quest Adventure	Gm	Sumlock	48K	C	SUm	£10.50
Wordpro	Bs	Kuma	48K	C	KU,LS	£45.45
Wordpro	Bs	Kuma	48K	C	KU,LS	£91.95
Wordprocessor LW	Bs	DCS	48K	C	DAv	£10.00
Wordprocessor RW	Bs	DCS	48K	C	DAv	£8.00
Utility Tape 1 — Maths	Ed	DCS	48K	C	DAv	£8.00
Utility Tape 2 — Maths/Physics	Ed	DCS	48K	C	DAv	£8.00
Y Geirfa	Ed	DCS	20K	C	DAv	£3.00
Zen Dos	Ut	Kuma	4K	C	KU	£66.16
Zen Editor Assembler	Ut	Kuma	20K	C	KU,MI,XI	£22.45
Zenmod	Ut	Kuma	4K	C	KU,MI	£12.00
Z-80 Disassembler	Ut	Sumlock	48K	C	SUm	£12.00

ZX81

1K Chess	Gm	Artic	1K	C	ARt	£2.95
1K Fun Learning	Ed	A.Parsons	1K	C	APa	£3.95
1K Games Pack	Gm	Artic	1K	C	ARt,THs	£6.00
1K Maths	Ed	Mr Purves	1K	C	JP	£3.50
1K Super Trio	Gm	Software Masters	1K	C	XI	£7.95
16K Fun Learning	Ed	A.Parsons	16K	C	JP	£4.95
16K Games	Gm	Serious S/W	16K	C	SEr	£5.95
16K Maths	Ed	Mr Purves	16K	C	JP	£3.50
3-D Labyrinth	Gm	dK'tronics	16K	C	DK	£3.95
3-D Monster Maze	Gm	J K Greye	16K	C	BUf	£4.95
Adventure	Gm	Anglo American	16K	C	AN	£6.00
Adventure A	Gm	Artic	16K	C	ARt,THs,BUf,	£6.00
					MI	£8.00
Adventure B	Gm	Artic	16K	C	ARt,THs,BUf	£7.00
					MI	£8.00
Adventure C	Gm	Artic	16K	C	ARt,THs, BUf,MI	£8.00
Adventure I	Gm	Abersoft	16K	C	BUf,ABe	£9.95
Angle	Ed	AVC Software	16K	C	AVc	£3.00
Adventure	Gm	Abersoft	16K	C	BUf,ABe	£8.95
Action Games	Gm	A.Parsons	16K	C	JP	£4.95
Aladdin	Ed	Bryants S/W	16K	C	BRy	£1.87
Arithmetic Teasers	Ed	Hard & Soft	3K	C	HAr	£3.95
Around Europe in 80hrs	Gm	S W Hessel	16K	C	BUf	£4.25
Assembler	Ut	Artic	16K	C	ARt	£6.95
Art & Fun	Gm	A.Parsons	16K	C	APa	£4.95
Asset Stripper	Gm	Micro Games	16K	C	BUf	£4.50
Asteroids	Gm	Quicksilva	16K	C	BUf	£5.50
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Bank Account	Bs	Transform	16K	C	TRa	£8.75
Bank Account	Bs	Transform	32K	C	TRa	£10.75
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Battle of Britain	Gm	Micro Games	16K	C	BUf	£4.50
Beam Analysis	Bs	Hilderbay	16K	C	HId	£25.00
Biology 1	Ed	AVC Software	16K	C	AVc	£3.00
Biology 2	Ed	AVC Software	16K	C	AVc	£3.00
Bearings	Ed	Bryant S/W	16K	C	BRy	£1.87
Breakout	Gm	Anglo American	16K	C	AN	£4.50
Breakout	Gm	Bug Byte	1K	C	BUf	£3.50
Brick-Stop	Gm	R & R Software	16K	C	RA,TOw	£3.75
Budget & Address Book	Do	Mr Purves	16K	C	JP	£4.00
Budget Programs (2)	Bs	Hilderbay	16K	C	HId	£17.00
Bumper 7	Gm	Software Masters	1K	C	XI	£4.95
Cassette 1	Gm	Michael Orwin	1K	C	OS	£3.80
Cassette 2	Gm	Michael Orwin	1K	C	OS	£5.00
Cassette 3	Gm	Michael Orwin	16K	C	OS	£5.00
Cassette 4	Gm	Michael Orwin	16K	C	OS	£5.00
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Gunfight						
Invaders						
Galaxy Invaders						
Snakebite						
Fungaloids						
Life						
3D Tic Tac Toe						
Cassette G10	Gm	Psion	16K	C	PSi,SIn	£5.95
Backgammon						
Cassette G11	Gm	Psion	16K	C	PSi,SIn	£6.95
Chess						
Cassette G12	Gm	Psion	8K	C	PSi,SIn	£4.75
Perilous Swamp						
Sorceror's Island						
Cassette G13	Gm	Psion	16K	C	PSi,SIn	£3.95
Space Raiders						
Bomber						
Cassette G14	Gm	Psion	16K	C	PSi,SIn	£5.95
Flight Simulation						
Cassette G2	Gm	Psion	16K	C	PSi,SIn	£4.95

ZX81 DEALERS

Supplier Code

ABe Abersoft
7 Maes Afallen
Bow Street
Dyfed SY24 5BA

AD Addictive Games
PO Box 278
Conniburrow
Milton Keynes
MK14 7NE

AN Anglo American S/W
138A Stratford Court
Sparkhill
Birmingham
021 7712995

APa A. Parsons
23 Coxhill Gardens
River
Dover

ARt Artic Computing
396 James Reckitt Avenue
Hull HU8 0JA

AVc AVC Software
PO Box 415
Harborne
Birmingham B17 9TT

BRy Bryants (Educational)
Software
1 The Hollies
Chalcroft Lane
North Berstead
Bognor Regis
W Sussex PO21 55X

BUf Buffer Micro Shop
374A Streatham High Road
London SW16
769 2887

CAm Campbell Systems
Rous Rd
Buckhurst Hill
Essex IG9 6BL

CPt Computator
3 Thalia Close
Greenwich
SE10 4NA

DK dk'tronics
23 Sussex Road
Gorleston
Gt Yarmouth
Norfolk
0493 602453

HAr Hard & Soft
85 Snowdown Avenue
Hillingdon
Middx UB10 0SE

HEw Hewson Consultants
7 Graham Close
Blewbury
Oxon
0235 850075

HId Hilderbrey Ltd
8/10 Parkway
Regents Park
London NW1
01 485 1059

IMa Image
185 Elm Road
New Maldon
Surrey KT3 3HX
01 942 7138

IM Imagine Software
Masons Building
Exchange Street East
Liverpool L2 3PN

JO John Prince S/W
29 Brook Ave
Levenshulme
Manchester M19



JP J Purves
12 Stobhill Road
Gorebridge
Midlothian EH23 4PL

MI Micro & VIdeo Palace
62-64 Kensington High St
London W8
937 8587

MCs Micro Computer Software
Unit D6
Pear Industrial Estate
Stockport Road
Lower Bredbury
Stockport SK6 2BP
061 494 2441

REFERENCE

SOFTWARE LISTING

ZX81

Title	Program Type	Program Produced By	Memory Reqd	How Sold	Supplier Codes	Prices
Feet/Metres Conversion						
Rings Round Saturn						
Secret Code						
Mind Boggling						
Silvelte						
Memory (Educ)						
Cassette G3	Gm	Psion	16K	C	PSi,SIn	£4.95
Train Race						
Challenge						
Secret Message						
Mind That Meteor						
Character Doodle						
Currency Conversion						
Cassette G4	Gm	Psion	16K	C	PSi,SIn	£4.95
Down Under						
Submarines						
Doodling With Graphics						
Invisible Invader						
Reaction						
Petrol Conversion						
Cassette G5	Gm	Psion	16K	C	PSi,SIn	£4.95
Martian Knockout						
Graffiti						
Find the Mate						
Labyrinth						
Drop a Brick						
Continental (Educ)						
Cassette G6	Gm	Psion	16K	C	PSi,SIn	£4.95
Galactic Invasion						
Journey into Danger						
Create						
Nine Hole Golf						
Solitaire						
Daylight Robbery						
Cassette G7	Gm	Psion	16K	C	PSi,SIn	£4.95
Race Track						
Chase						
Nim						
Tower of Hanoi						
Docking the Spaceship						
Golf						
Fascinating Tower of Hanoi (problem)						
Cassette G8	Gm	Psion	16K	C	PSi,SIn	£4.95
Tower Trail						
Blank						
Cassette G9	Gm	Psion	16K	C	PSi,SIn	£6.95
Bio-Rhythms						
Your Bio-Rhythms						
Catacombs	Gm	J K Greye	16K	C	BUf	£4.95
Catalogue	Ed	Bryants S/W	16K	C	BRy	£1.87
Centipede	Gm	dK'tronics	16K	C	DK,BUf	£4.95
Centipede (Graphics)	Gm	dK'tronics	16K	C	DK	£4.95
Champions Quiz	Ed	Rose Cassettes	16K	C	BUf	£4.50
Character Predictor	Do	Hard & Soft	1K 3 K	C	HAr	£3.95
Chess	Gm	Micro Gen	16K	C	MK	£6.50
Chess Board	Gm	Hard & Soft	1K	C	HAr	£3.95
Chess 1.4	Gm	Abersoft	16K	C	ABe	£8.95
Chess II Special	Gm	Artic	16K	C	ARt	£45.00
Claws	Ed	Bryants S/W	16K	C	BRy	£1.87
Compound	Ed	AVC Software	16K	C	AVc	£3.00
Computer Count ZX	Bs	Silicon Tricks	16K	C	BUf	£7.95
Constellation	Gm	Anglo American	16K	C	AN	£8.00
Counter	Gm	Pizzel	16K	C	BUf	£5.50
Critical Path Analysis	Bs	Hilderbay	16K	C	HId	£15.00
Crystal Ball	Do	Hard & Soft	1K 3 K	C	HAr	£3.95
Cursor Input	Ut	Serious S/W	1K 1 6 K	C	SEr	£2.95
Damsel & the Beast	Gm	Anglo American	16K	C	AN	£6.50
Damsel & the Beast	Gm	Bug Byte	16K	C	BUf	£6.50
Data Base	Bs	Mr Purves	16K	C	JP	£10.00
Data Base	Ut	Cambell Systems	16K	C	BUf	£10.00
Data File/Graphics	Ut	V&H Computer	16K	C	VA	£2.50
Death Isle	Gm	Buffer	16K	C	BUf	£4.50
Defender	Gm	Quicksilva	16K	C	QU	£5.50
Deflex	Gm	dK'tronics	16K	C	DK	£3.95
Dictator	Gm	Anglo American	16K	C	AN	£9.00
Dictator	Gm	Bug Byte	16K	C	BUf	£9.00
Diggles Kitchen S/W	Do	Micro Computer	16K	C	MCs	£4.99
Diggles Kitchen Vol 1 S/W	Do	Micro Computer	16K	C	MCs	£4.99
Diggles Kitchen Vol 2	Do	Micro Computer	16K	C	MCs	£4.99

ZX81 DEALERS

Supplier Code

MK Mikro Gen
24 Agar Crescent
Bracknell
Berks

NG Nick Godwin
4 Hurkur Crescent
Eyemouth
Berwickshire
TD14 5AP

OS Orwin Software
26 Brownlow Road
London NW10 9QL

PHi Phipps Associates
99 East Street
Epsom
Surrey
KT17 1EA

Plx Pixel Productions
39 Ripley Gardens
London W14 8HF

PSi Psion Ltd
2 Huntsworth Mews
Gloucester Place
London NW1 6DD

QU Quicksilva
95 Upper Brownhill Rd
Maybush
Southampton
Hants
0703 20169

RA R&R Software
34 Bourton Road
Gloucester
GL4 0LE
0452 502819

RO Rose Cassettes
148 Widney Lane
Solihull
W Midlands B91 3LH

S Screen Scene
144 St Georges Road
Cheltenham
Glos

SEr Serious Software
7 Woodside Road
Bickley
Bromley
Kent BR1 2ES

SIn Sinclair Software
Sinclair Research Ltd
6 Kings Parade
Cambridge CB2 1SN
0276 66104

THs The Essential Software Company (Visconti Ltd)
47 Brunswick Centre
London WC1
01 866 5445

TOw Town Book and Toys
15 Eastgate Street
Gloucester
Glos

TRa Transform Ltd
41 Keats House
Porchester Mead
Beckenham
Kent
01 658 1661

VA V & H Computer Services
182c Kingston Road
Staines
Middx

WId Wida S/W
2 Nicholas Gardens
London W5 5HY
569 6941

XI Xitan Systems
23 Cumberland Place
Southampton SO1
0703 38740



S/W						
Diggles Kitchen Vol	Do	Micro Computer	16K	C	MCs	£4.99
S/W						
Double Breakout	Gm	Beam Software	1K	C	THs	£6.00
Dragon Maze/Life	Gm	Software Masters	16K	C	XI	£6.95
Electricity	Ed	AVC Software	16K	C	AV	£3.00
Encounter	Gm	Pixel	16K	C	Plx	£5.50
Fast Life	Gm	dK'tronics	16K	C	DK	£3.95
Financial Package	Bs	Hilderbay	16K	C	Hld	£8.00
Football Manager	Bs	Addictive Games	16K	C	AD	£7.95
Forces	Ed	AVC Software	16K	C	AV	£3.00
Forensic	Ed	AVC Software	16K	C	AV	£3.00
Forth Compiler	Ut	Artic	16K	C	ARt	£35.00
Fortress/Pontoon	Gm	V&H Computer	16K	C	VA	£3.50
French	Ed	AVC Software	16K	C	AVc	£3.00
GB Ltd	Gm	S W Hessel	16K	C	BUf	£5.25
GCE Maths	Ed	Rose Cassettes	16K	C	BUf	£4.50
Galaxian	Gm	Artic	16K	C	ARt,THe	£3.95
					MI	£5.50
Galaxy Warrior/Star Trek	Gm	Artic	16K	C	ARt,MI	£6.50
Games Pack I	Gm	Silversoft	16K	C	BUf	£4.95
General Knowledge	Ed	A.Parsons	16K	C	APa	£4.95
Geography	Ed	Psion	16K	C	PSi	£6.95
Geography	Ed	AVC Software	16K	C	AVc	£3.00
Gold	Gm	Hilderbay	16K	C	Hld	£8.00
Gobbleman	Gm	Artic	16K	C	ARt	£3.95
Graph	Ed	AVC Software	16K	C	AVc	£3.00
Golf	Gm	R & R Software	16K	C	RA,TOw,S	£3.75
Gospel Stories	Ed	Bryants S/W	16K	C	BRy	£1.87
Grapix 2	Ut	Nick Godwin	16K	C	NG	£6.99
Greedy Gulch	Gm	Phipps Associates	16K	C	PHi	£5.00
Gulp	Gm	Cambell Systems	16K	C	BUf	£4.00
Hangman	Gm	Nick Godwin	16K	C	NG	£2.99
Hedgehog & Co	Gm	Buffer	1K	C	BUf	£3.00
High Res. Graphics	Gm	Macronics	16K	C	BUf	£4.00
History	Ed	Psion	16K	C	PSi,SIn	£6.95
House of Gnomes	Gm	Anglo American	16K	C	AN	£7.00
Human Biology 1	Ed	AVC Software	16K	C	AVc	£3.00
Human biology 2	Ed	AVC Software	16K	C	AVc	£3.00
Inheritance	Gm	S W Hessel	16K	C	BUf	£4.25
Invaders	Gm	Anglo American	16K	C	AN	£4.00
Invaders	Gm	Bug Byte	16K	C	BUf	£4.00
Invaders	Gm	Quicksilva	16K	C	QU	£5.50
Invaders	Gm	Abersoft	16K	C	ABe	£4.45
Inventions before 1850	Ed	Psion	16K	C	PSi	£6.95
Junior English I	Ed	Rose Cassettes	16K	C	BUf	£4.50
Junior English II	Ed	Rose Cassettes	16K	C	BUf	£4.50
Junior Maths I	Ed	Rose Cassettes	16K	C	BUf	£4.50
Junior Maths II	Ed	Rose Cassettes	16K	C	BUf	£4.50
Kingdom of Nam	Gm	Micro Games	16K	C	BUf	£4.50
Knockout Whist	Gm	Anglo American	16K	C	AN	£4.00
Labyrinth	Gm	Axis	16K	C	BUf	£5.95
Labyrinth	Gm	Software Masters	16K	C	XI	£5.95
Language Dictionary	Ut	Hewson	16K	C	HEw	£3.75
Life	Gm	Artic	2K	C	ARt	£3.00
Line Renumber	Ut	Hewson	16K	C	HEw	£4.95
Love and Death	Gm	Automata	1K	C	BUf	£5.00
Machine Code Monitor						
Disassembler	Ut	Micro Gen	16K	C	MK	£3.95
Madame ZX81	Do	AVC Software	16K	C	AVc	£3.00
Magic Cube	Gm	Cambell Systems	16K	C	BUf	£4.00
Magic Mountain	Gm	Phipps Associates	16K	C	PHi	£5.00
Man Page	Gm	Newsoft	16K	C	BUf	£4.00
Master Maths IV	Ed	LCL	16K	C	BUf	£5.00
Master Maths V	Ed	LCL	16K	C	BUf	£5.00
Master Mind	Gm	Hard & Soft	3K	C	HAr	£3.95
Mathematics	Ed	Psion	16K	C	PSi	£6.95
Maths	Ed	A.Parsons	16K	C	APa	£4.95
Maths Pack	Ed	Artic	4K	C	ARt	£11.00
Matrix Planner	Bs	G Asher	16K	C	BUf	£6.00
Mazeman	Gm	Abersoft	16K	C	ABe,BUf	£4.45
Mazogs	Gm	Bug Byte	16K	C	BUf	£9.00
Minefield	Gm	R & R Software	16K	C	RA	£3.75
Mini Space Invaders	Gm	Hewson	1K	C	HEw	£3.95
Mission Impossible	Gm	Buffer	16K	C	BUf	£4.50
Multifile	Ut	Anglo American	16K	C	AN	£17.50
Music & Composers	Ed	Psion	16K	C	PSi,SIn	£6.95
Music/Breakout/Invaders	Gm	Macronics	1K	C	BUf	£7.95
Namitar Raiders	Gm	Artic	16K	C	ARt	£3.95
Nightmare Park	Gm	Software Masters	16K	C	XI	£6.95
Novelists & Authors	Ed	Psion	16K	C	PSi,SIn	£6.95
Nowotnik, Demolition & Tenpin	Gm	Phipps Assoc	16K	C	PHi	£5.00
Numerology	Gm	Carnell	16K	C	BUf	£4.50
Odd One Out	Gm	Nick Godwin	16K	C	NG	£1.50
Office	Bs	Nick Godwin	16K	C	NG	£4.99
O Level Chemistry	Ed	Calpac	16K	C	BUf	£4.95
O Level French	Ed	Rose Cassettes	16K	C	BUf	£4.50
On Your Marks	Ed	Computatutor	16K	C	ARt	£3.95
Optimisation Package	Bs	Hilderbay	16K	C	Hld	£20.00
Oracle's Cove	Gm	Doric	16K	C	BUf	£6.95
Payroll	Bs	Hilderbay	16K	C	Hld	£25.00
Payroll	Bs	V&H Computer	16K	C	VA	£11.50
Payroll/Coin Analysis	Bs	V&H Computer	16K	C	VA	£12.65
Personnel Record System	Bs	Computator	16K	C	CPt	£9.95
P-E-P	Ut	R & R Software	4K	C	RA	£5.95



Pharaoh's Tomb	Gm	Phipps Associates	16K	C	PHi	£5.00
Phipps Adventures I	Gm	Phipps Associates	16K	C	PHi	£5.00
Phys Prob	Ed	AVC Software	16K	C	AVc	£3.00
Pilot	Gm	Hewson	16K	C	HEw	£5.95
Planet Defender	Gm	John Prince S/W	16K	C	JO	£3.65
Planet Lander	Gm	Hewson	1K	C	HEw	£3.75
Plotter	Ut	Nick Godwin	16K	C	NG	£4.99
Poets & Playwrites	Ed	Psion	16K	C	PSi,SIn	£6.95
Program Merge	Bs	ACS	16K	C	BUf	£5.50
Program Pack I	Gm	Bug Byte	1K	C	BUf	£3.50
Program Pack I	Ut	Anglo American	16K	C	AN	£3.50
Program Pack II	Gm	Bug Byte	16K	C	BUf	£4.50
Program Pack II	Ut	Anglo American	16K	C	AN	£3.50
Program Pack III	Gm	Bug Byte	1K	C	BUf	£3.50
Program Pack IV	Gm	Bug Byte	16K	C	BUf	£4.50
Program Pack V	Gm	Bug Byte	16K	C	BUf	£4.50
Program Pack IV	Gm	Bug Byte	16K	C	BUf	£4.50
Program Store	Bs	ACS	16K	C	BUf	£5.50
Program Store Toolkit	Bs	ACS	16K	C	BUf	£5.50
Programmer's Toolkit	Ut	Hewson	16K	C	BUf	£6.50
Purchase Ledger	Bs	Transform	16K	C	BUf	£8.75
Purchase Ledger	Bs	Transform	32K	C	HEw	£10.75
QS Asteroids	Gm	Quicksilva	4K	C	TRa	£5.50
QS Defenders	Gm	Quicksilva	4K	C	QU	£5.50
QS Invaders	Gm	Quicksilva	8K	C	QU	£5.50
QS Scramble	Gm	Quicksilva	4K	C	QU	£5.50
Revamped Chess	Gm	Micro Gen	16K	C	MK	£6.50
Reversi	Gm	Abersoft	16K	C	ABe	£4.95
Revise Chemistry	Ed	Sci-Soft	16K	C	BUf	£7.50
Revise Maths	Ed	Sci-Soft	16K	C	BUf	£5.50
Revise Physics	Ed	Sci-Soft	16K	C	BUf	£7.50
Sales Ledger	Bs	Transform	16K	C	TRa	£8.75
Sales Ledger	Bs	Transform	32K	C	TRa	£10.75
Scramble	Gm	Quicksilva	4K	C	QU	£5.50
Screenkit I	Bs	Picturesque	16K	C	BUf	£4.95
Secret Valley	Gm	Newsoft	16K	C	BUf	£6.50
Secret of Tenworth Manor	Gm	Hilderbay	16K	C	Hld	£14.95

SOFTWARE LISTING

ZX81

Title	Program Type	Program Produced By	Memory Req'd	How Sold	Supplier Codes	Prices
Shop Window	Bs	Cambell Systems	16K	C	BUf	£7.00
Similes	Ed	AVC Software	16K	C	AVc	£3.00
Snap	Gm	Hard & Soft	3K	C	HAr	£3.95
Sorcerer's Castle	Gm	Micro Gen	16K	C	MK	£3.95
Space Intruders	Gm	Hewson	4K	C	HEw,BUf	£5.95
						£4.95
Space Invaders	Gm	Macronics	16K	C	BUf	£4.95
Space Invaders	Gm	Macronics	1K	C	BUf	£3.95
Space Invaders	Gm	dK'tronics	16K	C	DK	£4.95
Space Invaders/Planetoids	Gm	Software Masters	16K	C	XI	£6.95
Space Trek	Gm	Beam Software	16K	C	THs	£8.00
Spellbound	Ed	Transform	16K	C	TRa	£3.75
Spelling	Ed	Psion	16K	C	PSi	£6.95
Star Fighter	Gm	R & R Software	16K	C	RA	£3.75
Star Quest	Gm	Pizzel	16K	C	BUf	£5.50
Star Quest	Gm	Pixel	16K	C	Plx	£5.50
Star Trek	Gm	Buffer	16K	C	BUf	£4.50
Star Trek	Gm	Bug Byte	16K	C	BUf	£5.00
Star Trek	Gm	Macronics	16K	C	BUf	£3.95
Star Trek	Gm	Silversoft	16K	C	BUf	£4.95
Star Trek	Gm	Abersoft	16K	C	ABe	£4.95
Sargon Chess	Gm	Hilderbay	16K	C	HId	£22.50
Statistics	Bs	Hewson	1K	C	HEw	£3.75
Stock Book	Bs	A.Parsons	16K	C	AP	£9.95
Stock Control	Bs	Hilderbay	16K	C	MI,HId	£25.00
Subspace Striker	Gm	Pixel	16K	C	Plx	£5.50
Super Breakout	Gm	Essential S/W	1K	C	BUf	£6.00
Super Invasion	Gm	Beam Software	1K	C	THs	£6.00
Super Invasion	Gm	Essential S/W	1K	C	BUf	£6.00
Super Program I						
Pints/Litres Conversion						
Invasion from Jupiter						
Skittles						
Magic Square						
Doodle						
Kim						
Liquid Capacity	Gm	Psion	16K	C	PSi,SIn	£4.95
Super Wumpus	Gm	Silversoft	16K	C	BUf	£4.95
Tables	Ed	AVC Software	16K	C	AVc	£3.00
Tarot	Ed	V&H Computer	16K	C	VA	£2.50
Tables Test	Ed	Bryants S/W	16K	C	BRy	£1.87
Ten Exciting Games	Gm	Beam Software	1K	C	THs	£6.00
Test Pack	Ed	Mr Purves	16K	C	JP	£7.50
The Bible	Gm	Automata	1K	C	BUf	£5.00
The Collector's Pack	Do	Psion	16K	C	PSi,SIn	£9.95
The Fast One	Bs	Cambell Systems	16K	C	BUf	£15.00
The Plug Record Recorder	Do	Psion	16K	C	PSi,SIn	£9.95
The War Game	Ed	AVC Software	16K	C	AVc	£3.00
Time Bandits	Gm	Newsoft	16K	C	BUf	£4.50
Time Ledger	Bs	Hilderbay	16K	C	HId	£15.00
Toolkit	Ut	Artic	16K	C	ARt	£5.95
Trader	Gm	Pixel	48K	C	Plx	£9.50
Video Index	Bs	Video Software	16K	C	BUf	£9.95
Video-add	Bs	Video Software	16K	C	BUf	£5.95
Videograph	Ed	Video Software	16K	C	BUf	£5.95
Videomap	Ed	Video Software	16K	C	BUf	£5.95
Videoplan	Bs	Video Software	16K	C	BUf	£5.95
Videoview	Do	Video Software	16K	C	BUf	£5.95
Volcanic Dungeon	Gm	Carnell	16K	C	BUf	£4.50
Vucalc	Bs	Psion	16K	C	PSi,SIn	£7.95
Vufile	Bs	Psion	16K	C	PSi,SIn	£7.95
What can I do with 1K	Do	V&H Computer	1K	C	VA	£4.95
Wordfix	Ut	Nick Godwin	16K	C	NG	£2.50
Wordpack	Ed	Wida Software	16K	C	WId	£19.00
Wordsearch/Clock Calendar	Do	V&H Computer	16K	C	VA	£3.50
ZX Bomber	Gm	Micro Gen	16K	C	MK	£3.95
ZX Breakout	Gm	Micro Gen	16K	C	MK	£3.95
ZX Bug	Gm	Artic	16K	C	ARt	£6.95
ZX Chess I	Gm	Artic	16K	C	ARt	£6.50
ZX Chess II	Gm	Artic	16K	C	ARt	£13.00
						£9.95
ZX Forth	Ut	Artic	16K	C	ARt	£35.00
ZX Graphical Chess	Gm	Artic	16K	C	ARt	£13.00
ZX Othello	Gm	MOI	16K	C	BUf	£6.95
ZX Scramble	Gm	Micro Gen	16K	C	MK	£3.95
ZX Space Invaders	Gm	Micro Gen	16K	C	MK	£3.95
ZX81 Chess	Gm	Software Masters	16K	C	XI	£6.90
ZXAS	Bs	Bug Byte	16K	C	BUf	£5.00
ZXDB	Bs	Bug Byte	16K	C	BUf	£6.50
ZXMC	Bs	Picturesque	16K	C	BUf	£6.50
Zombie/Sword of Peace	Gm	Artic	16K	C	ARt,THs	£6.50
					MI	£5.50
Zombies	Gm	R & R Software	16K	C	RA,TOw	£3.75
ZOR	Gm	Pixel	16K	C	BUf	£5.50
ZOR	Gm	Pixel	16K	C	Plx	£5.50

ZX SPECTRUM DEALERS

Supplier Code

AA A & F Software
10 Wilpshire Ave
Longsight
Manchester
061 320 5482

ABa Abacus Electronics
186 St Helens Avenue
Swansea
West Glamorgan

ABb Abbex Electronics
20 Ashley Court
Great Northway
London NW4

ABe Abersoft
7 Maes Afallen
Bow Street
Dyfed SY24 5BA

ACs ACS Software
7 Lidgett Crescent
Roundhay
Leeds

AD Addictive Games
PO Box 278
Conniburrow
Milton Keynes
MK14 7NE

AM Amba Software
Freepost
Cambridge CB3 7BR

ARt Artic Computing
396 James Reckitt Avenue
Hull HU8 0JA

AS ASP Software
145 Charing Cross Road
London WC2H 0EE
01 437 1002

AU Automata Ltd
65a Osbourne Road
Portsmouth PO5 3LR

AVc AVC Software
PO Box 415
Harborne
Birmingham B17 9TT

BUf Buffer Micro Shop
374A Streatham High Road
London SW16
01 769 2887

BU Bug-Byte
98-100 The Albany
Old Hall Street
Liverpool

CAl Calpac Computer Software
108 Hermitage Woods Crescent
St Johns
Woking
Surrey GV21 1VF

CAm Campbell Systems
Rous Road
Buckhurst Hill
Essex IG9 6BL

CAr Carnell Software
4 Staunton Road
Slough
SL2 1NT

CAs Cases Computer Simulations
14 Langton Way
Blackheath
London SE3 7TL

COl Collins Educational
PO Box
Glasgow G4 0NB
041 772 3200

COr Computer Rentals Ltd
140 Whitechapel Road
London E1

CRy Crystal Computing
50 Charles Close
Wroxham
Norwich
NR12 8TV

CT C Tech
184 Market Street
Hyde
Cheshire

DJ DJ Moody
1 Starnhill Cottages
Granby Lane
Bingham
Notts NG13 8DH

DK dk'tronics
23 Sussex Road
Gorleston
Gt Yarmouth
Norfolk
0493 602453

DO Docimodus
161 Walmersley Road
Bury
Lancs BL9 5DE

FO Foilkade Ltd
66 Littledean
Yate
Bristol BS17 4UQ

FUl Fuller Micro Systems
The ZX Centre
Sweeting Street
Liverpool 2

GE Gemini Software
36 Badminton Road
Leicester LE4 7RQ

HA Hartland Software
8 Penzance Place
London W11 4PA

HEw Hewson Consultants
7 Graham Close
Blewbury
Oxon
0235 850075

HId Hilderbray Ltd
8/10 Parkway
Regents Park
London NW1
01 485 1059

HIl Hilton Computer Services
14 Avalon Road
Orpington
Kent BR6 9AX

HIs Hisoft
60 Hallam Moor
Lidon
Swindon
Wiltshire

IC ICL
Putney Bridge
London

IM Imagine Software
Masons Building
Exchange Street East
Liverpool L2 3PN

IMp Impact Software
70 Redford Avenue
Edinburgh EH13 0BW

JAy Jaysoft
22 Dane Acres
Bishop's Stortford
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JO John Prince
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3D Tunnel	Gm	New Generation	16/48K	C	NG	£4.95
Adventure	Gm	Foilkade	16/48K	C	FO	£5.95
Adventure	Gm	Abersoft	48K	C	ABe	£9.95
Adventure 1	Gm	D J Moody	16K	C	DJ	£5.00
Adventure 2	Gm	D J Moody	16K	C	DJ	£5.00
Adventure 3	Gm	D J Moody	16K	C	DJ	£5.00
Adventure 4	Gm	D J Moody	16K	C	DJ	£5.00
Adventure Quest	Gm	Level 9	48K	C	LE	£9.90
Airline	Gm	Cases Computer Simulations	16K	C	CAs	£5.00
Alien	Gm	Spectra Soft	16K	C	SPe	£3.95
Alien Command	Gm	Microware	16K	C	MIw	£4.75
Angles	Ed	AVC Software	16K	C	AVc	£3.00
Arcade Pack 1	Gm	Ohmega Electronics	16K	C	OM	£4.82
Arcadia	Gm	Imagine Software	16/48K	C	IM	£5.50
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City	Gm	Docimodus	48K	C	DO	£8.00
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Collector's Pack	Do	ICL	48K	C	IC	£9.95
Colossal Adventure	Gm	Level 9	48K	C	LE	£9.90



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JR JRS Software
19 Wayside Avenue
Worthing
0903 65691 (eve. & w/e only)

KR Kricon Limited
11 Medway
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E Sussex
BN27 3HE
0323 846110

LE Level 9 Computing
229 Hughenden Road
High Wycombe
Bucks

LA Llamasoft Computer S/W
49 Mount Pleasant
Tadley
Hants
07356-4478

MAr Martech Games
9 Dillingborough Road
Eastbourne
E Sussex BN20 8LY

MC MC Lothlorian
4 Granby Road
Cheadle Hulme
Cheshire SK8 6LS

MGa Megadodo S/W
16 While Road
Sutton Coldfield
W. Midlands

MH Melbourne House
Glebe Cottage
Station Road
Cheddington
Leighton Buzzard
Beds
01 405 6347

MHp Melbourne House Publishers
131 Trafalgar Road
Greenwich
London SE10

MIp Micro Power
8/8a Chapel Allerton
Leeds LS7 4PE

MIs Microsphere Computer Services
72 Roseberry Road
London N10

MIw Microware
131 Melton Road
Leicester

MK Mikro Gen
24 Agar Crescent
Bracknell
Berks

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73 The Broadway
Grantchester
Cambridge CB3 9NQ

ND N Darwood Ltd
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NG New Generation Software
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OM Omega Electronics
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Co Antrim BT38 8JU

PAl Palantir Programs
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Hyde Lane
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PD PDQ Software
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W Wickham
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PSi Psion Ltd
2 Huntsworth Mews
Gloucester Place
London NW1 6DD

QU Quicksilva
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0703 20169

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Gloucester GL4 0LE
0452 502819

RI Richard Shepherd S/W
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RO Rose Cassettes
148 Widney Lane
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W Midlands B91 3LH

SAt Saturn Developments
37 Heol Dulais
Birchgrove
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SAx Saxon Computing
3 St Catherine's Drive
Leconfield
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Humberside

SEv Severn Software
5 School Crescent
Lydney
Glos GL15 5T

SIl Silversoft
40 Empress Avenue
Ilford
Essex

SIm Simon Hessel Softwtare
15 Lytham Court
Cardwell Crescent
Sunninghall
Berks

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Sinclair Research Ltd
6 Kings Parade
Cambridge CB2 1SN
0276 66104

SOf Softek
329 Croxted Road
London SE24

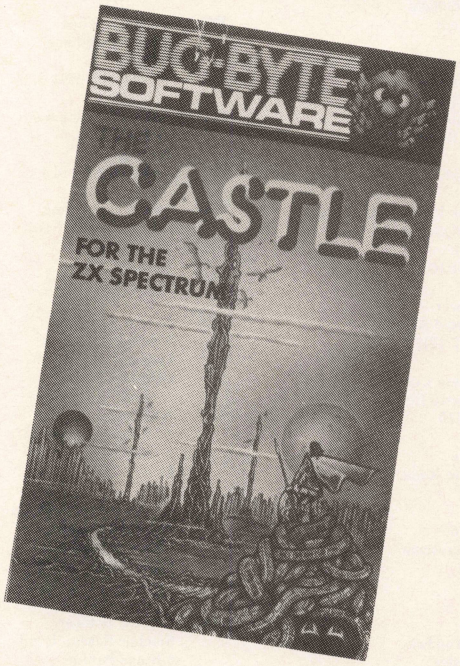
SO Software For All
72 North Street
Romford
0708 60725

SOs Sospan Soft
1 Warborough Close
Old Road
Llanelli
Dyfed

SOFTWARE LISTING

ZX SPECTRUM

Title	Program Type	Program Produced By	Memory Req'd	How Sold	Supplier Codes	Prices
Commercial Accounts	Do	Gemini	16/48K	C	GE	£19.95
Compiler	Ut	Softek	48K	C	SOf	£14.95
Compufile	Do	Jaysoft	16/48K	C	YAy	£4.95
Conflict	Gm	Martech Games	48K	C	MAr	£9.50
Cosmos	Gm	Abbex Electronics	16K	C	ABb	£4.95
Count-down	Ed	AVC Software	16K	C	AVc	£3.00
Crevasse/Hotfoot	Gm	Microsphere	16K	C	MIs	£4.95
Dallas	Gm	Cases Computer Simulations	16K	C	CAs	£5.00
Database	Do	Buffer	16K	C	BUf	£4.50
Data Base	Ut	Gemini	16/48K	C	GE	£19.95
Derby Day	Gm	Computer Rentals	48K	C	COr	£5.95
Digital X-Word Compiler	Gm	N Darwood	16K	C	ND	£6.00
Dragon Adventure	Gm	Level 9	48K	C	LE	£9.90
Editor/Assembler	Ut	Picturesque	16/48K	C	PI	£8.50
Educational Quiz	Ed	Rose Cassettes	48K	C	RO	£4.50
Electronics	Ed	Spectre	48K	C	SP	£5.95
English Literature	Ed	ICL	16K	C	IC	£6.95
Escape	Gm	New Generation S/W	16K	C	NG	£4.95
Espionage Island	Gm	Artic	48K	C	ARt	£6.95
ETX	Gm	Abbex Electronics	16K	C	ABb	£5.95
Everest Ascent	Gm	Richard Shepherd	16/48K	C	RI	£6.50
Evolution	Gm	Microsphere	48K	C	MIs	£6.95
Faust's Folly	Gm	Abbex Electronics	16K	C	ABb	£5.95
Figaro II	Do	Saxon	48K	C	SAx	£14.95
Football Manager	Gm	Addictive Games	48K	C	AD	£7.95
Football Pools	Gm	Hartland	48K	C	HA	£5.95
Fortune	Do	AVC Software	16K	C	AVc	£3.00
French	Ed	AVC Software	16K	C	AVc	£3.00



Frog/Showdown	Gm	Artic	16/48K	C	ARt	£4.95
Frogger	Gm	A&F Software	48K	C	AA	£7.00
Fruita	Gm	Wizard	48K	C	WZ	£6.50
Galaxian	Gm	Artic	16K	C	ARt	£3.95
Galaxy Conflict	Gm	Martech Games	48K	C	MAr	£9.50
Galleons	Gm	Wizard	48K	C	WZ	£5.00
Game of Logic	Ed	N Darwood	16K	C	ND	£8.00
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Geography 1	Ed	ICL	16K	C	IC	£6.95
Gobbleman	Gm	Artic	16K	C	ARt	£3.95
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Gorfian	Gm	C Tech	16/48K	C	CT	£5.00
Grail	Gm	Severn Software	16/48K	C	SEv	£4.95
Graph	Ed	AVC Software	16K	C	AVc	£3.00
Greph	Ut	Spectre Soft	16K	C	SPe	£4.95

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Supplier Code

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Hants

SPe Spectre Soft
Dunelm Cottage
Maltmans Lane
Gerrards Cross
SL9 8RS

SY Syrtis Software
23 Quantock Road
Bridgewater
Somerset TA6 7EQ

TAs Tasman
17 Harley Crescent
Leeds LS6 2LL

TIp Titan Programs
83 Ashwood Road
Rudloe
Corsham
Wiltshire
SN13 0LG

TRa Tranform Ltd
41 Keats House
Porchester Mead
Beckenham
Kent
01 658 1661

UL Ultimate Play the Game
The Green
Ashby de la Zouch
Leics LE6 5JV
0530 411485

VI Video Software
Stone Lane
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Stourbridge
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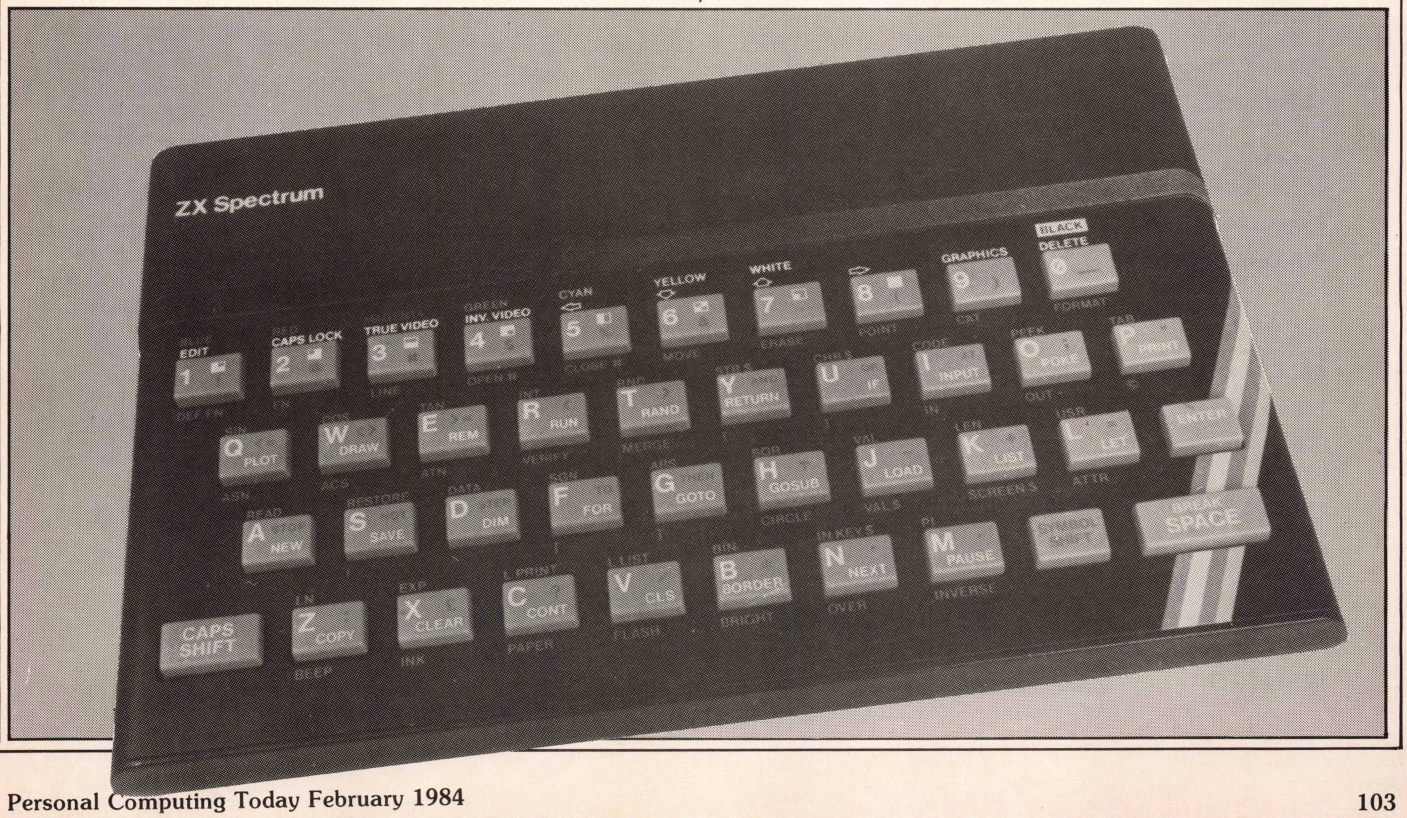
WZ Wizard Software
PO Box 23
Dunfermline
Fife KY11 5RW

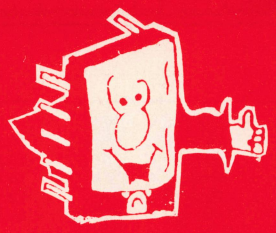
WO Work Force
140 Wilsden Avenue
Luton
Beds LU1 5HR

ZX ZX SAS
42/45 New Broad Street
London EC2M 1QY

Graphics Creator	Ut	Llamasoft	16K	C	LA	£2.95
Great Britain Ltd	Gm	S W Hessel	48K	C	SIm	£14.39
Ground Attack	Gm	Silversoft	16/48K	C	SII	£5.95
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High Noon	Gm	Abbex Electronics	16K	C	ABb	£5.95
History 1	Ed	ICL	16K	C	IC	£6.95
Home Accounts	Do	Gemini	16/48K	C	GE	£19.95
Horace Goes Skiing	Gm	Psion	16/48K	C	PSi	£5.95
Hungry Horace	Gm	Psion	16/48K	C	PSi	£5.95
Inca Curse	Gm	Artic	48K	C	ARt	£6.95
Income Tax	Do	ZX SAS	16/48K	C	ZX	£6.50
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Junior Education	Ed	Calpac	16/48K	C	CAl	£5.50
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Oro	Gm	Impact Software	48K	C	IMp	£5.00
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Star Trek	Gm	Impact Software	16K	C	IMp	£5.00
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Statistics	Do	Severn Software	16/48K	C	SEv	£6.95
Stock Control	Do	Gemini	16/48K	C	GE	£19.95
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The Orb	Gm	Computer Rentals	48K	C	COr	£4.95
The Quest	Gm	Impact Software	48K	C	IMp	£5.00
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Toolkit	Ut	Sinclair Research	16K	C	SIn	£5.95
Transylvanian Tower	Gm	Richard Shepherd	48K	C	RI	£6.50
Treasure Hunt	Gm	Amba Software	16K	C	AM	£4.95
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Turtle	Ed	AVC Software	16K	C	AVc	£3.00
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Ultraviolet	Ut	ACS Software	16/48K	C	ACs	£7.50
Video Pack	Do	C Tech	16/48K	C	CT	£5.00
Vu 3-D	Do	Sinclair Research	48K	C	SIn	£9.95
Viewpoint	Ut	ACS Software	16/48K	C	ACs	£6.50
Voice Chess	Gm	Artic	16/48K	C	ARt	£9.95
Vu-Calc	Do	Psion	16/48K	C	PSi	£8.95
Winged Avenger	Gm	Work Force	16K	C	PSi	£4.50
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Zeus Assembler	Ut	Crystal Computing	48K	C	CRy	£8.95
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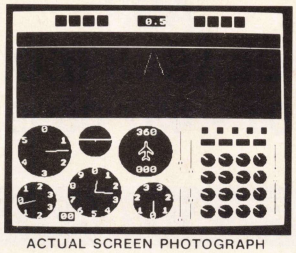
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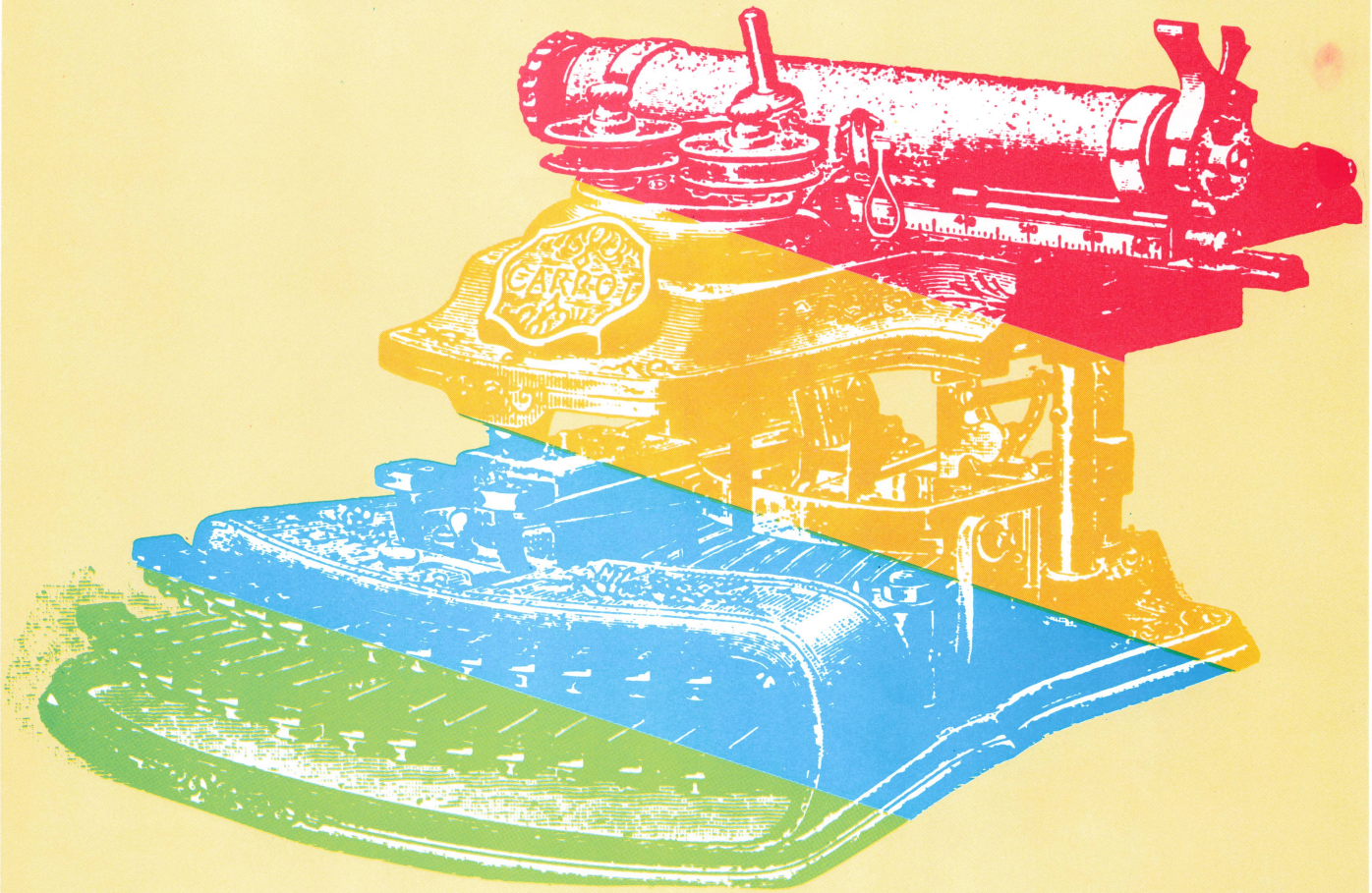
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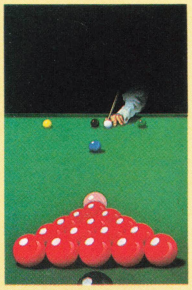
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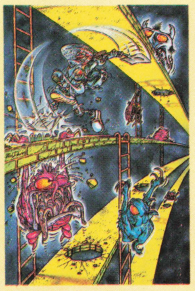


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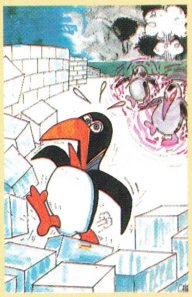
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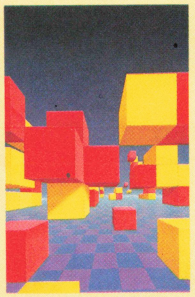
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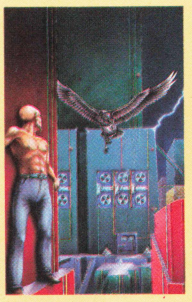
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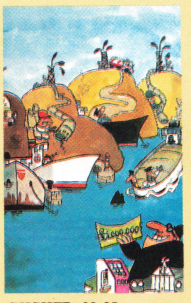
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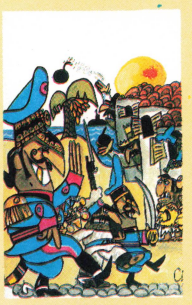
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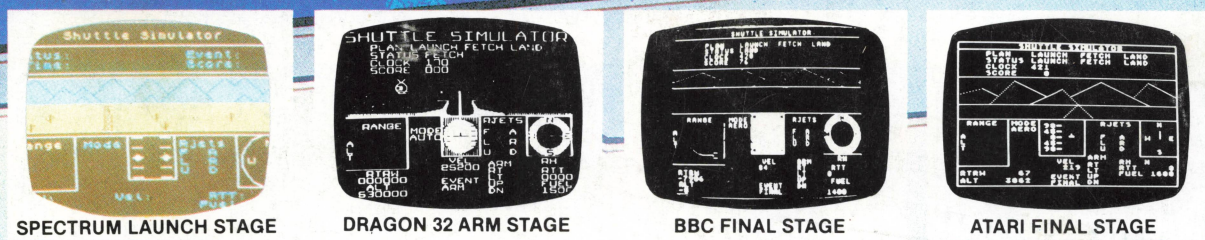
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