WIN A MILLION (BYTES)

YOUR COMPUTER

Canada	C$	4.00
Denmark	DKr.	35.00
France	Fr.	50.00
Germany	DM	9.50
Greece	Dra.	290.00
Holland	Dfl.	8.50
Italy	L	4200
New Zealand	NZ$	3.70
Singapore	M$	6.25
Spain	Pts.	390.00
Switzerland	SFr.	7.00
U.S.A.	$	3.95

90p

(D72163)

ECEMBER 1984 BRITAIN'S BIGGEST-SELLING HOME COMPUTER MAGAZINE Vol. 4 No. 12

FIRE!

ome day all
omputer
raphics will
ook like this:
e test fly mighty and micro flight simulators,
ioneer video discs, and top TV monitors

ctrum Rotator, Windows and UFO
BM-64 Bill Da Snowman
Amstrad Music and BBC Darts
amaha CX-5M music micro reviewed

Introducing
Telsoft ...

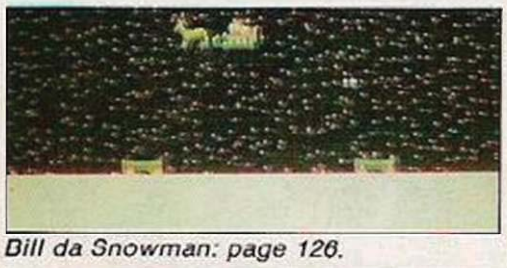
YOUR COMPUTER

Contents

DECEMBER 1984

Telsoft downloading service: page 64.

Yamaha CX-5M review: page 72.



Bill da Snowman: page 126.

BBC Darts: page 148 also on Telsoft.

Cover shot: Rediffusion simulator — see pages 90 and 91.

48 LETTERS AND EDITORIAL: Sinclair Plus manual gripes, using a ZX printer with your QL and much more.

50 NEWS: Domesday book, part two plus smashing time at the castle for YC readers and royal romps.

53 FIRST BYTES: Chips and word processors.

57 COMPUTER CLUB: Lee Paddon visits Medway Computer Club.

59 SOFTWARE SHORTLIST: Build your own robot factory; take a spin round the track; Your Computer looks at the latest commercial software releases.

63 QUEST CORNER: Hugo North has a few adventures.

64 SPECTRUM SOFTWARE: Paul Bond looks at Christmas presents.

66 THE TELSOFT FILE: Now part of British Telecom becomes available to your computer readers — two programs come down your phone.

72 YAMAHA CX-5 REVIEW: The complete music system from Japan — Tony Sachs plays kitten on the keys.

76 WIN 1,000,000 BYTES: Yamaha sound system, free ride in a flight simulator, modems for Spectrum, BBC, CBM64 and much more to be won.

79 COMPETITION RESULTS: Plus Four winners.

82 COMPUTER GRAPHICS: Simon Beesley puts you in the picture.

84 MONITOR REVIEW: A look at how monitors work and what they can do for your computing — plus buyer's guide.

88 FLIGHT SIMULATORS: Mike Gaines test flies the range available.

90 JOIN THE JET SET: Simon Beesley flies a simulator.

92 LASER DISCS: Meirion Jones trips the light fantastic.

95 SPECTRUM ROTATOR: Mark Jones starts a revolution.

101 SPECTRUM WINDOWS: Ian Briscoe sheds light on a new bumper graphics package for your Spectrum. You ain't seen nothin' yet. Available on Telsoft.

109 ORIC SPRITES: Mattias Gyllerup writes some bright sprites.

113 ZX-81 HI-RES: M Geerling and J Bosman with resolutions.

115 BBC VIRTUAL SCREEN: Screen switching.

121 DRAGON SCREEN EXPANDER: Stretch your D32.

126 BILL DA SNOWMAN: A festive romp with Patrick Edmond. Poor Bill is stuck out there in the cold build someone to keep his company.

128 VIC TOAD: Not just logs, but ladders. Graham Lynas gets on the rung side of the law as he teeters across the screen.

135 SPECTRUM UFO: Grid and bear it with Julian Wood.

145 MUSIC: Roy Mitchell frees you.

148 BBC DARTS: Also available on Telsoft. David Griffin says you don't need 180K to run this, just 32. You might end up with a 40 waistline, though.

155 ZX-81 MONSTERS: Ungeheuer galore in black and white.

164 SILICON PARAMEDICS: How computers helped out.

169 CBM-64 DISASSEMBLER: Chris Lightfoot enables you to distinguish between between source code and object code.

177 QL SPOOLER: :Allows the QL to use its massive capacity to get on with something else while printing out. Multi-tasking in action by Duncan Drummond.

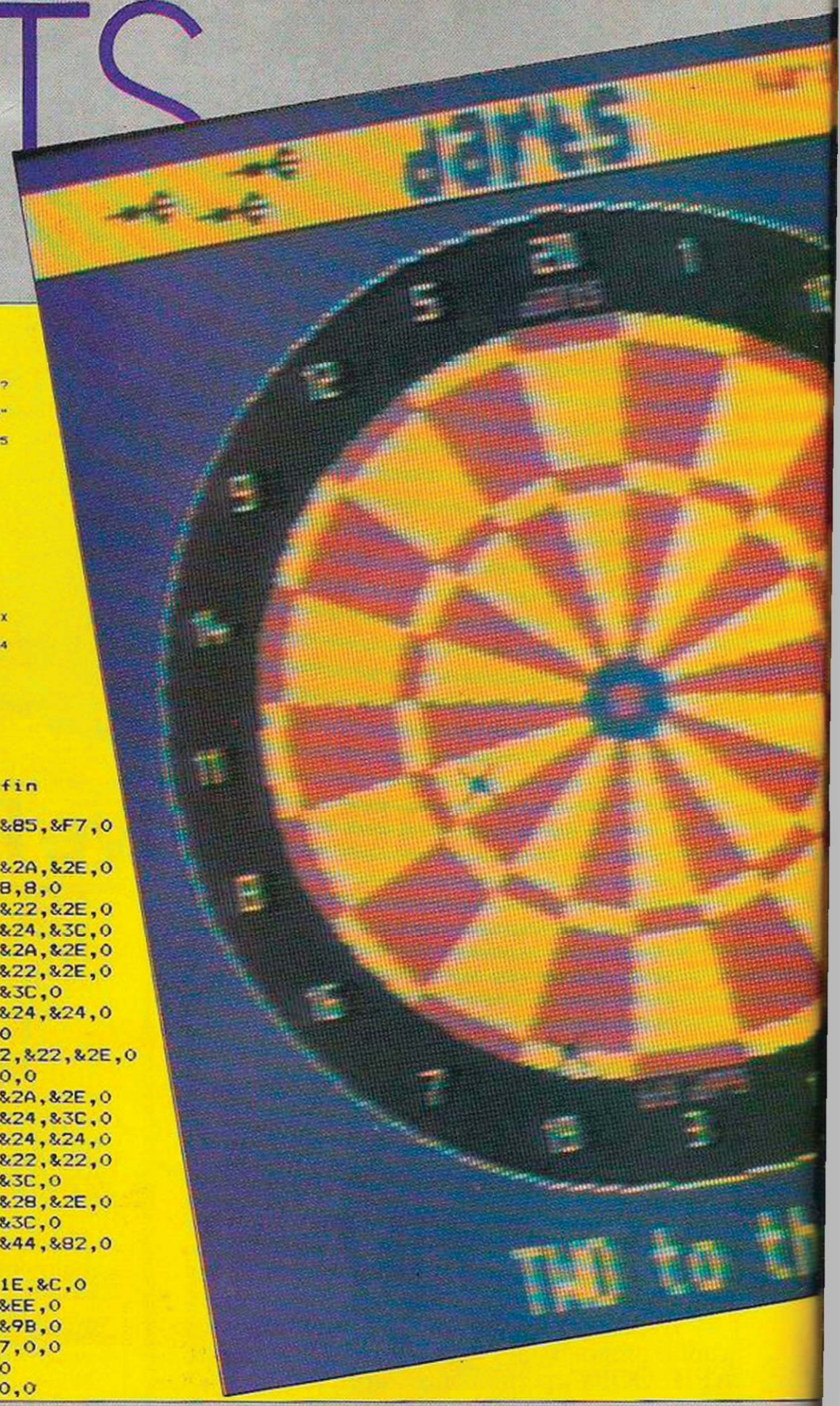
181 RESPONSE FRAME: Tim Hartnell answers queries.

183 SOFTWARE FILE: Ten pages of Xmas fun for most micros.

272 DATEBASE: Paul Bond rounds up micro events and provides useful telephone numbers.

DARTS

Fag in mouth and beer in hand, David Griffin goes for the bull's eye.



Listing 1.

```
    1 REM Listing 1
    2 REM BBC Darts  -  by David Griffin
    3
   10 MODE 7
   20 PRINT TAB(9,4)"""CHR$255"`m0 &+t"""CHR$255"`k4?
k7oh7`m"
   30 PRINT TAB(10,5)CHR$255" j5j:!"CHR$255" "CHR$255"
,v' j5 ""-,t"
   40 PRINT TAB(9,6)"_"CHR$255"p>'z0_"CHR$255"p"CHR$25
5"0*u zu *tp?"
   50 PRINT TAB(8,8)"written by David Griffin"
   60 PRINT TAB(23,9)"(c) 1984"
   70 PRINT TAB(17,10)"x"CHR$255"`8"
   80 PRINT TAB(16)"h"CHR$255"a&x5"
   90 PRINT TAB(16)"j}y^?!"
  100 PRINT TAB(14)" x?``!"
  110 PRINT TAB(12)" _x"CHR$255"?"
  120 PRINT TAB(11)"h"CHR$255CHR$255"7"
  130 PRINT TAB(10)" "CHR$255"?`"
  140 PRINT TAB(9)" &!"
  150 PRINT TAB(8)"8!"
  160 FOR Y=3 TO 20:VDU 31,5,Y,132,157,31,35,Y,156:NEX
T
  170 VDU 31,7,4,147,154,31,7,5,147,154,31,7,6,147,154
,31,7,8,135,31,7,9,135
  180 FOR Y=10 TO 18:VDU 31,7,Y,145:NEXT
  190 FOR Y=15 TO 18:VDU 31,15,Y,130:NEXT
  200 VDU 28,16,18,34,16
  210 *L."darts"900
  220 PAGE=&D00:CHAIN"darts....."
```

Listing 2.

```
    1 REM Listing 2
    2 REM BBC Darts  -  by David Griffin
    3
   10 VDU 23,128,&F7,&15,&15,&F5,&85,&85,&F7,0
   20 VDU 23,129,8,&18,8,8,8,8,0
   30 VDU 23,130,&2E,&6A,&2A,&2E,&2A,&2A,&2E,0
   40 VDU 23,131,&20,&20,&20,&28,&3C,8,8,0
   50 VDU 23,132,&2E,&62,&22,&2E,&22,&22,&2E,0
   60 VDU 23,133,&3C,&20,&20,&3C,&24,&24,&3C,0
   70 VDU 23,134,&2E,&6A,&2A,&2A,&2A,&2A,&2E,0
   80 VDU 23,135,&2E,&68,&28,&2E,&22,&22,&2E,0
   90 VDU 23,136,&3C,4,4,&3C,&20,&20,&3C,0
  100 VDU 23,137,&2E,&62,&22,&22,&24,&24,&24,0
  110 VDU 23,138,&38,8,8,&38,8,8,&38,0
  120 VDU 23,139,0,&2E,&6A,&2A,&2E,&22,&22,&2E,0
  130 VDU 23,140,&3C,4,8,8,&10,&10,&10,0
  140 VDU 23,141,&2E,&68,&28,&2E,&2A,&2A,&2E,0
  150 VDU 23,142,&3C,&24,&24,&3C,&24,&24,&3C,0
  160 VDU 23,143,&24,&6C,&24,&24,&24,&24,&24,0
  170 VDU 23,144,&28,&68,&28,&2A,&2F,&22,&22,0
  180 VDU 23,145,&3C,&24,&24,&3C,4,4,&3C,0
  190 VDU 23,146,&2E,&62,&22,&2E,&28,&28,&2E,0
  200 VDU 23,147,&3C,&20,&20,&3C,4,4,&3C,0
  210 VDU 23,146,&82,&44,&38,&38,&38,&44,&82,0
  220 VDU 23,149,0,0,&F,&FF,&F,0,0,0
  230 VDU 23,150,&C,&1E,&30,&FF,&30,&1E,&C,0
  240 VDU 23,151,0,0,&2E,&22,&EE,&AA,&EE,0
  250 VDU 23,152,0,0,&D3,&9A,&93,&91,&9B,0
  260 VDU 23,153,0,&45,&45,&77,&51,&77,0,0
  270 VDU 23,154,0,5,5,&1D,&15,&1D,0,0
  280 VDU 23,155,0,&DC,&54,&DC,4,&1C,0,0
```

DARTS IS A GAME for the BBC model B or 32K model A, and although not tested will probably work on an Electron.

The game of darts once only played in its traditional home of the pub and club is now an international sport frequently seen on television. It is one of the most popular participant sports in this country, and indeed the world, played by millions.

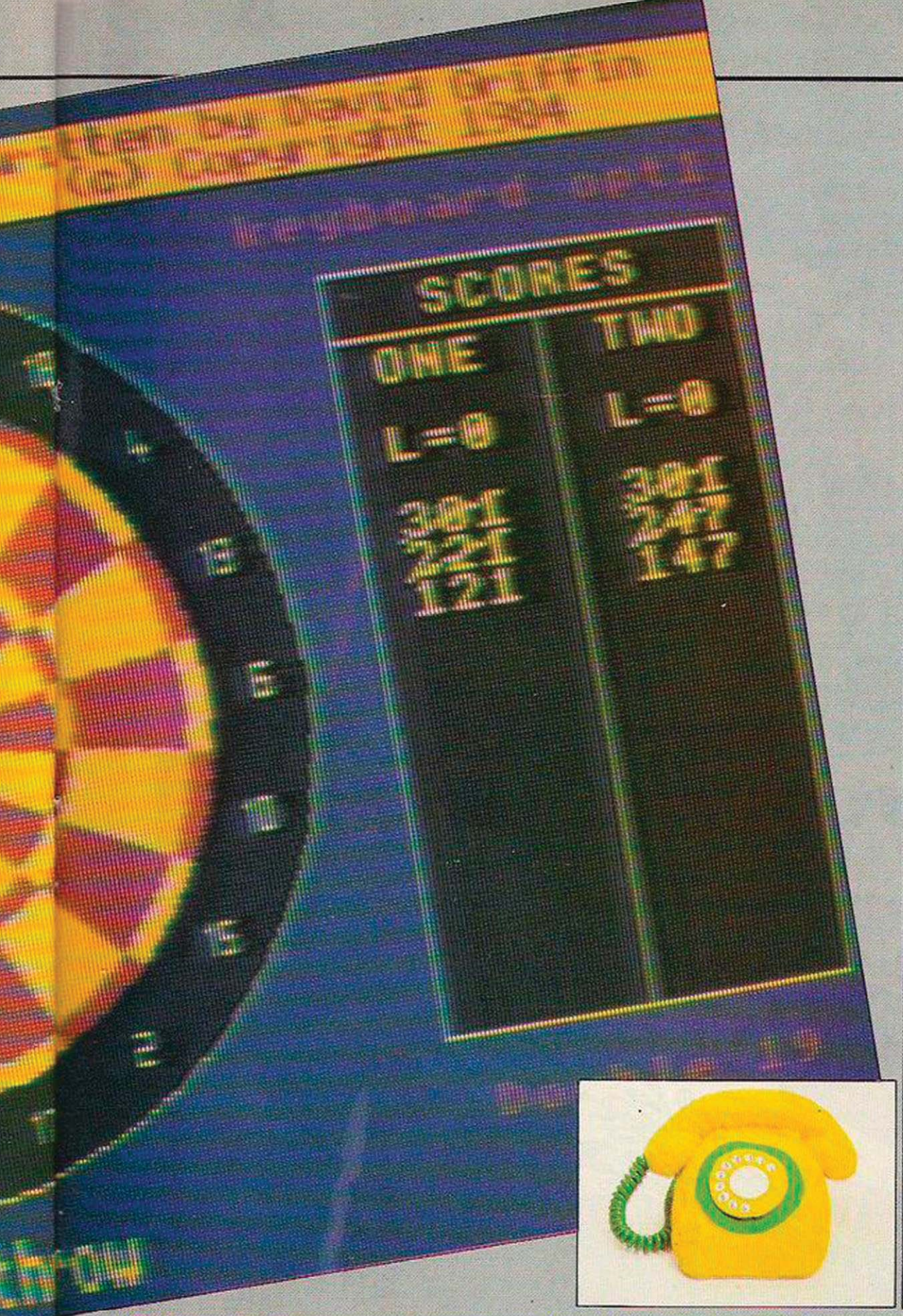
My computerised version is by no means a substitute for throwing arrows from the oche down at your local but an alternative to arcade-type games requiring manipulation of at least 11 of your fingers and very quickly, a feat not suitable for some of the more elderly BBC users!

It is difficult to emulate the same skills of the darts game proper on a computer game and so the method of aiming and throwing darts I have employed is to manoeuvre a crosshair sight over the board, throwing a dart when it is over the place you want. A skill element is introduced with the sight drifting and so making it more difficult to hit the number you require. The game was written with joysticks in mind although I have provided for keyboard use.

There are three different games to play in my program, the standard game, around the clock and all fives. All are for two players.

The standard game — options 1 and 2 on the main menu: Option 1 provides a standard 301 game with double start and double to finish, played over five legs, i.e., the first to win three games wins the match. The difficulty level decides how much the sight drifts, level 1 is the easiest.

After the board has been drawn both players should enter their initials or three lettered



pseudonym. The scoreboard shows initials, how many legs each has won — shown by 'L=' — and the score required for this game.

As each dart has been thrown the display to the bottom right of the screen shows what it has scored.

Option 2 allows the parameters to be altered, giving games such as 801 straight off over 3 legs and 101 double start over 9 legs.

Around the clock — option 3: In this game each player goes around the board, throwing at 1 until hit and then at the 2 etc. and ending on the outer bull — 25 — and then the bull's eye — 50. It is possible to aim for singles, doubles or trebles depending on your initial choice. The score-board shows what each player must throw for next, with sgl, dbl or tbl printed under initials.

All fives — options 4 and 5: Option 4 gives the standard all fives game. Each player must score a multiple of five for his three dart total throw, for example: 55, 25 etc. If he misses the board with one of his darts the throw is not counted. Then the number of fives scored is calculatled, that being his score for that throw — a score of 45 counts as 9, 10 as 2 etc. — and taken from his initial 51 points. A throw resulting in a score that is not a multiple of five is not allowed. The match is over five legs.

Option 5 allows parameters to be changed, so the game can become all threes or all eights etc.

An unusual feature in the programming of darts is the use of two Basic programs resident in the machine at the same time, the main game — listing 4 — and a routine to draw the dart-board — listing 3. The reason for this was to allow myself an extra three pages of pro-gramming space. The memory soon got full while developing the game although relocating Page to &D000. I couldn't start the Basic program below this because of the user-defined characters stored between &C00 and &CFF, so I chopped part of the main program off and stored it between &900 and &BFF, this area is free when files, RS-423 and function keys are not used. Then Page only needs to be changed to pass control from one program to the other. See line 60 of listing 3 and line 80 of listing 4.

To enter the program and store it on cassette in the correct order, the following procedure should be followed:

- type in listing 1
- save with 'SAVE "DARTS" (RETURN) (RETURN)'
- type in listing 2 and RUN it

(continued on page 151)

Table 1.

10 to 150	main control program 80 jumps to small program stored between &900 and &BFF to draw dartboard
160 to 550	standard game and all fives routine 330 all fives missed a dart 360 all fives not a multiple of five 380 fanfare on 180 400 cross off old score
560 to 860	Around the clock routine 770 hit bull's eye 780 hit outer bull 810 cross off old score and print new score
870 to 950	get players' names
960 to 1030	get word at position (X,Y) of length L
1040 to 1060	open text window for player P's socreboard
1070 to 1090	close above windows
1100 to 1240	throw three darts routine 1110 print marker darts 1190 check for individual game end of throw 1210 to 1230 rub out darts
1250 to 1480	throw a dart 1270 to 1350 move sights until fire pressed 1380 print dart 1390 work out distance and angle of dart from the centre of the board 1410 find which number dart has hit
1490 to 1510	see if space bar or fire pressed to throw a dart
1520 to 1570	get movement of sight from keyboard or joystick
1580 to 1680	additional trimming for dartboard display
1690 to 1770	set up variables and arrays 1720 to 1740 put SINs and COSs in arrays for fast circle drawing 1750 to 1760 order of numbers around dartboard
1780 to 1880	draw sight
1819 to 1910	print M$ in double height at (X,Y) in colour C 1850 see User Guide p462
1920 to 1940	wipe out n characters at (x,y)
1950 to 1970	delay for t seconds
1980 to 2020	print 'press space bar'
2030 to 2410	instructions and menus
2420 to 2450	get key but only one of those characters supplied by K$

(continued from page 149)

- type 'PAGE = &900 (RETURN)'
- type in listing 3
- save with '*SAVE "darts" 900 D00 (RETURN) (RETURN)'
- type 'PAGE = &D00 (RETURN)'
- type in listing 4
- save with 'SAVE "darts . . ." (RETURN) (RETURN)'

Important — omit lines 1, 2 and 3 from each program.

I would advise saving listing 2 on a back up cassette. In case of deformed characters it will be possible to track them down and repair them.

It would be helpful to replace line 10 of listing 4 with

10MODE7:ON ERROR MODE7:REPORT: PRINT "at line";ERL:END

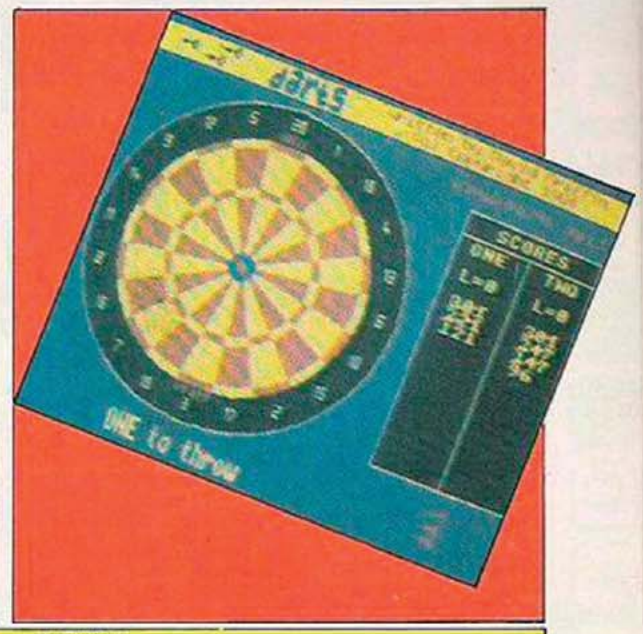
while the game is developed to trap any typing errors.

For a complete working copy, without the effort and strain of a couple of hours at the keyboard, send £3.75 or £2.75 plus blank cassette plus S.A.E. to [redacted]

The game is also available on Prestel via the pages of Viewfax 258.

Listing 3.

```
  1 REM Listing 3
  2 REM BBC Darts  -  by David Griffin
  3
  10COLOUR2:COLOUR131:VDU31,6,1,149,150,31,5,2,149,150,5:GCOL0,2:MOVE80,972:VDU149,150:GCOL0,1:*&2FE0="written by David Griffin":FORIX=0TO23:MOVE624+IX*24,980:VDU!%&2FE0:NEXT:*&2FE0="(c) Copyright 1984"
  20FORIX=0TO17:MOVE696+IX*24,956:VDU!%&2FE0:NEXT:COLOUR128:VDU29,448;512;
  30PROCC(300,2,2):GCOL0,3:MOVE0,388:FORIX=0TO40:DRAW300+S(IX),300+C(IX):NEXT:PROCC(300,1,3):PROCC(280,3,1):PROCC(184,1,3):PROCC(164,3,1):PROCC(52,0,0):PROCC(12,1,1)
  40GCOL0,3:FORIX=0TO3STEP2:MOVE340+S(IX)*16,340+C(IX)*16:VDU128+IXDIV2:NEXT:GCOL0,1:MOVE-32,332:VDU151,152:MOVE-44,-300:VDU153,154,155,29,0;0;:GCOL0,2:MOVE896,200:DRAW1248,200:PLOT85,896,832:PLOT85,1248,832
  50GCOL0,3:MOVE896,200:DRAW1248,200:DRAW1248,832:DRAW896,832:DRAW896,200:MOVE976,816:PRINT"SCORES":VDU4:MOVE896,776:DRAW1248,776:MOVE1072,776:DRAW1072,200
  60PAGE=&D00:GOTO70
  70DEFPROCC(RX,CX,DX):DX=CX+DX:GCOL0,CX:MOVE0,RX:FORIX=1TO40:IF(IX+1)MOD2CX=DX-CX:GCOL0,CX
  80DRAW0,0:PLOT85,RX+S(IX),RX+C(IX):NEXT:ENDPROC
```



Listing 4.

```
  1 REM Listing 4
  2 REM BBC Darts  -  by David Griffin
  3
  10MODE7:ON ERROR RUN
  20g=FNinstr
  30MODE 1
  40VDU 23;8202;0;0;0;19,0,4,0,0,0,19,2,0,0,0,0,19,3,3,0,0,0
  50PROCboard
  60PROCSET
  70*FX200 1
  80PAGE=&900:GOTO10
  90*FX200 0
  100IF g=1 PROCSgame(301,1,3,H)
  110IF g=2 PROCSgame(5,D,L,H)
  120IF g=3 PROCAclock
  130IF g=4:gS=5:PROCSgame(51,0,3,H)
  140IF g=5:g=4:gS=5:PROCSgame(51,0,L,H)
  150RUN
  160DEFPROCSgame(G,SO,L,H)
  170PROCGnames
  180Pleg(0)=0:Pleg(1)=0:P1=RND(2)-1:LEG=0
  190REPEAT
  200LEG=LEG+1
  210FOR P=0 TO 1
  220PS(P)=G:start(P)=SO
  230COLOUR130:PRINTTAB(29+P*6,10)"L=";Pleg(P);
  240SV(P)=0:PROCwndo(P):CLS:PRINT;PS(P);
  250PROCwoff(P)
  260NEXT
  270P1=1-P1:P=P1
  280REPEAT
  290P=1-P
  300PROCw(13,8,29)
  310PROCa(PN$(P)+" to throw",10,29,3)
  320sc=FNdarts(H)
  330IF g=4 sc=sc/gS:IF s=0 PROCm("MISSED ONE",33,28,3):PROCdel(1):PROCw(10,29,28):GOTO 440
  340IF ((start(P)=1 AND dbl=0)OR(PS(P)-sc=0 AND dbl=0))AND g<>4 PROCm("NO DOUBLE",34,28,3):PROCdel(1):PROCw(10,29,28):GOTO 440
  350IF (PS(P)-sc=1 AND g<>4) OR PS(P)-sc<0 PROCm("BONE BUST",34,28,3):PROCdel(1):PROCw(10,29,28):GOTO 440
  360IF g=4 AND sc<>INTsc PROCm("NOT "+STR$(gS)+"x",35,28,3):PROCdel(1):PROCw(10,29,28):GOTO 440
  370IF sc=0 GOTO440
  380IF sc=180 SOUND 1,1,50,50
  390PROCm("Score="+STR$(sc),34,28,3)
  400GCOL0,3:MOVE(29+P*6)*32,(20-SV(P))*32:DRAW(29+LEN(STR$(PS(P)))+P*6)*32-8,(21-SV(P))*32-4
  410PS(P)=PS(P)-sc
  420PROCwndo(P):PRINT;PS(P);:IF PS(P)<100 PRINT
  430PROCwoff(P)
  440UNTIL PS(0)=0 OR PS(1)=0
  450PROCw(13,8,29):PROCw(9,29,29)
  460IF LEG=1 M$="st" ELSE IF LEG=2 M$="nd" ELSE IF LEG=3 M$="rd" ELSE M$="th"
  470PROCm(PN$(P)+" won the "+STR$(LEG)+M$+" leg",8,29,3)
  480Pleg(P)=Pleg(P)+1
  490COLOUR130:PRINTTAB(29+P*6,10)"L=";Pleg(P);
  500PROCdel(2):PROCw(40,0,29)
  510UNTIL Pleg(0)=L OR Pleg(1)=L
  520PROCa(PN$(P)+" won the match",3,29,3)
  530PROCa("Play again (Y/N) ...",24,29,1)
  540IF(FNget("YyNn")+1)DIV2=1:PROCw(40,0,29):GOTO180
  550ENDPROC
  560DEFPROCAclock
  570PROCGnames
  580FOR P=0 TO 1:PS(P)=1
  590COLOUR130:COLOUR3:VDU31,29+P*6,10:IF S=1 PRINT"sg1":ELSE IF S=2 PRINT"dbl":ELSE PRINT"tbl"
  600PROCwndo(P):CLS:PRINT;PS(P);:PROCwoff(P)
  610NEXT
  620P=RND(2)-1
  630REPEAT
  640P=1-P
  650PROCw(13,8,29):PROCa(PN$(P)+" to throw",10,29,3)
  660sc=FNdarts(H)
  670N=PS(P)
  680FORT=0TO2
  690IF PS(P)>20 GOTO750
  700IF PS(P)=0 GOTO800
  710M$=LEFT$(throw$(T),1)
  720IF S=2 AND M$<>"D" GOTO800
  730IF S=3 AND M$<>"T" GOTO800
  740IF S=1 AND(M$="D" OR M$="T")GOTO800
  750S=RIGHT$(throw$(T),2)
  760IF VAL(S$)=PS(P):PS(P)=PS(P)+1
  770IF S$="HT" AND PS(P)=50 PS(P)=0
  780IF S$="LL" AND PS(P)=25 PS(P)=50
  790IF PS(P)=21 PS(P)=25
  800NEXT
  810IF PS(P)>N OR PS(P)=0 GCOL0,3:MOVE(29+P*6)*32,(20-SV(P))*32:DRAW(31+P*6)*32-8,(21-SV(P))*32-4:PROCwndo(P):PRINT;PS(P);:PROCwoff(P)
  820UNTIL PS(P)=0
  830PROCw(40,0,29):PROCa(PN$(P)+" won the match",3,29
```

(continued on page 153)

ATTENTION! ATTENTION! ALL COMMODORE USERS

A FREE LIGHTPEN!

TORNADO SUPER FAST SAVER

Do you use tapes? Are you sick and tired of waiting for your programs to be Loaded/Saved from/on the tape? Then you need TORNADO!! Ronado allows you to Save/Load/Verify your Basic/machine code programs faster than a CBM 1541 disk drive does! Due to popular demand! Tornado now comes with new and more powerful commands plus extra instructions to assist you in making fast versions of your existing machine code/Basic programs. Tornado is available on tape for CBM 64 and 8K + Vic 20.

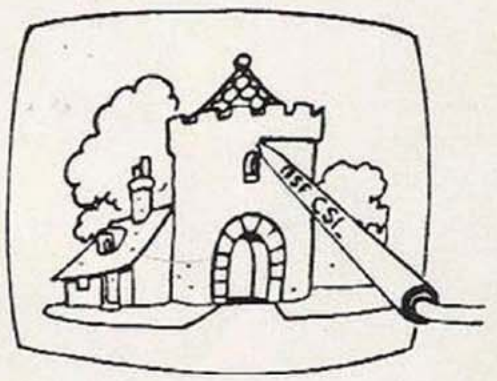
Do your Run/Stop and Restore keys often fail? Do you want to come out of those crashes?! Or get into those unbreakable programs?! Then what are you waiting for, get yourself a BREAKER!! Reset switch and let your computer know who is the boss!! Breaker can be connected to your machine in seconds, no soldering. Included with the Breaker is a copy of basic recovery software on tape. Now available for any CBM 64 or Vic 20.

A FREE BREAKER WITH EVERY TORNADO IF YOU USE THIS COUPON NOW!

Yes a FREE Light Pen! with every GRAPHKIT! Graphkit is the ultimate in drawing! designing! or painting! (using the light pen of course, which incidentally has a full 3 year warranty!) Graphkit will amongst other things allow you to:

- Draw free handed on the screen anything from a Micky Mouse to your latest integrated circuit! With all the fill colour and erase facilities of course!
- Save/load your latest master piece to/from the disk/tape drive.
- Or directly copy the drawing on the screen to the printer! And keep it for ever or send to a friend as a post card!
- Design your own colourful sprites and characters.
- Play the games in the package or use the light pen in your own games/education/programs.

GRAPHKIT is available on disk and tape. Tape version is £15.95 and disk version (recommended) is £19.95.



DMON! IS A MUST!

All you 1540/1541 disk users DMON! is here at last. Dmon is the disk monitor you have been waiting for. It will allow you to:

- read/write blocks from/to the disk
- display and edit blocks on the screen
- display and send disk messages%commands
- transfer your programs from tape to disk or disk to disk or even disk to tape! ● and more!
- protected disks a speciality!

DMON comes on DISK at only £9.95 — but hurry! Offer closing on 30/12/84.

BSF CSL, 82 FURNACE DRIVE, CRAWLEY, W SUSSEX RH10 6JE

Please send me .....Tornado at £9.95 + my free! Breaker

Please send me .....Breaker at £7.95

Please send me .....Graphkit at £16.95 (tape)

Please send me .....Graphkit at £19.95 (disk)

Please send me .....DMON at £9.95

I enclose cheque/PO/cash to the sume of £.....

Name.....Computer.....

Address.....

.....

Please use this form and block letters only. All prices are inclusive of p&p (mail order only, add £2 if outside UK). Please post to: BSF CSL, 82 FURNACE DRIVE, CRAWLEY, WEST SUSSEX RH10 6JE. Y.C.

(continued from page 151)

```
,3)
  840PROCm("Play again (Y/N) ...",24,29,1)
  850IF(FNget("YyNn")+1)DIV2=1:PROCw(40,0,29):GOTO580
  860ENDPROC
  870DEFPROCSnames
  880FOR P=0 TO 1
  890PROCm("Please type Player "+STR$(P+1)+"'s initial
s ...",3,29,3)
  900COLOUR3
  910PN$(P)=RIGHT$("  "+FNword(34,29,3),3)
  920PROCw(40,0,29)
  930COLOUR130:PRINTTAB(29+P*6,0)PN$(P):COLOUR128
  940NEXT
  950ENDPROC
  960DEFFNword(X,Y,L)
  970*FX 15 0
  980VDU31,X,Y:N$="":REPEAT A=GET
  990SOUND 1,-15,RND(10)*4+100,3
 1000IF A>31 AND A<122 AND LEN(N$)<L VDUA:N$=N$+CHR$A
 1010IF A=127 AND LEN(N$)>0 VDU127:N$=RIGHT$(N$,LEN(N$
)-1)
 1020UNTIL A=13 AND LEN(N$)>0
 1030=N$
 1040DEFPROCwndo(P)
 1050VDU 28,29+P*6,24,31+P*6,12,31,0,SV(P):COLOUR130:C
OLOUR3
 1060ENDPROC
 1070DEFPROCwoff(P)
 1080SV(P)=VPOS:COLOUR128:VDU26
 1090ENDPROC
 1100DEFFNdarts(H)
 1110dbl=0:COLOUR1:FOR Y=27 TO 29:PRINTTAB(29,Y)"
CHR$149CHR$150"    ":NEXT
 1120SCORE=0:T=-1:XX=RND(400)+248:YX=RND(400)+312
 1130REPEAT T=T+1
 1140throw$(T)=FNthrow(H)
 1150X(T)=XX-12:Y(T)=YX+12
 1160IF start(P)=1 AND dbl=1 start(P)=0
 1170IF start(P)=0 SCORE=SCORE+s
 1180PRINTTAB(34-(LEN(s$)/2),27+T)throw$(T)
 1190UNTIL T=2 OR(PS(P)-SCORE<2 AND g<>4 AND g<>3)OR(g
=4 AND s=0)OR(PS(P)-SCORE/g5<0 AND g=4)OR(g=3 AND PS(P
)=50 AND throw$(T)="BULL'S EYE")
 1200PROCdel(1):PROCw(10,29,27):PROCw(10,29,29)
 1210VDU5:FOR D=0 TO T
 1220COL3,3:MOVEX(D),Y(D):VDU148
 1230NEXT:VDU4
 1240=SCORE
 1250DEFFNthrow(H)
 1260s$="":press=1
 1270REPEAT IF NOT FNfire press=0
 1280PROCsight
 1290PROCdel(.01)
 1300PROCsight
 1310PROCKJ
 1320XX=XX+(RND(16*H+1)-(8*H+1)):YX=YX+(RND(16*H+1)-(8
*H+1))
 1330IF XX>848 XX=98 ELSE IF XX<48 XX=798
 1340IF YX>912 YX=162 ELSE IF YX<112 YX=862
 1350UNTIL FNfire AND press=0
 1360SOUND0,2,5,4:PROCdel(.4):SOUND1,-15,0,1
 1370VDU31,33,27+T,32,32
 1380COL3,3:VDU5:MOVE XX-12,YX+12:VDU148,4
 1390x=XX-448:y=YX-512:r=SQR(x^2+y^2):a=DEG(ACS(x/r))
 1400IF y<0 a=360-a
 1410s=A(((459-a)MOD360)DIV10)
 1420s$=STR$(s)
 1430IF r<=32 s$="outer BULL":s=25
 1440IF r<=12 s$="BULL'S EYE":s=50:dbl=1
 1450IF r>=164 AND r<184 s$="Treble "+s$:s=s*3
 1460IF r>280 AND r<=300 s$="Double "+s$:s=s*2:dbl=1
 1470IF r>300 s$="Missed":s=0
 1480=s$
 1490DEFFNfire Z=FALSE
 1500IF(J=1 AND((ADVAL(0)AND 3)=P+1))OR(J=2 AND INKEY-
99)Z=TRUE
 1510=Z
 1520DEFPROCKJ
 1530IF(J=1 AND ADVAL(P*2+1)>40000)OR(J=2 AND INKEY-98
)XX=XX-16
 1540IF(J=1 AND ADVAL(P*2+1)<20000)OR(J=2 AND INKEY-67
)XX=XX+16
 1550IF(J=1 AND ADVAL(P*2+2)>40000)OR(J=2 AND INKEY-73
)YX=YX+16
 1560IF(J=1 AND ADVAL(P*2+2)<20000)OR(J=2 AND INKEY-10
5)YX=YX-16
 1570ENDPROC
 1580DEFPROCboard
 1590GCOL0,3:MOVE0,924:DRAW1280,924:PLOT85,0,992:PLOT8
5,1280,992
 1600GCOL0,2:MOVE0,920:DRAW1280,920:MOVE0,996:DRAW1280
,996
 1610VDU23,158,2,7,7,&7F,&FF,&E7,&FF,&7E:PROCm(CHR$158
,2.2,1,0)
 1620VDU23,158,&7E,&FF,7,&7F,&FF,&E7,&FF,&7E:PROCm(CHR
$158,13.7,1,0)
 1630VDU23,158,&46,&EF,&FF,&F9,&F0,&F0,&E0,&E0:PROCm(C
HR$158,15,1,0)
 1640VDU23,158,&20,&70,&70,&FC,&FE,&70,&7F,&3E:PROCm(C
HR$158,16.3,1,0)
 1650VDU23,158,&7E,&FF,&E0,&FE,&7F,7,&FF,&7E:PROCm(CHR
$158,17.6,1,0)
 1660COLOUR1:VDU31,26,4:IF J=1 PRINT"joystick";ELSE PR
INT"keyboard";
 1670PRINT" opt";g
 1680ENDPROC
 1690DEFPROCSET
 1700DIM5(40),C(40),A(19),X(2),Y(2),PN$(1),PS(1),SV(1)
,start(1),Pleg(1),throw$(2)
 1710g5=5:ENVELOPE1,0,10,30,3,100,100,100,126,0,0,-1,1
26,60:ENVELOPE2,1,0,0,0,0,0,0,5,10,-1,-5,10,100
 1720FOR I%=0 TO 40
 1730S(I%)=SIN(RAD(I%+9)):C(I%)=COS(RAD(I%+9))
 1740NEXT
 1750FOR I%=0 TO 19:READA(I%):NEXT
 1760DATA20,1,18,4,13,6,10,15,2,17,3,19,7,16,8,11,14,9
,12,5
 1770ENDPROC
 1780DEFPROCsight
 1790GCOL3,1:MOVEXX-32,YX:DRAWXX+32,YX:MOVEXX,YX-32:DR
AWXX,YX+32
 1800ENDPROC
 1810DEFPROCm(M$,X,Y,C)
 1820VDU5:GCOL0,C
 1830FOR I%=1 TO LENM$
 1840?&70=ASC(MID$(M$,I%,1))
 1850XX=&70:YX=0:AX=&A:CALL&FFF1
 1860LX=&71
 1870FOR J%=0 TO 1:VDU23,255
 1880FOR KX=1 TO 4:VDU?LX,?LX:LX=LX+1:NEXT
 1890MOVE(X+I%-1)*28,(32-(Y+JX))*32-4:VDU255
 1900NEXT,:VDU4
 1910ENDPROC
 1920DEFPROCw(n,x,y)
 1930COLOUR128:FOR y=y TO y+1:PRINTTAB(x,y)SPC(n);:NEX
T
 1940ENDPROC
 1950DEFPROCdel(t)
 1960tt=TIME:REPEAT UNTIL TIME=tt+t*100
 1970ENDPROC
 1980DEFPROCpspace
 1990*FX15 1
 2000VDU31,0,23,131,157,148:PRINTSTRING$(8,",")CHR$129
"Press SPACE BAR"CHR$148STRING$(9,",")"  "CHR$156TAB(2
7,23);
 2010REPEAT UNTIL GET=32
 2020ENDPROC
 2030DEFFNinstr
 2040FOR I=0 TO 4:VDU31,4,I,132,157,146,31,34,I,156:NE
XT
 2050PRINTTAB(8,1)"""CHR$255"`a0_&+t""CHR$255"`k47k7
0h7`a"TAB(9,2)CHR$255" j5;!!"CHR$255" "CHR$255",v` j5
 ""-,t"TAB(8,3)" "CHR$255"p)'z0_"CHR$255"p"CHR$255"o+u
 zu +tp?"TAB(2,6)CHR$129"(c) Copyright David Griffin 19
 84"
 2060PRINTTAB(4,9)"Move the sight around the board"TAB
 (5)"and throw a dart when it is"TAB(7)"over the number
  you want"
 2070PRINTTAB(8,17)CHR$134"Joysticks ? (Y/N) ...";
 2080J=(FNget("YyNn")+1)DIV 2
 2090PRINTTAB(8,17)SPC(22)
 2100IF J=2 PRINTTAB(11,13)CHR$134"* ... move UP"TAB(1
 1)CHR$134"/ ... move DOWN"TAB(11)CHR$134"Z ... move LE
 FT"TAB(11)CHR$134"X ... move RIGHT"TAB(7)CHR$134"SPACE
  ... throw a dart";
 2110IF J=1 PRINTTAB(8,15)CHR$134"FIRE ... throw a dar
 t";
 2120PRINT''TAB(6)CHR$134"ESCAPE ... reset"
 2130PROCpspace:VDU28,0,23,39,9,12,26
 2140PRINTTAB(7,10)CHR$131"1 ... Standard 301 game"TAB
 (7)CHR$131"2 ... Standard game"TAB(12)CHR$131"(you cho
 ose parameters)"TAB(7)CHR$131"3 ... Around the clock"T
 AB(7)CHR$131"4 ... All fives"TAB(7)CHR$131"5 ... As op
 tion 4"
 2150PRINTTAB(12)CHR$131"(you choose parameters)"TAB(5
 ,20)"Please press the number of the"TAB(9)"game you wa
 nt to play ";
 2160*FX15 0
 2170G=FNget("12345")
 2180VDU28,0,23,39,9,12,26
 2190IF G<>3 GOTO2210
 2200IF G=3 PRINTTAB(5,11)CHR$131"Singles,doubles"TAB
 (5)CHR$131"or trebles ? ........"TAB(0,13):GOTO2270
 2210IF G<>2 AND G<>5 VDU31,0,11:GOTO2270
 2220IF G=5 VDU28,0,23,39,1
 2230PRINTTAB(5,9)CHR$131"Which game ? ........"TAB(5)
 CHR$131;
 2240IF G=2 PRINT"(101,501 etc..)"TAB(5,12)CHR$131"Dou
 ble to start ? ..."TAB(5)CHR$131"(YES/NO)"
 2250IF G=5 PRINT"(4s,7s etc..)"
 2260PRINT''TAB(5)CHR$131"No. of legs in"TAB(5)CHR$131
 "each match ? ........."TAB(5)CHR$131"(3,5,7 or 9)"
 2270PRINT''TAB(5)CHR$131"Difficulty level ? .."TAB(5)C
 HR$131"(1-3)".
 2280*FX15
 2290IF G<>3 GOTO2320
 2300VDU31,27,12,132:S=(FNget("ScDdTt")+1)DIV 2:IF S=1
  PRINT"SINGLES";ELSE IF S=2 PRINT"DOUBLES":ELSE PRINT"
 TREBLES"
 2310VDU31,27,15,132:GOTO2390
 2320IF G<>2 AND G<>5 VDU31,27,12,132:GOTO2390
 2330VDU31,27,9,132:IF G=2 S=FNget("123456789")*100+1:
 ELSE S=FNget("3456789")+2
 2340PRINT;S;:IF G=5 PRINT"s":VDU31,27,13,132:GOTO2370
 2350VDU31,27,12,132:D=(FNget("YyNn")+1)DIV2:IF D=1 PR
 INT"YES":D=1:ELSE PRINT"NO":D=0
 2360VDU31,27,16,132
 2370L=FNget("3579"):PRINT;L*2+1:L=L+1
 2380IF G=2 VDU31,27,19,132:ELSE VDU31,27,16,132
 2390H=FNget("123"):PRINT;H
 2400VDU26:PROCpspace
 2410=G
 2420DEFFNget(K$)
 2430*FX15 1
 2440REPEAT K=INSTR(K$,GET$):SOUND1,-15,RND(10)*4+100,
 3:UNTIL K<>0
 2450=K
```


NO HOME COMPUTER IS COMPLETE WITHOUT IT

Because Touchmaster opens up the home computer.

First, to the full range of users, even the very young.

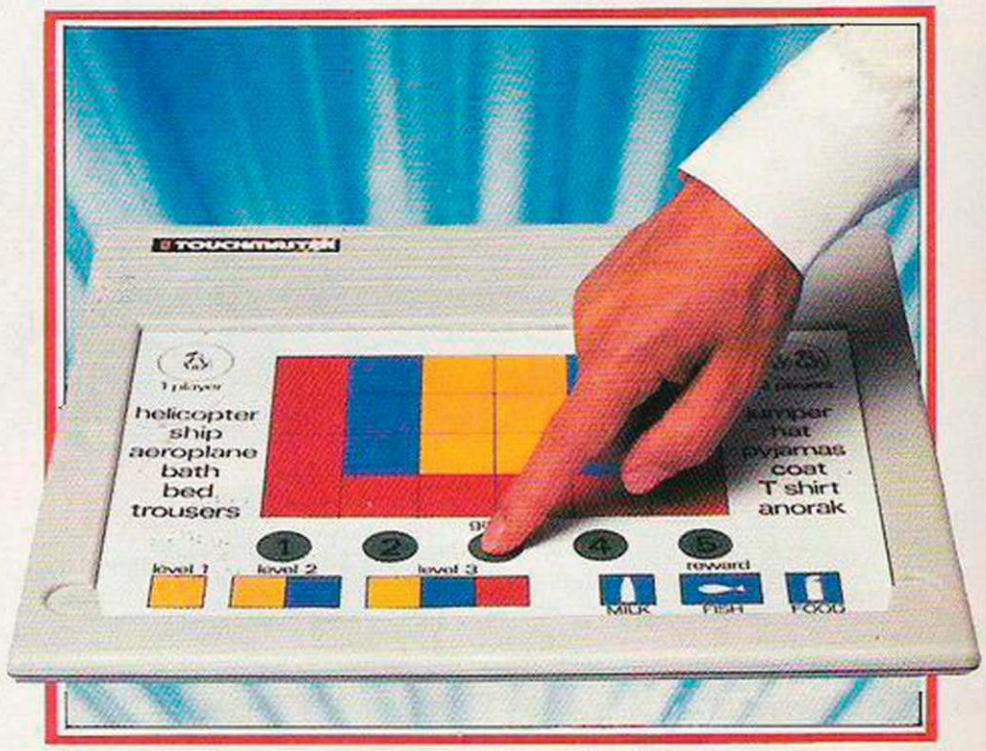
Secondly, to a whole new style of software ("Touchware"), which is not limited by the keyboard.

Touchware goes all the way from early education packages to sophisticated graphic programs.

What's more, comparable pads are limited because their surface is composed of either a bank of switches of finite size or carbon tracks laid in a grid.

Or they need a delicate electronic stylus. Or they offer a limited working surface. Touchmaster's full A4 printed surface, by comparison, is totally linear.

It has a resolution of 256 x 256 points (that's what makes Touchmaster so flexible).



Now anyone can master the home computer

TOUCHMASTER

For full details, contact **Touchmaster Limited,**
PO Box 3, Port Talbot, West Glamorgan SA13 1WH,
or phone **Teledata (01) 200 0200**