

# DRAGON



# USER

January 1987

The independent Dragon magazine

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## Editorial

At last... quick Happy Christmas to you all if this reaches you when it should, and if it doesn't, then a Happy New Year! I had such a 'good' Christmas last year that I'm thinking of keeping it all to a minimum this year — so you may think of me as reached over my word processor in these early, silent days between 20th December and January 1st, putting the next issue into shape. On the other hand ... don't phone, I might be at a party!

There are one or two pieces of interesting news about ... H. C. Andersen of Denmark have been given a license to sell OS-9 in Europe — see News Desk for details. And Quickbeam Software have taken over Simulations Computing a software firm. The recently silent Microvision has re-emerged with a whole new list of utilities and a few games as well.

In response to many suggestions, Gordon Lee has been asked to re-clarify his input to Dragon User by extracting some of the better and more solutions to his puzzles and analyzing their success or failure. This month Gordon outlines the principles of effective puzzle-solving. We will also be printing his solution to the current month's prize-winning efforts in future.

Because of a last minute let down, none of the Dragon reports made it to the London 8800 Show — well the general reports from anyone who had a good look issued. The best ones'll get paid and printed.

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### How to submit articles

The quality of the material we can publish in Dragon User each month will, to a very great extent, depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was designed to do the most with a powerful version of Basic, but with very poor documentation.

Articles which are submitted to Dragon User for publication should not be more than 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you wish to have your program returned you must include a stamped address and envelope.

# Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters.  
Page, Dragon User, 12-131, 18a Newpass Street, Llanelli SA9 7PP.

## Guilt edged

IN OCTOBER 1988 issue you received a program from Cascade Games called *Cassette 90*.

I purchased this cassette seven months ago and must entirely agree with your review in fact I'm surprised you gave it even one dead dragon.

I have to say that I feel guilty about not writing to you at the time to warn people not to buy this complete waste of money, as they say, there's one born every minute!

However, not all is bad, as you reviewed Electronic Action, I myself have Printer Control from MacGinnart Consultants which is in my opinion an excellent piece of software which I would have no hesitation in recommending. Your review in a previous issue did not really touch on the excellence and real value for money of this program. Top marks from me.

By the way, apparently Commodore 20 has several cover bugs in it, or so I am informed, if you know about these then the message should have been passed on.

Keith Gardner  
21 Berkeley Street  
Suter Road  
Leicester LE2 3WQ

THE EDITOR has had no first hand complaints about Commodore 20, but one or two enquiries, and would like to hear from someone who has used the latest version thoroughly ...

## Teacher's pet

I HAVE been buying Dragon User since the first issue in 1983, and now have a subscription.

But what do I find? Articles which treat users as idiots. Surely there cannot be many (if any) users of the Dragon left who do not know how to program in Basic! The standard of the programs published has not changed in any way since the first issue. I hope this will

be improved, as the machine code articles and programs are of a very good standard. As a computer studies lecturer I see enough poorly thought out pieces of work.

A. D. Butler  
Flat 5  
18 Meridian Lane  
Merridale  
Wolverhampton

**NOT AT all.** Not only are new users still coming to the Dragon, as people pick them up at bargain prices, but we have a steady demand for Basic programs, as well as machine code.

As a teacher with experience of correcting awkward pieces of programming, how about writing an educational piece based on your experience? Drop us a line.

## Cardiff club

CALLING all Dragon and Tandy computer users in the Cardiff area, interested in joining a User Group? If so, telephone Ms J. James on Cardiff (2022) 933559.

J. James  
43 Fri Aft  
Pontcanna  
Cardiff CF1 3FF

## Double your disc

HAVING glanced through the July issue I read with interest the article on disc drives by Geoff Ehringer. He mentioned that with the Dragon Drive using double sided discs, only one side can be used. This is true using the disc as purchased, but both sides can be used if one uses a paper punch and punches another small hole in the cover on the other side of the centre line to the existing one, keeping the same geometrical distance from the centre. The holes on both sides must be opposite each other for the beam to pass through. Care must be taken not to damage the disc. Another must also be cut out on the opposite edge, and in a similar position, to the existing square notch.

I have over a dozen such discs operating in this way with no problems whatsoever. I trust this information can be passed on to the publishing editor for the benefit of other Dragon Drive users.

L. J. Fort  
PO Box 180  
Llanonmas 470  
Rep. of South Africa

## A week point

I MUST commend you on getting something right. No, I'm not referring to your subscription-only policy. I'm referring to your getting my copy of *DU* here by the second day of the cover month! The June issue actually got here about a week after the May issue. I assume you've taken over from your former distributors. I felt that the problem was there all along and hope this arrangement will continue. I like your magazine very much (almost as much as my Dragon), but was not very happy with the sometimes distribution. Your advertisers and writers with whom I've communicated have been exceptionally helpful, too. Thank you.

Donald Hicks  
284 St. Evreard St.  
Mobile  
Alabama 36603  
USA

THE TRADITION is being preserved, rest assured. Donald, quite a few of our readers got their September issue only a week after their October one ... the mailing company tell us that they think the labelling database is now sorted correctly, and Anne Marie, who runs the mailing list here, has been awarded an Executive Carbon of Hades.

## Passed his eggsums

I AM desperate to know what the high score for *Chuckie Egg* is. The highest score I have ever got is 168870 level 17 after my dad needed the computer.

he replaced the SRAM chip. Level 17 has got 168880 and one more clock.

Jonathan Baker  
Aged 17

## Late bookings

MANY thanks to the 'back spotters' who responded to my article (September issue). Additional titles to add to the convenient space at the bottom of page 14 (*Colourful* - Ed. John).

The 5885 Composer (Barbara James, Monoguide for the Dragon (Virgin/Interface) Gilford, St. Programs for the Dragon32 (Century) Langold, Color Computer Assembly Programming (Radio Shack) Bantock, Getting Started with the TRS80 (Dragon (Future) Hatfield & Young).

And a correction: list Programs to Feed your Dragon (Magazine by Robinson, Smith and Brown, not James).

The comment about Colour Computer Assembly Programming (Tandy catalogue number 82-2077) is that it uses, as you would expect, the EDWASM editor/ assembler but 'is information readable'. Barlow's 'Colour Computer Graphics' is the one I keep to for instant graphics info, so I can believe that.

Two comments were received on David Barrow's book: I generally find it good; an easier intro than Lenthalah, though less detail! It did not get a single program to work (I just about got the whole book and I found it too difficult).

... you pass your money ...  
Not possessing the book, I couldn't help the reader who asked about the Draughts program in Enter the Dragon. Apparently it crashes when it reaches the first move, but the text cannot be found. Can anyone help him through this page, please?

Many thanks to those who took the trouble to write, either to me or to Dragon User, with further book news.

Pete O'Reilly  
21 Woodburn Lane  
Woodburn Green  
High Wycombe  
Bucks HP12 3ND

# Dragon User People's Chart

## The Best Games of 1986

THE final People's Chart ends with a roundup of the games you have voted the most popular in the last ten months. And we have some new plans.

- 1 Juxtaposition.....(Wintersoft)
- 2 Shocktrooper.....(Microdeal)
- 3 Shaolin Master.....(Quickbeam)
- 4 Bean Stalker.....(Micro Vision)
- 5 Speed Racer.....(Microdeal)

THIS IS the Big One — the top five games of 1986, according to your votes. We have a surprise number one — Juxtaposition! Well, you'll be surprised if you never saw Dragon User in your life before — not other

wise. Our mailing, as well as the People's Chart, has borne built address to the Big J's popularity. It's a shame and a pity that Wintersoft had to pack up before they could come up with part II.

The other top four favourites have all pretty well ruled the roost since the People's Chart began in March 1986, hotly pursued by other classics like Jet Set Willy, Eddie Steady Go, Rommel 3D, Moon Cresta, Total Eclipse (etc.)

This is also the Final Countdown. As features like the Expert's Arcade Arena and Gordon Lee's puzzle page grow in popularity, we have decided to hand over the columns of the People to the people with their ears to the ground — The Expert and Mike Gerrard, on arcade games and adventures respectively. And we'll be making more room for comments from games players on the Letters/Page, with star prizes for the best letter every month.

So thank you both us and from the staff ware authors to everyone who voted in the People's Chart, keep playing and let us know what you find in the Dragon games world.

The final anagram has to be a good one — well, we think, it's a good one. It goes "Take it from me — Dragon User is Best", and its from S. Goode of Subway! Your Microdeal software is on its way.

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# TROJAN

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## OS-9 licence

DANSH supplies H. C. Andersen Computer A/S have been licensed by Microsoft in the USA to distribute the OS-9 operating system, Level 1, Version 1.2 for the Dragon.

According to H. C. Andersen, they are the only company to be licensed by Microsoft to distribute OS-9 for the Dragon.

The Dragon OS-9 system includes software and assembler, with English manuals, and will cost £174.00, inc. VAT but excluding delivery charges.

According to Microsoft, Thomson SIMM of Paris has licensed the OS-9/8030 operating system for the software nucleus of the recently announced European Educa-

tion Standard microcomputer system.

Three major European electronics companies, Thomson in France, Olivetti in Italy and Acorn in the UK are co-operating in developing a new standard in personal and educational micros.

The selection of OS-9 signifies its increasing acceptance as a standard operating system for 8030 based micros. In late July, Tandy released the Color Computer III based on Microsoft's system.

Anyone wishing for more information should contact H.C. Andersen Computer A/S at Ringvej 380, DK-2770 Naarup, Denmark.

## New, new, new

MICROVISION SOFTWARE, best known to Dragon User readers for reloader Roy Coates, and Brian Staker have announced a new product list of unanticipated alternatives, including games, utilities and support programs, and Fax software.

All the FLEX software comes on disc with documentation, and all the games are available on cassette or DragonDOS disc with the exception of Catacomb Crisis, which is currently only available on cassette says Roy Coates.

The forthcoming list includes the aforementioned Catacomb Crisis a graphics adventure in caves and tunnels, avoiding traps and other nasties while looking for items, clean cakes (these people have their right idea) and other useful items (£7.95); Starship Destiny, Dungeon Destiny and Wild West Destiny; three more graphics adventures with location graphics, problems and puzzles (£5.95 each); Composer Compiler, a graphics utility which works with Composer (available from Microsoft) allowing musical data to be entered on a store instead of Data statements

(10.00); Hi-Res, a hi res driver compatible with Dragon Basic, both Basic and machine code drivable (£5.00); Light Mail, a mailing list which uses a light pen and allows data entry, editing, searching, printing and label production (£5.00); D'Pics 1 and 2, which are quite simply collections of Dragon music created on Composer (£3.00 each); Help, Phone, Diary, X (an extension of the TSC XDUT utility), and Four (easy access to Epson printers) all on one disc (£7.50); Item, which re-routes all IO through the PC032 port to allow a terminal to be connected up (£5.00); Core of Corin (already reviewed), 4th of FLEX classic adventure (£7.00); Shenjick, a FLEX utility which allows sector editing, mapping, tracing and dumping (£7.00); and CMDR, a FLEX programmer's utility which allows ASCII or hex dumps, memory search etc (£7.00) and (available mid December) EDT, a re configuration FLEX screen editor (price to be announced, but it won't be cheap).

More information from Microvision Software, 8 Wensley Road, Liverpool L8 5DW.



Shaolin Master from Quickbeam

## Quickbeam quicker

Dave Hiltzman has been in touch to tell us that as from 23rd November, Smithson Computing will become part of Quickbeam Software, ceasing to operate as a separate enterprise.

Wayne Smithson is hoping to do some programming for Quickbeams.

Dragon Monthly subscribers will be glad to hear that the newsletter will continue with Quickbeam under the new name of Dragon's Tail, run by

Julian Cogbill, 34 Shooters Drive, Haverly, Essex EN9 3DD. All previous subscriptions will be honoured, says Dave.

Smithson Computing's popular range which included Gordon Bennett and Electronic Archer, as well as a new game, 100 Screen Frenzy, will join Quickbeam's list.

For more details contact Dave Hiltzman, 47 Old Nazeing Road, Broxbourne, Herts EN10 6RN.

## Lucky thirteenth

ALAN Cook of Arc Software has been on our list to try that the Thirteenth Day (reviewed by Mike Gerrard in December's Adventure Tally) is now out and ready for sale and has been picking up favourable reviews in the shops. Mike liked it. The game costs £5 from Arc Software, 273 Marks Road, Newton Mearns, Glasgow G17 5LY.

## Buzz offer

Buzz Software have a number of pre-Christmas special offers, including Small Business Telephone Directory and Small

Business Mail Processor. For further information, send them a T3 stamp for their information pack.

Write to: Buzz Software, 10 St Stephen Road, Penketh, Nr. Warrington, Cheshire WA6 2RN.

## Quickbeam still quick

DU wishes to apologise to anyone who has waited more than 20 days for their copies of Fire Force and would like to see that any hold up has been getting the order through the Dragon User filing system, and not through any fault of Quickbeams. All orders received before the closing date have now been dealt with.





# Daisywheel graphics

Learn how to get squares and circles out of your printer, says Mike Hosken

THERE seems to be a supposition in some quarters that only plotters and dot-matrix printers can produce printed graphics. But a daisywheel is equipped with a perfectly good dot — the full stop.

Depreciated the character width and line depth can be suitably adjusted there is no reservation a program cannot be devised to dump screen graphics onto paper, for example.

Squares, squares and round circles — needs five 120ths (ie, one 24th of an inch) by two 48ths (which is also one 24th of an inch). But according to the printer instruction books the codes need, for some unspecified reason, to be one greater than the number actually required, so it's code 11 for character width, and code 3 for line depth.

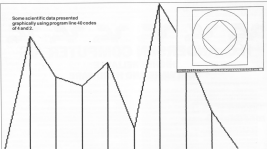
A screen dump can be incorporated into any graphics program. But it doesn't have to

LF (the Left Flight) it should not be necessary to emphasize the vital importance of the punctuation in line 80. But line 100 is not essential: it simply re-initialises the printer, setting character and line dimensions back to normal (as if you had switched the printer off and back on again). CHR\$(12) just prints the paper right out for your added convenience.

256 characters each one 24th of an inch

```
10 REM High resolution screen dump for daisywheel printer.
20 CLS: PRINT "CHECK THAT THE PRINTER IS READY AND THEN PRESS 'ENTER' ..."
30 INPUT A$: SCREEN 1,1
40 PRINT #=2, CHR$(27)CHR$(31)CHR$(6)CHR$(27)CHR$(30)CHR$(5)
50 FOR UD=0 TO 191
60 FOR LR=0 TO 255
70 IF PPOINT(LR,UD)=0 THEN PRINT #=2," "; ELSE PRINT #=2,".";
80 NEXT LR
90 PRINT #=2: NEXT UD
100 PRINT #=2, CHR$(27)CHR$(26)CHR$(13)CHR$(12)
```

Some scientific data presented graphically using program line 40 codes of 4 and 2.



Among the commoner daisywheels at the lower end of the market seem to be those which are marketed as Daisystep 2000, MicroP and Quenda. Sending CHR codes can set the character width to anything from zero to any number of one-hundred and twenty-fifths of an inch, or line depth similarly is units of forty-eighths of an inch. So to get geometrical accuracy —

(a) Having run a program and produced the last word in art or design the masterpiece will be retained in graphics memory even after MEM and loading a separate graphics dump program. But don't switch off in between, nor use PCLS, nor re-assign memory with a POLEAR.

In pretty well its simplest form, a suitable SFD here, UD is the Up/Dwn coordinate,

wide amount is something under eleven inches, fitting nicely onto A4 paper sideways. But 192 lines each one 24th of an inch deep come to just eight inches, requiring that the paper be very carefully inserted to give only a tenth of an inch top margin. Smaller versions can be produced by altering the 8 and 3 codes in line 40 — if the resulting geometrical distortion doesn't matter.

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January 1987.

# Fractal pictures

Brian Hulley describes the notion of fractals and tree growth

UP until recently I was under the impression that you would have to use a mainframe to generate fractal pictures. However I soon realised that it is perfectly possible to generate fractals using the Dragon. For anyone who has escaped the flood of interest in fractals, they are simply structures which are formed when one basic shape (the initiator) can be used to derive several secondary shapes by means of a generator. For example, in figure one, a vertical line splits into two branches which then split again and again to give the image of a tree in figure five. By using the computer, we can simulate this repeated division and take the process much further than four divisions to derive a more realistic picture. In doing this the computer is not only creating a picture, it is also simulating the growth of a real tree. By then introducing a random element to the program, an even more accurate simulation of natural growth can be achieved.

The first program uses the process of repeated division to draw a tree. The formula derived in figure five is used to obtain the end coordinates of two secondary branches given the end coordinates of the primary branch and the angle this makes with the horizontal (to eliminate 90 errors). The length of the primary branch by the branching ratio, and the angle that each secondary branch makes with the primary, is the bisecting angle,  $G$ . (The other branch is derived by substituting  $-G$  into the equations).

Randomness is introduced in the second program, by adding two new variables,  $R$  and  $Z$ .  $Z$  contains the constant branching number and  $R$  contains the random part.

```

U=Z+RND*(1/R)
To modify the first program to get the second version, simply insert:
140 U=Z+RND*(1/R)
:445 INPUT "BRANCHING OFFSET (R) "R
Then change:
80 N=N+49G-0.49833 R=0.2 Z=80
:440 INPUT "BRANCHING NUMBER
880 "Z

```

Also change "VERSOSH 1" to "VERSOSH 2" in line 40 and "UNIFORM" to "UNIFORMRANDOM" in line 80.

When you run this program without entering new values you will get a uniform tree as before. To introduce the randomness, enter 80 for the branching number, and 88 for the random offset. Of course, a little experimentation is required to get the best values for a realistic tree.

There is still quite a lot that could be added to this program. For example, the branch angle could be made random, or a random factor could decide whether two secondary branches or one would be formed each time. Alternatively, a small routine could be added at the beginning of the program to draw several trees, each with its own branching

Figure 1



Figure 2



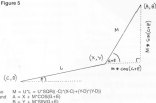
Figure 3



Figure 4



Figure 5



Notice:  $U$  is the branching ratio.

angle, branching number ... and so on.

However, fractals can also be used to good effect in the creation of snowflakes. This time, we begin with an equilateral triangle, then produce an equilateral 'link' on each side, then produce kinks on each side of the first link as in figure six tonight. The program takes the process to the limit of the Dragon's resolution. Unlike the tree program, there is no necessity for a random element to be present, since snowflakes

are perfectly symmetrical. Also, this program is slightly more complicated since more variables have to be dealt with each time, although it behaves in a very similar way. The formula used is derived in figure six. One of the main problems is that the program must know which way up the link. The routine at 300 deals with this by looking at which way round the coordinates have been sent to it, then swapping the variables back the right way round and setting a flag, which is later used to determine

Figure 6



Figure 7



Figure 8



The correct angle to use (see Figures ten and eleven). The other main problem is that the Dragon has no ARCCOS command. The correct formula for the inverse cosine is:

$$180 \cdot \text{atan}(X/\text{hyp})/X^2 + 180$$

You can use this program to generate transverse sections of crystals or crystals by changing the coordinates in line 85, so that a scalene triangle is used. The program can also be modified so that a pentagon is used instead of an equilateral triangle. To do this, simply alter line 70 so that all arrays are dimensioned with 300 instead of 180; replace 3 by 5 in lines 140, 160, 210 (where 3/4, 1/4) occurs); change the coordinates in line 85 setting 8/2 to 4 and 1/3 to 3/5 with the required values, and change 100 to 120 to draw four lines instead of three.

The tree and the snowflake crystals are by no means the only structures which are composed of fractals. The coastline of Britain is perhaps the best known example of a

fractal, and indeed it was in trying to answer the question "How long is the coastline of Britain?" that led Mandelbrot to formulate his theory of fractals in 1975. The Dragon can be used to simulate the development of

all sorts of natural structures, from continents to microscopic plants.

More information on fractals can be obtained from *The Fractal Geometry of Nature* by Mandelbrot, published in 1982.

Figure 9



$$\begin{aligned} [A, B] &= \frac{1}{2} \cdot \text{SQR}((G-A)^2 + (H-B)^2) \\ Z &= \text{ARCCOS}((H-B)/(2 \cdot Z)) \\ N &= \text{INT} Z / 2 \text{ or } \text{INT} Z \text{ depending on whether the link is to be facing upwards or downwards} \\ I &= M \cdot \text{COS}(N) + C \\ J &= M \cdot \text{SIN}(N) + D \\ C &= \frac{1}{2} \cdot (G+2A) \quad D = \frac{1}{2} \cdot (H+2B) \quad E = \frac{1}{2} \cdot (2^2 G + A) \quad F = \frac{1}{2} \cdot (2^2 H + B) \end{aligned}$$

Figure 10



Figure 11



## Program notes

### Tree

10-1000 Initialise variables, input parameters, clear screen etc.  
 110 Initialise level counter.  
 120 Draw the 'trunk' of the tree.  
 130-270 Add branches onto the last primary branch (line stored in X1,Y1,U) and store the coordinates of the secondary branches in A(),B() and the new angle in P.  
 280 If level = 7 then the arrays are full,

so wait until a key is pressed before starting again.

240-250 Transfer arrays A(),Y() into C(),D().  
 270-280 Transfer arrays A(),B() into R(),Y().  
 300-350 Increment level counter then loop back to a further recursive division.  
 350-360 Routine to draw a line of variable thickness depending on the level. It does not draw the line if any of the coordinates are off the screen.  
 380-410 Wait routine.  
 430-480 Routine to get new parameters.

### Snowflake

10-70 Into x dimension arrays.  
 80 Initialise variables.  
 90-130 Draw triangle on screen.  
 130 Initialise level counter.  
 140-190 go through each line in previous level, producing links and storing new variables in A(),B(),C(),D(),E(),F(),G(),J().  
 200 Goto routine and wait.

210-240 Get arrays set up for next time round transferring A() ... into X() ... Y() ...  
 250-280 Increment level counter then loop back.  
 270-300 Paint snowflake then wait for keypress etc.  
 300-Routine to produce white the right way up as in figures ten and eleven.

In both programs V is used as a level counter. The other variables are as shown in the formula diagrams, five and nine.

## TREE

```

10 CLEAR B000
20 GOTO 1000, V=1, D1=0, D2=0, D3=0, D4=0, D5=0,
  D6=0, D7=0
30 SCREEN=0
40 PRINT SCREEN, "TREE: V=0 TO 5"
50 PRINT "PUSH ANY KEY TO START"
60 IF INKEY="" THEN GOTO 50
70 GOTO 1000
80 PRINT "PUSH ANY KEY TO STOP"
90 GOTO 1000
100 V=V+1
110 IF V=5 THEN GOTO 1000
120 GOTO 1000
130 GOTO 1000
140 GOTO 1000
150 GOTO 1000
160 GOTO 1000
170 GOTO 1000
180 GOTO 1000
190 GOTO 1000
200 GOTO 1000
210 GOTO 1000
220 GOTO 1000
230 IF V=5 THEN GOTO 1000
240 FOR J=0 TO 2^V

```

```

250 CLEAR D1=D2=D3=D4=D5=D6=D7=0
260 NEXT J
270 FOR I=0 TO 2^V-1
280 X=I AND 1:Y=I AND 2:Z=I AND 4:W=I AND 8:V=I AND 16
290 NEXT I
300 V=V-1
310 GOTO 1000
320 'CONTINUAL LINE
330 IF V=0 THEN GOTO 1000
340 GOTO 1000
350 GOTO 1000
360 GOTO 1000
370 GOTO 1000
380 GOTO 1000
390 GOTO 1000
400 GOTO 1000
410 GOTO 1000
420 GOTO 1000
430 GOTO 1000
440 GOTO 1000
450 GOTO 1000
460 GOTO 1000
470 GOTO 1000
480 GOTO 1000
490 GOTO 1000

```

## SNOWFLAKE

```

10 CLEAR
20 PRINT "FRactal Snowflake"
30 PRINT "PUSH ANY KEY TO START"
40 IF INKEY="" THEN GOTO 40
50 CLEAR B000
60 DIM X(1000),Y(1000),A(1000),B(1000),C(1000)
70 X(0)=0:Y(0)=0:A(0)=0:B(0)=0:C(0)=0
80 X(1000)=0:Y(1000)=0:A(1000)=0:B(1000)=0:C(1000)=0
90 SCREEN=0
100 L=100:Y(0)=0:Y(1000)=0:Y(200)=0:Y(300)=0:Y(400)=0:Y(500)=0:Y(600)=0:Y(700)=0:Y(800)=0:Y(900)=0:Y(1000)=0
110 L=L*2:Y(0)=0:Y(1000)=0:Y(200)=0:Y(300)=0:Y(400)=0:Y(500)=0:Y(600)=0:Y(700)=0:Y(800)=0:Y(900)=0:Y(1000)=0
120 L=L*2:Y(0)=0:Y(1000)=0:Y(200)=0:Y(300)=0:Y(400)=0:Y(500)=0:Y(600)=0:Y(700)=0:Y(800)=0:Y(900)=0:Y(1000)=0
130 V=0
140 FOR T=0 TO 244-V-1
150 GOTO 1000
160 IF T=244-V-1 THEN GOTO 1000
170 GOTO 1000
180 GOTO 1000
190 GOTO 1000
200 IF V=5 THEN GOTO 1000
210 FOR J=0 TO 244-V-1
220 Y=0
230 X(1000)=0:Y(1000)=0:Y(200)=0:Y(300)=0:Y(400)=0:Y(500)=0:Y(600)=0:Y(700)=0:Y(800)=0:Y(900)=0:Y(1000)=0

```

# DRAGON



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## It takes two to Kung-Fu

Program: Shaolin Master  
Supplier: Quickbeam  
Software  
Price: £9.45

THE SECOND of Quickbeam's games reviewed in this issue is a version of the two-player Kung-Fu games so often found in pubs, amusement arcades, etc. The game can be played by one player against a rather deadly computer opponent or by players to play each other (which gives this game one good point already).

The game is in two sections, there's the dual between you and an opponent, and then there's the rather gimmicky corridor of death in which you subdue a corridor kinking and jumping various large spiky objects.

The game rather like real Kung-Fu needs practice before one can become deadly at it. There are trials and a right time to start without, like driving a car after a while they become natural, even second nature. However, to give you an idea of what you're letting yourself in for, the game has the ability to

jump up, high jump, move right, low punch in kneeling position, back, back counter-pull, move left, forward counter-pull, stand up, drop kick, high kick, medium kick, low kick, forward leg sweep, back leg sweep, turn around, high back kick, and low back kick, and all these operations are performed with ONE joystick.

The graphics are as excellent as those of 6809 Express (and that's pretty good) but the game is about thirty times as fast, and thirty times as interesting.

Now for some not picking the game comes in an attractive cassette box but the instructions are on a separate printed leaflet. Although this seems like a good idea at the time, there should be a reprint of the joystick configurations on the inside of the case along with what each can do, as I managed to lose my sheet three days after receiving the game and thus rendered the game inoperative until I found two controllers!

Also, the collision detection

routine needs some work on it as it is a little easy for you to lose your figure kick, the other guy squashes in the grain only to find that you've actually done so damage to his actual body! And then, to add insult to injury the device computer assistant will knock you flat with a flying axe kick three inches away from you! I exaggerate, of course, but please, and this goes for all programmers, remember that all we have to

judge by is what we can see on the screen!

To sum up then, a really good game. Let's hope *Five Fists* is just as good, because it will surely establish Quickbeam - who now have Wayne Smithson working for them, and he is a good programmer — as one of the market leaders.

Jason Orban



## Turtle graphics

Program: LOGO 3.4  
Supplier: Bernd Knechtel Software, etc.  
Price: £6

THE latest piece of DragonDOS software to arrive from Bernd Knechtel is a utility which interfaces directly with the Dragon/Combit Basic and provides a few useful additions to the already excellent graphics commands.

LOGO 3.4 provides the user with four sets graphics commands which allow turtle-type graphics to be programmed. Upon running a program an invisible 'turtle' is placed at the centre of the screen facing upwards (zero degrees) and this turtle may be manipulated very easily with the four commands mentioned above. For those who have not had the pleasure of using turtle graphics before, this involves 'guiding' a fictional turtle around the graphics screen with the option of moving, or not leaving, a line drawn in its wake. So it is with a turtle. The first two commands in LOGO 3.4 are TRIGHT and TLEFT which allow you to turn the turtle left or right through some specified angle (up to 360 degrees) in the direction you wish to draw.

The position you wish to start from may be defined and re-defined using the TSTART command which sets the initial position of the turtle on the screen. And the line may be drawn (or the turtle moved) using the TMOVE command. The TMOVE command which specifies the distance the turtle is to move (in pixels) has an optional parameter which allows a line to be drawn without moving the turtle, or moving the turtle without drawing a line.

Using the example given earlier in the text, the following program would instruct the turtle to draw a square on the screen.

```
1.0 MODE4:PCLS SCREEN
1.1
— Setup graphics mode
30 TSTART 08,88
— Move to centre of the screen
30 TMOVE 50
— Draw a line 50 pixels long
40 TRIGHT 90
— Turn through 90 degrees
50 TMOVE 50
— Draw a line 50 pixels long
60 TRIGHT 90
— Turn through 90 degrees
70 TMOVE 50
— Draw a line 50 pixels long
80 TRIGHT 90
— Turn through 90 degrees
90 TMOVE 50
— Draw a line 50 pixels long
100 END
```

This is obviously a very tedious way of achieving a quite simple objective and so, because LOGO interfaces directly with Dragon Basic, a loop may be written which obviously allows far greater flexibility.

For someone who uses Dragon Basic a lot to draw graphics, LOGO 3.4 is a very useful addition to the programmer's armoury. A full assembler listing of LOGO is supplied with the program for anyone daft enough to try and modify it and the package carries no anti-copying devices which makes it easy to incorporate into your own programs. Although LOGO only yields four simple commands to Basic it can't think of anything else that could be added. LOGO does give the benefits of turtle graphics without the assumption of having to learn an entirely new environment.

Ray Coates



## Trouble on the 6809 Express

Program: 6809 Express  
Supplier: Quickbeam  
Software  
Price: £9.45

OOOOOOOOOOOO

The runaway game came over the hill and she blew.  
The runaway game came over the hill and she blew.

The runaway game came over the hill.  
And has spent several months on my desktop!  
'Cause it's too, too, too boring for you.



The 6809 comes plod the lines and it blows.  
You play a Mac but that's just the way the game goes.

The programming's all been designed to please

But there's trouble with the stereotypes.  
Unless you, you, you are not a Jew.

The 6809 is a split screen game that goes fast.  
Below is the top view above are the things as they're passed.

The graphics are great and the soundtrack.  
It's just a great shame that the game is not.  
'Cause it's too, too, too bad for the love.

Controlling the game requires just enough skill as sleep.  
And I think that I've had more fun having a chat with a sheep.

And just 'cause you know how to drive on the screen.  
Doesn't mean that you've been got a game that's so serene.  
So I'm sorry Dave, but this one just won't do.

Jason Orban





# Inside the 32

Dave Barnish strikes a light on the Dragon's memory map

THE average user of the Dragon 32 computer probably sits quite happily at his or her computer, turns it on and starts programming in Basic or using applications programs (or games) written by somebody else, without a lot of concern about how the Dragon really works. Anyone who has dabbled in machine code may sometimes wonder at the complexity of a system that can take a microprocessor, which only understands binary numbers, and produce a computer capable of interacting with the outside world via a keyboard and screen in a language which is not too far removed from English. This article is intended to take a little of the mystery out of the subject and may help those of you feeling confident enough to modify the basic operation of the machine by enhancing the Basic or to use Basic facilities in your own machine code programs.

At the heart of the Dragon is a 6809 microprocessor which is the computer's central processing unit (CPU), while the brainwork goes on, in order for the CPU to do anything it must have instructions, and these are stored in Read Only Memory (ROM). The instructions are built into the ROM when it is made and cannot be altered; they are retained even when the computer is switched off. Random Access Memory (RAM) on the other hand provides a temporary store of data which may be changed at will but is lost when the power is off. In order to communicate with the outside world, some facility for input/output (IO) is required. On the Dragon, the IO is provided by two general purpose IO chips (peripheral interface adapters or PIAs) which, with their associated electronics, provide the keyboard, cassette, sound, printer and joystick interfaces. The screen

is a special case of IO and is handled by a special video display generator chip (VDG).

Because the 6809 is an 8 bit processor, all data is handled in groups of eight bits (8 binary digits) called bytes. For this reason RAM, ROM and IO are split into a number of locations, each of which can hold one byte, and in order that the CPU may distinguish one location from another each is given an individual address which is a number in the range 0 to 65535. The address decoding which organises what goes where is contained in a large chip called a synchronous address multiplexer (SAM) which also does a bit of display management, and maintains the contents of RAM amongst other things. A block diagram of the Dragon's hardware is given in Figure 1, which shows the interconnection between each device. The 6809/SAM and VDG combination is a standard chip set produced by Motorola which has also been adopted by the fairly colour computer. This and the common origin of their Basic explains their internal similarities.

Since the addressing is not based on the decimal system but on binary, it seems sensible not to use decimal ourselves when trying to understand what's going on. However, binary is very unwieldy, so generally the hexadecimal (base 16) system of counting is used which makes things much more manageable. Each hexadecimal (hex) digit has a range of 0 to 15 and to get the numbers 10 to 15 into one digit, the characters A-F are used. Hexadecimal numbers are in general preceded by a \$ sign, which is a much more conventional way of indicating hex than the \$H that Dragon Basic uses. Figure 2 gives an example of various numbers expressed in decimal, binary and hexadecimal, note that each hex digit refers directly to a group of four binary digits (four binary digits make up half a byte which is known as a nibble).

Figure 1 — Hardware block diagram

A = Address bus  
D = Data bus

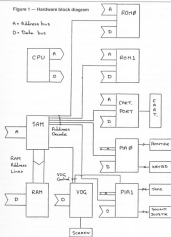


Figure two — Examples of decimal, binary and hexadecimal numbers

Decimal	Binary	Hexadecimal
1	1	1
2	10	2
9	1001	9
10	1010	A
11	1011	B
12	1111	F
16	10000	10
19	10011	13
20	10100	14
31	11111	1F
32	100000	20

A list of which location is assigned to which physical device is known as a memory map, an example of which can be seen in the back page of the Dragon's user manual. This map gives a general idea of where things are, but for a serious investigator how the system works a more detailed map is required. Such a map is provided in Figure 3 and the rest of this article should be read in conjunction with this map.

In order to appreciate how the Dragon works we had best start at the beginning and find out what happens when the computer is first switched on. When power is

first applied to the machine its electronics come on in an underdetermined state. In order to set everything to a known configuration the CPU, MD and SAM chips are provided with a reset input line which is held low (grounded), for a short time after power up by a simple circuit. When the reset line is low the RAMs are cleared and the SAM is set to its initial configuration enabling the address decoding and locking in to the MD's timing. The CPU then looks at addresses \$FFFF and \$FFFF which SAM remaps to ROM locations \$BFFF and \$BFFF where it finds the reset vector which is the address

of the reset routine to which control is passed. This routine initialises all the MD, sets up the Basic system variables to their default values, and clears the screen. Having got that far the fixed locations of the cartridge memory area are checked (\$C000 and \$C001) and if they contain \$44 and \$48 respectively their control is passed to the cartridge software at locations \$C000. If they two bytes are not set as described the reset routine prints the startup message from locations \$D483 onwards and passes control to the main Basic operating systems.

Figure 3 — Dragon memory map — RAM

\$0000	Address to beginning of BASIC text	\$00	Printer code, fixed state
\$0001	Address to beginning of variable space	\$01	Text code, fixed state
\$0002	Address to beginning of error monitor table	\$02	Printer state
\$0003	Address to beginning of variable count	\$03	Printer head position
\$0004	Top of stack (fixed zero count)	\$04-05	Start address
\$0006	Top of string free space	\$06-09	Start of soft and time routine contained in rom reads a char from BASIC text.
\$000B	Header for available to BASIC	\$0A-0F	Text pointer to current arrival byte
\$0010	Pointer to statement to be executed	\$0B-0C	Address of start of MD routine address table
\$0012	Text pointer for BASIC zero start after reset	\$0D	Permanent Colour
\$0013	BASIC line number	\$0E	Background Colour
\$0014	BASIC pointer	\$0F	Active Colour
\$0016	BASIC pointer	\$10	Graphics Mode
\$0018	Current Line Number	\$11-12	Top Address of current graphics screen
\$00	Current Device (Graphics Plotter or Printer)	\$13	Count of lines in a row of graphics
\$01	End of file flag (after read)	\$14-15	Base address of current graphics screen
\$02	Restart flag - 0 or 1 000 when 0000 start of text	\$16-18	Current X position
\$03-05	Restart Vector - 14 \$10000 is vector points to a 1000 then zero start to 000 after cold start	\$19-20	Current Y position
\$06	Text status - defined current device	\$21-22	Current X max 10000
\$07	How much text (header) into PPU	\$23-24	Current Y max 10000
\$08	No. of lines to base	\$25	Row constant slope
\$09-11	Base address of lines by base	\$26	Row constant slope
\$0C	Text error code table (0-checksum error 1-memory error)	\$27-28	Page No - 1/0 Drivers - Extended Basic
\$0D	Text row address (always to base 0000)	\$29-31	Reference vector point to this area
\$0E-0F	Pointer to each location for address subset	\$32-33	\$000 - default 400 00 00
\$10	Point for Plot	\$34-35	\$001 - default 400 00 00
\$11-12	Device to Plot	\$36-37	\$002 - default 400 00 00
\$13	Printer Line Count	\$38-39	\$003 - default 400 00 00
\$14-15	Text Leader Byte Value	\$40-42	\$004 - default 400 00 00 + 00F 0000
\$16-18	Text error setup	\$43-44	services Plot A, 10000
		\$45-46	Plot - default 400 00 00 + 00F 0000
		\$47-48	services information
		\$49-54	Plot 0000 writes in screen list

0104	NAME used in place of BASIC keyword address	0179	
	is or cannot reserved word	0179	
001-100	Address of normal reserved word list	0179	
0101-101	Address of statement reserved words table	017C	
0101	is or function reserved words	017F	
0101-107	Address of function reserved word list	0181	Read as word list
0101-109	Address of function reserved words	0181	
0101-110	0101-110 to 1100 - address of all other labels in 01000	0181	
	except 0101 - address of all data routines	0181	Evaluate an expression
	0101 - address of all data routines	0181	User error flag
0104-200	0104-200	0181	System error flag
0104-247	Normally used for FOR function address.	0181	000
0100	Printer Buffer full after LP line default=OFF Card	0181	000
	if 0 then OR printed as 00.	0181	
0100	Alpha lock flag default=Function Disabled	0181	Read in next statement
0100	Printer out of line sequence.		After 0100 error is cleared
	is, or flag to print an 00. (default)	0181	is can be used to disable break.
0100	default = 000 (offered)	0181	
0100	default = 000 (line break)	0181	Clears BASIC line for starting
0101-100	default = 000 (null)	0181	Clears BASIC line for output
0101	data location bit of 01 00	0181	
		0181	
0101-100	Statement column table	0181	
0101-100	Row/line padding		
0101-100	Two zero columns a number of 3 zero substrings	0181	Five low 11 0-00000 (extra) branching code
	which default to 010. They are called from		
	various BASIC routines.	0000-0100	Cassette buffers etc.
0101			
0101		0000	Top of hardware stack (stack open down)
0101			
0101	Input a character	0000-0100	Text screen (default) 0100
0101	Output a character	0000-0100	0100-0100/0100/0100 : BASIC user mem
0101			
0101			

Figure 3 (cont'd) — Dragon memory map — ROM — 0000-01000

0000	JP 0000 - RESET	0000	JP 0070
0000	JP 0000	0000	JP 0070
0000	JP 0000 - Full initialize routine for 10 0	0000	JP 0070
0000	JP 0000 - 0100-0100 0100		
	0100-0100 00	0000-0100	Normal reserved word table
0000	JP 0000 - write char from 0 to address	0004-0100	Normal reserved table
0000	JP 0000 - write char from 0 to address	0000-0100	Function reserved word table
0000	JP 0000 - generate instruction addresses	0000-0100	Function reserved table
0000	JP 0000 - save tape index on	0000-0100	if letter error 00000000
0000	JP 0000 - save tape index off	0000-0100	' 0000' in 0100
0000	JP 0000 - compare tape for writing	0000-0100	' 0' in 0100
0000	JP 0000 - get tape from 0 out to tape	0000-0100	'000 00000' in 0100
0000	JP 0000 - compare tape for input	0000-0100	'000 00000' in 0100
0000	JP 0000 - input char from tape to 0		
0000	JP 0000 - get char bit from tape into 0100	0000	Direct error message - error no 00 in 0

#1045-1047	MEM	#1036	FEED
#1048-	FM	#1038	FEED
#1054	RESTORE	#1039+	LEAVE
#1055-	END	#1040	LIST
#1058-	STOP	#1041	Reconnect tabulated BMSL to test
#1060	STOP	#1047	Crunch test to tabulated BMSL
#1071	ELONG	#1050-	PLATE
#1085	END	#1055	END
#1088-	ON	#1058	END
#1090	ACTUAL	#1060	END
#1093	DATA	#1065	END
#1096-	ADD and ELONG	#1070	Print 3 byte analyzed number from 2
#1097-	IF		
#1099	ON	#1087	END
		#1093	END
		#1095	END
#1100	LIST	#1098	END
#1108-	LEAVE	#1101	END
#1111	END	#1104	END
#1115-	PRINT	#1107	END
#1118-	END	#1109	END
#1124	INTERNAL conversion routine	#1115	END
	replaces BMSL conversion to machine code	#1120	END
#1130	MEM	#1126	PRINT
#1132	more software on D to BMSL	#1131	END
#1136	END	#1134	PRINT
#1137	END	#1136	PRINT
#1140	LEAVE	#1141	PRINT
#1144	END	#1143	END
#1148	LEAVE	#1145	END
#1150	END	#1147	END
#1154	LEAVE	#1150	END
#1158	PRINT	#1155	END routine - TONER and PLATE serviced here
#1160	END	#1159	PRINT
#1162	END	#1161	END
#1163	END number from BMSL data 2	#1163	PRINT

Figure 3 (cont'd) - Dragon memory map - ROM - BMSL-LEFFF

#1800-1802	internal jump routine		
#1804	#1804 - roll keyboard	#1808	#1808
#1806	#1806	#1810	SCREEN
#1808	#1808 - printer file for test	#1812	POWER
#1810	#1810	#1814	POWER
#1812	#1812	#1816	SET
#1814	#1814 - vehicle joystick	#1818	END
#1816	#1816 - printer file for service	#1820	PRINT
		#1822	POWER
#1824	#1824	#1824	END
#1826	#1826	#1826	SCREEN
#1828	#1828	#1828	RESET routine
#1830	#1830	#1830	PLATE routine - cartridge software
#1832	LEAVE	#1832-1836	Character generator
#1834	POWER		
#1836	POWER		
#1838	POWER		

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 180 BMSL INFORMATION L/R Cont



hardware service routine, thus giving you a permanent block on screen without interfering with BASIC. Figure 4 is a listing of a machine code program which does this.

The locations assigned to ROM, RAM and I/O are fixed by the address decoding of BASII but the user to which RAM and I/O is put is determined by the CPU's instructions stored in ROM. The actual functioning of the RAM has already been discussed in previous editions of Dragon (see July 1983 but see an article with a few errors which were corrected in March 1984) so the detail has been omitted from the map of Figure 3. However, the usage of RAM gives a good insight into the way Basic actually works and it is well worth some investigation.

The area from 800 to 8FF is known as page zero and is used by the system's core variables and system variables. The start and end addresses of any program entered are stored here as well as pointers to the available storage area and many other pieces of information which collectively decide the current state of Basic. Useful locations are \$10 and \$1A, which point to the beginning of Basic text; programs can be managed by manipulating these locations as follows:

1) Turn the Dragon off and on to make sure the pointers are set to their default values.  
2) Load the first program — this will be stored at \$1000 which is pointed to by \$101A as a default.

3) Change the pointer as \$101A to point to the space after the program. The space after the program is the simple variable space pointed to by \$101C, so \$101A should be given this value minus two, to get over the last two bytes of the first program, which are delimiters (see later).

4) Load the second program and renumber it so that the line numbers are higher than those in the first program.

5) Restore the start of program pointer to its original value (\$1000).

The process is accomplished from Basic Plus:

CLD&0 "first prog" — first program is loaded at \$1000.

POKE20,PEEK(\$?) — change pointer to end

POKE20,PEEK(\$?)&2 — of program.

CLD&0 "second prog" — second program is loaded after first.

RENUM n,y — change conflicting line numbers.

POKE 25,0 — return pointer to beginning.

POKE 25,1 — of first program.

Locations 803 and 804 point to the start of a statement to read and can be used to provide a kind of random access data statement. Locations \$70 and \$75 hold the word in start vector; when the reset button on the side of the Dragon is pushed location \$71 is checked and if it contains \$85 and location \$70/\$and\$73 points to a NOP; NoOperation — code \$10, then control passes to that NOP which normally results in the screen being cleared and the message 'OK' being printed. This vector can be changed to point to your own reset routine, a technique used in Miroslav's The King amongst others.

The system also uses the area \$80 to \$1FF which contains Basic's statement dispatch table (more about this later), the

based table, the joystick readings and a very useful set of "patches" into Basic itself. These patches are three byte subroutines which are called when Basic is executing certain commands. By default these subroutines contain \$08 which is the code for RTS (Return from Subroutine), so they don't do anything at all. However, because there are three bytes to each patch, there is room to insert a jump instruction so that when the subroutine is called, it jumps to your own routine which can do something other than returning. An example of this is intercepting the patch into the LIST command in RAM with a delaying routine to slow down listings (see Dragon User October 1983 page 15). It is also possible to disable the break key by intercepting the 'read in' statement patch in RAM and returning with the return address incremented by four, which bypasses the break key check.

The final area of RAM reserved for the system is from \$200 to \$2FF which is principally used for the cassette buffer.

The reserved locations hold the information which will be displayed on the screen. The area from \$400 to \$2FF is the default location for the text screen (this can be changed as in the Dragon Toolkit from Phoenix, which gives 25 different text screens). The text screen address is put into RAM which tells the VDG which area of memory it should get its data from and what mode it is in. In text mode the data stored in each byte of the screen memory is used to access a character generator which is built into the VDG and which provides the dot patterns which make up each character. The screen code for each character is given in the back of the Dragon manual.

After the text screen, the graphics pages start (\$800 onwards). The amount of memory used for graphics depends on how many pages have been PAGEP'd, the default being four pages, which uses the area from \$800 to \$10FF. If eight pages are used, the graphics memory extends to \$20FF leaving 76K of RAM for your Basic programs and variables, which are stored immediately after the graphics pages up to location \$7FFF. If you change the number of graphics pages while you have a program in memory, the system automatically moves the program up or down in memory to follow in PMODES, each byte in the screen data represents four dots, the two bits for each dot allow the four possible colours to be encoded. PMODE4 represents each dot on the screen by one bit. As a bit can be either 1 or 0 there are only two colours available in this mode.

After the user RAM area the address space is given over to ROM which extends from location \$8000 to \$20FFF. This ROM contains the instructions that enable the Dragon to understand Basic; what follows is a rough outline of how this is accomplished.

When a program is typed in, it is stored in the user RAM area according to the start and end of text pointers in zero page. The program is stored as shown:

#### Storage format of Basic text

1 byte containing 0 to mark the end of the first program location.  
2 bytes for the line number (in hex).

2 bytes for the line number (in hex).  
Up to 255 bytes for the line text.  
1 byte containing 0 to mark the end of the line.

line text.

2 bytes for the line number (in hex).

Up to 255 bytes for the line text.

1 byte containing 0 to mark the end of the line.

And:

2 bytes containing zero to mark the end of the program.

Each character which the machine can display is represented in memory by an eight bit number — its own ASCII code (ASCII stands for the American Standard Code for Information Interchange). The ASCII code is a standard system adopted by most machines (the Sinclair computers being one notable exception) and is listed in Figure 5. The reserved words, listed as P&HT and P&AL, are not stored in their ASCII format but are converted to a one byte token, thus cutting down on storage used by a great deal. Functions, such as LEN or AGO, are represented by a token preceded by \$FF. Figure 6 contains a list of reserved words and their respective tokens.

When the LIST command is used the tokens encountered in each line are looked up in a table and the full word printed out. Converting reserved words to tokens is often known as "tokenizing" and detokenizing is the reverse. The routines which do this are at \$1F04 and \$1F0C. As an example of using Basic's routines from your own programs, Figure 6 contains a program which produces nearly fifty mailings to a printer using the do-over routine from Basic. Looking through the reserved word table turns up a word which isn't explained in the manual. The word is DLOAD and if you enter it into your Dragon, you will get an I/O error. It looks like DLOAD is a relic from early code Basic, which has an P2000 (serial I/O) port input command — DLOAD.

When a Basic program is RUN, tokens are used to point into the statement dispatch table. This table contains the address of the routine which executes the reserved word designated by the token; looking through the memory map shows where some of these routines are to be found.

The area of RAM between the end of the Basic program and address \$1FFF is available for the storage of Basic variables. There are four types of variables in Dragon Basic: simple numbers, simple string, numeric arrays and string arrays and each is stored in a particular format as shown in Figure 7. Simple variables are stored immediately after the Basic program and any variables are created after these. If a simple variable is encountered, all the arrays which have been defined are moved to main memory, this process being known as dynamic memory allocation. String variables of both types are stored as pointers to the actual location where the string is stored. If the string is defined in the program text, the pointer will point there; if not, the area at the top end of memory is reserved for strings and the pointer will point to that area. Pointers in zero page are used to keep track of the start and end addresses of the simple variables, array variables and string storage space. See locations \$10 to \$28 on the memory map.



# Memory Browser

This short program allows one to browse through the memory of the Dragon. After entering the start address, which can be in either in hex or decimal, the contents of 99 bytes from that address are displayed, together with the equivalent ASCII character. Any non-ASCII or control code characters are displayed as full stops. The user can then browse backwards or forwards through the memory by using the up

and down arrows, or restart from a new address by touching the spacebar. Interesting sample browsers start at hex 8000 (Basic program area, unless you have PCLEAR), and hex 8003 (the BASIC keywords).

The superiority of Dragon Microsoft BASIC was simply demonstrated when I tried to adapt this program for the Commodore 64: no PRINT USING, no HEX\$, no PRINT% etc made it half as long again!

In retrospect, it's a pity that Dragon Data didn't make better play of the commonality of Dragon Basic with that supplied to IBM for the PC and XT, both highly respected machines.

Hugh Pattfield  
Room 218  
Bilston House  
Widley Grove  
London NW1 6BL

```
100 A$=CHR$(1200)+$(STR$(8192,81):REM Memory Display by H Pattfield
110 B$=A$+"addr "+A$+"00"+A$+"01"+A$+"02"+A$+"03"+A$+"04"+A$+"05"+A$
+A$+"012345"+A$+REM TYPE addr IN REVERSE VIDEO
120 C$=A$+"%  %"+A$+"%"+A$+"%"+A$+"%"+A$+"%"+A$+"%"+A$+"%"+A$
+A$+"%  %"+A$
130 D$=A$+"hex "+STR$(8192,81)+"ascii":REM TYPE hex AND ascii IN RE
VERSE VIDEO
140 CLS:INPUT "START ADDRESS->";A
150 DLSO:PRINT B$;D$;C$;
160 PRINT#92," USE UP & DOWN ARROWS, ";
170 PRINT#94,"OR SPACEBAR TO RESTART";
180 PRINT#96,"";
190 FOR ROW=0 TO 9
200   B$=HEX$(A+(ROW*6))
210   IF LEN(B$)<4 THEN B$="0"+B$:GOTO 210
220   P$="....."
230   FOR COL=0 TO 5
240     F(COL)=PEEK(A+(ROW*6)+COL)
250     IF (F(COL)>127 OR F(COL)<127) THEN 270
260     H$(A+(ROW*6)+COL,1)=CHR$(F(COL))
270     G$(COL)=HEX$(F(COL))
280     IF LEN(G$(COL))=1 THEN G$(COL)="0"+G$(COL)
290   NEXT COL
300   PRINT #92,USING C$(G$,G$(0),G$(1),G$(2),G$(3),G$(4),G$(5),P$);
310 NEXT ROW
320 P$=INKEY:IF P$="" THEN 320
330 IF ASC(P$)=94 THEN A=A+65:GOTO 100
340 IF ASC(P$)=10 THEN A=A+65:GOTO 100
350 IF ASC(P$)=32 THEN 140
360 CLS:STOP
```

# Intelligent Pattern Generator

This has been written in response to all those letters asking for short programs. It will fill the screen with a random pattern, and is best viewed on a colour TV or monitor.

Line 1 and 2 set the random co-ordinates; lines 3 and 4 work out where to put the patterns; line 5 and 6 draw the patterns to the screen; lines 7 and 8 move through the various screens.

A. Bailey (Chaffers)  
52 Parsons St  
Chislehurst  
South East, UK

```
1: P=0:Q=1:SCREEN=0,0:POL%=(7+RND)*128:R1=1
2: A=RND*50+H$(RND)(48+1):B=RND*48+1:B
3: H$=55-(120-100*INT(Q/81)+Q-8)A:(Q)=(Q-82)/2
4: Q=51-(120-100*INT(Q/81)+Q-8)H:(Q)=(Q-82)/2
5: P=0:Q=80:DO 255-Q:2 STEP A:IF Q=255:DO 100-Q:2 STEP B
6: CIRCLE(1,1),0,CTIME*5,1:IF P=0 TO 4
7: FOR J=0 TO 1:P=0: H=SCREEN-1,1:FOR I=0 TO 99
8: NEXT I, J, H:GOTO 255,3:GOTO 1
```



# Expert's Arcade Arena

Write to "The Expert" at Dragon User  
13-13 Little Newport St, London WC2H 7PP,  
with all your arcade tips and hints.

AND to the new-year dawns, bringing with it new hope (unless you own a Dragon, in which case you've probably completely given up hope), new life, new resolutions, both going where no man has, and every 1000 appear to have lost track here a bit.

Anyway, the new-year heralds something else, the new year brings another TWELVE MONTHS of the award winning EXPERT'S ARCADE ARENA. Yes, we're won again, last night at the prestigious APOCALYPTIC Awards ("Awards For Columns Called Expert's Arcade Arena") which took place in my bedroom, this column took every award available. Yes, you are reading the "Best Identity Column in Dragon User Called Expert's Arcade Arena", the "Most Witty Column Called Expert's Arcade Arena", and last but by no means least the "Most Amusing And Clever Column With The Most Awards Ever In A Magazine Called Dragon User".

So, a new year, but at the same-old place. As I'm writing this column in November and it's not really the new year yet, I haven't received your Christmas gifts yet, but a big thank you in advance for them and the winner of the "Healthily Rather Glibly Presents" competition will be announced soon!

Now then, if you remember a few months back I published a complete list of the messages at the end of each screen on Time Bandit and asked you to send me a complete list. Now, I wasn't really that convinced that anyone would be stupid enough to copy out a list and post it in the postable box to me. I copy out nearly everything you write and post it out to the entire readership... (I) but I thought it was worth a try for a good laugh and YES! Someone actually bothered to do a competition with no question SO, I am proudly announce that Philip Saffer receives the award for "Possibly the most stupid person in the world who owns a Dragon and reads Expert's Arcade Arena and has nothing better to do than copy out lines of text from a column called Expert's Arcade Arena in a magazine called Dragon User" (I) this sounds very familiar... (I).

Philip has also written some jokes to help those among you who aren't smart enough to play games by yourselves...

**DRAGON HUNT:** "Load the game with the following command: CLORDM 000000 (POKE 2084,ST EXEC 50:50 then when the game has loaded type POKE 1508, 50" (EXEC 5000 ... unfortunately all of the rest of Philip's jokes were covered by me in my last column, so laugh-tilly these Philip's Happy Christmas!

**GRIMM:** Now then, on the subject of last month's issue, if you'd like it out and written on page 4 in the bottom left hand corner you'll see an apology, nonetheless, the last issue reads "Dragon User and Mr. Barclay was, let me apologise to all concerned for the misunderstanding." You notice (DCE089)?



sly "Dragon User and Mr. Barclay and The Expert would like to apologise to all concerned for the misunderstanding." Well, in case you were wondering, I'll tell you: it's because I'M NOT SORRY AT ALL! In fact, I find a RATHER FUNNY! However, I would like to apologise instead of my editor (and I say "my" because I do in fact own the fact that a map of the game Fantasy Flight was called Fantasy Flight, the Map (Please refer above for explanation, and to please Don't ... it). I can assure my loyal readership that Mr. Armstrong has received 40 letters as well as being read... sorry, get off the back again there.

Some of you may be wondering "Where is the map this month? Oh great one?" Well, the truth is, there ISN'T ONE, so you can stop looking for it. Instead, next month's Arcade Arena will be a MAP SPECIAL with maps of Brock's Kingdom, stages two and three of Maple Snatch (with four and five to follow in March), Sargolwood and a rather incomprehensible map of Universe One to boot (please, I mean you in advance that this one is going to be difficult to read, but I've decided to publish it because it's so damn useful!

Now then, to Joe Simcal from Malta who really sent probably the best written letter I've ever seen... (which confuses me, I must get into the new competitors) and the asks are FIVE BIT and SAUCE or Tote/Colpo-and always out of touch. The answer is simply because those options are not available until later Universes.

Now then, to the competition... we are still running the following competitions most of which are free to enter and have temporarily non-existent prizes:

What is the best music to play to? (Latest nomination is Keith Jarrett, by me!)

What are the codes at the end of each screen on Time Bandit? (well, it's got to be worth a try, hasn't it?)

Who can send the silliest Christmas present to the Expert?

Who is the Expert, and who does he or she have such strange musical tastes?

AND NOW... THE NEW COMPETITION...

Who can send the best written letter to the Expert? (I mean it handwriting, not use of English)

Right, now to move on to the letter from M. "No, I'm Not A Software Pirate: Really 'Your Honour'" Vins, who asks for more maps (your price is answered) and provides more jokes (them, strange combination somewhere there) so that those of you who don't want to play in black and white can move up to glorious full colour. The addresses are:

AGLMAUUT 471: POKE 10309,204  
1148308PH: POKE 7545,204 (or 222)  
VORTEX FACTOR: POKE 7963, 204  
SHEMANSKANS: POKE 7263, 204  
ZAXXON (from SBOA): POKE  
26230, 204 (or 222)

To use these jokes you need Real D Dragon's leader programs which have been the cause of more phone calls and letters than any other, and for the first time (and only time until January 1988) have also in the famous programs A, B and C:

#### PROGRAM A:

10 A=008: POKE A,142: POKE A+1,A:  
POKE A+2,B: POKE A+3, 100: POKE  
A+4, 183: POKE A+5, 94: SGRP:  
EXEC A

#### PROGRAM B:

10 A=00000: POKE A,189... POKE A+1,  
1, 360: POKE A+2, 148: POKE A+3,  
134: POKE A+4, 57: POKE A+5, 183:  
POKE A+6, 1: POKE A+7, 182: POKE  
A+8, 57: EXEC A

#### PROGRAM C:

10 PCLAMP: CLEAR 10: FOR I=0000  
TO 9999: READ M: POKE I,M: NEXT  
EXEC 1800:0:EXEC PEEK  
1840:208 + PEEK (1847)  
30 DMR 134, 178, 183, 1, 142, 48, 142,  
38, 99, 1, 143, 143, 37, 141, 34, 134, 3,  
171, 0, 142, 84, 0, 141, 3, 13, 0, 36, 247,  
180, 84, 12, 158, 0, 128, 183, 91, 188, 0,  
141, 7, 141, 2, 52, 144, 182, 8, 0, 118,  
120, 120, 185, 0.

Right, that's it for this month, keep the letters coming, see you soon, etc...etc...etc...

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## Functions

I HAVE had problems connecting ATN functions to ACS and ACS (Arc Coarse and Arc Fine). These in the manual appear to be incorrect, please could you give the correct versions.

J. F. Greenwood  
21 Kyleside Road  
Milton Keynes  
MK14 6JG

YOU can use the following function definitions to return the arc sine and arc cosine of  $x$  respectively:  
`DEF FN:AS(x)=ATN(X/SQR(1-X*X))+PI/2`  
`DEF FN:AC(x)=ATN(X/SQR(1-X*X))+PI/2`

## Restore

I AM present writing a game for my Dragon 32. However, I have come across a problem. Is it possible to extract separate pieces of information from a DATA statement at random? If there was a RESTORE statement it would help tremendously.

David May  
27 Newton Road  
Widmore Street

ALTHOUGH Dragon Basic does include the RESTORE command there is no facility to restore particular individual lines. I gave a short routine to do this in a recent SW. Alternatively read all your data into an array at the start of the game, and access it directly in the array. This will generally be faster than using READ/DATA. A hint if you want repeatedly use READ/DATA: put all the DATA statements at the start of the program.

## Not ready

I AM writing a wordprocessor program for my Dragon 64 with Dragon-Soft, but I have run into a problem. How does the 'Ready' and 'Write Protect' lines of the drive to see if there is a disc present in the drive.

The Dragon-Soft routines just look if the drive is present, or how can I prevent this?

Stu Edwards  
Salford  
Wid. Wilmslow

UNFORTUNATELY, DragonSoft does not support the 'ready' line from the disc drive, and so this cannot be used to check if the drive is ready. However, it is possible to detect if a disc is in the drive and ready by inspecting the index strobe signal.



Initially the DMS routine at 49900 should be called, this returns the drive status in the command register at 5F448. If bit 0 is set then the disc is write protected. If bit 2 is set then the drive is not on line and is hence not ready. Bit 1 is the index signal, this goes high when the index hole passes under the led in the drive. Your machine code routine should look at this in a loop (about 6000 times) and await it changes — it does then a disc is in the drive and the hole is closed. This should be done with interrupts disabled.

## Link up

I OWE a Dragon 64 and two printers, one with serial interface. I have been trying for sometime to link up the serial printer to the Dragon's RS232 port but have been unsuccessful.

I have tried connecting the following lines: GND to GND (GND to RX), and DSRUS to RTS. The problem is that the Dragon just freezes up whenever I send a character to the printer. Examining the value at 44F7C seems to indicate that the printer is permanently busy?

Ken Norman  
Salford  
Wid. Wilmslow

THIS IS quite a common problem on which I regularly get letters. The problem is that the output status from the control on many printers goes 'high' (+12V) when the printer is busy and 'low' when ready. The Dragon's 'CTS' output is the opposite to this, i.e. high when ready, low when busy.

Unfortunately there is no simple solution to this. You could build a small interface consisting of an hex inverter chip to invert the status

signal. Alternatively you can try increasing the out-of-line delay value at 5D57/5D58 and using 'CTS' to +12V permanently.

## Printer

THE PROBLEM is that I have decided to get a printer for my Dragon 32. However, as you can understand, the problem of which one to choose is not overly difficult.

One machine has certain advantages above all others, this being the CMP-2000 from Amstrad. It is within the price range I'm looking at and has a near letter quality print which I need.

With this in mind my question is quite simple. Will my computer be able to use Hercules, or another two machines incompatible.

George Cooke  
34 Devenor Lane  
Sarnborough  
Derbyshire

THE AMSTRAD CMP-2000 has a standard 8-bit Centronics parallel interface and will work quite happily with a Dragon computer. In fact, because of the Dragon's 8-bit interface, it is possible to directly access the selected characters available on the printer, which can be done from an Amstrad drive (which has 3-bit interfaces).

You will need a suitable printer lead, any Dragon lead should work, but those supplied with the printer will only fit Amstrads.

## Pins

AT SCHOOLS I am about to do a Computer Studies Project. I would like to do my project on my Dragon 32 as it

is much better than the school computers, but I do not have a printer. My teacher could put together a makeshift printer lead to use with a dot-matrix printer, but he needs to know the separate pin connections for the Dragon's printer port.

Could you give me this information, or tell me where I can obtain it from?

R. (Amstrad)  
1 Elmst Road  
Barnsley

THE pin connections for the printer port can be found at the back of most Dragon manuals, or in the separate 'additional information' booklet. However, this question does come up quite regularly, so I'll repeat it here.

Odd numbered pins on top line, pins 1 on the right (viewed and on), even pins on bottom, pin 2 on the right again.

- Pin 1 Print Stroke Pin 2 +5 volts  
3 Data bit 0-1 +5 volts  
4 Data bit 1-0 Ground  
7 Data bit 2-0 Ground  
8 Data bit 3-0 Ground  
11 Data bit 4-10 Ground  
12 Data bit 5-10 Ground  
15 Data bit 6-10 Ground  
17 Data bit 7-10 Ground  
19 ACK (in \* mode) 20 0V

## Database

I AM writing a database program in Basic and want a Dragon with hard disc drive. I want to 'Print' and 'Write' to the drive but being used by the menu program (which will RUN 'DATABASE' etc.).

However I find that the command 'DRIVE 2' when included in a program causes an I/O ERROR. Is there a way of changing the drive without changing the program?

Arthur (Amstrad)  
11 Colney Road  
Dorset

THE DRIVE command shouldn't cause you any problems, when used as described above. However, it will not accept a variable as a parameter, e.g. DRIVE D. The drive may be included as part of the PROGRAM/PARTS file name, so a variable could be used thus:

PARTS  
C:\DRIVE+D+\*.PRG\NAME.DAT  
variable D!

Alternatively, you can set the default disc drive to be used with the following direct print to DOS BASIC:

PRINT CBS:0 (where 0 is 1-4)

# Winners and Losers

Every month, Gordon Lee will look at some prize programming points from a previous month's competition.

OK, you lucky lot! Here is your opportunity to share in some feedback from Dragon User's regular competition pages. For an experimental period, the Powers That Be (We call them the Powers, that Do amount to us — G.) have asked me to sift through the entries to the competition answers and highlight some of the innovations in programming and problem solving that competitors use. These should provide a useful reference for use in programming generally, as well as for writing future competitions (I can see that I shall have to be even more devious...), in addition, mention of some of the commonly occurring mistakes could be of help in avoiding these pitfalls, especially for beginners who may be disappointed if they've got to the competition, and maybe win some prizes.

This month, we'll look back at the August '86 competition in greater detail, and, as with most of these problems, there are a few main stages in their solution:

**1 Read the question carefully.** How many times have you hated that bit of advice? For the August problem you had to substitute digits for the letters in DRAGON USER, such that the result was a two-digit number; the value of which spelled a common English word when the digits were replaced by letters from the original sum.

A surprisingly large number of competitors were of the impression that you were not permitted to use a zero as one of the digits. There was nothing in the question to suggest this, although in the event, this would not have affected the result which, purely by chance, did not contain a zero. Had it done so, many of the programs submitted would not have come up with the answer. The question of a leading zero is a different matter. Conventionally, in puzzles of this type, it is assumed that a leading zero is not permitted, unless specifically mentioned in the question. Thus, in this particular question, neither the 'D' nor the 'U' can be replaced by a zero, since it would seem reasonable to assume that, for example, DRAGON was a six-digit number and not a five-digit number with a zero in front.

A number of entrants allowed values with a leading zero which, apart from increasing the number of tests to be carried out, could have produced spurious results.

**2 Method of approach.** On the interpretation of the problem into a program which the computer can handle. Just as there is more than one way to crack a nut so there may well be alternative ways, often as good, maybe better, to solve a given problem. Nearly all competitors started, probably wisely, to take as a starting point the possible values of USER and the two-digit constant, and then work backwards to find and test the corresponding value for DRAGON. Most entrants using this approach generated the value for USER in a single FOR/NEXT loop, testing each value for duplication of digits, but some used two FOR/NEXT loops to generate and test each digit individually before combining them into the final four-digit number. Which of the two methods will be most time-efficient is best determined by experiment. The long running time of the programs was a generally expressed complaint by many readers, so any opportunity to reduce this should be seized. However, it is probably more efficient to exclude whole ranges of impossible values for testing rather than to test every set of values for comparatively minor features. The listing on this page is a "composite" compiled from a number of listings submitted, but which follows the general ideas of the majority of the programs examined. It runs for several hours, but the winning answer appears after about three (see entrant from earlier competition set in Dragon User admitted to a running period of over a week! Clearly it's a case of procrastination and, being of a lazy nature myself, I see no reason why a computer should not do most of the work — that's what they are there for, isn't it?

Most entrants took the minimum and maximum values of USER to be 1000 and 9999 respectively. In fact, USER must be greater than 2910 as any smaller value, multiplied by an two-digit number will give a value for DRAGON either a five-digit

number or, at best, a six-digit number beginning with a 1. Clearly, if the 1 already stands for the 'U' then it cannot also represent the 'D'. The range to be included can be further reduced in many cases. If 'F' is the two-digit result of DRAGON/USER, then any value of 'F', the range of USER will lie between INT(1000/549) and INT(9999/549). Other points which can be incorporated into the program are that 'F' cannot be a multiple of ten or its cube will end in three zeros, and hence the resulting word in three zeros, and hence the result word in three zeros, otherwise 'F' would also have to equal zero if the quotient is to be a whole number. From this analysis of the problem we should now be in a position to:

**3 Write the program.** The listing given here will print out all sets of values in which the cube will end in all its digits present in the generating divisor, the letter equivalents being printed alongside. A few (very few) readers also tried to quicken things along by using the notorious Dragon speed prize, DRIFTS. The effectiveness of the individual programming submitted was reflected in the number of possible "words" that were printed out for examination. Where included, these varied from a list of under a dozen words to several with over one hundred. Also the length of the programs ranged from under 10 to over 80 program lines. Once these lists have been printed out, the final (and comparatively minor) stage is to:

**4 Check the results.** In the case of the competition in question this usually simply to find a common English word from amongst these letters and print out. B. A. Newman of Banbury reports that the letter set CPVWBN occurs twice (has this word any special or mystical significance, EAT?), while C. Hinchinson of Middleborough also lists a number of alternative solutions. These include such words as samas, saasoo, saades and remn, which he describes as "words used in comics to give sound effects in heads being crushed, people being tortured in mercilessly broken, and aircraft being shot down". Strange reading material you have there! Phil Sapiro of Liverpool was surprised to find that there was only one acceptable word formed from the cubes tested. In setting the question, I had first tested the squares without finding a single word. As this type of letter substitution is almost the equivalent of a pseudo-random selection of letters from the words DRAGON USER the chance of an English word occurring at all must be fairly low. Perhaps interested readers would like to generate some random sequences and find the incidence of acceptable words.

Finally, Martin Mingo of Banbury deserves mention for the month's worst double pun used in the tie-breaker sentence:

"You're never alone in the Universe... Because Mars is always got Orion just? Go on! Say it quickly! Now I know what made Banbury cross!"

```

100 REM *****
101 REM P=100 TO 999
102 FOR P=100 TO 999
103   IF P MOD 10=0 THEN NEXT P
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I'VE HAD a letter this month from those two gentlemen from Verona, Marco and Roberto, offering help on El Diablero and others. Where do you do the infamous trail? "The set of cactus blossoms is under the golden statue in the cave, but you'll probably have something else to do before..." And anyone who wants help on Monsters and Magic, Pardon! Addictive Mission of Ominous Danger Island, Don't Panic, Crystal Chamber of Gloom, Franklin's Tomb or El Diablero is invited to write to Marco Pareda, via San Roque 9, 37126 Verona, Italy, or Roberto Galiani, via Pavetto 9, 37100 Verona, Italy. Maybe they can also give you some tips on when to spend your summer holiday this year.

## Frequent updates

Someone who sounds like he needs a holiday is Mr D'King of Birmingham, who signs himself "Annoyed letter". He's annoyed because his children have just started playing adventures and he's expected to know all the answers. Now that he's got copies of my clue sheets he's probably a bit better informed, and I think it's about time I informed everyone again as to what's available, as I frequently get letters from people asking for regular updates on this, and I've also just presented a solution sheet to Robin Foster, thanks to Simon Hargrave, who's becoming such a regular in this column that it's worth thinking about giving him one.

Anyway, in addition to Mike Foster, for the price of a stamped addressed envelope you can have copies of any or all of the following help sheets/solutions: Black Demons, Cocklewood Incident, El Diablero, Filly Business, Franklin's Tomb, Juxtaposition, Madness and the Moorland and The Tower. In addition, I've a copy of the notes that were on the original cassette tapes for El Diablero, and for those who don't want to get straight into full solutions there's a sheet with a list of the various verbs recognized by El Diablero and The Tower.

Chris Morris of Bath contacts with a few of those "think, but ask of S&E" means I'll deal with his questions here, as per usual. In Blackmoor get past the fireweed you need TILLYMIA EHT and you find this on top of WIKIMIC EHT, while to get over the lake you STAMP HVSUWHT OG and then ELU BUW SNOFC. For your problem on Verter Factor that won't budge, the answer is that it won't budge. To light the lamp in Cobble Station, the only problem is that the matches

are on one side of the road and the lamp is the other, so SHECTAM WOHHT and MOM MWG, then it's a straightforward PMAL THUG, and PMAL THUGING. Outside the castle you need to EPCOR WOHHT. For Aqueduct 471 you'll need to write to some clever clogs who's solved it, such as Keith Marshall of 5 Madstone Road, Loweroft, Suffolk NR22 2AY or Stephen McIlhenny of 140 Kimberley Road, Plympton, Cardiff CF22 5AF, South Glamorgan.

Stephen's just written to me to say that he's solved Aqueduct 471, and as well as offering help he would therefore like a script for an adventure he doesn't have, such as Verter Factor, Ginnaroo Moor or other graphics adventures apart from Backdoor, Juxtaposition, Syzygy Ring of Darkness or Don't Get Lost. He also needs help on destroying Death Vader. Any offers?

Also in keep mood is Ann Cooper, Site House, Ingolcincta Holiday Park, Sea Lane, Ingolcincta, Lincs PE20 3PG. I don't think it'd normally encourage people to go ransacking swapping software instead of buying it, but as Dragons and adventures are getting harder to come by all the time, particularly the older titles, I think a bit of trading won't go amiss, as long as it's legitimate swapping of originals and not copies. With adventures it often is a case of not wanting to play it again once you've cracked it. If you want S&E to Ann she'll let what she's got, which she includes several quite old titles plus a few lesser-known American ones. She also offers help on Sea Quest and Shenango, which gives you some idea of two she might be ready to part with.

Robert Margrave is ready to part with copies of his adventures, Fernando Pico, having decided to market himself at a price of £1, or £2 if you provide a blank tape and S&E. At either price it's a bargain, and even one especially well I've said in earlier columns which is that Robin's adventure is one of the best I've ever seen sent in by a reader, and it suddenly has been published in days when the Dragon was a healthier beast. Pico's address is 24 Canon Young Road, Whitmas, Leamington Spa CV31 3GU.

Phil Callaghan of Stafford sends in some hints on Backdoor. Can't cross bridge? Trick SCAPS EMBER. Can't find Xanadu? MOTTLED DER EHT HTW ROOBS EHT HVSUWHT. Can't get out of chain after getting out of grass? EERT OF EPCOR EHT.

No clues from Carl Twest, just the infor-

mation that he's finished and is prepared to help other readers on. The Cocklewood Incident, Verter Factor and Aqueduct 471, "before is a brilliant adventure," Carl reckons, "I would recommend it to anyone, but I must agree with you about Aqueduct 471 and the irritating 'accade' screens. Nice graphics, but little else." Carl's address for help is 11 Hayden Road, Rushmore, Northants NN10 2HX.

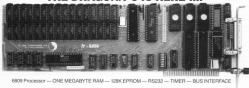
Simon Scottcock signs himself "A reader without shame," and the reason for this is that he gives various ways of cheating in Richard Shephard's game of Transylvania Now! Knowing how many of you readers out there are also without shame, and believing that all is fair in love and vampire hunting, here is what Simon says. If you're stuck on a particular level then BREAK into the program and type LV=7 (ENTER) COME (ENTER). Instead of the 7 type the number of the level you want to resume playing on. The same method works if you want to change the number of bats that you've killed, in which case type BA=1 and CONTINUE, while you can increase your number of bullets by altering the BL variable. To get a longer look at the map press SWHT + G at the same time to cause and then any key to continue, and what do you need to kill Count Kresper? The answer's the name of a daily paper, and it isn't the Transylvania Times.

## Lost in space

I'd like to thank Bob Williams for sending me four photocopied maps of Juxtaposition for passing on to other readers, and there are now four readers somewhere who are grateful to Bob for his kindness. Others will be grateful if they're stuck on the game, Backdoor, Franklin's Tomb, Mansion Adventure or Black Demons next session, as Bob's offering help on those, as well as adventures he's partially completed, like Lost in Space, Filly Business, Pettigrew's Diary, Cocklewood Incident and Syzygy. As for one reader's comment that the Adventure Trail heading should be removed to make the column bigger, Bob says "Hands off! The Adventure Trail heading is the first thing I look for when I open Dragon User." This man of facts lives at 18 Pound Street, Warrminster, Wills BA12 8NL.

Another kind creature is H.J. Newenham, 3 Long Drive, Amberhill, Boston, Lincs PE20 3PG. This reader's sent in the

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security code for the Phoenix Software game, The Emperor Must Die, which had what I always thought was a rather silly idea of making you complete an arcade game before you get the pass-code to the adventure in the two-game pack. If the arcade games too easy it's a waste of time, and if it's too hard then adventure fans will never get through it. Anyone in that position, please note that the code is printed forwards (in this issue): TCHK. The same reader offers help on *Arctus Factor*, and would like to hear from anyone who's ever come across any adventures in Danish.

Andrew Wells of Wells admits that most adventures are double-Dutch to him, and he reasons if there are actual Dutchmen coded for the most failed adventures, he'd have to be a mite. He's presently stuck in six of them (that's nothing, Andrew, believe me!), and I've tried to do-aside him in my reply, though he can offer help on the three adventures he's actually solved, Ring of Centaurs, Mansion Adventure and Daxico Island. Andrew's partly made progress on *Spygy* by cheating — does this column have no honest readers at all? I've discovered that if you pause the cassette two or three times while loading in a saved game, you can sometimes find yourself in a much better position than you were previously, though this doesn't always work. Andrew's address is a 30-Corinth Way, Wells, Somerset BA5 2JA.

Keith Emerson wants to see his name mentioned in *Dragon User*, so obviously the rest of his life is now going to be something of an anti-climax after his moment of glory.

It seems to have an unhealthy interest in obscure adventures (not to mention obscure football teams like Stockport County) and wants to hear from anyone who can help him on *River of Fire* and *To Boldly Go*, and also wonders where he can get hold of copies of *Twisted* from ASP, *Conquering Everest* and *The Valley*. In addition, he can offer help on *Superny*, *Movie Producer*, *Franklin's Tomb*, *Island Adventure*, *Dragon Mountain*, *Rosario Adventure*, *Spygy*, *Castle Adventure* and a typed-in listing called *Adventure* from some little-known rag called *Your Computer*. The *Emerson* article is at 31 Blaverton Avenue, Heaton Chapel, Stockport, Cheshire SK6 6LT.

From rather further afield than this even is:

Stef Skovjott comes Gusto Jonsson, via Loomvisholm 58, 2108 Dewane (Antwerp), Belgium. Gusto's also got some pretty obscure adventures, and his answers questions or provides complete solutions to *Station of Doom*, *Jerusalem Adventure*, *Rescue on Alpha II*, *The Head of the Beast*, *Ring of Centaurs*, *Twisted*, *Spygy* and *The Curse of Abu Simbel*. Here's also some local tips, and if I'm kidding those in future issues — time for a few more class soon, I feel.

Finally from Richard Heath in Leek, various questions, including what use is the girl in the *Juxtaposition* discotheque? The answer to that is: REINTRAP GAGMAD DOGG A. SERAM ENG. And that's all, in some ways (than one).

## Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to: *Dragon User Adventure Helpline*, 12/13 Little Newport Street, London WC2H 7PP. As space is enough letters have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Mail to write to as well!

**Name** .....

**Address** .....

**Problem** .....

.....

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## Adventure Contact

**Adventure: Caverns of Chace**  
**Problem:** How to get past the Temple by Factory screen  
**Name:** Mabon John  
**Address:** Y Bryn, Bull Lane, Denbigh, Chwyd. N. Wales LL18 2BN

### Adventures

*Jerusalem/Ultimate*

**Problem:** Can't do anything, need maps.

**Name:** Tudor Davies  
**Address:** 57 Sunnyside Road, Ilkeston Super Mars, Acoo S65 0GD

**Adventure: 1) Mountains of Ice 2) Temple of the Prophet**  
**Problem:** 1) Where are the hat and the cloak? 2) How can I open the huge doors?  
**Name:** David Palmer  
**Address:** Via Molino Di Peraloca 12, 40128 Bologna, Italy

**Adventure: The Verber Factor**  
**Problem:** How can I open the safe? How can I open the door?  
**Name:** Joseph Jeme  
**Address:** C/ Juan Monagall No 5, 28250, 08900 — Vilanova, la Geltru (Barcelona), Spain

**Adventure: Juxtaposition**  
**Problem:** Every time I try to go into Baron White's fort, I get the reply "Not now." Why?  
**Name:** Martin Lewis  
**Address:** 38 London Road, Chesham, Bucks. G6P 1AE

**Adventure: Juxtaposition**  
**Problem:** What use is the girl in the Laserbeque. How do I get the spade from the Droid in the Red Mines  
**Name:** Tim Entwistle  
**Address:** 61 Grappa Close, Wroughton, Swindon, Wiltshire SN4

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# Design or chance

Gordon Lee issues a creative challenge to budding wallpaper artists

THIS month is by way of a change the competition is departing from its usual format in favour of something a bit more creative and artistic. In the forthcoming months we will also be including something within the scope of any designers who have previously fought shy of entering. So, come on all you Dragon eyes, now's your chance to try for some of those prizes — and don't worry, all you computer masochists, there will still be lots of toughies for you!

Very simply, the competition this month is to design an interesting visual display using one of the high resolution screens of the Dragon. To give you an idea of the sort of thing we're after, try the listing given on this page. As you can see, this program is quite compact, and yet, when run, it is surprising that such an intricate and yet logical design could be produced from this simple process.

This economy of programming will be one of the points that we will be looking for in the entries, which should utilise one of the high resolution screens (PMODE 0 to 4).

What we do not require is a lengthy program which, for example, has virtually every pixel or line drawn and listed within the program itself! You should aim for maximum effect from minimum program!

Your entry must be 'predictable', in the sense that when run it will produce an identical result each time, it is not a series of randomly placed circles or rectangles, it is quite in order to use the random feature to control minor details such as colour variations, but the overall design should be 'fixed'.

To enter the competition, send your finished program on a cassette only (no discs please), together with a listing (if possible) and any other documentation relating to your entry. There should be only one program on each cassette, placed at the beginning of the tape — though you may include a duplicated back-up copy on the other side. Ensure that your name is marked on the cassette label and, if you would like your tape returned, please enclose a stamped, self-addressed envelope.

Finally here is an analysis of the sample program given with this competition. It is based (very loosely) on Pascal's Triangle, a mathematical curiosity which will be dealt with on a future competition page.

As regards the pattern, imagine a rectangular grid 50 squares across by 100 squares down. In each of the squares along the top and left hand edges write in the number 1. Now, starting at the left hand end of the second row, write in each empty square to the immediate left. Continue along the row in this way to the right hand end and then repeat the procedure with

each row in turn down to the bottom.

Of course, if we were to actually do this the numbers on most of the squares would soon become very large, however, if we merely coloured green each square with an odd number in it, and coloured black each square with an even number, the result would be the same as that shown on the screen. The simplicity of the program is dependent on the use of the PPOINT com-

mand to test the colour of the pixels above and to the left of each location, and using this information to decide whether to draw a green or black pixel. The actual numbers are not themselves evaluated, merely whether they are odd (black) or even (green).

That's if it is a subjob, so now it's up to all of you budding William Morrises to come up with something of your own!

```
10 PMODE 4: PCL: SCREEN 1, 0
20 LINE 10, 0: - (255, 0), PSET
30 LINE 10, 0: - (0, 151), PSET
40 FOR Y=1 TO 151
50 FOR X=1 TO 255
60 P1=PPOINT (X-1, Y):
   P2=PPOINT (X, Y-1)
70 IF (P1+P2)/2=INT
   ((P1+P2)/2)
   THEN PSET (X, Y), 0
   ELSE PSET (X, Y), 1
80 NEXT X:NEXT Y
90 GOTO 50
```

## Prize

"WOW!" said Microvision's main man, "We're marketing a few new programs in the new year. 'Oh yes!' we yawned, acting blasé. "How many?" "Seventeen!" he said. So straight away we fell off our chair and touched him for a box of prize yummies. Seventeen is The Random Number, so our random choice was CRACKING CHRIS. We have twenty Crises to give away to our January prizewinners.

## Rules

Right. We're having a tiny departure from tradition. Because we realise that not everyone can easily supply a screen dump of their entry, we're allowing contestants to send in cassettes (not discs) as an alternative. Please put in an SAE if you want Gordon to send you cassette back.

That's it as usual. Please remember to enclose a listing of your program whenever possible, your name and address, and your envelope. JANUARY COMPETITION, don't forget to post it and ... YES! You thought we'd forgotten, didn't you? A TEEBALKER. Complete the phrase "if seventeen is the Random Number, then ..."

## October winners

The winners of Baby Computer Games's BOULDER CRASH in the October competition are: G. R. Barber of Sutton Coldfield, Christopher James of Tarnock, S. A. Siddiqui of Chorlton, G. P. Heston (not the man of Denmark), E. C. Hasted of Elm, R. J. Taylor of Middleborough, S. Frestad of York, M. Owsen of Parghford, Mike Johnson of Newcastle, Keith David of Crawley, Denis O'Malley of Comberston, A. Thomas of Stapleford, J. Hewitt of Mason, D. Demman of Selskirkham, Terry Potter of Chisleton, Michael Graham of Bangor, Mark Draven of Lincoln, Neil Michelson of Norway, Paul Woodson of Wotton Under Edge, and Mark Hoops of Arford.

One or two pretty good tiebreakers, but the favourite comes from S. A. Siddiqui.

"Look out for falling rocks, but don't worry ... SF will find you after a few million years."

## Solution

Oh, oh, you asked for it, and it makes you all feel crawlingly inferior, guilt-ridden, miserable, doubted and puzzled, serves ye all right.

See page 5.

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JOINING OUR **DAY 1 CLUB**

IF YOU HOLD A MAJOR CREDIT CARD THEN YOU SIMPLY FILL  
IN THE ORDER FORM BELOW AND WHENEVER WE RELEASE A  
NEW LINE FOR THE DRAGON/TANDY COLOUR WE WILL SEND  
YOU A COPY AT HALF PRICE ON **DAY 1** AND CHARGE IT TO  
YOUR CREDIT CARD! YOU MUST UNDERTAKE TO TAKE AT  
LEAST 6 NEW RELEASES BUT AFTER THAT YOU CAN CANCEL  
AT ANY TIME.

YOU KNOW AS A PREVIOUS CUSTOMER OF MICRODEALS  
THAT ALL OUR PRODUCTS ARE OF HIGH QUALITY AND  
WORTH PURCHASING. ALL OUR FUTURE RELEASES WILL  
COST £5.95 AND YOU PAY ONLY £2.95 PLUS OUR REGULAR  
75p POST & PACKING, SO SIGN UP **NOW!**

I would like to become a member of the **DAY 1** Club and agree to allow Microdeal to charge  
£2.95 at regular intervals against my credit card.

Credit Card Type: \*Access/Barclaycard/American Express/Diners

Credit Card Number ..... Expiry Date.....  
Tick here if you want the latest releases sent straight away

Signed .....  
To: Date:

Post to: Name .....



Address .....

Box 68, St Austell PL25 4YB

Post Code .....

