

# DRAGON USER

International edition

96p US\$3.25 December 1985

*The independent Dragon magazine*

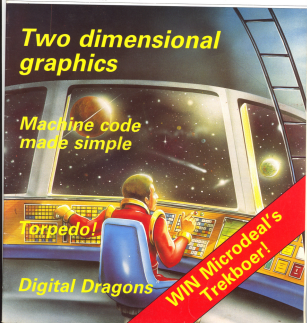
**Two dimensional  
graphics**

**Machine code  
made simple**

**Torpedo!**

**Digital Dragons**

**WIN Microdeal's  
Trekboer!**





# DRAGON USER



Telephone number:  
(All departments)  
01-457 4544

Editor  
JOHN COCKE

Production Editor  
BARBARA HAJEK

Software Editor  
ORHAM TAYLOR

Editorial Secretary  
GERALDINE SMYTH

Advertisement Manager  
SIMON LANGSTON

Administration  
GERALDINE SMYTH

Managing Editor  
DAVID KELLY

Publishing Director  
JOHNNY IRELAND

Subscriptions  
UK £10 for 12 issues  
Overseas (airfreight) £15 for 12 issues  
0258 0288-0172 Telex: 296275  
Dragon User, 12-13 Little Newport Street,  
London WC2H 7PP

US address: c/o Business Press  
International, 205 East 42nd St, New York,  
NY 10017



Published by Business Press, Gold Press  
Ltd, 10 Basinghall Street, London.  
Typesetting by Chapman Press, Chesham,  
Bucks. Printed by Greenaway Printers  
(Southend) Ltd, Southend-on-Sea, Essex.  
Distributed by S.M. Distribution, London  
SW6 0JY (0871) Telex: 261543

Registered at the Post Office as a news-  
paper

Dragon and its logo are trademarks of  
Dragon Data Ltd

## How to submit articles

The quality of the material we can publish in  
Dragon User each month will, in a very great  
extent, depend on the quality of the  
discussions that you can make with your  
Dragon. The Dragon computer was launched  
on 12 to the market 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  
5000 words long. All submissions should be  
typed. Please leave wide margins and a  
double space between each line. Programs  
should, wherever possible, be computer  
printed on plain white paper and be accom-  
panied by a tape of the program.

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

# Contents



<b>Letters</b>	<b>4</b>	<b>Dragon soft</b>	<b>29</b>
Yet more Jet Set Willy correspondence — and Roy Coates tells how to cheat! Plus pleasure to help and advice, and more			
<b>News</b>	<b>7</b>	<b>Dragon Answers</b>	<b>33</b>
The 6809 Show — who will be there, and what they will be showing! Pam Drury tells up her own company; Governor and Harris release programs; and Microdeal goes on the road			
<b>Two Dimensional Graphics</b>	<b>9</b>	<b>Adventure Trail</b>	<b>35</b>
Peter Whitaker shows how you can give your flat screen the illusion of depth — not for beginners			
<b>Simple machine code</b>	<b>16</b>	<b>Cat and Mouse</b>	<b>38</b>
Roy Colson takes you through some easy machine code routines			
<b>Firmware</b>	<b>23</b>	<b>The Dragon's Claw</b>	<b>42</b>
The latest in Brian Codd's series exposing the secrets of the Dragon's ROM routines			
<b>Torpedo</b>	<b>26</b>	<b>Competition Corner</b>	<b>46</b>
The first of two games from Steve Gethercole — a recreation of a classic from the arcades			
An amazing line up of five star games reviewed by our expert panel — plus some not so good			
Yet more questions answered by Bruce Coddie			
Our second contribution this month from Steve Gethercole — a simple game aimed at teaching how to six year olds letter recognition			
Roy Coates reviews a new peripheral for the Dragon from Cambridge based Laxdata			
Gordon Lee sets the question, and includes a puzzling little Christmas bonus program — Microdeal provide 20 copies of Trakker as the prize			

# Editorial

THE OFFICIAL publication date for this magazine is November 20 — which means that you should all have read this before the 6809 Show. So you have no excuse not to go and support your machine.

If you are reading this at the 6809 Show, then you deserve praise for two reasons — firstly, having taken the trouble to show up and prove your loyalty to the Dragon, and secondly, because you've had the sense to buy Dragon User.

There will be a lot of other people at the show too.

Microdeal will be present in force, selling a number of games for the Dragon, including Mike Gerrard's new raws, Trakker: Compuseries will be taking up a large amount of space as well, selling amongst other things, the new 64K expansion board that can make your 64 a 128 (see Roy Coates review); Winterset will be selling Juxtaposition, another game Mike Gerrard fell over backwards about.

The list isn't endless, but there are plenty of other names as well: Cumans, Design Design, Trojan, CRL, Andtek, Baby, and our very own Pam D'Arcy to name but a few.

And of course Dragon User will be there, and our roving reporters will be doing quite a lot of roving so they can write a proper show report for a future issue.

What's more, over 2,000 people, the organisers say, have already bought tickets, so it looks like it's going to be a record breaking turnout. So just who isn't going to be there?

Well, it's unlikely that any representatives from the major high street retailers will be turning up.

Remember them? They're the people who decided the Dragon was dead, and nobody wanted to buy software and peripherals for it any more — or so they thought. They're the reason that you have to buy everything for your Dragon by post these days, unless you're lucky enough to live near one of the small independents who really know what there's a demand for.

# Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

## Powerless

COULD anyone at Dragon User tell me where I could purchase a transformer for my Dragon 32. I have tried Touchmaster, but they no longer stock it. Can the transformer be repaired or is it cheaper to buy new?

J. Webb

44 Downland Place  
Adairton Road  
Canford Heath  
Poole  
Dorset BH17 7DR

## Roll on!

I READ with interest your editorial in the October 85 issue which referred to the lack of effective marketing by some companies supporting the Dragon.

For myself I own a TRS-80 Co-Op 84, and I would like to see more companies providing compatible soft and hardware for both computers.

In the main it is the TRS-80 that is ignored — why is this?

There are over 150 Tandy branches in major towns, and cities in the U.K. alone. It must be an untapped market potential for most of these companies, and with the potential of an even bigger one.

I would also like to see Dragon User printing articles for the TRS-80, then I for one would be a regular purchaser of your magazine.

W. P. Flannery  
140 Sevenoaks Road  
Orpington  
Kent BR6 3LZ

## Pity the editor

PITY the poor Editor.

Make it simpler. Make it more complex. Make it all games. Don't give us any games — only utilities! It must be worse than being the Prime Minister or Leader of the Opposition.

Should I sympathise with G. R. Gurnee (October issue), we all have to begin somewhere at sometime and I suspect it will not be very long before he might grumble that he could do with something better than his old self (with respect to

those kids who happen to be very delinquent).

I hope he is carefully keeping all his copies of Dragon User for he will ultimately find them a most useful source of reference and ideas. I have every issue since No. 1, but being very short of time can only type a program when first published. Also I am not into games at all nor do I have a disk system, so offerings of this nature are rather wasted on me. However, I am very happy that other readers' interests are being covered since this makes the magazine more of a viable proposition. It would have to be much more expensive to cover merely my interests alone!

I think Dragon User continues to improve — roll on the D'Arcys, Cadges, Winklers et al, and dear Mr Editor please don't lower that standard (but add a little encouragement for the Mr Gurnees here and there).

Yes, people do type in long programs — I did Pam D'Arcy's Dissembler recently with much satisfaction.

B. Yeaman-Miller  
Preston  
Merseyside

## Jet Set Willy!

I HAVE been "wandering" through Jet Set Willy's manual and have found 57 non-screenshots so far. Can anyone tell me how many there are supposed to be?

Plus, is there a cheat as in Masterblaster?

H. James  
34 Albion Street  
Canterton  
Rochdale  
Lancs

THE NEXT letter may be of some interest to you — so should the information following R. . . .

## Pokes!

THE following two programs will interest anyone who has purchased Jet Set Willy by Software Projects. Program A gives infinite lives and program B gives total immunity.

To use them type them in

and enter EXEC171. Your Jet Set Willy original will then load and run as normal but without infinite lives or immunity.

If you are hoping to complete the game, there are some things to be careful of. You need 99 objects to finish, no more and no less.

With infinite lives, endless loops can occur if you die at a monster's start position.

With immunity, endless loops can occur if you fall through killing blocks, ie the water in the bridge.

If you go to the top of the chain, an extra item is placed in the bathroom, so don't collect too many.

Program A  
10 REM INFINITE LIVES.  
EXEC 171 TO RUN  
20 READ MPOKE, X=171,  
M X=X+1 IF X=15 THEN 20  
30 DATA 18,208,0,285,189,  
155,148,134,125,183,43,8,  
128,0,8

Program B  
10 REM IMMUNITY. EXEC  
171 TO RUN  
20 READ MPOKE, X=171,  
M X=X+1 IF X=32 THEN 30  
30 DATA 18,208,0,285,189,  
182,146,284,125,27,183,43,8,  
183,43,11,247,43,20,128,0,8  
Jet Set Willy  
Afternoon

If the pokes don't work, then you could always try the codeword which allows you access to any screen so that you can practice the game. According to Wonderful Poy Codes (where would you be without him?) the procedure is as follows:

- 1 Get the game running on any screen.
- 2 Press the M, A, and X keys at the same time.
- 3 Using the left and right arrow keys, select your screen.
- 4 Very quickly press the space bar and Minor Willy will appear in the middle of the screen.
- 5 Using the four arrow keys, position Minor Willy where you want him on screen.
- 6 Press the space bar and the game will start from that point.

Roy assures that this works on all copies of the game: if it doesn't work for you, this isn't because you've got a different version of Jet Set Willy, you aren't doing it right.

## Excellent

I HAVE been reading Dragon User since it was first published and find it an excellent magazine. Could I venture to make a suggestion (well two to be exact) which would further improve it?

Firstly I would find an index to topics covered in articles and the answers page most helpful. It would save me hours of searching for the little bit of information I need. Perhaps you could give consideration to this on, say, a yearly basis.

Secondly, would it be possible to publish a list of the useful POKEs which have appeared from time to time in various places. I am thinking of such things as the POKE for speeding up the operation of the computer and the one to calculate pressing -SHIFT -> O in order to get lowercase. Meanwhile, keep on publishing your excellent magazine.

John Appleby  
Leeds

## Black screen

I HAVE had my Dragon 64 for eight months and although I have attempted some Basic programming, my knowledge of machine code is nil.

Regrettably, I purchased the Gatoroom games cassette before the version was published in the October edition of Dragon User. Jason O'Shea's views more or less sum up my own.

I have made a few minor changes, such as preventing the same word being selected repeatedly in Execution. However, as they all use a machine code loader, I have been unable to save these changes. Is there any way I can save these programs after entering them, and be able to load them again?

Also, can anyone tell me if it is possible in Basic to change the standard text format to green on black as I am sure this would be better than black on green?

Alan Green  
2 Rydal Close  
Burton Park  
Stourport on Severn  
Worce



HERE IT IS! The 22 screen, 60 level, See Sawing, Frog Slurping, Lift Catching, Apple Munching, Mind Blowing, Eddie Guiding, Arrow Dodging, Mountain Jumping, Laser Zapping, Airship Gazing, Boulder Hopping.....

# EDDIE STEADY GO!



**NEW  
FROM INCENTIVE  
£7.95**

## PRIORITY ORDER FORM

Please tick one the titles as indicated below for my Dragon 50/44 computer.

**EDDIE STEADY GO!** £7.95 ☐

**Back Track (Eddie's first)** £5.50 ☐

**The Red Trilogy of Adventures** £9.95 ☐

I enclose cheque/P.O. for £..... or please debit my credit card no.

Name Address .....

.....

.....

.....

.....

.....

.....

.....

INCENTIVE SOFTWARE LTD. - 84 LONG CH STREET, READING, RG1 4JQ  
Credit card telephone orders - Ring (0734) 871078

# NEW GAMES FROM BLABY COMPUTERS

TANDY & DRAGON



**KARMAKRY** — Guide your ship around the maze avoiding monsters and KarmaKry's evil K8-J8.  
**DRAGON £3.99**



**BROCK'S KINGDOM** — The powerful wizard-bro has been banished by the king. As a left behind agent for would be successors. Can you succeed where others failed. No.  
**DRAGON £4.99**



**GORM'S CRUSADE** — Venture where no man has dared to go before. When Gorm's form takes the sales of your money, but his fat is long — no less than 34 credits is what you'll get. Help with Gorm's your relatives and the power. Superb sounds and graphics.  
**DRAGON £3.99 TANDY £3.99 (T)**



**QUEEN OF CRABS** — The ultimate platform game! If you've tried the real, now try the best deal from Blaby. World's best life-guarantee where design. 35 credits.  
**T-B-25 DRAGON £3.99 TANDY £3.99**



**OLYMPIA** — Complete in the athletic month — 100 metres, decathlon, long jump, hurdles and high jump. Features include high graphics sound world records and a lot of fun. No.  
**DRAGON £3.99 TANDY £3.99 (T)**

## FINGERS

If you fancy yourself as a safe-cracker then read on. Thirteen screens of disappearing floors, conveyors and will you find out for yourself. Help light-fingered Fred to collect his golden keys to open each safe. 35

**DRAGON £3.99 TANDY EXT. £3.99 (T)**



**CREEPER** — The Creepers have invaded — no longer will they stand for being stamped on, sprayed and provoked. They will have their revenge! Arcade Action £3.99



**TO SOLDIERS GO** You'll find the 100% — Mrs. Spock, MacGyver, Boulder. Add out your own adventure with these star characters in the star ship. 100% — 100% to 100% players. Adventure £3.99



**SMOKE BATH** — Get to the bottom and before the bottom is reached, you get you. Lay traps, bombs of the bottom gas. Arcade Action £3.99



**BARRIERS** — The Professor is in his quest for the lost Art of a long time ago and has not returned — has he met with his play? Adventure £3.99 (T)

**BOTH GAMES £2.99**

**BOTH GAMES £2.99**

**TO BE OPENED  
 AT THE 6809**

**? SHOW ?**



**SMOKE AND THE CIGARETTE** — Our first graphic adventure. Journey back in time to the days of dragons, vampires, werewolves and all right to the death as they give us quarter. 100% to 100% players. Adventure £3.99  
**DRAGON £3.99 TANDY £3.99**

**Coming Soon  
 Kung Fu!**

**D = DRAGON  
 T = TANDY**

Send stamped addressed envelope for catalogue of our large range of software

**DRAGON 32 &  
 TANDY COLOUR 32K**

PLEASE ADD 50p  
 POST AND PACKING  
 PER GAME

**COMING SOON: 3 games on a tape @ £3.99**

**GOOD QUALITY GAMES WANTED**

**BLABY COMPUTER GAMES**

**CROSSWAYS HOUSE LUTTERWORTH ROAD, BLABY  
 LEICESTER TELEPHONE: 0533-773641, TELEX: 342029 DYNA-G**

## 6809 Show

The 6809 Show looks like being the best supported ever, if the organisers are right in their estimates.

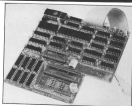
The list of companies attending is impressive — Microdeal, Tandy, Compuserve, Cumina, Design Design, Dalapex, Blaby, Peaksoft, Trijex, Greenwald, Smithson, John Pean, Mico Concepts, Andros, Computape, Quickbeam, Intertec, Pericomms, Cambridge Main Processor, Modersoft, Software Projects, Gamesmanship, Winterset, Harts Moore, Lucidata, Greiner, Modem House, Computer Bookshops, the 6809 User

Group, the 48 Micro Group, and Dragon User. And that won't be all, by a long chalk.

Congratulations to all of them for supporting the Dragon.

Congratulations also to the 2,000 or so ordinary Dragon owners who have apparently already booked tickets, thus avoiding all that nasty queuing at the door.

There will be great numbers of new games and hardware on show, including Computer's new Dragon expansion board that turns your Dragon 64 into a 128, and your 32 into a 64. Winterset will be showing Juddaposters.



Incentive will have Andy Steady's Jet! Microdeal will have hundreds of new games, including Trekboar and Modem Man. Lucidata will have

the Dragon's Claw, a printer-adapter which gives your Dragon a BBC-style interface.

If you aren't there you only have yourself to blame.

## Microdeal roadshow

ALL IS not gloom for Microdeal events following the company's recent announcement that Microdeal, Pocket Money, Bad Data, Speech, Microman and Salamander products would only be available by mail order from the Cornish company's Microcost division.

John Sykes, Microdeal's managing director, has copied

Radio One and organised a Microdeal Roadshow to bring his products to the public.

The Roadshow will be covering the length and breadth of England and a lot of Wales.

On November 2 and 3, it will be at UMIST in Saleville Street, Manchester. On November 5 and 6, at the Civic Centre Exhibition Hall,

Newcastle Upon Tyne; on November 7, the Watney Hotel, Wellington Street, Leeds; on November 8, Royal QED, Aston University, Birmingham; on November 9 and 10, Sloane Hotel, Westgate Street, Cardiff.

Admission to the Show is free, and there will be lots of games, many of them at bargain prices.

And don't forget that Microdeal will also be at the 6809 Show, November 23 and 24, Royal Horticultural Halls, London. You'll have to buy tickets for that, though.

Memo to Microdeal: what about the Scots and the Irish? Microdeal is at 41 Turo Road, St Austell, Cornwall PL25 3JE.

## DRS Rom

GROSS/MORPH Software has produced a Rom cartridge version of its database utility DRS, extending the size of database supported to 38,000 bytes, compared to 22,000 for the cassette version.

DRS was written by Mike Kern, who also wrote Grossmorp's Address assembler system.

Apparently, there are some very powerful features included — search, update and sort facilities amongst them.

DRS costs £18.40 on cartridge, and £10.20 on cassette, transferable to disc.

Greiner Software is at 2 Beacon Close, Seaford, East Sussex BN26 3JZ.

## Meaning business

HARRIS Software is about to launch three new programs for Gregorians at Cumina One users. The three titles are a continuation of Harris' series of programs for home and small business use.

The first title is Stockbox, a stock control system which can record sales, customers orders, deliveries and supplier orders.

It can report on low stock, orders outstanding, stock valuation at cost or selling price, turnover and profit margins and a host of other things.

Outboard is an invoicing program which prints invoices onto either plain or pre-printed paper. It can be linked to Salesbox, Harris'

sales ledger program, or to Stockbox.

Sharebox is a share management program, which can be used to record the details of a portfolio of stocks and shares, and print or display valuations, capital gains, dividends and tax credits, and so on. It can also draw graphs of price trends.

Stockbox costs £18.95, Outboard and Sharebox £18.95.

Harris will be exhibiting for the first time ever at the Third 6809 Show, and will have all their software on display.

Otherwise, Harris Micro Software can be contacted at 20 Alexandria Road, Hounslow, Middlesex TW1 4HP.

## Pamcomms plain

ONE OF Dragon User's best contributors, Pam D'Arcy — wizard of the keyboard — has finally decided to make some money out of her programming skills.

She has formed her own company — Pamcomms — dedicated to supplying top-priced, high quality software for the Dragon.

The first fruits of her labours, Pamcomms Plain Packs, will be on view at the 6809 Show.

Dreplex is a PRADOES-4 graphics pixel editor for full screen or individual apertures.

characteristic editing. Supplied on cassette with sample character sets, simple BASIC demonstrating programs and supporting documentation, it costs just £3.95.

Also on sale at the 6809 Show from Pam will be an electronic Book Buster Pack at £1.95, and Golden Bytes, featuring an enhanced version of Dash Detective and a selection of other past magazine contributions, at £3.00.

Pamcomms is located at 21 Wycombe Lane, Woodburn Green, High Wycombe, Bucks. HP13 9AG.

# TREKBOER

This exciting fairy adventure begins aboard the starship "Trailboat". It is the 21st century and life on earth is threatened by a deadly virus. Your mission is to search the heavens of space and return with a cure to save mankind from disaster. But how? Where? The clues of your story provides the first clue.



**Abstract** *Keywords:* **Abstract** *Keywords:*

Available for  
Dragon 32/64 cassette OS.  
Tandy colour SPC cassette OS.  
IBM PC & most compatibles £19.95  
Requires 128K & colour graphics.

[illegible]

Use our 24 hour Mail Order Service  
**0736 88020**   

By post to: **AMERICAN**  
41 Truro Rd. St Austell,  
Cornwall PL25 5JE

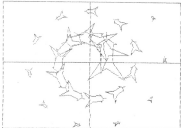
# MICRODEAL

# The Dragon draws in two dimensions

*Peter Whittaker demonstrates how to get the best out of a flat surface*

THE DRAGON'S DRAW command is very powerful, but it does have its limitations. It is no great task to DRAW a square, and it is easy to move the square around the screen, but once complicated relations are required, the DRAW command starts to show its limitations since objects can only be rotated in ninety degree steps. There are similar limitations with the scaling ability of the DRAW command, and so, it would not, for example, be an easy task to draw a spaceship spiralling away from a planet, and getting smaller as it went (Fig #1). To accurately move objects around in two-dimensional space, we must abandon the DRAW command in favour of a co-ordinate based system. These co-ordinates can be manipulated, and then joined together using the LINE command. This way we will be able to improve on the scaling and rotation of the DRAW command, and also add shearing and reflection to our repertoire.

The equations used to manipulate the co-ordinates are recorded in the form of



matrices. This facilitates the combination of several operations into one equation. Table #1, using an anti-clockwise rotation as an example, shows how an object's co-ordinate system is multiplied with a matrix to give the object's new position. The result of this matrix manipulation is used in Listing #1 (lines 66 and 70) to

draw a rotating space ship. (Delete the REM statement in line 80 before running.) The origin has been moved to the centre of the screen. For a smoother rotation, change the STEP value in line 130. Table #2 gives a list of all the matrices we will need for object manipulation in two dimensions.

All of the matrices in Table #2 are for operations based around the origin (co-ordinates 0,0). If we try to use them to rotate an object that is not centred on the origin, the object may not move in the way we would like. Change line 66 for DATA 40,40,60,40,60,40,60,40,40 and RUN the program again. Instead of spinning about its centre, the square will orbit the centre of the screen. If we want the square to rotate about its own centre, we must first move it to the origin, then rotate it, and then move it back.

This would take three sets of matrix multiplications to do. However, the process can be much speeded up by first combining the matrices into one compound matrix. Table #3 shows how two rotations can be combined, and Table #4 works out the combined matrix for our square rotation program. GOTO lines 66 and 70 to DEF FN(A,B)=(X-50)/COS(THETA)+ (Y-50)/SIN(THETA)+50 DEF FN(B,Y)=(Y-50)/COS(THETA)+ (X-50)/SIN(THETA)+50 and RUN the program again. Now the square rotates about its

$$\begin{pmatrix} X_2 \\ Y_2 \end{pmatrix} = \begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} \times \begin{pmatrix} A & B \\ C & D \end{pmatrix} = \begin{pmatrix} AX_1 + BY_1 \\ CX_1 + DY_1 \end{pmatrix}$$

$$\begin{matrix} X & Y & 1 \\ \text{old} & \text{old} & \text{old} \end{matrix}$$

$$(X_2, Y_2) = (XA + YB + C, XD + YD + E) \quad (C \text{ and } E = 0)$$

$$(X_2, Y_2) = (XA + YB + C, XD + YD + E)$$

$$\begin{pmatrix} X_2 \\ Y_2 \end{pmatrix} = \begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} \times \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix}$$

$$= (X\cos\theta + Y\sin\theta, -X\sin\theta + Y\cos\theta, X_2 + Y_2)$$

$$(X_2, Y_2) = (X\cos\theta + Y\sin\theta, -X\sin\theta + Y\cos\theta)$$

Table 1. Object manipulation by matrix multiplication.



$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
Identity	Rotation clockwise	Reflection Y-axis
$\begin{pmatrix} S1 & 0 & 0 \\ 0 & S2 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
Scaling	Rotation anticlockwise	Reflection X-axis
$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ TX & TY & 1 \end{pmatrix}$
Shear X	Shear Y	Translation X,Y

Table 2. Matrices for origin centered object manipulation.

$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix} \times \begin{pmatrix} j & k & l \\ m & n & o \\ p & q & r \end{pmatrix}$   
 Matrix 1 Matrix 2

Multiply each row in matrix 1 by each column in matrix 2.

Top line =  $\begin{pmatrix} a\&+a\&+a\& \\ b\&+b\&+b\& \\ c\&+c\&+c\& \\ \text{total} \end{pmatrix}$   
 Centre line =  $\begin{pmatrix} b\&+b\&+b\& \\ e\&+e\&+e\& \\ h\&+h\&+h\& \\ \text{total} \end{pmatrix}$   
 Bottom line =  $\begin{pmatrix} c\&+c\&+c\& \\ f\&+f\&+f\& \\ i\&+i\&+i\& \\ \text{total} \end{pmatrix}$   
 $\begin{pmatrix} a\&+b\&+c\& & a\&+b\&+c\& & a\&+b\&+c\& \\ b\&+e\&+h\& & b\&+e\&+h\& & b\&+e\&+h\& \\ c\&+f\&+i\& & c\&+f\&+i\& & c\&+f\&+i\& \end{pmatrix}$

Table 3. How to multiply two matrices to get one compound matrix

$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ TX & TY & 1 \end{pmatrix} \times \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \times \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -TX & -TY & 1 \end{pmatrix}$   
 Translation Rotation Translation

$= \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ (TX\cos\theta+TY\sin\theta-TX) & (-TX\sin\theta+TY\cos\theta-TY) & 1 \end{pmatrix}$

$\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ (TX\cos\theta+TY\sin\theta-TX) & (-TX\sin\theta+TY\cos\theta-TY) & 1 \end{pmatrix}$

Table 4. Matrix combination, Translation to origin a rotation x translation back.

own centre, and does not obey the origin. The same process of matrix combination can be carried out to include scaling, shearing, reflection, and variable translation.

Restores the original rocket co-ordinates to line 80, and EDIT lines 80 and 70 to DEF PLOT(Y)=R\*S\*COB(THETA)+TX\*COB(THETA)-TY\*SB(THETA)

=Y\*SB(THETA) and DEF PLOT(Y)=R\*S\*SB(THETA)+Y\*S\*COB(THETA)+TX\*SB(THETA)+TY\*COB(THETA). Add lines 126, TX=20\*Y-8.5+1 and 128 S=S\*8\*TX/TX+3 where S=the scale, TX=the translation along the X-axis, and TY=the translation along the Y-axis. Now RUN the program and you will see the spaceship spiral out from the centre of the screen, getting smaller each time it moves, until it eventually disappears from the screen (Fig #1).

## Slow

The program works well, but it is quite slow. It can be speeded up by reducing the amount of number crunching carried out. Instead of reading the co-ordinates from data statements each time, we can read them from an array. Secondly, if we update the co-ordinates each time we move the object, we do not need to keep on recalculating the matrix values every time. Instead we can use the same matrix each time on our updated co-ordinate system. Listing #2 demonstrates the increase in speed of operation using this approach, running at about twice the speed of listing #1. To help with this, listing #3, where RUN will calculate the resulting matrix when two matrices are entered for multiplication. The result matrix can be used in the DEF PLOT statements to modify the movement of an object.

## Fast

This is about as fast as we will get with 'real time' two dimensional graphics, without resorting to machine-code. Unfortunately, this is still not good enough for use in animation sequences. If we want better graphics, we must resort to 'off line' animation (listing #4). This technique involves splitting the program into two halves, and running them separately. The first half does all the number crunching, it calculates the spaceship co-ordinates as it spirals around the planet, but instead of drawing in the spaceship, the data is saved to high memory. The second half of the program then does all of the drawing. The data has been poked into high memory, and so all that needs to be done is to peak the data and draw to the co-ordinates indicated.

When RUN, select option #1, and the program will take several minutes to calculate the data. Eventually it will reach when the spaceship reaches the extremes of the screen, and the program tries to poke a number greater than 255 or smaller than 0 into memory. Run the program again, and select option #4. This will draw in the spaceship as it spirals around the screen. The increase in speed is quite dramatic, with hardly a pause between each movement of the ship. The data can be saved to tape by selecting option #2, and reloaded by option #3. This saves the long wait of the data calculation section of the program. The program can be easily modified to manipulate different shapes (change the DATA line) through different movements (change the DEF PLOT statements). Try it and see.

# WINTERSOFT PRESENT THEIR FIRST ADVENTURE WITH PANORAMIC GRAPHICS

THE BARONS OF CETI V are the eight fabulously wealthy owners of the distant planet Ceti V. Between them they control the Galaxy's richest source of celtis ore, the fuel for hypercrossovers.

THE JUXTAPOSITION is the meeting point of two totally different universes, a semi-mythical line of dimensional instability thought to pass through Ceti V.

AS SERVITOR CROSS, Baron White's head trouble-shooter, you face a daunting mission. For to Ceti's north, beyond the blue mountains, the unsung-always Baroness Black is meddling with the JUXTAPOSITION's awesome power. Alone, you must travel the airless wastes of Ceti V, to discover the purpose of her secret experiments.

JUXTAPOSITION is the first in an epic new series of adventures from WINTERSOFT, creators of the widely acclaimed KING OF DARKNESS. Whichever machine code it features over 650 internal locations, a 4500 location planet, complete sentence input, and, with our spectacular PANORAMIC GRAPHICS system, nearly 33000 colour 3D views of the planet's surface.

Available on cassette for Dragon 32/64 price £6.95

May luck travel your path.

## HOW TO ORDER

Don't despair if you are unable to buy our games locally. Our express mail order service will despatch your order within 24 hours of receipt. Fill in the order form on this page (or write us a letter), enclose a cheque or postal order made payable to WINTERSOFT, and post it to:

**WINTERSOFT**  
Express Mail

30 UPLANDS PARK ROAD  
ENFIELD, MIDDLESEX,

EN2 7PE

01-367 5720

(Trade enquiries welcome)



# WINTERCRAFT

## ALSO AVAILABLE-

**DIAMOND DUNE**  
For the C64  
For the King 2000  
For the King 2000

**LANDER CPC 640**  
For the King 2000

**SPECTRUM 48K**  
For the King 2000

**ORD-1 48K**  
For the King 2000  
For the King 2000

All titles at the new WINTERSOFT price of  
£6.95 each.

PRICE INCLUDES P&P, V&T, AND  
OUR LIFETIME GUARANTEE

## ORDER FORM

Please tick one:

QUANTITY	FILE	COMPUTER

I enclose my cheque/P.O. for £

Name

Address



## LISTING #1. SPACESHIP SPIN

```

8  POKE4495,0:"HIGH SPEED POKE"
10  "*****INITIALIZE*****"
20  POLERR=0
30  RESTORE:NUM=0
40  READ A:IF A<999 THEN NUM=NUM+1:
    GOTOD8
50  NUM=NUM/2-1:"COUNT HOW MANY SETS
    OF CO-ORDINATES"
60  DEF FNAX(X)=COS(X)*THETA+Y*SIGN(TH
    ETA):X=X*ROTATION
70  DEF FNKY(Y)=Y*SIN(X)*THETA+X*SIGN(TH
    ETA):Y=Y*ROTATION
80  DATA 0.40,15.00,10.00,10.00,0.00,-3
    0.0,-10.0,-30.0,-30.0,-10.0,-10.00,-1
    5.0,0.40,0.00:"CO-ORDINATE DAT
    A FOR SPACESHIP"
90  DATA 000
100  "*****DRAW*****"
110  PPOKE4,1:"POL=SCREEN1,0:"DISPLA
    Y SCREEN
120  LINE(125,0)-(125,191),PSET:LINE
    (0,91)-(255,91),PSET:"DRAW XAY
    AXIS"
130  FOR THETA=0 TO 6.3 STEP .1:"ROT
    ATION"
140  GOSUB(70)-NEXT THETA
150  STOP
160  "*****DRAW*****"
170  PPOKE4,0:"POL=DRAWING SCREEN"
180  LINE(0,91)-(255,91),PSET
190  LINE(125,0)-(125,191),PSET
200  RESTORE:READ X,Y:"READ CO-ORDIN
    ATES"
210  LINE(FNAX(X)+125,91-FNKY(Y))-(FNA
    (X)+125,91-FNKY(Y)),PSET:"SET LI
    NE TO START CO-ORDINATE"
220  FOR A=1 TO NUM
230  READ X,Y
240  LINE-(FNAX(X)+125,91-FNKY(Y)),PSE
    T:"DRAW IN OBJECT"
250  NEXT A
260  FOR A=1 TO 4:"COPY A=4 TO A=NEX
    T:"COPY TO DISPLAY SCREEN"
270  RETURN
280  "C) 1995 PETER WHITTAKER

```

## LISTING #2. SPACESHIP SPIRAL

```

8  POKE4495,0
10  POLERR=0:PPOKE4,1:"POL=SCREEN1,0:"
    PPOKE4,0:"POL=
20  RESTORE
30  READ A:IF A<999 THEN NUM=NUM+1:
    GOTOD8
40  NUM=NUM/2-1
50  DIMX(NUM),Y(NUM)
60  RESTORE
70  FOR A=0 TO NUM
80  READ X(X),Y(Y):"READ CO-ORDINATE
    S INTO ARRAY"
90  NEXT A
100  DATA 10.0,10.40,25.00,20.00,20.
    0.40,-30.10,-10.00,-30.00,0.00,0
    0,-5.00,10.40,10.00
110  DATA 999
115  S=.95:S0=SIN(.0):C0=COS(.0):"SC
    AL=SIGN(THETA)*COS(THETA)
120  "*****DRAW ROUTINE*****"
130  POLS=LINE(0,91)-(255,91),PSET:L
    INE(125,0)-(125,191),PSET
140  X1=X(X)+Y1=Y(Y)+Y2=X(X)+Y1,0.0:
    Y2=Y(Y)+Y1,0.0:"TRANSLATION TO-PR
    ORIGIN"
150  FOR A=0 TO NUM
160  A1=X(X)+S0C0-Y1Y2S0S0:(S0X1=X2
    X2C0=S0Y1+Y2Y2S0
170  A2=X(X)+S0S0S0+Y1Y2S0C0:(S0X1=X2
    X2S0=C0Y1+Y2C0X2
180  X=X(X)+Y(X)+X2:NEXT A:"CO-ORDI
    NATE UPDATE"
190  LINE(X1+125,91-Y1+125)-(X1+12
    5,91-Y1+125),PSET:"SET LINE TO OR
    JECT START POINT"
200  FOR A=2 TO NUM
210  LINE-(X(X)+125,91-Y(Y)),PSET:"D
    RAW LINES"
220  NEXT A
230  FOR A=1 TO 4:"COPY A=4 TO A=NEX
    T:"COPY TO DISPLAY SCREEN"
240  GOTOD8
250  "C) 1995 PETER WHITTAKER

```

## LISTING #3. MATRIX \*C MULTIPLY

```

10  CLS:PRINT#0 0 0 0 0 0
20  PRINT#0 "E H A B A H"
30  PRINT#0 "C F I C F I"
40  PRINT#MATRIX 1,...."
50  FOR A=1 TO 5
60  INPUT#0A(0+A*5):"..."INPUT#0A(
    1+A*5)
70  NEXT A
80  PRINT#MATRIX 2,...."
90  FOR A=1 TO 5
100  PRINT#0A(5+A*5):"..."INPUT#0A(
    6+A*5)
110  NEXT A
120  CLS:PRINT#0,"SOLUTION":PRINT

```

# What's your best source of information on color computing?

# HOT CoCo

Now you can improve your color computing skills... and it's easy to do. HOT CoCo gives you more practical information on the Dragon\* than any other publication. Nearly 180 pages a month!

Every issue is packed with exciting new things for you to do. We won't waste your time with filler stories. You'll get instructive columns:

- **Illman's Arcade**—enjoy old-fashioned arcade style games on your computer
- **The Basic Boot**—learn everything you need to program in Basic
- **The Educated Guest**—discover how to use your computer as a teaching tool
- **Dozier ASCII**—get answers to your technical questions
- **Cryptically Speaking**—create eye-catching designs that add appeal to your programs

You also get a dozen easy-to-understand articles every month. Games... utilities... programming techniques... tutorials... graphics... education... hardware projects. They'll help you expand what you can do. And complete program listings show you how to use what you learn.

That's not all. HOT CoCo saves you money too:

- **Cardinal reviews** help you make every purchase a sound investment.
- **Informative ads** let you comparison-shop from home.
- **New-product announcements** tell you what's available before it reaches the stores.

With all this at your fingertips, your subscription could pay for itself with one win purchase.

And HOT CoCo is risk-free. If you don't like your first issue, just write "cancel" across the invoice and return it to us. You won't owe a thing.

Subscribe to HOT CoCo today. Twelve big issues are only \$44.97 (US funds drawn on a US bank). Simply fill out the coupon below and return it right now to: HOT CoCo Subscription Dept., PO Box 975, Farmingdale, NY 11737, USA.



\* Dragon is a registered trademark of Dragon Data Ltd.

**YES!** Help me improve my computing skills. Send me 12 issues of HOT CoCo for \$44.97 (US). I understand that with payment enclosed or credit card order I will receive a **FREE** issue, making a total of 13 issues for \$44.97 (US).

Get a 15th issue **FREE** when you enclose payment or charge it on your Mastercard, Visa, or American Express.

☐ CHECK/MO ☐ MC ☐ VISA ☐ AE

CARD# \_\_\_\_\_ EXP. DATE \_\_\_\_\_

SIGNATURE \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

POST-CODE \_\_\_\_\_ COUNTRY \_\_\_\_\_

HOT CoCo • 180 Pine Street • Portsmouth, NH 02808 • USA

TELEFON



# Machine code made simple

Ray Collinson with some simple machine code routines

HAVING WRITTEN a machine code routine for the SERIE screen, I also wanted to include some text, PRINTING or POSITIONING BASIC being undesirable in this case. The pseudo-op POC-FORM CONSTANT CHARACTER was the obvious instruction to use, but the problem was in retrieving the characters stored in memory and PRINTING them to the screen. The immediate requirement seemed to be to set a pointer to a memory location, store the operand in a register then send it to the screen.

The ACCUMULATOR-OFFSET INDEXED instruction seemed most appropriate in pointing to and retrieving from memory any characters stored there by the POC instruction. Using both accumulators, it is written #LDA 0,Y. This means take the current value held in the Y register, add it to the address held in the X register, and store the operand to the A accumulator ready to PRINT to the screen.

Enter listing #1 and, when assembled, GSAVE a copy before SERIEating. If you are uncertain about the function of lines 180 and 280, delete or REM each line, re-assemble and EXECUTE.

If you have studied any physics you may

remember reading about Drocke's Dark Spaces. What you should have is the Dragon's dark spaces. We are in effect POKING data to memory and, since there is no CHR\$ equivalent to POK\$ (see introducing Dragon Machine Code Pp 68-67, by Ian Sinclair), the Dragon gives an inverted space. This means that we need to change the data stored in the A register.

You understand, of course, that numbers are stored and used in binary form. For a space, we have in the A register Hex 20-decimal 32, or in binary 00100000; the number that the DRAGON requires is decimal 96 or in binary 01100000, which is the POC\$ equivalent of CHR\$ 32. The EXCLUSIVE OR operation returns a 1 if either one of the operands is a 1. So, if we logically OR 64 and 32 together...

```
00100000 32
+01100000 64
01100000 96
```

We get

In other words, set bit 6 in the A accumulator ready to store in video memory.

The comments in listing #1 should adequately explain the remainder of the program.

Listing #2 shows a slightly different

method in lines 100 onwards. Line 105... LDA X,LOAD\$ EFFECTIVE ADDRESS X loads 40 in the X register and sets up the video memory address where the next line of text is to be displayed. Line 130 finds the first character, in this case a space; the data in the Y register is LOADED into the A accumulator and the Y register is then incremented. This is rather a tortuous method but demonstrates how registers can be manipulated.

Listing #3 inverts the first text line so it is not necessary to carry out any operations on the spaces. However to invert the text we need to reset bit 6. To see why this is so, type into listing #1 POC "A LINE OF TEXT" in SERIE 0 inverted characters.

To reset bit 6 we need to carry out an EXCLUSIVE OR operation on the A register. The XOR returns a 1 if one and only one of the operands is a 1. Now the ASCII code for A is binary 65 in binary 01000001 and for A inverted, which is what we want, it is 00000001, so if we XOR, which contains 65 with 64, to reset bit 6, we get:

```
01000001 65
+00000001 64
```

We get 00000001 01

and we get an inverted character.

The remainder of the program follows the same structure as the previous listings.

Listing #4 was originally a subroutine and so the register values had to be preserved, but on its own the POK\$ and PUL\$ instructions can be left out.

The first text line is inverted by the program but by setting the routine back in RAM at address \$B844 you can enter text in SERIE 0 mode. This is an implemented PRINT routine. If you use the SERIE 0 mode the spaces between words will be unchanged, as a modification to the prog-

## LISTING #1

```
10 REM *****
20 REM *****
30 REM *****
40 REM *****
50 REM *****
60 REM *****
70 REM *****
80 REM *****
90 REM *****
100 REM *****
110 REM *****
120 REM *****
130 REM *****
140 REM *****
150 REM *****
160 REM *****
170 REM *****
180 REM *****
190 REM *****
200 REM *****
210 REM *****
220 REM *****
230 REM *****
240 REM *****
250 REM *****
260 REM *****
270 REM *****
280 REM *****
290 REM *****
300 REM *****
310 REM *****
320 REM *****
330 REM *****
340 REM *****
350 REM *****
360 REM *****
370 REM *****
380 REM *****
390 REM *****
400 REM *****
410 REM *****
420 REM *****
430 REM *****
440 REM *****
450 REM *****
460 REM *****
470 REM *****
480 REM *****
490 REM *****
500 REM *****
510 REM *****
520 REM *****
530 REM *****
540 REM *****
550 REM *****
560 REM *****
570 REM *****
580 REM *****
590 REM *****
600 REM *****
610 REM *****
620 REM *****
630 REM *****
640 REM *****
650 REM *****
660 REM *****
670 REM *****
680 REM *****
690 REM *****
700 REM *****
710 REM *****
720 REM *****
730 REM *****
740 REM *****
750 REM *****
760 REM *****
770 REM *****
780 REM *****
790 REM *****
800 REM *****
810 REM *****
820 REM *****
830 REM *****
840 REM *****
850 REM *****
860 REM *****
870 REM *****
880 REM *****
890 REM *****
900 REM *****
910 REM *****
920 REM *****
930 REM *****
940 REM *****
950 REM *****
960 REM *****
970 REM *****
980 REM *****
990 REM *****
```

```
1000 REM *****
1010 REM *****
1020 REM *****
1030 REM *****
1040 REM *****
1050 REM *****
1060 REM *****
1070 REM *****
1080 REM *****
1090 REM *****
1100 REM *****
1110 REM *****
1120 REM *****
1130 REM *****
1140 REM *****
1150 REM *****
1160 REM *****
1170 REM *****
1180 REM *****
1190 REM *****
1200 REM *****
1210 REM *****
1220 REM *****
1230 REM *****
1240 REM *****
1250 REM *****
1260 REM *****
1270 REM *****
1280 REM *****
1290 REM *****
1300 REM *****
1310 REM *****
1320 REM *****
1330 REM *****
1340 REM *****
1350 REM *****
1360 REM *****
1370 REM *****
1380 REM *****
1390 REM *****
1400 REM *****
1410 REM *****
1420 REM *****
1430 REM *****
1440 REM *****
1450 REM *****
1460 REM *****
1470 REM *****
1480 REM *****
1490 REM *****
1500 REM *****
1510 REM *****
1520 REM *****
1530 REM *****
1540 REM *****
1550 REM *****
1560 REM *****
1570 REM *****
1580 REM *****
1590 REM *****
1600 REM *****
1610 REM *****
1620 REM *****
1630 REM *****
1640 REM *****
1650 REM *****
1660 REM *****
1670 REM *****
1680 REM *****
1690 REM *****
1700 REM *****
1710 REM *****
1720 REM *****
1730 REM *****
1740 REM *****
1750 REM *****
1760 REM *****
1770 REM *****
1780 REM *****
1790 REM *****
1800 REM *****
1810 REM *****
1820 REM *****
1830 REM *****
1840 REM *****
1850 REM *****
1860 REM *****
1870 REM *****
1880 REM *****
1890 REM *****
1900 REM *****
1910 REM *****
1920 REM *****
1930 REM *****
1940 REM *****
1950 REM *****
1960 REM *****
1970 REM *****
1980 REM *****
1990 REM *****
```

## LISTING #2

```
10 REM *****
20 REM *****
30 REM *****
40 REM *****
50 REM *****
60 REM *****
70 REM *****
80 REM *****
90 REM *****
100 REM *****
110 REM *****
120 REM *****
130 REM *****
140 REM *****
150 REM *****
160 REM *****
170 REM *****
180 REM *****
190 REM *****
200 REM *****
210 REM *****
220 REM *****
230 REM *****
240 REM *****
250 REM *****
260 REM *****
270 REM *****
280 REM *****
290 REM *****
300 REM *****
310 REM *****
320 REM *****
330 REM *****
340 REM *****
350 REM *****
360 REM *****
370 REM *****
380 REM *****
390 REM *****
400 REM *****
410 REM *****
420 REM *****
430 REM *****
440 REM *****
450 REM *****
460 REM *****
470 REM *****
480 REM *****
490 REM *****
500 REM *****
510 REM *****
520 REM *****
530 REM *****
540 REM *****
550 REM *****
560 REM *****
570 REM *****
580 REM *****
590 REM *****
600 REM *****
610 REM *****
620 REM *****
630 REM *****
640 REM *****
650 REM *****
660 REM *****
670 REM *****
680 REM *****
690 REM *****
700 REM *****
710 REM *****
720 REM *****
730 REM *****
740 REM *****
750 REM *****
760 REM *****
770 REM *****
780 REM *****
790 REM *****
800 REM *****
810 REM *****
820 REM *****
830 REM *****
840 REM *****
850 REM *****
860 REM *****
870 REM *****
880 REM *****
890 REM *****
900 REM *****
910 REM *****
920 REM *****
930 REM *****
940 REM *****
950 REM *****
960 REM *****
970 REM *****
980 REM *****
990 REM *****
```

```
1000 REM *****
1010 REM *****
1020 REM *****
1030 REM *****
1040 REM *****
1050 REM *****
1060 REM *****
1070 REM *****
1080 REM *****
1090 REM *****
1100 REM *****
1110 REM *****
1120 REM *****
1130 REM *****
1140 REM *****
1150 REM *****
1160 REM *****
1170 REM *****
1180 REM *****
1190 REM *****
1200 REM *****
1210 REM *****
1220 REM *****
1230 REM *****
1240 REM *****
1250 REM *****
1260 REM *****
1270 REM *****
1280 REM *****
1290 REM *****
1300 REM *****
1310 REM *****
1320 REM *****
1330 REM *****
1340 REM *****
1350 REM *****
1360 REM *****
1370 REM *****
1380 REM *****
1390 REM *****
1400 REM *****
1410 REM *****
1420 REM *****
1430 REM *****
1440 REM *****
1450 REM *****
1460 REM *****
1470 REM *****
1480 REM *****
1490 REM *****
1500 REM *****
1510 REM *****
1520 REM *****
1530 REM *****
1540 REM *****
1550 REM *****
1560 REM *****
1570 REM *****
1580 REM *****
1590 REM *****
1600 REM *****
1610 REM *****
1620 REM *****
1630 REM *****
1640 REM *****
1650 REM *****
1660 REM *****
1670 REM *****
1680 REM *****
1690 REM *****
1700 REM *****
1710 REM *****
1720 REM *****
1730 REM *****
1740 REM *****
1750 REM *****
1760 REM *****
1770 REM *****
1780 REM *****
1790 REM *****
1800 REM *****
1810 REM *****
1820 REM *****
1830 REM *****
1840 REM *****
1850 REM *****
1860 REM *****
1870 REM *****
1880 REM *****
1890 REM *****
1900 REM *****
1910 REM *****
1920 REM *****
1930 REM *****
1940 REM *****
1950 REM *****
1960 REM *****
1970 REM *****
1980 REM *****
1990 REM *****
```

ers will be required if this is not desirable.

In this program, to insert the text we logically OR the A register with 32 and to put in a black space we OR the accumulator with 126. The PRINT routine at 5054AA requires that the ASCII codes are stored in the A register only. In order to put the text at a specific screen position, it is necessary to use the cursor address at locations 5060-5065. LOAD the X register with the required screen address then STX 5060 then, 16 (3) addresses in which stored in the

**Keywords:** child sexual abuse; disclosure; legal system

Before returning to BASIC, you will have to re-locate the cursor position at some appropriate place on the screen. For example, if you want to return the cursor to the same position, then `$400.LD00` `#4000`, `$TR $00`, puts it in the top left hand corner of the screen.

Those readers not possessing an assembler should input the Hexadecimal numbers in the OBJECT code and write a HEX2DATA program to store the data.

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 105–112

This program is not written in an ideal format, since you will notice that there are repeated instructions which are unhelpful and waste memory; the object, though, is to familiarise beginners with the ways in which the registers and memory can be handled.

Listing #9 uses a HCM routine to PRINT to the screen and the address is repeatedly called as a sub-routine, which makes it compact, fast and tidy.

[illegible][illegible][illegible][illegible]

The screenshot shows the Windows Task Manager Performance tab. At the top, it displays 'C:\Windows\system32\cmd.exe' and 'C:\Windows\system32\cmd.exe' with a 'Details' button. Below this, the 'Performance' tab is selected, showing various system metrics:

- Memory:** 16.0 GB (1.0 GB free)
- Processor:** Intel Core i7-4790K 3.9 GHz (4 cores)
- Storage:** Samsung SSD 850 EVO 128 GB (100% free)
- Network:** Intel Ethernet Controller I217-V (100% free)
- System:** Windows 10 Home (64-bit) (100% free)
- Power:** AC Power (100% free)
- GPU:** NVIDIA GeForce GTX 980 (4 GB)
- Audio:** Realtek High Definition Audio (100% free)
- Mouse:** Logitech G502 (100% free)
- Keyboard:** Logitech G502 (100% free)
- Mouse 2:** Logitech G502 (100% free)
- Keyboard 2:** Logitech G502 (100% free)
- Mouse 3:** Logitech G502 (100% free)
- Keyboard 3:** Logitech G502 (100% free)
- Mouse 4:** Logitech G502 (100% free)
- Keyboard 4:** Logitech G502 (100% free)
- Mouse 5:** Logitech G502 (100% free)
- Keyboard 5:** Logitech G502 (100% free)
- Mouse 6:** Logitech G502 (100% free)
- Keyboard 6:** Logitech G502 (100% free)
- Mouse 7:** Logitech G502 (100% free)
- Keyboard 7:** Logitech G502 (100% free)
- Mouse 8:** Logitech G502 (100% free)
- Keyboard 8:** Logitech G502 (100% free)
- Mouse 9:** Logitech G502 (100% free)
- Keyboard 9:** Logitech G502 (100% free)
- Mouse 10:** Logitech G502 (100% free)
- Keyboard 10:** Logitech G502 (100% free)
- Mouse 11:** Logitech G502 (100% free)
- Keyboard 11:** Logitech G502 (100% free)
- Mouse 12:** Logitech G502 (100% free)
- Keyboard 12:** Logitech G502 (100% free)
- Mouse 13:** Logitech G502 (100% free)
- Keyboard 13:** Logitech G502 (100% free)
- Mouse 14:** Logitech G502 (100% free)
- Keyboard 14:** Logitech G502 (100% free)
- Mouse 15:** Logitech G502 (100% free)
- Keyboard 15:** Logitech G502 (100% free)
- Mouse 16:** Logitech G502 (100% free)
- Keyboard 16:** Logitech G502 (100% free)
- Mouse 17:** Logitech G502 (100% free)
- Keyboard 17:** Logitech G502 (100% free)
- Mouse 18:** Logitech G502 (100% free)
- Keyboard 18:** Logitech G502 (100% free)
- Mouse 19:** Logitech G502 (100% free)
- Keyboard 19:** Logitech G502 (100% free)
- Mouse 20:** Logitech G502 (100% free)
- Keyboard 20:** Logitech G502 (100% free)
- Mouse 21:** Logitech G502 (100% free)
- Keyboard 21:** Logitech G502 (100% free)
- Mouse 22:** Logitech G502 (100% free)
- Keyboard 22:** Logitech G502 (100% free)
- Mouse 23:** Logitech G502 (100% free)
- Keyboard 23:** Logitech G502 (100% free)
- Mouse 24:** Logitech G502 (100% free)
- Keyboard 24:** Logitech G502 (100% free)
- Mouse 25:** Logitech G502 (100% free)
- Keyboard 25:** Logitech G502 (100% free)
- Mouse 26:** Logitech G502 (100% free)
- Keyboard 26:** Logitech G502 (100% free)
- Mouse 27:** Logitech G502 (100% free)
- Keyboard 27:** Logitech G502 (100% free)
- Mouse 28:** Logitech G502 (100% free)
- Keyboard 28:** Logitech G502 (100% free)
- Mouse 29:** Logitech G502 (100% free)
- Keyboard 29:** Logitech G502 (100% free)
- Mouse 30:** Logitech G502 (100% free)
- Keyboard 30:** Logitech G502 (100% free)
- Mouse 31:** Logitech G502 (100% free)
- Keyboard 31:** Logitech G502 (100% free)
- Mouse 32:** Logitech G502 (100% free)
- Keyboard 32:** Logitech G502 (100% free)
- Mouse 33:** Logitech G502 (100% free)
- Keyboard 33:** Logitech G502 (100% free)
- Mouse 34:** Logitech G502 (100% free)
- Keyboard 34:** Logitech G502 (100% free)
- Mouse 35:** Logitech G502 (100% free)
- Keyboard 35:** Logitech G502 (100% free)
- Mouse 36:** Logitech G502 (100% free)
- Keyboard 36:** Logitech G502 (100% free)
- Mouse 37:** Logitech G502 (100% free)
- Keyboard 37:** Logitech G502 (100% free)
- Mouse 38:** Logitech G502 (100% free)
- Keyboard 38:** Logitech G502 (100% free)
- Mouse 39:** Logitech G502 (100% free)
- Keyboard 39:** Logitech G502 (100% free)
- Mouse 40:** Logitech G502 (100% free)
- Keyboard 40:** Logitech G502 (100% free)
- Mouse 41:** Logitech G502 (100% free)
- Keyboard 41:** Logitech G502 (100% free)
- Mouse 42:** Logitech G502 (100% free)
- Keyboard 42:** Logitech G502 (100% free)
- Mouse 43:** Logitech G502 (100% free)
- Keyboard 43:** Logitech G502 (100% free)
- Mouse 44:** Logitech G502 (100% free)
- Keyboard 44:** Logitech G502 (100% free)
- Mouse 45:** Logitech G502 (100% free)
- Keyboard 45:** Logitech G502 (100% free)
- Mouse 46:** Logitech G502 (100% free)
- Keyboard 46:** Logitech G502 (100% free)
- Mouse 47:** Logitech G502 (100% free)
- Keyboard 47:** Logitech G502 (100% free)
- Mouse 48:** Logitech G502 (100% free)
- Keyboard 48:** Logitech G502 (100% free)
- Mouse 49:** Logitech G502 (100% free)
- Keyboard 49:** Logitech G502 (100% free)
- Mouse 50:** Logitech G502 (100% free)
- Keyboard 50:** Logitech G502 (100% free)
- Mouse 51:** Logitech G502 (100% free)
- Keyboard 51:** Logitech G502 (100% free)
- Mouse 52:** Logitech G502 (100% free)
- Keyboard 52:** Logitech G502 (100% free)
- Mouse 53:** Logitech G502 (100% free)
- Keyboard 53:** Logitech G502 (100% free)
- Mouse 54:** Logitech G502 (100% free)
- Keyboard 54:** Logitech G502 (100% free)
- Mouse 55:** Logitech G502 (100% free)
- Keyboard 55:** Logitech G502 (100% free)
- Mouse 56:** Logitech G502 (100% free)
- Keyboard 56:** Logitech G502 (100% free)
- Mouse 57:** Logitech G502 (100% free)
- Keyboard 57:** Logitech G502 (100% free)
- Mouse 58:** Logitech G502 (100% free)
- Keyboard 58:** Logitech G502 (100% free)
- Mouse 59:** Logitech G502 (100% free)
- Keyboard 59:** Logitech G502 (100% free)
- Mouse 60:** Logitech G502 (100% free)
- Keyboard 60:** Logitech G502 (100% free)
- Mouse 61:** Logitech G502 (100% free)
- Keyboard 61:** Logitech G502 (100% free)
- Mouse 62:** Logitech G502 (100% free)
- Keyboard 62:** Logitech G502 (100% free)
- Mouse 63:** Logitech G502 (100% free)
- Keyboard 63:** Logitech G502 (100% free)
- Mouse 64:** Logitech G502 (100% free)
- Keyboard 64:** Logitech G502 (100% free)
- Mouse 65:** Logitech G502 (100% free)
- Keyboard 65:** Logitech G502 (100% free)
- Mouse 66:** Logitech G502 (100% free)
- Keyboard 66:** Logitech G502 (100% free)
- Mouse 67:** Logitech G502 (100% free)
- Keyboard 67:** Logitech G502 (100% free)
- Mouse 68:** Logitech G502 (100% free)
- Keyboard 68:** Logitech G502 (100% free)
- Mouse 69:** Logitech G502 (100% free)
- Keyboard 69:** Logitech G502 (100% free)
- Mouse 70:** Logitech G502 (100% free)
- Keyboard 70:** Logitech G502 (100% free)
- Mouse 71:** Logitech G502 (100

[illegible]

# **IMPORTANT**

## **ANNOUNCEMENT TO DRAGON OWNERS**

Dear Dragon Owner

On September 10th 1985 the directors of Microdeal made 2 important decisions that will affect YOU.

The first was to make all Dragon Lines published by Microdeal available **ONLY** through Microdeals Mail Order Division - **MICROPOST**. This means that as soon as your local dealers stocks are exhausted you will have to purchase from Micropost.

The second decision was to increase support for the Dragon 32/64 computer for 1985/6 including a Touring Roadshow in November with shows at many of the major cities in the UK.  
**CARDIFF - MANCHESTER - BIRMINGHAM - LEEDS - NEWCASTLE**  
Continuing support for the Dragon will be confirmed by our scheduled new releases:-

- |                     |   |                                         |
|---------------------|---|-----------------------------------------|
| <b>MODULE MAN</b>   | - | Multi screen arcade game, available now |
| <b>TREKKER</b>      | - | Superb graphic adventure                |
| <b>SPACE WREK</b>   | - | 3D arcade space duel game               |
| <b>SHOCKTROOPER</b> | - | To be announced shortly                 |

Microdeal would like to express to customers the need for a stable Dragon software house, and hopes that customers past, present and future will continue support for Dragon products from Micropost.

**John Symes** - Managing Director - Microdeal

- publishers of Microdeal - Tom M's Software - Pocket Money Software - Salamander.

Our Autumn/Winter catalogue is out now, for a copy of this catalogue plus the latest issue of the CUTHBERT CHRONICLE send a large s.u.s. with the coupon below.

NAME \_\_\_\_\_ TYPE OF COMPUTER \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_ POST CODE \_\_\_\_\_

Post to: Catalogue Dept.

### **MICROPOST**

41 Truro Rd, St. Austell Cornwall PL25 5JE

# MICROPOST

A DIVISION OF  
MICRODEAL LTD

## MICRODEAL CRAZY TEN PACK

Usually includes:

Akrotiras - Gertiebert goes Walkabout, Defense  
Progger, Katapult Attack, Space Raiders, Space  
Monopoly, Space War, Talking Android Attack,  
Planet Invasion

OR, value of regular price **Now only £7.50**  
P & P 75p per order

We reserve the right  
to change titles in  
this 10 pack



## SHARDS SPECIAL 4 PACK

Includes:

Petigrievs Diary - Family Programs  
Mystery of Java Star  
- Monster Maths

Regular price of  
4 programs  
£29.00

**Now only £7.50**



## SALAMANDER SIX PACK

Includes: Golf - Games Pack 1 - Grid Runner  
Lasertone - Night Flight - Wings of War  
Regular price of six programs £42.70

**Now only £9.95**

P & P 75p per order



## DUST COVERS

Protect Dust Covers are now available -  
a must for any serious computer user  
this dust cover protects your Dragon 32/64  
against dust and increases the life of  
sockets and keyboard -

**only £2.99**

P & P 75p

per order

## SALAMANDER Dan Diamond Trilogy

Includes: Frankies Tomb - Lost in Space  
Fight Business - 3 Great Adventures  
Regular price of all 3 £29.85

Special Offer

**£12.95** P & P 75p per order

## MICRODEAL JOYSTICKS

Available in both analogue & digital  
versions. The analogue (floating) version is essential for our top flight  
simulator "Worlds of Flight". Both joysticks are strong  
and made in England.



Floating  
(analogue)

Add 75p P & P per order

**£15.00** per pair

Self Centring  
(Digital)

**£19.95**

per order



## QUICK SHOT / JOYSTICK

Digital Joystick for Dragon 32/64 &  
Tandy colour. Twin Fire Buttons  
Plus positive response.

Dragon/Tandy  
Colour Version  
each

**£10.99**

P & P 75p



## ZIP STICK COMPETITION

A very rugged digital  
competition joystick, with strong steel  
components. Twin fire buttons  
90% British

**£10.99** each

P & P 75p



## QUICK SHOT 2 JOYSTICK

Digital Joystick for Dragon 32/64 &  
Tandy Colour. Twin fire buttons - Rapid Fire  
Button - Fast Action - Rugged Construction  
- The Ultimate Joystick for  
your Dragon/Tandy colour

**£14.95** each P & P 75p



Add 75p Post & Packing per order

For Orders visit our 24 hour system

By phone with credit card



By post to

0726 66020

41 Truro Rd, SL Austell, Cornwall PL26 5JE

# MICROPOST

## MICROPOST

A DIVISION OF  
MCCORMICK LTD.

GENERAL INFORMATION		CONTACT INFORMATION	
NAME	ADDRESS	PHONE	FAX
ALBERTA	1000 10th Ave. S.E.	403-242-1000	403-242-1001
BRITISH COLUMBIA	1000 10th Ave. S.E.	604-242-1000	604-242-1001
MANITOBA	1000 10th Ave. S.E.	204-242-1000	204-242-1001
ONTARIO	1000 10th Ave. S.E.	416-242-1000	416-242-1001
QUEBEC	1000 10th Ave. S.E.	514-242-1000	514-242-1001
SASKATCHEWAN	1000 10th Ave. S.E.	306-242-1000	306-242-1001
YUKON	1000 10th Ave. S.E.	604-242-1000	604-242-1001
NEW BRUNSWICK	1000 10th Ave. S.E.	506-242-1000	506-242-1001
NEWFOUNDLAND	1000 10th Ave. S.E.	709-242-1000	709-242-1001
PRINCE EDWARD ISLAND	1000 10th Ave. S.E.	416-242-1000	416-242-1001
NOVA SCOTIA	1000 10th Ave. S.E.	902-242-1000	902-242-1001
ATLANTA	1000 10th Ave. S.E.	404-242-1000	404-242-1001
BALTIMORE	1000 10th Ave. S.E.	410-242-1000	410-242-1001
BOSTON	1000 10th Ave. S.E.	617-242-1000	617-242-1001
CHICAGO	1000 10th Ave. S.E.	312-242-1000	312-242-1001
DALLAS	1000 10th Ave. S.E.	214-242-1000	214-242-1001
DENVER	1000 10th Ave. S.E.	303-242-1000	303-242-1001
HOUSTON	1000 10th Ave. S.E.	281-242-1000	281-242-1001
LOS ANGELES	1000 10th Ave. S.E.	213-242-1000	213-242-1001
MILWAUKEE	1000 10th Ave. S.E.	414-242-1000	414-242-1001
MINNEAPOLIS	1000 10th Ave. S.E.	612-242-1000	612-242-1001
NEW YORK	1000 10th Ave. S.E.	212-242-1000	212-242-1001
PHILADELPHIA	1000 10th Ave. S.E.	215-242-1000	215-242-1001
PORTLAND	1000 10th Ave. S.E.	503-242-1000	503-242-1001
RICHMOND	1000 10th Ave. S.E.	804-242-1000	804-242-1001
SAN ANTONIO	1000 10th Ave. S.E.	214-242-1000	214-242-1001
SAN FRANCISCO	1000 10th Ave. S.E.	415-242-1000	415-242-1001
SEATTLE	1000 10th Ave. S.E.	206-242-1000	206-242-1001
SINGAPORE	1000 10th Ave. S.E.	65-242-1000	65-242-1001
TORONTO	1000 10th Ave. S.E.	416-242-1000	416-242-1001
VANCOUVER	1000 10th Ave. S.E.	604-242-1000	604-242-1001
WASHINGTON	1000 10th Ave. S.E.	202-242-1000	202-242-1001
WILSON	1000 10th Ave. S.E.	403-242-1000	403-242-1001
WINDY CITY	1000 10th Ave. S.E.	312-242-1000	312-242-1001
WORLDWIDE	1000 10th Ave. S.E.	403-242-1000	403-242-1001

[illegible]

## TO ORDER

[illegible]

My phone with crackling cord

01728 680050

41 Truro Rd., St. Austell,  
Cornwall PL26 5JE



UK purchaser must use prices from column 1 and add **75p** Post & Packing.  
Non-UK purchaser must use prices from column 2 and add **£2.00** Post & Packing.  
EU/EEA/Channel Islands/USA must use column 3 and add **75p** Post & Packing.

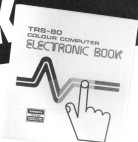
NAME _____		TYPE OF COMPUTER _____	£
ADDRESS _____		POST CODE _____	£
PLEASE SUPPLY _____			£
_____			£
_____			£
_____		POST & PACKING	£
_____		TOTAL ENCLOSED	£



# THE NEW TRS 80

# ELECTRONIC BOOK

**WORKS ON  
DRAGON  
TANDY COLOUR**  
\*BBC WITH ADAPTOR



Designed by experienced British teachers, interactive routines written into programs make learning a game. This unique concept in computer peripherals plugs into the joystick port and allows programs to interact with written material in the ring binder. Hundreds of uses including educational, business, adventures, game playing, quizzes and much more, interact the book with your own programs.



Different areas of the book's touch sensitive surface are pressed to make selections

\*Adaptor for BBC Microcomputer £5.49  
(28-7228)

**Electronic Book for Tandy Colour/Dragon  
(28-3141)**

**£16.95**

POSTAGE & PACKING TSP

## MICROPOST

41 TRURO RD., ST. AUSTELL, CORNWALL PL26 5JE

PHONE CREDIT  
CARD ORDERS  
**0726 68030**



Tandy & TROSO are registered trade marks of the Tandy Corporation.

**NEW  
TRS 80**

# SPEECH/SOUND ROM-PAC

**£59.95**  
Post & Packing 10p

Works with

**DRAGON 32/64**

**& TANDY COLOUR**

*This great addition to your computer "Speaks for itself"*

- ★ Generate complex sound effects
- ★ Play 9 octaves of music on 3 independent channels
- ★ Integrate speech & sound effects
- ★ ROM-PAC contains 4k ROM plus 2k RAM to store routines
- ★ Comprehensive 64 page manual
- ★ Sample programs included in manual
- ★ Incorporate professional speech/sounds in your own programs without large memory overheads
- ★ Technical information included

## MICROPOST

41 TRURO RD., ST. AUSTELL, CORNWALL PL26 5JZ

PHONE CREDIT CARD ORDERS: **0726 60020**    

# DRAGON 32

**OR TANDY  
COLOUR**

## QuickShot II JOYSTICK

If you're a real arcade professional then Microdeal's latest addition to the range is for you. We've taken the world's top selling Joystick and converted it to work with your Dragon 32 or Tandy Colour Computer.

The circuit board inside will even give you **RAPID FIRE**.

Available from Computer Dealers, Supermarkets or direct from:

Mail Order Sales from **MICROPOST**  
41 Truro Rd, St. Austell, Cornwall PL26 5JZ

Credit Card Sales

Phone **0726 60020**



**MICRODEAL**

© B. This joystick is of the outstanding type and will work with most games

**£24.95 EACH  
POST & PACKING 75p**

This month we take a look at the graphics and sound sections of the Dragon's ROM. These can be usefully used in machine code programs for setting up elaborate displays, and for playing music, but for fast action games customised routines will be needed.

## Graphics and Sound Memory Map

The following decimal addresses are those used by the graphics and sound commands on the Dragon and Tandy machines.

104	Data for low-res SET-RESET routines
176	Current foreground colour in use
176	Current background colour in use
180	Temporary colour in use (colour given as parameter in command to override default settings)
181	Byte value for current colour (ie the value stored in a byte to set all pixels to that colour)
182	Prode-graphics mode number in use
182/184	Address of the last byte of the current graphics display
185	Number of bytes used per line in current graphics mode
185/187	Address of the first byte of the current graphics display
188	Start of graphics pages (MSB). Defaults to 586, ie address 1536 — changed by Dragoncode etc
189	Current X cursor position — not user available
191	Current Y cursor position — not user available
193	Colour set currently in use
194	Plotting flag (0=reset, non-zero=on)
195/196	Current horizontal pixel number
197/198	Current vertical pixel number
199/200	Current X cursor co-ordinate
201/202	Current Y cursor co-ordinate
203/204	Circle command X co-ordinate
205/206	Circle command Y co-ordinate
208	Circle Radius
210	Current angle to be used in DRWW routines
230	Current scale to be used in DRWW routines
140	Sound pitch value
202	Current Octave in use (0-4)
223/224	Volume data for current volume setting in PLAY routines
225	Current note length for PLAY routines
226	Current tempo for PLAY routines

## Graphics and Sound Firmware Routines

The following ROM routines can be used from machine code programs. The details of various commands like circle and point are not given, as they cannot easily be used as stand alone routines, but see the 'GRAPH' routine.

**Set VDO Mode**  
Dragon 43481 Tandy 38296  
Sets the VDO into the mode given in the A register. The mode will be displayed immediately.

**Set VDO Offset**  
Dragon 43421 Tandy 38415  
Sets the display offset for a graphics mode, eg to start a display at address 1536 the A register would contain 0 on entry. This routine also takes account of disks etc, so the same result will not occur if disks are attached — if A=0 then the display will start at graphics page 1, otherwise that is.

**Select Page**  
Dragon 43489 Tandy 38483  
On entry the B register contains the Prode page number to be used in subsequent graphics routines.

**Select Col Set**  
Dragon 43538 Tandy 38530  
Selects either colour set zero or one, depending on the value of the B register on entry.

**Select VDO Col**  
Dragon 43428 Tandy 38423  
Selects the required VDO colour set from the data in location 182.

**Set Colours**  
Dragon 43264 Tandy 38268  
Sets up the locations 188 & 189 from the data in locations 184 and 178/179. (See Memory Map for details.)

**Select Display**  
Dragon 43580 Tandy 38514  
Selects either TEXT or GRAPHICS modes depending on the Z condition code. If Z=1 then text, else sets up a display in current Prode location 182, starting at the address in locations 186/187.

**Reserve HRG RAM**  
Dragon 43586 Tandy 38540  
Reserves RAM for graphics and moves Basic programs if necessary. The B register holds the number of pages to be reserved — ie this routine does a PCLEAR.

**Clear Graphics**  
Dragon 43607 Tandy 38601  
Clears the current graphics screen to the data in the B register on entry.

**Calc Pixel Pos**  
Dragon 47656 Tandy 43225  
On entry the top of stack must contain the low res vertical co-ordinate, preceded by the horizontal co-ordinate. On return the X register contains the address of the byte containing the low res pixel, and location 128 will contain the OR data for the pixel.

**Set LRG Pixel**  
Dragon 47683 Tandy 43148  
On entry the X register contains the screen address, the B register the colour and location 188 the OR data. The Pixel will be plotted on the low res screen.

**Reset LRG Pixel**  
Dragon 47623 Tandy 43148  
As for 'Set LRG Pixel' above, except the B register is ignored and the pixel is reset to black.

**DRWW**  
Dragon 45137 Tandy 40118  
This routine allows access to all the facilities of the DRWW command. Its use is, as follows. On entry location 188/187 must point to a string of characters consisting of normal Basic commands, the first character must be code 34, and the last must be code 0. The A register should also contain 34 on entry.

**Enable Sound**  
Dragon 47613 Tandy 43582  
Enables 8 bit sound by setting bit 3 of the hardware location 65285.

**Disable Sound**  
Dragon 47611 Tandy 43580  
Disables 8 bit sound by clearing bit 3 of the hardware location 65285.

**Beep**  
Dragon 47776 Tandy 43245  
This routine sounds a beep for the length held in the B register. The pitch is set by location 140.

**Play Note**  
Dragon 44696 Tandy 38676  
The A register contains the ascii code of the note to be played. The various octave, tempo, volume and note length settings should be set up in memory before entry. (See memory map for details.) Sound must be enabled before calling this routine (see 'Enable Sound' routine).

This is the fourth in Brian's series on the Dragon's Rom routines. Next month, he will be covering Basic variables.

If you have missed any of the previous issues, you can get them from Dragon User at £1.25 each including postage, packing and administration charges.

# TOTAL

## ***THE ELITE OF DRAGON GAMES***

- ✱ Embark on a voyage of adventure through time and space in your quest to solve the mystery of the lost shards.
- ✱ Encounter the risks and perils of intergalactic trading, evading pirates and dodging customs officials to become the greatest wheeler-dealer in the universe.
- ✱ You don't play TOTAL ECLIPSE, you experience it.

QUOTE FROM VEEBO ZOGROD - MASTERGAMES FROM THE PLANET GROGFAX:-  
*'You will never buy a better game for your DRAGON'*

### **GAME FEATURES**

- ✱ 3D Universe
- ✱ 12 Galaxies
- ✱ 120 Sectors
- ✱ 720 Worlds
- ✱ 1 Prophet (Yes, only 1, SORRY!)
- ✱ High resolution graphics
- ✱ Written in 100% machine code
- ✱ Played entirely on PMODE 4 Screen
- ✱ Arcade action pirate attacks

***TOTAL ECLIPSE... simply light years ahead of any other DRAGON game***



**FREE UNIVERSE** with every game

ECLIPSE - DENMAR LTD, Suite 10, 4 Orphanage Road, Birmingham, B24 9HS. Tel: 021 236 1130.



# TOTAL ECLIPSE

**£9.95**

INC. P&P

*Veebo says...*

***'Don't be the one without TOTAL ECLIPSE this Christmas'***  
***ORDER NOW!***

PLEASE RUSH ME \_\_\_\_\_ copies of TOTAL ECLIPSE. I enclose cheque/PO for £ \_\_\_\_\_ to cover

NAME: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

send to: ECLIPSE-FENMAR LTD, Suite10, 4 Orphanage Road, Birmingham, B24 9HS. Tel: 021 336 1130.



## USEFUL SOFTWARE

### FOR DRAGON 32/64 AND DRAGONDOS/CUMANA DOS

Professionally written programs for home, clubs, and small business, using random access disk filing to give large capacity, and our £2 by 24 screen with true lower case, C-sign etc.

**MONEYBOX Personal accounts £14.99**  
Program to analyse income and expenses, control bank account, credit card, building society etc. Forecasting, budgeting, and optional VAT analysis for use as small business cashbook.

**MAILBOX Mailing list £16.99**  
Stores names, addresses and up to 10 user-defined fields. Selects batches of records by name, town, region, and multiple keys. Prints labels, address and salutation, record cards, displays reports.

NEW!

**SHAREBOX Stocks and shares £16.99**  
Stores details of share holding. Prints or displays share valuation, capital gains, dividends and tax credits, income forecast, price changes, draws graphs of price trends over 12 periods.

**SALESBOX Sales ledger £19.99**  
Balance brought forward with cash allocated over four periods. Prints statements, aged debt analysis, sales analysis, labels, daybooks, nominal code analysis. Can link to CASHBOX.

**BILLSBOX Purchase ledger £19.99**  
Balance brought forward with cash allocated over four periods. Prints liabilities notes, aged credit analysis, purchases analysis, labels, daybooks, nominal code analysis. Can link to CASHBOX.

**CASHBOX Nominal ledger £19.99**  
Double entry system, posting balanced batches of debits and credits to up to 999 accounts. Prints trial balance, balance sheet, profit and loss, budgets, forecasts, audit trail. Can read SALESBOX and BILLSBOX files.

NEW!

**STOCKBOX Stock control £19.99**  
Records sales, customer orders, deliveries, supplier orders. Prints low stock list, orders outstanding, stock valuation, turnover, price list, stock movements, can bulk change prices.

**ORDERBOX Invoicing £16.99**  
Prints invoices etc. on plain or pre-printed paper. Can link to SALESBOX and/or STOCKBOX.

Cheques PCs: Further details dealer enquiries to:

## HARRIS MICRO SOFTWARE

49 Alexandra Road, Hounslow  
Middlesex TW3 4HP Tel: 81-579 8395

For more information  
write to: Harris Micro Software  
49 Alexandra Road  
Hounslow, Middlesex TW3 4HP

## DRAGON BOOKS

The members list offers a complete Dragon computer software directory, listing the availability of a wide range of

### A Pocket Notebook for the Dragon

by Peter George and John Dore

£14.95 + £3.00 p.p.

The members list contains a complete Dragon computer software directory, listing the availability of a wide range of software for the Dragon 32/64 and DragonDOS/CUMANA DOS.

### Applications for the Dragon 32

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 64

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 128

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 256

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 512

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 1024

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 2048

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 4096

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 8192

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 16384

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 32768

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 65536

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 131072

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 262144

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 524288

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 1048576

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 2097152

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

### Applications for the Dragon 4194304

by J. Dore

£14.95 + £3.00 p.p.

Book of programs that allow a computer system — tape, general knowledge, maths, geography, etc. Designed for students.

## Wizard Software

### COMPETIT PRIMA £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### WIZARD PRIMA £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### CELE INTERPRETER £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### JUMBO'S TROUBLES £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### SPACE CASTLE £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### THE PRIMA £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### ALL PRIMA £5.95

A 100% machine code program presented in a friendly form. Contains a complete directory of 1000+ programs. Includes a complete directory of 1000+ programs.

### WIZARD SOFTWARE, 90PT, 91, P2 BOX 22

CHURCHILL, PIRE K11 1SW

Send page 104/105 to: 90PT 91, P2 BOX 22

Requires paid for machine code (DRAGON software)





## Juxtaposition

**Software:** Juxtaposition, Wiersoft, 30 Uplands Park Road, Enfield, Middlesex EN2 7PT  
**Price:** £6.95

IT'S WELL OVER twelve months now since Wiersoft's last Dragon adventure, *Return of the King*, but the time's been well spent judging by the quality of their new mega-tale, *Juxtaposition: Barons of Celt V*.

Fans of their earlier quests may or may not be delighted to know that there isn't a ring in sight in this new one. It's a completely fresh story — well, fresh to Dragon adventures, though players with access to other machines might spot resemblances to adventures such as *Snowball*. *Return of the King*, most of all, *Lords of Midnight*. What, you say, all this on a Dragon? Almost, as the program must be a masterpiece of compression, with no subsidiary programs loaded, as has happened in the past.

You are Gwaii — no, not because you've bought the adventure, but just happens to be your name, and you live on the planet Celt V as a fairly low grade servant, the planet being split into colour-coded sections and each one ruled by the appropriate Baron. You and a few million others are sentinels to Baron White, living in a domed city in the middle of his lands.

The game begins with you waking in your tiny, poorly decorated apartment, a sort of Celt V council hall, with seemingly the bare minimum for a happy existence: a bed and a fireplace. A message comes through on the Vido-phone, the equivalent of a Royal summons. It's Baron White himself sending you on a suicide mission to the lands of Baroness Black to find out why her hasn't attended the last few cabinet meetings and discover if she's got her hands on the secret of Juxtaposition, enabling her to cross the line of dimensional instability which passes right through Celt V. Got that? Right, off you go.

As you're undertaking this mission on behalf of the Baron himself, you'd think he'd give



you a bit of co-operation and protect you from the dreaded droids which are patrolling the corridors outside your apartment, but no, you have to deal with them first, but that's not too difficult with a little careful observation of their movement habits. This last section is basically a text adventure, with a small picture of the domed city in the upper right of the screen. The text has been redefined for easier reading and a more attractive layout, and occupies the bottom half of the screen.

### Superior

Examine every object you can and you should find a way of getting down to a slightly superior set of apartments below yours, and if you can deal with the patrolling droid here you get yourself a blue key card allowing you through the locked doors that lead to the city itself.

Almost immediately you come across an airlock, though something tells me it's not wise to step through here just yet. Wandering round the 'Wireless Red Zone' for a while convinced me I was heading nowhere fast, but after finding a mentor I was able to travel to four different parts of the city, in one of which was an ultra-modern Lasertheatre, with a girl saying 'Let's Dance.' After unpleasant Terrain Trials and being accused of making improper suggestions, I left her for a while and explored elsewhere. This led to me finding a breather mask, at which I rushed for the airlock and

found myself outside the domed city.

Out on the surface of the planet itself the game switches to a *Lords of Midnight* landscaping style of game, though you're still entering text commands underneath. The top half of the screen shows you your current view and you can look in any of the eight compass directions, with the up arrow key moving you forward in the direction you're facing. The speed with which your viewpoint changes is incredible, faster even than *Lords of Midnight*, I would say, and you can whizz around the landscape — graphics have obviously been kept simple, and you do notice slight duplications of mountains and forests here and there, but this doesn't detract from the very impressive effects. Don't whizz round too quickly, though, I sat off in one direction and found myself in the lands of Baron Red, unable to get back again before I was spotted by the Barons' Choppers. Not being able to furnish the appropriate ID card, I was capped without mercy. Come you, Red Baron!

Thanks to the GAIFF facility I returned to Baron White's domain, and made sure I stayed there. I found a pyramid which I was able to enter, but the only thing inside was a wide cavern leading nowhere, so that's something to come back to later. I eventually found a key, inside which was a maze of pillars, not to mention ever-present electronic eyes watching me, but at last I made contact with the Baron himself, who gave me a red ID Tag. Scouring through the Red Baron's lands I found another pyramid, a tower, and eventually a domed city bearing a remarkable resemblance to the white one I'd left. In fact it was identical — almost. But it did give me chances to stock up on food from the dinner droid and restore my health to a safe state — you have to eat once a day, with SCORE showing you not just what percentage of the game you've done, but your current bill of health.

Out again on to the planet, I specifically had to find the home of Baron Red, but such is my luck I wandered off into Baron Brown's lands and was reduced to a pile of prodding

adventurer yet again. All this playing, and still only 80% completed. Mapping the planet's surface is a tricky business, as there are apparently 4,000 locations, and of course you can make off in any one of eight directions from most of them, the exceptions being the mountains which border the map. You have to really keep your eyes open and try to spot potentially interesting buildings in the distance, then head for them. If you want to map this lot properly I'd suggest you go out and buy yourself a roll of wall paper.

### Complex

As if 32,000 viewpoints wasn't enough, the last journey is equally complex, coping with long sentences — yet ironically having trouble with shorter ones, sometimes. You have to try several variations on a command to fit upon the right combination of words. You can also speak in other characters, using notation marks, such as SAY TO DINNER DRUID "DRAUGAGE EDDO AND CHIPS PLEASE", as well as get them to carry things for you, but so far I've only found the ultra-complex game and a few droids so I think there's more of this still to come.

After a couple of days' play, the adventure itself looks like it's going to be fairly straightforward, and possibly a little repetitive — I sincerely hope that when I get to the Red Baron he isn't going to give me a Brown ID Tag, which I then take to the Brown Baron etc. But I still have a few objects I haven't yet been able to make use of, so maybe it'll get more complicated than that. And I've also a feeling the apparent simplicity of the cities is going to be deceptive. Apart from these slight reservations, then, I'd say *Juxtaposition* looks like being one of the best programs you're likely to see on your Dragon this side of Christmas, and maybe even the other side as well. Programmer John Humphreys deserves all credit for squeezing more into the Dragon than you'd have thought possible, and my guess is it'll be an even bigger seller than Wiersoft's earlier successes.

Mike Gerard



# Dark Star

**Program:** Dark Star, Design Design, 125 Smedley Road, Manchester M8 7NS.  
**Price:** £7.95

**FROM** 1981 people who brought you *Romney's Revenge* and *Labyrinth*, *Twelve* Army comes quite simply the best 3-D game for the Dragon since — you guessed it — *Romney's Revenge*!

Dark Star puts the player in the role of Luke Skywalker, Captain Starbuck, Buck Rodgers, or any other space hero from Orkney to Hal Sutton, flying through space, diving towards the planet to loot law and destroy everything else, in rare that George Lucas would be envious of!

The game places you literally in the pilot seat of a small craft. The controls are simple. By adjusting your sights you also control your rati, standing and diving. You can fire, accelerate, and decelerate. And that is it for controls. Very simple, right? Wrong. At least not when there are what seem like 15 billion alien ships casually there are actually two or three! All spanning fire with equal vehemence upon your tiny little craft.

The game is very simple in fact so simple that it could become boring after a while, but seems to have an extraordinary addictive quality that makes me want to keep playing for just an hour and then suddenly hours later.

There are enough options to set up a game for every day in the year, and they can certainly cater for any player's level of expertise. You can choose to use one or two joystick options or set his own keys for keyboard play.

You then choose difficulty level, type of enemy missile, and other options and launch into space.

The game operates in 3-D and is graphically stunning. The graphics are simple but beautifully effective and the speed at which they moved seems to have no effect on the smoothness and clarity of screen action. The planet is depicted simply and effectively and the feeling of diving and climbing is quite superbly gut-wrenching!

The game is a mud. I have given it five stars. It probably only deserves four and a half as I'm not yet sure of its

durability, but seeing as Design Design have done this on the Dragon thus confirming to support our mice with quality software it gets five!

Jason Orban



## Trekboer

**Software:** Trekboer, Microdeal, 41 Thuro Road, St Aswell, Cornwall  
**Price:** £8.00

A MERE graphics quest to gladden the hearts of Dragon adventurers, coming as it does from the same stable which produced *Shenagans*, *Sea Quest*, *Black Starium* and *Calisto Island* and just in case you'd forgotten those you'll be reminded should you find the advertising leaflet hidden somewhere — is the first five locations.

The screen layout is identical to those earlier titles, as is the style of the graphics with their occasional moving sections and flickering lights — flickering in this case because you're aboard the *Trekboer*, a spaceship from the 21st century when life on earth is threatened by a deadly virus. All you have to do is search the known universe till you've found a cure. No problem.

First location is the control room, with a couple of buttons to press, a plaque and a view screen to look at, and a ladder to climb up. Moving around, there's a teleporter room, duty storage room, communications room and environmental control room. There's also a pitch black room, which I haven't yet figured out how to illuminate, and a few personality useful objects. After a certain number of moves a message comes through from River Comol telling you that plague is still rampant. Kanto is the only known cure, there's been no contact with the *Veldboer* spaceship for three months and their last known co-ordinates were 0000.

Setting the controls for 0050 brings up a planet on the view screen. Next step was a little tricky, but after being ejected into space a few times I finally worked out how to get down

onto the planet's surface, and if nothing else than the graphics here are even more interesting. Your view of the planet scrolls across the graphics window, and after a little searching I found the wretched *Trekboer*, a virtual copy of the ship it's just left, except that everything is dead and empty — though that wretched pitch black room is still there.

I don't want to give too much away, but something here should show you a way of visiting a frozen planet, and there you might learn something to help you find your way to a beautiful garden planet, though not as beautiful as it might sound as I plunged to my death here trying to cross a bridge that wouldn't bear my weight. Nasty, but not as nasty as returning to earth, I imagine, which I haven't yet tried to do.

The adventure unfolds nicely, opening up well yet you somehow always have to leave something behind that you're sure you'll need to go back to. A convincing story and some nice effects, and I think an even better effort than its enjoyable predecessors. I can see the questions in the adventure column already!

Mike Gervard



## Ready Eddy?

**Program:** *Edible Ready Go!*, Incentive Software, 54 London Street, Reading RG1 1AG  
**Price:** £5.95

**TITLE** FOR another novel! This game is all the usual adjectives for brilliant combination



with another few thousand that you've never heard of (except I've made them up) so I haven't bothered to print here!

This is a deceptively simple concept that sees a lot of *Edible Ready Go!* (surprise!) but has also successfully devalued it into something less complex, but even more exciting and addictive.

The story starts that having finally escaped the vicious satyr-like tentacles (sic) in *Black Star*, this guy Eddie now has to go through a crazy obstacle course that the notorious programmer has designed for him.

There are three controls (left, right, and — you guessed it — jump), and the aim on each screen is simply to get Eddie from one side of the screen to the other, via a risk, left to right.

To stop him are arrows, lizards, frogs, pits, rivers, etc. and they are usually (although not always) coming from the other side of the screen. It takes a bit to manoeuvre, especially the look of the early stages.

The thing that sets this game up above its brothers is (as is usually the case with quality programs) its design. The screens really do get progressively more difficult, with screens that appear simple (throw in a wall, of course, have a catch (the invisible one being a screen involving simple precise running and jumping but with a horrifically short time limit).

I've hardly stopped playing *Edible Ready Go!* since I got it. There are 22 screens, I'm on number 17 but progress has become slow in comparison with the early screens. One of the most notable things about it is the way that individual people feel different screens easy (one man's thing is another man's other thing, or something like that).

It plays through at the normal speed, and then when all 22 screens are complete, it plays again at medium speed, and then fast.

The sound is more than vaguely "Shaper"ish but then one can't have the perfect game, that would be too much to ask. This one is nearly there though.

Last but not least — and you can quote me on that!

Jason Orban



Show ?

**Program:** Show-jump, Carri-  
pularware, PO Box 336  
Sticks-on-Trend (STG 616)  
Phone: 771-501

I, PCRB (one), have never really had much interest in show-jumping, probably due to a dated fear of horses! However, that is not to say I do not know what it involves. I would be able to tell the difference quite easily between, for example, show-jumping and organised crime, or, to use a more appropriate example, show-jumping, and Computerware's Show-Jumpers software.

Years ago, in rules, there was a real little game called *Shuriken*. What you had to do was drive a cute little graphic Hell's Angel biker over ramps and jumps.

In this game, you control a cute little Princess Anne as she bobs over various jumps. The ramps have gone, the game is now more complex: you have a jump button

This game has been badly classified (and anyway the "home" could just as easily be a stunt bike with the quality of definition). That is not to say it's a bad game. It's just lost some of its prospective market. I mean surely something like *Speedy Gonzales* would sell more copies than *Showtime*?

Thus, unlike the first language in creative marketing.

I'd love to be able to go on to say that the game itself was a superbly additive challenge. Oh well, another unrequited love!

Shut jump consists of a horse jumping fences of various lengths and heights spaced over several lines on the screen (the horse goes left to right on the top line, then the second, and so on to the end of the event). The controls are accelerate, decelerate, and jump. Basically, you want a lot of speed for the long jumps and very little for the short ones. And there's a

There are nine courses, which would be nice if there was any real variation between them other than slightly taller and longer jumps, more frequently on the later day courses.

The game has a "jump-off" option for two tying competitors which I was fortunate enough never to require. All in all it does seem to be a well written and thought out program.

It is said that this game is so [...] loose and [...] right word alert [...] having, it just doesn't make the most of lead it. It is suffering from the length-grab syndrome.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26



and [7]. Whenever there is a request for data the "format" required is displayed at the top of the screen.

For quickly locating entries a "short-form" of the name is entered for each record. For example, for Fred Smith one might use SM-F. This short-form is also used by the program for sorting the records into alphabetical order before access.

Requests for information are signalled by a flashing cursor enclosed within a bracket. System prompts such as "Press any key" appear on the bottom line of the screen as do any error messages generated. Pressing the down arrow key with shift produces a line of help information at the bottom of the screen which cuts down on repeated references to the manual. Pressing shifted up arrow returns you to the main menu, that is, it aborts the option selected. Similarly, the Irish key has been disabled and has no effect.

Once you have entered your data, a card, if necessary, to be edited by selecting the option from the main menu. Records are selected by entering the Short-form of the name. The program will attempt to find the nearest match for you if you include the "wild card" character "?". For example, if you want to edit the record of a bill Smith, but can't remember his first name, you might enter DAD? as the short-form. When a match is found you can either accept it to edit, or scroll forward or backwards through the file.

This method of retrieving records is also used for the "view", "delete" and "print" options. When printing is selected the program can make use of another field that can be entered for each record, the "salutation" field. This is the "Dear Fred" part of a letter head. The program always prints "Dear", so it is only necessary to enter the "Fred" part in the salutation field.

A final option in the Mailbox menu is to "Run Report Program". This loads and runs another program from the Mailbox disk, used for most of the printing options. The Report program allows address labels to be printed; the user can set the horizontal and vertical tabs for the particular type of labels being used.

(Most of the Report Program options depend on selecting batches of records using selective criteria on the fixed and user-defined fields. It is possible to select certain names, forms and regions using the wild card character once again. The testing on user fields is possibly more useful. The tests available are *greater than*, *less than*, *equal to*, *not equal to*, *contains*, *not contains*, *is null*, *is not null*. For example, if a file contains a user-defined field, number 18, which is called "Occupation", you could select only the records whose occupation is "doctor" using the following test #10 - *Predefined*.

In addition to "IF", "Either" and "OR" is allowed, several tests can be combined for very powerful selection of particular records. The other main option of the Report Program is to display or print selected fields from selected records in the form of a report, with automatic totalling of numeric fields.

There are two more programs on the Master disk, "MAIL.PURGE" and "MAIL.MERGE". The former allows selected records to be deleted in bulk from a file, and the latter allows different files to be merged together. Neither of these two programs use the 42-column screen, which seems to tarnish the professional feel of the software a bit. I would suggest that these two programs were either hurriedly written to get the software out

Mailbox is undoubtedly the best Name & Address file management program I have seen running under DragonEdit. The screen display is excellent, the keyboard has a variable autospeed speed, and the help messages make the program very user-friendly.

The manual is also very well written with useful examples. With its very powerful selection options and user-defined fields this program is ideal for a small business which needs to hold simple customer records, or a club or society. The price is also just about right for disk software of this type. **Haris** deserves to do well with **Matthew**.

Not perhaps one for the Christmas stocking, though — unless your loved one is a small business!

**Figure 1**



## Mailbox software

**Program:** *Alibon*, Harris  
Micro Software, 49 Alexandra  
Road, Hounslow, Middlesex  
TW9 2HP  
Below: C&A 300

**ADDISON** is a new name and address database program for the Dragon 32 and 64 with Dragonator, from Harris Micro Software, the company that produces the Moneybox program.

As with Monkeys (last session), Mailbox uses Intertec's custom 42x24 screen and keyboard driver which provides a very clear and pleasant display, including full lower case and so on. Mailbox can handle up to 66 separate lists on one disk (named MAIL01 to MAIL66) of variable length. Each list contains records of names and addresses plus up to 10 user defined facts.

<sup>1</sup> The author is grateful to the referees for their comments.

file drives, and has extensive input error checking. The first thing to do is to select the **CREATE** file option. Information on the size of the file and the number of user defined fields is required for the program to then create the empty file on a data disk. *Manhole* always assumes that you only have a single disk drive, so prompts are output to swap program and data disks when not used.

The data defined user defined fields is that you can store extra information, such as occupation or age, about each person on the file. These user defined fields are given names and formats by another option from the main menu. Three formats are available. "Alpha" simply means any character. "Num" means numeric only, and "Date" means only dates will be accepted (ie, characters, D, M, Y).

NEW

# SHOW-JUMP

NEW



Exclusively written for the Dragon 32/64

- Exercise your riding skill in the show-jumping arena!
- Full Colour, High Resolution "Arcade-Action" Graphics
- Any number of riders may compete
- Nine different courses of varying difficulty
- Wide range of fence styles including walls, water jumps, etc
- Jump-off against the clock

£6.50

SAME DAY DESPATCH!

TRADE ENQUIRIES WELCOME



£5.50

## LINKWORD

This is a 10 x 10 crossword, the input being in word order by following which on the board using one of the letters provided in your secret word. The computer automatically calculates all scores, for both word and colour word bonuses, including start and end word bonus. Furthermore, full colour context is provided so that when you incorrectly guess a word on the board, the game features high resolution graphics will assist in locating the correct spelling in neighbouring positions.

"Linkword seems to be an excellent program, with much enjoyment to be had from it..." — *Dragon User, May '85*



## BLOCKBUSTER QUIZ

All the fun of the TV game adapted to 12 screens. The game contains 100 word lists covering a wide range of topics and giving a 100% hit rate. High resolution graphics are used to display the board from which a guess is made for each screen and game. No programming!

£5.50

"Computerware present the quiz in an efficient and compelling way" — *Dragon User, May '85*

All prices include postage. Cheques, POs payable to:

## COMPUTERWARE

PO Box 318, Stoke-on-Trent, ST6 8LQ.

NEW  
ONLY  
£7.95

## DRAGON DRAW

This superb lightpen-driven drawing program allows the DragonOnly mouse graphics commands to be used directly from the on-screen menu shown here. There are a wealth of commands available and the lightpen response is virtually instantaneous.

- 4 pen sizes
- Dotted lines, adjustable spacing
- Shape brush tool
- 3 drawing screens
- Solid and empty boxes
- Polygons
- Freehand sketch
- Solid and shaded fill
- Printer/Plotter dump
- Save and Load
- Get and Put from different screens



**SPECIAL OFFER:**  
**DATAPEN LIGHTPEN and**  
**DRAGON-DRAW Software**  
only £29.95

Available from: DEPT. DU  
Datapen Microtechnology Ltd., Kingsclere Road, Overton, Hants RG26 3JH  
Tel: (0256) 778488

**Datapen**

## DRAGON SOFTWARE SUPPLIED WITH LIGHTPEN

### SKETCH

- PLOTTER 4 with 2-colour drawing
- PLOTTER 1 with 4-colour drawing
- On screen menu
- Curves, Lines, Colour Fill
- Erase and adjustable backlight for accurate drawing

### SHAPE

- PLOTTER 4
- On screen menu
- Design shapes of enlarged scale
- Construct shape libraries
- Plot shapes
- Rotate, Join, Fill
- Use patterns in SKETCH or DRAGON-DRAW

PLUS details for use in your own programs

ALL FOR ONLY £29.95 inc. VAT and Postage

## C SAVE

I HAVE been trying to write a program which has to read in a program which has been saved by CSAVE.

When I save a program this way, I always get an IO error at the beginning of the last block of information when loading it back in.

This means I cannot load or read the last block, is this a common fault, or have I got a problem with the computer?

C Luckhurst  
Pymstock  
Devon



IN PSET (X,Y,PC): NEXT X,Y  
IN: GETO IN

30 GET PC

500 P1 RMO 1  
510 P2 RMO 2

## Variable pick up?

I'VE been working on a machine-code routine that needs to pick up specially reserved variables incorporated in a Basic program, look through the Basic Variable table and, after converting the byte floating-point number to an integer, pass it to the machine code table.

Something is not right, as all the variables return the same number from the first variable name — as in the short program example below:

```
10 CLS
20 FOR P1=0 TO 512
30 FOR P2=0 TO 256
40 DIMVARS (P1, P2, etc)
50 NEXT P2
60 NEXT P1
```

The variable P2 returns the same value as P1.

Inside the Dragon has been my main source, especially the 'Number Representation' section, but I need more help.

Richard Brooks  
Croydon, Surrey CR0 3DE

THE simplest way of incorporating a routine such as this is to use the EXEC command with parameters. For example, the Envelope command could be written as a routine at address 30000 which could be called as:

40 EXEC 30000,P1,P2

The first part of the routine would read as follows:

```
10 CPU 30000
20 JSR 35142 ;Skip comma
30 JSR 35483 ;Set P1 in X
40 GET P1
50 JSR 35142 ;Skip comma
60 JSR 35483 ;Set P2 in X
```

JMP 40044 for Envelopes) rather than a RTI.

It is not necessary to 'call' an interrupt from a program; the routine will automatically be executed every 50th of a second transparently to the program running at the time. If you want to use interrupts which are called from the program you should use 'Software Interrupt', initiated by the SWI instruction. The address of the interrupt routine should be stored in locations 353-354 and the routine should end with a RTI. The SWI instruction automatically saves all registers and the RTI automatically restores them.

## Structure

I AM attempting to structure my Dragon Basic.

I would be grateful if you could help me overcome some of the problems I have encountered.

How does the Dragon evaluate such expressions as (A-C) OR (A-B)?

How do I access and use CLDIRM, CLORG and GUPP?

Kevin Cascard

THE Dragon, in common with most Basics, evaluates true/false expressions, such as (A-B), as 0 for false, and -1 for true. In fact, the Basic will allow any non-zero value to signify a 'true' value.

For details of the Cassette I/O routines see Chapter One, October 1985. The evaluation routines you mention return the value of the following number in the B and X registers respectively. The only pointer used is the 'Text Pointer' at address 156/157 which should point to the first character of the expression.

## Dancing

WHERE locations are affected by sound input from the cassette player? I wish to write a bar graph program which will 'dance' to the music entered from the tape.

N A Schiller

THE ONLY hardware location affected by the cassette input port is SPFR - bit 0. By sampling this bit a number of times in a loop, it is possible to obtain the frequency of the sound coming in which can be used within a 'bar-graph' program such as you describe.

## Beeb data

IS it possible to transfer data from a BBC computer to the Dragon 64? I wish to use a large amount of data and so cannot transfer it directly into the Dragon. I have a disk drive and the BBC data is on disk.

Peter Bennett  
Hindlip  
Worcester

THE BBC disk format is not directly compatible with the Dragon disk system. The easiest method of transferring data is to use an RS232 link. The Dragon's BLOAD command could be used, but this would mean writing code on the BBC to send data in a standard Dragon file format. A simpler solution would be to write a small program on both computers to send and receive the data as a character by character basis, saving the data to disk on the Dragon as it is received using PWRNG.

## Interrupts

I HAVE recently been trying to understand the use of interrupts and how these are initiated in a program. My interest is in their application in games programming.

E Tomlinson  
Preston

THE START address of an interrupt routine is placed in locations 295-296 and the routine must end with a JMP 40031 (or

## P POINT

COULD you please write a small program demonstrating PPOINT and how to use it. The manual isn't a lot of help as it doesn't actually give a very good example.

I am a complete beginner and am trying to teach myself programming.

Linda Pugh

THE PPOINT command seems to create more confusion than most graphics commands. Its purpose is to return the colour of the pixel at the specified position. The program below should demonstrate this by changing any green pixels to blue and any red to yellow on every other line.

```
10 PMODE 1,17CL2:SCREEN
1,0
20 COLOR 4,LINE (10,10)-
(50,50),PSET,0F
30 LINE (10,50)-(200,100),
PSET,0F
40 For Y=0 TO 191 STEP 4
50 FOR X=0 TO 159 Step 2
60 C=PPOINT (X,Y)
70 IF C=4 THEN PC=0
80 IF C=1 THEN PC=3
```

# THE TOP TWENTY OF EDUCATIONAL SOFTWARE FOR THE

## DRAGON or TANDY COCO

- |                                 |                                 |
|---------------------------------|---------------------------------|
| 1. Physics I Level/CSL          | 12. Maths I Level               |
| 2. Biology I Level/CSL          | 13. Chemistry I Level           |
| 3. Computer Studies I Level/CSL | 14. Spelling I/II/III           |
| 4. Maths I/CSL                  | 15. Tables I/II/III             |
| 5. Arithmetic I/II/III          | 16. Reasoning I/II              |
| 6. English I/II/III             | 17. Sports and Games            |
| 7. English I/II/III             | 18. Knowledge test I/II/III     |
| 8. Science I/II/III             | 19. Computer Studies (set of 4) |
| 9. Typing I/II/III              | 20. Profile                     |
| 10. Maths I/II/III              | Computerised filing system      |
| 11. Maths I/II/III              |                                 |

**£4.95 each**

(Has 1 to 10)

(No 19 £14.95 No 20 £9.95)

Cheques/POs to

**MICRO DE-BUG CONSULTANCY**

DEPT DU  
68 SIR JOHN ROAD  
SEELY PARK, BIRMINGHAM B29 7EN

Tel: 021-472 7810

—★— IT'S FANTASTIC! —★—

## PRINTER CONTROL

Versions available for 8, 7, 8 and 9 dot printers.  
Also daisywheels and electronic typewriters.

What the customers say

"A joy to use"

"At the price, it's a gift"

"Why aren't all utilities for this easy to operate?"

## "DUMPER"

High speed — relocatable machine code program to print and manage any or all of your forms screens. Accurate from your BASIC program — full instructions and examples supplied. Operates with or without DOS in any mode.

Currently 31 different types of printer, if you think you've no, 32 give me a ring.

**PRINTER CONTROL: £18 + £1 p&p**

**DUMPER: £5.00 + 50p p&p**

Please state printer type when ordering. For more than one program just take the higher p&p total.

Write or phone for free quote and advice — no obligation, all software covered by unconditional money-back guarantee

**MacGowan Consultants**

8 Anstey Drive, Caythorpe, Nr Grantham  
Lines NG32 3DD (0490 72088)

REAL VALUE FOR MONEY SOFTWARE



**H.C. ANDERSEN COMPUTER A/S**

## HIGHLY RELIABLE SOFTWARE AND HARDWARE

**DISK** (double sided 80 track drive) and booter upgrade your 5540 OS-9 Operating System. Supply disc to a 5590 OS-9 Operating System floppy disc. Insert the drive and you can BOOT from the new OS-9 Operating System. You have now one million byte-effective disc capacity on your Dragon/Coco and you can read and write on standard OS-9 floppy disc.

Requirements: 2nd 40 track (step rate 3ms) drive and one 80 track (step rate 3ms) drive. **£29.95**

**STEP-TWO** converter lets your 80 track (step rate 3ms) disc drive read and write 80 track floppy discs. Just put it on the disk flat cable. Power supply +12V via the disc flat cable from the disc controller. **£49.95**

**Floppy Disc Drive** 80 track double sided, step rate 3 ms, double density, capacity one million bytes. **£199.95**

**CAD MODEM (Dragon MODEM)** telecommunication transmission program running under OS-9. CAD MODEM will communicate with nearly any computer. Tell modem lines up to 80 characters (the line will relay left when 70 characters is reached). Internal buffer of 100, 1000-character. Send/Receive Text and Binary files. Dump dialog to buffer. Extensive buffer. Dump buffer to disk for later printing. Will communicate safely up to 4800 baud full duplex. Manual included. **£119.95**

We stock software and hardware for OS-9, PLEX and UNIFLEX. Prices exclusive VAT. 12 months guarantee on software and hardware. Postage and packing add 10% for hardware and 5% for software. Send check made payable to: DRAGON DISTRIBUTION to DENMARK.

**H. C. ANDERSEN COMPUTER A/S**

Anger Road 118 DK-2670 Sønderborg

Telephones 06-62 44 26 Telex 21488

OS-9 is registered TM of MICROSOFT and UNIFLEX, data files software is registered TM of TECHNICAL SYSTEMS, UNIFLEX, data files software is registered TM of H. C. ANDERSEN COMPUTER A/S, Denmark

## DO YOU WISH . . . . .

that you could use all the Beek bits on  
your faithful Dragon?

**NOW YOU CAN !!!**

With the Dragon's Claw Interface from Lucidata you can ADD a BBC to your part AS WELL AS a Commodore part to your Dragon 32 or 64 computer WITHOUT sacrificing your expansion slot.

So if you have some good friends with BBC (and no good friends — why not become them) And if your friends aren't that generous, never mind. Each month we will be offering a BBC (bottom goods, you can see on your Dragon with claws)

First Month we are offering the popular SNAP camera from Micro Robotics. This compact little camera, complete with flash unit, captures high-res images which can be displayed, stored and processed. A vast range of experimental and educational projects are possible (image enhancement, computer vision, computer art, computer etc. etc. SNAP is TO-ADD. Just plug this beastie into a Dragon's claw, etc. test and run the supplied software — and that's all there is to it!

AVAILABLE NOW FROM LUCIDATA LTD.

P.O. BOX 138, CHAMBERS CREEK RD.

Tel. (0203) 336699

VISA and ACCESS cards accepted.

Dragon's Claw Interface

£29.95 inc VAT, P&P

Snap Camera

£149.95 inc VAT, P&P

**the dragon's claw**

by



**Lucidata**

# MIKE GERRARD'S ADVENTURE TRAIL

CHRISTMAS is coming, the goose is getting fat, and no doubt if you put a few pennies into Adventure International's hat they'll be delighted to supply you with your choice of Scott Adams' adventures this Yuletide. Which you choose is up to you, but whichever it is I doubt if you'll be disappointed with the challenge of a Scott Adams title. The two I'll be looking at this month have very distinct scenarios. *Pirate Adventure* should obviously cater to the pirates amongst our readers, whilst *Hoodoo Castle* should cater to... well, we won't go into that.

*Pirate Adventure* is actually the second in the lengthy Adams' series, and was in fact written by Scott jointly with his wife Alexis. Scott's first adventure, *Adventureland* (reviewed last month), allegedly occupied so much of his spare time that his wife at one point put the master disk of the game in the family oven. Fortunately for all concerned she didn't turn the oven on, and obviously it didn't take long for her to be bitten by the adventure bug herself. For her first attempt at authorship she chose a desert island setting, though the opening location seems to be fully sun-drenched, being a flat in London: a hush-drum-drum, as Arthur Daley might call it. At first it looks just like any ordinary flat, with a pair of sneakers lying on the floor, a rug, a

discarded bottle of booze, a sack of crockery. A sack of crockery? No doubt there'll be a parcel lurking somewhere. And what's that sign on the wall? "Bring treasures here, say Scott."

## Nailed

Taking what I could (the rug proved to be nailed to the floor) I went upstairs to an attic, in which there was a backdoor, in which there was a back, in which there was a wind written in blood on the floor: Yikes. Suddenly, suspiciously like a magic word to me, the book itself is *Treasure Island* and another message informs you that Long John Silver left two treasures there, which must be mine to Robert Louis Stevenson but let's not quibble. There are a couple more locations in the flat, if you can find them, and then it's out to a window ledge, provided you've done something to prevent yourself falling to the pavement far below.

Go everything right and you might find yourself on a sandy beach on some tropical isle. Resisting the temptation to get out the towel, sub in the sun-lan cream and settle down with the latest Jeffrey Archer paperback, I examined the lagoon and found that totally the tide was out. I waded lustily into the lagoon, found an impenetrable rusty anchor, went north and promptly discovered that I was out, out of the game and in "Never-never-land," from where every direction takes you nowhere. You can usually escape from a Scott Adams death, but seemingly not this one. I returned and had the sense to explore the island before venturing into the lagoon again, and it's a good job I did, although I don't think so while I was wandering around the maze of caves.

Apart from Never-never-land, *Pirate Adventure* had only 25 locations, and if you think that's small then *Hoodoo Castle* is limited to only 22! With very little by way of text, you could probably fit these adventures into an unexpanded ZX-81, maybe even a pocket calculator, but with Scott Adams it's the puzzles that matter and it will take you a goodly while to uncover those pretty few locations, believe me.

*Hoodoo Castle* is written solely by Alexis Adams and "dedicated to all miners." The mors among my readers will no doubt see that's a good reason for buying it, while those with mine might feel it would make an excellent Christmas present. What,

your mom doesn't like adventures? All the more reason, then, 'tis, or your mom, begin the game in a chapel with nothing but a closed coffin for company. Taking our life in our hands we use the magic words OPEN COFFIN and discover not a rousing corpse but a sign saying "Count Greto's been cursed! There's one way for him to feel 'I'm in, and he'll go free!' What can it all mean? And what about the man wearing the sapphirine ring? Is he dead or alive? Who cares, give that ring back, it's bound to come in useful somewhere."

Heading north I walked into a room where the window slammed shut instantly, and wouldn't open again. I left that problem for later and headed south, which brought me to a dingy-looking stairwell and a dagger with an open jail cell. It didn't seem a good idea to enter here just yet, so I peeked the pocket shovel that was lying around and went instead into the torture chamber. I couldn't get through the tiny door that requires a bit of magic, but did go into the armory which contained a shield, a sword and a suit of armour. Or rather a suit of armor, this being an American adventure. Strangely, you could MOVE ARMOR, but nothing happened when you did.

## Witch's brew

Next I wandered my way past a room full of animal heads, another room with a pot of witch's brew, and finally into a lab containing several interesting items. There was a jar of lag, which I naturally tried to get in touch with the (a-)is man statue I'd already found. No dice, it was stuck to the floor. There were some chemical tubes, though using these only prompted one of them to explode periodically and eventually kill me. There was also some labelled chemicals. I was informed, an examining them, that they appeared to be mixable. Is this a good move? Maybe not. By the time I found a secret tunnel leading to a slippery chute down into another room, the exploding tubes had got me... what a painful way to go.

For all their brief text and few locations, I think any adventurer worthy of the name ought to try tackling these titles from the Adams family.

Philip Blandell of Bognor Hill has been living a later Scott Adams effort, his adventures (if there is such a word) of Spideeman, and has kindly sent in a few clues for the benefit of other readers.

**Adventure**  
INTERNATIONAL

## PIRATE ADVENTURE

"with Superb Graphics"



**IT'S ON  
AGAIN!**

# The 6809 COLOUR SHOW

**FOR DRAGON AND TANDY USERS**



**SATURDAY 23rd and SUNDAY  
24th NOVEMBER, 1985**

**ROYAL HORTICULTURAL  
HALLS, VICTORIA.**



**The first one was good, the second better, but this one is going to be amazing.**

#### **NOT JUST A SHOW!**

A weekend of fun, information and bargains. We are organising special events for everyone to join in, competitions with prizes and an advice centre. The exhibitors are promising to bring along lots of bargains as well as new products.

The third 6809 Show isn't going to be just a show, it's going to be a definitive showcase for 6809 users.

#### **A GREAT VENUE!**

If you don't know the way to the Royal Horticultural Halls by now, let me just say it's in the heart of Victoria, in between Parliament Square and Victoria Station. Easy to get to and from.

#### **BOOK NOW, BEAT THE QUEUES AND ENTER THE PRIZE DRAW!**

If you book tickets in advance you stand a chance of winning over £150 of 6809 related products. And you'll miss the queues - at the last show there were two hour queues but you'll just walk right in. And you'll save £1 per ticket.

#### **This exhibition is organised by:**

**Editionscheme Ltd., HR House,  
447 High Road, Finchley  
N12 8AF. Tel: 01-349 4667.**

**Editionscheme Ltd., HR House, 447 High Road, Finchley N12 8AF. Tel: 01-349 4667.**

Please rush me \_\_\_\_\_ (only) adult tickets at £2 and \_\_\_\_\_ (only) under sixteen tickets at £1  
for the 3rd 6809 Colour Show. I understand I am eligible for the prize draw.

I enclose my cheque/P.O. payable to Editionscheme Ltd for \_\_\_\_\_

Express card No. \_\_\_\_\_ Signature \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Postcode \_\_\_\_\_

6809 is the registered name of National Ltd.





Scott Adams

When you can't go any higher in the elevator, **PUDDING RIGHT DOWN** (LHSUP) is the fix is proving a problem. **TITLE LEFT** (COHS); and if hypomania is a problem is you, **MIND ZEPHER**.

Another helpful reader is Alan Matthews of Nottingham, who has sent me a copy of the introductory notes that should accompany *Diablo*. Alan thought those readers who have bought the adventure without the cassette may might appreciate a copy of these, so if anyone would, then write and ask me nicely, as well as enclosing a stamped addressed envelope, and I might just send you one. If you're well into the game then it won't help you much, but if you're having trouble getting started then it might prove useful.

O Eames of 10 Kent Close, Perryerby, Clevedon CH1 2LD is having trouble with *Mystery of the Java Star*, having spent many late nights on board a shipwreck looking for the Java Star. If anyone can help him, or for, please write to him, or him, at the above address. Any reader who sends in SAAG with their queries will be sure to get a reply, but the naughty ones who don't will have to wait till the letter can be dealt with in the column itself. If you can't bear to wait several weeks for it to appear, the answer's simple: **EASE SOLU ME!**

Gerrard Saunders didn't even include an address with his queries on *The Red Frigate*, so if you want to write again, Gerrard, I'll do my best for you (we're very pushed for space, this month).

Not too pushed to thank S & Woodbury of Bromsgrove who sent me a map of the various forests in *Mistral of Storms*, along

with some playing hints. Someone obviously making use of the school holidays, as the letter came from the end of August. One tip from among many refers to moving the snake. **TAKE SUCH ADO** **DOGO RIGHT ISOLAC**.

Help on *Black Sanctuary* is offered by John Toomes, 19 Lakeside Court, Boreley Hill, West Midlands DY5 3RD, but John asks for a stamped envelope as his pocket money doesn't stretch very far. A hint on *Spygy* from R A Reed of Manchester, who points out that there are no space suits without holes in them, but to join the corridor type: **HITAE RAGOL**. Oh, that should help Andy Hughes of Hemmelsford, who wrote in asking about just that point.

Damian Griffiths of 163 Sparrow Avenue, Burnley, Lancs BB11 3AS seems to have completed about six million adventures, but not *Spygy* (for which he'd like someone to tell him how to obtain the communications). Some tips on *Quest*, which Damian's discovered, are that to gain items you can drop a minor quantity and you can also double your wealth by selling your coins for 1/10 coins each.

## Thanks

I'd like to thank all the readers who have written in with queries and offers of help, and apologise if I haven't featured your letter because space doesn't allow a mention of them all. One I would like to mention is from Gillian Keys of Bangor in Northern Ireland, who asks for some general help on vocabulary for beginners to adventure games. This is something I think we forgot once we've played a few, but it's very important to get used to those abbreviated two-word commands. **LOOK WINDOW**,

**Adventure**  
INTERNATIONAL

## VOODOO CASTLE

"with Experts' Guidance"



**GO DOOR** etc are common commands which seem to baffle some players. You can't use **GO THROUGH** (LH DOOR) **PASSAGE/TUNNEL** or whatever, so simply **GO DOOR**. Likewise with looking at or through things, and the command **LOOK** often is a synonym for **EXAMINE**. That's something you must also learn to do. **EXAMINE** everything. This sometimes enables you to find concealed objects or secret passages, and some adventures even require you to **EXAMINE** some things twice, to produce two hidden objects. Always make a map, of course, and always read this column. More tips next month.

## 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.

Adventure  
Problem.

Name  
Address.

line, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

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

Dec 85

## Adventure Contact

**Adventure Return of the Ring Problem** How do I get the red/blue passes? How is fire use for the task? **Name** Christian May **Address** 6 Swift Gardens, Woolston, Southampton, Hants, SO9 0PD.

**Adventure Frankins Tomb Problem** How do you get into the Water Tomb? How do you give the robot the catalyst? How do you open the Sanctuary? **Name** J P Thorpe

**Adventure Black Sanctuary Problem** How is get through the boarded-up door (the one doesn't help)? **Name** Stephen Wood **Address** 3 New Street, Stalybridge, Cheshire, SK9 2EL.

**Adventure El Diablo Problem** I'm stuck in the cactus and all I did is going up on the Granite rock. **Name** Eyal Bar on

**Address** Eyal Street 8/5, Kfar Beit 27000, Israel.

**Adventure Return of the Ring Problem** How do you get the moon valise in the inventory? **Name** Ian Griffin **Address** 59 The Serpentine, Aughton, Nr Ormskirk, Lancs L26 5RA.

**Adventure Dragon Mountain Problem** How do I get a drink of water? **Name** L. Durnell **Address** 62 Riverside, Grays, Essex, RM16 4BD.

**Adventure Calico Island Problem** How do you get past the natives on Calico Island?

**Adventure Broog Problem** How do you use the transporter co-ordinates on the transporter? **Name** Louise Gifford **Address** 7 Water line, Westthorpe, Sandy, Beds, SG9 6XH.

**Adventure El Diablo Problem** Where do I dip the stick, how do I get to the cave in the cliff? **Name** Fraser Chaffern

**Address** 47 Ibbot Close, Rempston, Beds, MK43 9DU.

# Cat and mouse!

A game for four to six year olds from Steve Gathercole

THE IDEA of the game is to teach four to six year old children the alphabet and the position of the keys on the keyboard. When run, the game displays two little houses, one for a cat and one for the mouse. A letter is presented in the middle of the screen and the child must press that key, if the key is not pressed quickly enough or the wrong key is pressed the cat will start to catch the mouse. The idea is to get home before the cat gobbles you so! The alphabet is displayed in order and

there are three levels of difficulty. Mum or Dad should try their hand at level one — but be careful, you could show yourself up!

**APPARATUS** — BL = blank, MD = mouse down, MJ = mouse up, MR = mouse right, ML = mouse left, CR = cat right, CL = cat left, HD = house

**VARIABLES** — DY = cat 'y' position, CX = cat 'x' position, MY = mouse 'y' position, MX = mouse 'x' position  
**LINES** 85 — 340 poses graphics to screen

and sets up arrays

**LINES** 350 — 450 data for the graphics

**LINES** 460 — 620 data and routine for drawing letters on the high res screen

**LINES** 630 — 800 sets up and displays introduction screen

**LINES** 890 — 1000 main loop

**LINES** 1010 — 1030 subroutines for cat and mouse movement and check for end of screen positions

**LINES** 1040 — 1060 count free time

**LINE** 1080 death march

## MOUSE

```
10 REM MOUSE
20 REM FOR 4 TO 6 YEAR OLDS
30 CLS:PRINT@;"CAT AND MOUSE";
40 PRINT:PRINT"*****
*****"
50 PRINT:PRINT:PRINT:PRINT"  AM A
  LPHABET TEACHING GAME";
60 PRINT:PRINT:PRINT"    FOR THE
  VERY YOUNG...";
70 PRINT:PRINT:PRINT:PRINT:PRINT:P
  RINT:PRINT"    HANG ON A MINUTE"
80 POKE 3,1:CLS
90 DIM BL(15),HD(15),MU(15),MR(15)
  ,ML(15),CR(15),CL(15),HO(15)
100 DIM LE#(26)
110 GOTO 200
120 A=1536
130 FOR B=0 TO 3
140 FOR N=1 TO 24
150 READ S:POKE A+B,S
160 A=A+32
170 NEXT N
180 A=1536:NEXT B
190 RETURN
200 FCL$=GOSUB 120
210 GET O#:(O#-C24,24),HD,G
220 FCL$=GET O#:(O#-C24,24),BL,G:GOS
  UB 120
230 GET O#:(O#-C24,24),MU,G
240 FCL$=GOSUB 120
250 GET O#:(O#-C24,24),CR,G
260 FCL$=GOSUB 120
270 GET O#:(O#-C24,24),HO,G
280 FCL$=GOSUB 120
290 GET O#:(O#-C24,24),CL,G
300 FCL$=GOSUB 120
310 GET O#:(O#-C24,24),MR,G
320 FCL$=GOSUB 120
330 GET O#:(O#-C24,24),ML,G
340 FCL$
350 DATA 0,0,0,0,0,0,0,1,5,5,5,5,5,1
```

```
,1,5,5,5,13,1,1,0,0,0,0
360 DATA 00,16,16,16,64,64,0,64,64
  ,64,64,64,0,0,64,64,64,192,0,0,0,0
  ,0,0
370 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0
380 DATA 0,0,0,0,1,1,7,5,5,5,5,1,1
  ,5,5,5,5,5,1,0,0,0,1,5,0,0,0,0,0
  ,120,64,64,64,64,0,0,64,64,64,64,0
  ,0,64,64,64,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
390 DATA 0,0,0,64,60,16,4,4,4,4,4
  ,17,60,64,60,64,64,64,64,64,16,5
  ,5,0,16,20,20,16,16,160,0,20,145,6
  ,5,0,5,5,0,4,64,1,1,1,1,64,65,65,0
  ,16,60,60,16,16,160,120,96,0,0,0,64
  ,64,0,0,0,0,0,0,0,64,64
400 DATA 0,0,0,1,4,16,65,16,16,16
  ,16,16,16,16,16,16,16,16,16,16,1
  ,6,16,21,20,20,65,0,0,0,65,0,5,4,4
  ,5,0,0,0,0,0,65,65,65,65,65,65,0
  ,0,0,64,16,4,65,4,60,60,60,60,4,4
  ,4,4,4,4,4,4,4,4,4,4,4,4
410 DATA 0,4,5,5,4,4,42,2,7,32,0,0
  ,1,1,0,0,0,0,0,0,0,0,1,1,0,4,20,20
  ,4,4,42,32,24,70,65,0,60,60,0,16,2
  ,1,64,64,64,64,21,65,65,0,0,0,1,5,4
  ,16,16,16,16,16,60,17,21,5,1,1,1,1
  ,1,1,4,60,60
420 DATA 16,65,60,60,70,21,1,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0
430 DATA 60,60,65,140,141,60,60,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
440 DATA 64,60,60,65,65,64,60,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
450 DATA 1,5,37,65,65,1,5,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,5,21,65
  ,65,67,5,21,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,4,65,61,61,145,64,64,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
460 FOR K=0 TO 26:READ LE#(K):NEXT
  K
470 FOR K=0 TO 7:READ MU#(K):NEXT
```

```

400 DATA BR2,ND4R3D2ML2MD2BR2,ND4R
3D2ML2F2DML2BL4BR2,NR3D4R3D2BR2,ND
NR2FD2ML2BR2BR,NR3D2NR2D2R3D4BR2
470 DATA NR3D2NR2D2BR4BR,NR3D4R3D2
L2C2BR,04BR3D2ML2U2BR2,ND4BR2,0D4R
EU2L2R2BR2,D2ND2NF2E2BR2
500 DATA 04R3D4BR2,ND4FTRND4BR2,N
D4F2D4BR2,NR3D4R3D4BR2,ND4R3D2ML3
BR2,NR3D4R3D4BR2
510 DATA ND4R3D2L2F2D4BR2,0D4R3D2
L2U2R2BR2,RN4BR2,04R2U4BR2,03F2U
3BR2,D4EFU4BR2
520 DATA DF2D4L2UE2U2BR2,0FND2E2BR2
,R3D2D2R3D4BR2
530 DATA NR2D4R2U4BR2,0DND4BR2,R2
D2L2D2R2U4BR2,NR2D2NR2D2R2U4BR2
,D2R2D2U4BR2,NR2D2R2D2L2DE4,04R2U2
L2D2BR2,R2ND4BR2,NR3D4R3D2ML2U2BR
2,NR2D2R2D2U4BR2
540 GOTO 430
550 DRAW"BR"+STR$(00+"",""+STR$(Y))
560 FOR K=1 TO LEN(M)
570 BR=MID$(M,K,1)
580 IF BR<>"R" AND BR<="9" THEN DR
AW MUBR$(BR):GOTO 610
590 IF BR<=" " THEN N=0 ELSE N=ASC(
BR)-64
600 DRAW LE$ 00
610 NEXT
620 RETURN
630 POL$3:SCREEN 1,0
640 XX=30:YY=30:AR="CAT":DRAW"C251
6":GOSUB 550
650 X0=100:Y0=90:AR="AND":DRAW"C20
8":GOSUB 550
660 X0=75:Y0=150:AR="MOUSE":DRAW"C
2516":GOSUB 550
670 FOR T=1 TO 4
680 PLAY"01":FOR N=1 TO 4:PLAY"125
5056FG400+":NEXT N
690 NEXT T
700 FOR T=0 TO 200:NEXTT
710 POL$3
720 XX=30:YY=30:AR="LEVEL":DRAW"C2
516":GOSUB 550
730 SOUND 50,5:X0=30:Y0=90:AR="LEV
EL":DRAW"C2516":GOSUB 550
740 SOUND 100,5:X0=30:Y0=150:AR="L
EVEL":GOSUB 550
750 SOUND 150,5
760 X0=200:Y0=30:AR="1":DRAW"C2516
":GOSUB 550:SOUND 100,2
770 X0=200:Y0=90:AR="2":DRAW"C2516
":GOSUB 550:SOUND 100,2
780 X0=200:Y0=150:AR="3":DRAW"C251
6":GOSUB 550:SOUND 100,2
790 BR=INKEY$
800 IF BR="1" THEN W=30:CY=12:CX=1
2:RY=12:RX=12:GOTO 840
810 IF BR="2" THEN W=120:RY=12:RX=
12:CY=12:C0=12:GOTO 840
820 IF BR="3" THEN W=200:CX=24:CY=
24:RY=24:RX=24:GOTO 840
830 GOTO 790
840 POL$:PUT (0,0)-(24,24),HD,PSET
850 PUT (100,0)-(200,20),HD,PSET
860 LINE (100,72)-(100,107),PSET,0
870 XC=10:YC=30
880 XR=170:YR=30
890 REM*****MAIN LOOP
900 PUT (10,30)-(34,54),CR,PSET
910 PUT (170,30)-(202,54),MR,PSET
920 FOR N=1 TO 20
930 BR="ABCEFGHIJKLMNOPQRSTUVWXYZ
"
940 AR=MID$(BR,N,1)
950 XX=120:YY=82:DRAW"C2516":GOSUB
550
960 FOR Z=0 TO W
970 Z=INKEY$
980 IF Z=AR THEN GOSUB 1200:GOTO
1010
990 IF Z<>AR AND Z<>" " THEN GOSUB
51070
1000 NEXT Z
1010 GOSUB 1070
1020 XX=120:YY=82:DRAW"C2516":GOSUB
51070
1030 IF XR=XC AND YR=YC THEN 1060
1040 IF XR<170 AND XR>130 AND YR<3
0 THEN 1030
1050 NEXT X
1060 GOTO 920
1070 IF XR=XC AND YR=YC THEN 1060
1080 IF XC<=10 AND YC<=30 THEN GOTO
1120
1090 IF XC<=100 AND YC<=30 AND YC<
140 THEN GOTO 1170
1100 IF XC<=100 OR XC<=60 AND YC<
=140 THEN GOTO 1210
1110 IF XC<=60 AND YC<=140 OR YC<=
30 THEN GOTO 1250
1120 REM RIGHT
1130 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1140 XC=XC+CX
1150 PUT (X,Y)-(X+24,Y+24),CR,0
R
1160 RETURN
1170 REM DOWN
1180 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1190 YC=YC+CY:PUT (X,Y)-(X+24,YC
+24),CR,0R
1200 RETURN
1210 REM BACK LEFT
1220 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1230 XC=XC-CX:PUT (X,Y)-(X+24,YC
+24),CL,0R
1240 RETURN
1250 REM UP LEFT
1260 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1270 YC=YC-CY:PUT (X,Y)-(X+24,YC

```

MOVE OVER POLE POSITION HERES -

# SPEED RACER



**NOW  
ON  
DISK!**

1 Joystick required



Dragon Screen Shot

Take your choice of 4 circuits then race from the cockpit of a Formula 1 Car

One of the best games I've seen for ages  
— Dragon User



Dragon Screen Shot

Available for  
Dragon 3264 cassette £8.00  
Dragon DOS disk £9.95  
Premier DOS disk £9.95  
Tandy colour 32K cassette £8.00  
(Available only at Tandy Shops)  
Post & Packing 75p

Tandy version available at **TANDY** Shops  
other versions available on  
our 24 hour service

By phone **0726 68020**

By post to **MICRODEAL**  
41 Truro Rd St Austell,  
Cornwall PL25 5JE



## MICRODEAL



# The Dragon's Claw

*Roy Coates looks at an interesting new development in Dragon peripherals*

THE DRAGON'S CLAW is one of the many hardware add-ons that should have appeared a couple of years ago. If it had then the Dragon may have enjoyed a far more interesting and widespread user base than it currently does.

The Claw is a standard sized cartridge which has three sockets protruding from it. There are two on the top of the cartridge, the first being an eight-bit Centronics I/O port, and the second being an emulation of the BBC computer's "User Port". The third connector is something that should be found on a lot more of the add-ons on the market. It is simply an extension of the Dragon's cartridge port which allows another cartridge such as another Claw or a disk interface to remain connected to the Dragon whilst the Claw is in use. With this in mind, the Claw has been designed in such a way that it may be configured to reside in one of four different places within the Dragon's address space. Although none of these addresses are known to conflict with those used by other cartridge add-ons, it does mean that up to four Claws may be connected together.

## Heart

The heart of the Dragon's Claw is the tried and tested Motorola 6802 Versatile Interface Adaptor (VIA). This is a very clever device which may be set up to handle just about any type of I/O that may be required. As mentioned in the Claw manual, it would take many reams of paper to illustrate all of the possible applications of the 6802 VIA and so a brief description of the device will have to



The Dragon's Claw — I am sure it will prove to be a success.

suffice. The 6802 contains 16 eight-bit registers and these are individually addressable through four address lines on the chip. Address decoding is provided within the cartridge to allow the placing of the cartridge at the four different addresses as mentioned above.

The documentation that is supplied with the Claw consists of the now standard A4 sized booklet and contains a description of the Claw along with a programming example and the Data sheet for the VIA chip.

With the software to support it, the Claw may be used to drive all the wonderful peripherals that have appeared for the

BBC micro such as the Penman plotter, Robot arm and the Snap-Camera pictured here. Programming the Claw to interface to other devices does require a basic knowledge of interfacing, but an example is provided and would give a good starting point for someone interested in the often fascinating task of computing.

The Snap-Camera is surprisingly small, fitting in a plastic case measuring only 2" x 2" x 1" and is fitted with a small 28mm Pentax lens. A tripod mounting bush has thoughtfully been provided although it will require a larger than average mounting bolt as the bush is recessed into the case. A length of ribbon cable about six feet long is used to connect the camera to the Dragon's Claw and the plug is a very tight fit against the side of the Dragon. Although I usually assure you that this is intentional, I must admit to being a little wary when moving the camera about in case the cable should snag on something and pull the cartridge out. It didn't and I was not prepared to see how hard you had to pull to-led out!

The demonstration software provided with the camera is on cassette although instructions are given for saving this to disk. The program consists of a BASIC program and one machine code program. A source listing of the machine code is given in the manual with descriptions of all the routines and how to implement them in your own programs.

Having loaded the software, the camera worked straight away and I was a little surprised at being myself asked on the



computer screen. (If you have seen "Titan" you will understand why!) The demo program is in three parts, the first part will display a picture as seen by the camera and will calculate an average exposure to build up the image on the screen. The second part of the program allows you to alter the exposure time manually which does give a lot more scope to the final picture quality, and the final part of the demo performs a colour enhancement of the last exposure as used in many scientific applications to enhance certain areas of the picture.

Having quickly experimented with varying objects, it was found that the camera has a particularly narrow field of vision and is best using objects no more than about four feet away. Strong lighting tends to "bleach" the image, thus losing a lot of the detail. The light from a normal 60 watt domestic bulb was found to be about the best source of light. The quality of the picture obtained varies enormously depending on the content. Items which have a great deal of contrast such as a newspaper or a cartoon appear far more clearly than would a coloured object. As mentioned in the camera manual, the Optimal RAM is particularly sensitive to the colour red, and so anything that is red tends to come out as if it was pure white.

## Beastie

Luddite have already released the Snap-Dragon camera with software to drive the unit through the Dragon's Claw



Portrait of the author as a computer screen.

and now have a "Beasty" robot arm working happily. They will be demonstrating this at the forthcoming 6666 show. Future devices may include some of the turtles available for the BBC micro and possibly a home satellite weather station. Obviously this will depend on the market response to this product but the Claw is

the key that opens up so many doors as far as add-ons go that I am sure that it will prove to be a success.

Over the next few weeks I shall be trying the Claw with a commercial robot arm, and I shall also be trying some of the suggested applications for the camera in the camera manual. Watch this space!



## of the hill!

The RAINBOW is the biggest and best magazine available for the TRS-80 Color, TDP-10L, MC-10 and Dragon-32 Computers.

And no wonder! It's over 300 pages thick each month... pages brimming with programs, product reviews, fanletters, columns, tips and tips aimed at your computer. Yes, it is considered "the" Color Computer magazine to buy.

Don't delay. For only \$28 you can get the Rainbow every month of the year. Then your CoCo will be King of the Hill too!

U.S. Subscription rates  
U.S. \$28 outside rate  
U.S. \$18 air rate

Dr. Raymond  
82000-1000  
Project: RY-1000

1000 Top Magazine Cover (10 copies of THE RAINBOW)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Payment Enclosed ☐ Bill Me ☐  
Charge VISA ☐ MasterCard ☐ American Express ☐  
My Account ☐ Discover ☐ Other ☐  
Signature \_\_\_\_\_ Card Expiration Date \_\_\_\_\_

SEND NO MONEY NOW

NAME

NAME

Subscriptions to the RAINBOW are \$28 per year (12 issues) in advance. All payments must be in U.S. dollars. Payment may be made by check or money order. Payment by credit card is subject to credit review. Payment by credit card is subject to credit review. Payment by credit card is subject to credit review.





**APPROXIMATE RRP'S ONLY** — The arcade game's a favourite price, £999 (£14.99 only £11.99)

**HEROIC HOBBOCK** — The first of our exciting action-adventure games — available to the new 'high-top' generation of kids (RRP £14.99 each, £9.99 only)

**CRASH THE LEADER** — £12.99  
**BOBBER** — Racing Dragon (RRP £14.99), Dragon Trainer (RRP £14.99), Dragon 32 (Saves/Steps) (RRP £14.99), Advanced Sound/Steps/Steps for the Dragon (RRP £14.99), Android Interference for the Dragon (RRP £14.99) and what if that game is a dragon (not meaning to scare) (Save only £14.99 each, £1 for £14.99, £1 for £14.99, £1 for £14.99) is a complete story for £14.99

**BOBBER** — Dragon (see back numbers). There are many Dragon titles — see our new (there is also) interesting new family examples in particular for £14.99

**BOBBER** — The latest Dragon (RRP), New Champions (RRP) for trade in your old Dragon and you get £14.99 (RRP £14.99)

**BOBBER** — This last you get £14.99. See our new (there is also) interesting new family examples in particular for £14.99

**BOBBER** — This last you get £14.99. See our new (there is also) interesting new family examples in particular for £14.99



**FREEPOST** — 100000 STREET, BILDERSTON, NORTH WOOD (S40 2NS), Telephone 0444 700000 (see back numbers)



**ACE WAGON (RRP)**  
 Machine gun warfare in the sky £14.99  
  
**TIME ATTACK**  
 The second TIME (RACING) £14.99



Special £14.99 only for both of these full 256 games!  
 Telephone: 021-287 1000. Personal orders welcome.  
**TUDOR WILLIAMS**  
 10 Bonnamant Road, Burton, West Midlands, WY14 8PD

## FREEDOM FIGHT

A startling new development from Merlin Games Design that puts your Dragon to its very limits. Move you get the ball and have to survive the onslaught from alien attacks!



ONLY £14.99



### FEATURING

- 100% machine code arcade game
- Scrolling backdrop
- Full colour, high resolution graphics
- Superb music and sound effects

Please send cheque/PO to:  
 Merlin Games Design, 143a Lupton Hall Road, Burton, S-8 7T, Staffs, ST12 9SL

TOP ROYALTY-PAY FOR DRAGON SOFTWARE

**NOW AVAILABLE**  
 £17.25 inclusive

## TOP VALUE LIGHT PEN

DRAGON 32/TANDY COLOUR 32K/SPECTRUM 48K

### THE NEW ADVANCED PROGRAM

for the Trojan light pens include the following facilities:

- DRAW BOX
- DRAW CIRCLE
- DRAW LINE
- DRAW PICTURES FREEHAND
- COLOUR FILL DOMINATED AREAS
- SAVE AND LOAD PICTURES TO AND FROM TAPE
- FULL ERASE FACILITIES



- DATA ENTRY AND PROCESSING
- MENU SELECTION AND CONTROL
- GAMES PLAYING

This is a first class program which gives hints and tips on how to write programs for the pen. Ideal for many educational uses.

A top quality pen plus a first-class program. The best value pen package available.

Send cheques/P.O. to:  
**TROJAN PRODUCTS**  
 88a Derby, Dursley, Stroud, Gloucestershire SA2 7PP  
 Tel: (0782) 285490

**TROJAN**   
 Micro Computer Software & Accessories

DEALERS CONTACT TROJAN NOW FOR DETAILS OF EXTRA SPECIAL DISCOUNTS



# Classified

**New! — Hardware for robotics, artificial intelligence, speech recognition, microprocessor control, etc.**

## ANALOG CONTROL INTERFACE

An Analog and Digital Control Board for Process Control and Data Acquisition for Universities, schools, colleges and industry. 8-bit A-to-D and D-to-A converters, bipolar buffered amplifiers, nine lines of TTL I/O, six status indicators, relay control.

### SPECIAL PRICE £27.00

(+ 50p p&h)

Detailed Manual with full instructions and numerous application notes, along with basic programs and machine code routines for use. Kit available mail order only from:

## ELECTROANALYTICAL TECHNOLOGY COMPUTER DIVISION

8 Access Road, West Derby, Liverpool L12 4YN

## DUST COVERS

### \* DRAGON 32 & 64 \*

Machine measures in quality material and will protect your terminals and discs. Each costs £6.95 (plus delivery against cash).

### ALL-INK ENTERPRISES

Freemans, Leigh L16 5BP

Trade enquiries welcome

**EDUCATIONAL GAMES — £3.95 each — £3.95 for both. MAESTRO** (3-11 years) teaches spelling (using pictures), addition and subtraction. **SPELLBOX** (12-14 years) teaches spelling using a 600 word vocabulary, multiple choice and display. Both use high resolution colour text and graphics. "A tribute to Dragon-Soft" (21.1). (Send request for brochures, details, children etc.) **More** (each £3.95) includes: **Arithmetic** (21.1), **Mathematics** (21.2), **Science** (21.3), **History** (21.4), **Geography** (21.5), **Art** (21.6), **Music** (21.7), **Physical Education** (21.8), **Health** (21.9), **Home Science** (21.10), **Religion** (21.11), **Philosophy** (21.12), **Law** (21.13), **Politics** (21.14), **Social Studies** (21.15), **Business** (21.16), **Finance** (21.17), **Insurance** (21.18), **Banking** (21.19), **Stocks and Bonds** (21.20), **Real Estate** (21.21), **Travel** (21.22), **Transportation** (21.23), **Communication** (21.24), **Recreation** (21.25), **Religion** (21.26), **Philosophy** (21.27), **Law** (21.28), **Politics** (21.29), **Social Studies** (21.30), **Business** (21.31), **Finance** (21.32), **Insurance** (21.33), **Banking** (21.34), **Stocks and Bonds** (21.35), **Real Estate** (21.36), **Travel** (21.37), **Transportation** (21.38), **Communication** (21.39), **Recreation** (21.40), **Religion** (21.41), **Philosophy** (21.42), **Law** (21.43), **Politics** (21.44), **Social Studies** (21.45), **Business** (21.46), **Finance** (21.47), **Insurance** (21.48), **Banking** (21.49), **Stocks and Bonds** (21.50), **Real Estate** (21.51), **Travel** (21.52), **Transportation** (21.53), **Communication** (21.54), **Recreation** (21.55), **Religion** (21.56), **Philosophy** (21.57), **Law** (21.58), **Politics** (21.59), **Social Studies** (21.60), **Business** (21.61), **Finance** (21.62), **Insurance** (21.63), **Banking** (21.64), **Stocks and Bonds** (21.65), **Real Estate** (21.66), **Travel** (21.67), **Transportation** (21.68), **Communication** (21.69), **Recreation** (21.70), **Religion** (21.71), **Philosophy** (21.72), **Law** (21.73), **Politics** (21.74), **Social Studies** (21.75), **Business** (21.76), **Finance** (21.77), **Insurance** (21.78), **Banking** (21.79), **Stocks and Bonds** (21.80), **Real Estate** (21.81), **Travel** (21.82), **Transportation** (21.83), **Communication** (21.84), **Recreation** (21.85), **Religion** (21.86), **Philosophy** (21.87), **Law** (21.88), **Politics** (21.89), **Social Studies** (21.90), **Business** (21.91), **Finance** (21.92), **Insurance** (21.93), **Banking** (21.94), **Stocks and Bonds** (21.95), **Real Estate** (21.96), **Travel** (21.97), **Transportation** (21.98), **Communication** (21.99), **Recreation** (21.100), **Religion** (21.101), **Philosophy** (21.102), **Law** (21.103), **Politics** (21.104), **Social Studies** (21.105), **Business** (21.106), **Finance** (21.107), **Insurance** (21.108), **Banking** (21.109), **Stocks and Bonds** (21.110), **Real Estate** (21.111), **Travel** (21.112), **Transportation** (21.113), **Communication** (21.114), **Recreation** (21.115), **Religion** (21.116), **Philosophy** (21.117), **Law** (21.118), **Politics** (21.119), **Social Studies** (21.120), **Business** (21.121), **Finance** (21.122), **Insurance** (21.123), **Banking** (21.124), **Stocks and Bonds** (21.125), **Real Estate** (21.126), **Travel** (21.127), **Transportation** (21.128), **Communication** (21.129), **Recreation** (21.130), **Religion** (21.131), **Philosophy** (21.132), **Law** (21.133), **Politics** (21.134), **Social Studies** (21.135), **Business** (21.136), **Finance** (21.137), **Insurance** (21.138), **Banking** (21.139), **Stocks and Bonds** (21.140), **Real Estate** (21.141), **Travel** (21.142), **Transportation** (21.143), **Communication** (21.144), **Recreation** (21.145), **Religion** (21.146), **Philosophy** (21.147), **Law** (21.148), **Politics** (21.149), **Social Studies** (21.150), **Business** (21.151), **Finance** (21.152), **Insurance** (21.153), **Banking** (21.154), **Stocks and Bonds** (21.155), **Real Estate** (21.156), **Travel** (21.157), **Transportation** (21.158), **Communication** (21.159), **Recreation** (21.160), **Religion** (21.161), **Philosophy** (21.162), **Law** (21.163), **Politics** (21.164), **Social Studies** (21.165), **Business** (21.166), **Finance** (21.167), **Insurance** (21.168), **Banking** (21.169), **Stocks and Bonds** (21.170), **Real Estate** (21.171), **Travel** (21.172), **Transportation** (21.173), **Communication** (21.174), **Recreation** (21.175), **Religion** (21.176), **Philosophy** (21.177), **Law** (21.178), **Politics** (21.179), **Social Studies** (21.180), **Business** (21.181), **Finance** (21.182), **Insurance** (21.183), **Banking** (21.184), **Stocks and Bonds** (21.185), **Real Estate** (21.186), **Travel** (21.187), **Transportation** (21.188), **Communication** (21.189), **Recreation** (21.190), **Religion** (21.191), **Philosophy** (21.192), **Law** (21.193), **Politics** (21.194), **Social Studies** (21.195), **Business** (21.196), **Finance** (21.197), **Insurance** (21.198), **Banking** (21.199), **Stocks and Bonds** (21.200), **Real Estate** (21.201), **Travel** (21.202), **Transportation** (21.203), **Communication** (21.204), **Recreation** (21.205), **Religion** (21.206), **Philosophy** (21.207), **Law** (21.208), **Politics** (21.209), **Social Studies** (21.210), **Business** (21.211), **Finance** (21.212), **Insurance** (21.213), **Banking** (21.214), **Stocks and Bonds** (21.215), **Real Estate** (21.216), **Travel** (21.217), **Transportation** (21.218), **Communication** (21.219), **Recreation** (21.220), **Religion** (21.221), **Philosophy** (21.222), **Law** (21.223), **Politics** (21.224), **Social Studies** (21.225), **Business** (21.226), **Finance** (21.227), **Insurance** (21.228), **Banking** (21.229), **Stocks and Bonds** (21.230), **Real Estate** (21.231), **Travel** (21.232), **Transportation** (21.233), **Communication** (21.234), **Recreation** (21.235), **Religion** (21.236), **Philosophy** (21.237), **Law** (21.238), **Politics** (21.239), **Social Studies** (21.240), **Business** (21.241), **Finance** (21.242), **Insurance** (21.243), **Banking** (21.244), **Stocks and Bonds** (21.245), **Real Estate** (21.246), **Travel** (21.247), **Transportation** (21.248), **Communication** (21.249), **Recreation** (21.250), **Religion** (21.251), **Philosophy** (21.252), **Law** (21.253), **Politics** (21.254), **Social Studies** (21.255), **Business** (21.256), **Finance** (21.257), **Insurance** (21.258), **Banking** (21.259), **Stocks and Bonds** (21.260), **Real Estate** (21.261), **Travel** (21.262), **Transportation** (21.263), **Communication** (21.264), **Recreation** (21.265), **Religion** (21.266), **Philosophy** (21.267), **Law** (21.268), **Politics** (21.269), **Social Studies** (21.270), **Business** (21.271), **Finance** (21.272), **Insurance** (21.273), **Banking** (21.274), **Stocks and Bonds** (21.275), **Real Estate** (21.276), **Travel** (21.277), **Transportation** (21.278), **Communication** (21.279), **Recreation** (21.280), **Religion** (21.281), **Philosophy** (21.282), **Law** (21.283), **Politics** (21.284), **Social Studies** (21.285), **Business** (21.286), **Finance** (21.287), **Insurance** (21.288), **Banking** (21.289), **Stocks and Bonds** (21.290), **Real Estate** (21.291), **Travel** (21.292), **Transportation** (21.293), **Communication** (21.294), **Recreation** (21.295), **Religion** (21.296), **Philosophy** (21.297), **Law** (21.298), **Politics** (21.299), **Social Studies** (21.300), **Business** (21.301), **Finance** (21.302), **Insurance** (21.303), **Banking** (21.304), **Stocks and Bonds** (21.305), **Real Estate** (21.306), **Travel** (21.307), **Transportation** (21.308), **Communication** (21.309), **Recreation** (21.310), **Religion** (21.311), **Philosophy** (21.312), **Law** (21.313), **Politics** (21.314), **Social Studies** (21.315), **Business** (21.316), **Finance** (21.317), **Insurance** (21.318), **Banking** (21.319), **Stocks and Bonds** (21.320), **Real Estate** (21.321), **Travel** (21.322), **Transportation** (21.323), **Communication** (21.324), **Recreation** (21.325), **Religion** (21.326), **Philosophy** (21.327), **Law** (21.328), **Politics** (21.329), **Social Studies** (21.330), **Business** (21.331), **Finance** (21.332), **Insurance** (21.333), **Banking** (21.334), **Stocks and Bonds** (21.335), **Real Estate** (21.336), **Travel** (21.337), **Transportation** (21.338), **Communication** (21.339), **Recreation** (21.340), **Religion** (21.341), **Philosophy** (21.342), **Law** (21.343), **Politics** (21.344), **Social Studies** (21.345), **Business** (21.346), **Finance** (21.347), **Insurance** (21.348), **Banking** (21.349), **Stocks and Bonds** (21.350), **Real Estate** (21.351), **Travel** (21.352), **Transportation** (21.353), **Communication** (21.354), **Recreation** (21.355), **Religion** (21.356), **Philosophy** (21.357), **Law** (21.358), **Politics** (21.359), **Social Studies** (21.360), **Business** (21.361), **Finance** (21.362), **Insurance** (21.363), **Banking** (21.364), **Stocks and Bonds** (21.365), **Real Estate** (21.366), **Travel** (21.367), **Transportation** (21.368), **Communication** (21.369), **Recreation** (21.370), **Religion** (21.371), **Philosophy** (21.372), **Law** (21.373), **Politics** (21.374), **Social Studies** (21.375), **Business** (21.376), **Finance** (21.377), **Insurance** (21.378), **Banking** (21.379), **Stocks and Bonds** (21.380), **Real Estate** (21.381), **Travel** (21.382), **Transportation** (21.383), **Communication** (21.384), **Recreation** (21.385), **Religion** (21.386), **Philosophy** (21.387), **Law** (21.388), **Politics** (21.389), **Social Studies** (21.390), **Business** (21.391), **Finance** (21.392), **Insurance** (21.393), **Banking** (21.394), **Stocks and Bonds** (21.395), **Real Estate** (21.396), **Travel** (21.397), **Transportation** (21.398), **Communication** (21.399), **Recreation** (21.400), **Religion** (21.401), **Philosophy** (21.402), **Law** (21.403), **Politics** (21.404), **Social Studies** (21.405), **Business** (21.406), **Finance** (21.407), **Insurance** (21.408), **Banking** (21.409), **Stocks and Bonds** (21.410), **Real Estate** (21.411), **Travel** (21.412), **Transportation** (21.413), **Communication** (21.414), **Recreation** (21.415), **Religion** (21.416), **Philosophy** (21.417), **Law** (21.418), **Politics** (21.419), **Social Studies** (21.420), **Business** (21.421), **Finance** (21.422), **Insurance** (21.423), **Banking** (21.424), **Stocks and Bonds** (21.425), **Real Estate** (21.426), **Travel** (21.427), **Transportation** (21.428), **Communication** (21.429), **Recreation** (21.430), **Religion** (21.431), **Philosophy** (21.432), **Law** (21.433), **Politics** (21.434), **Social Studies** (21.435), **Business** (21.436), **Finance** (21.437), **Insurance** (21.438), **Banking** (21.439), **Stocks and Bonds** (21.440), **Real Estate** (21.441), **Travel** (21.442), **Transportation** (21.443), **Communication** (21.444), **Recreation** (21.445), **Religion** (21.446), **Philosophy** (21.447), **Law** (21.448), **Politics** (21.449), **Social Studies** (21.450), **Business** (21.451), **Finance** (21.452), **Insurance** (21.453), **Banking** (21.454), **Stocks and Bonds** (21.455), **Real Estate** (21.456), **Travel** (21.457), **Transportation** (21.458), **Communication** (21.459), **Recreation** (21.460), **Religion** (21.461), **Philosophy** (21.462), **Law** (21.463), **Politics** (21.464), **Social Studies** (21.465), **Business** (21.466), **Finance** (21.467), **Insurance** (21.468), **Banking** (21.469), **Stocks and Bonds** (21.470), **Real Estate** (21.471), **Travel** (21.472), **Transportation** (21.473), **Communication** (21.474), **Recreation** (21.475), **Religion** (21.476), **Philosophy** (21.477), **Law** (21.478), **Politics** (21.479), **Social Studies** (21.480), **Business** (21.481), **Finance** (21.482), **Insurance** (21.483), **Banking** (21.484), **Stocks and Bonds** (21.485), **Real Estate** (21.486), **Travel** (21.487), **Transportation** (21.488), **Communication** (21.489), **Recreation** (21.490), **Religion** (21.491), **Philosophy** (21.492), **Law** (21.493), **Politics** (21.494), **Social Studies** (21.495), **Business** (21.496), **Finance** (21.497), **Insurance** (21.498), **Banking** (21.499), **Stocks and Bonds** (21.500), **Real Estate** (21.501), **Travel** (21.502), **Transportation** (21.503), **Communication** (21.504), **Recreation** (21.505), **Religion** (21.506), **Philosophy** (21.507), **Law** (21.508), **Politics** (21.509), **Social Studies** (21.510), **Business** (21.511), **Finance** (21.512), **Insurance** (21.513), **Banking** (21.514), **Stocks and Bonds** (21.515), **Real Estate** (21.516), **Travel** (21.517), **Transportation** (21.518), **Communication** (21.519), **Recreation** (21.520), **Religion** (21.521), **Philosophy** (21.522), **Law** (21.523), **Politics** (21.524), **Social Studies** (21.525), **Business** (21.526), **Finance** (21.527), **Insurance** (21.528), **Banking** (21.529), **Stocks and Bonds** (21.530), **Real Estate** (21.531), **Travel** (21.532), **Transportation** (21.533), **Communication** (21.534), **Recreation** (21.535), **Religion** (21.536), **Philosophy** (21.537), **Law** (21.538), **Politics** (21.539), **Social Studies** (21.540), **Business** (21.541), **Finance** (21.542), **Insurance** (21.543), **Banking** (21.544), **Stocks and Bonds** (21.545), **Real Estate** (21.546), **Travel** (21.547), **Transportation** (21.548), **Communication** (21.549), **Recreation** (21.550), **Religion** (21.551), **Philosophy** (21.552), **Law** (21.553), **Politics** (21.554), **Social Studies** (21.555), **Business** (21.556), **Finance** (21.557), **Insurance** (21.558), **Banking** (21.559), **Stocks and Bonds** (21.560), **Real Estate** (21.561), **Travel** (21.562), **Transportation** (21.563), **Communication** (21.564), **Recreation** (21.565), **Religion** (21.566), **Philosophy** (21.567), **Law** (21.568), **Politics** (21.569), **Social Studies** (21.570), **Business** (21.571), **Finance** (21.572), **Insurance** (21.573), **Banking** (21.574), **Stocks and Bonds** (21.575), **Real Estate** (21.576), **Travel** (21.577), **Transportation** (21.578), **Communication** (21.579), **Recreation** (21.580), **Religion** (21.581), **Philosophy** (21.582), **Law** (21.583), **Politics** (21.584), **Social Studies** (21.585), **Business** (21.586), **Finance** (21.587), **Insurance** (21.588), **Banking** (21.589), **Stocks and Bonds** (21.590), **Real Estate** (21.591), **Travel** (21.592), **Transportation** (21.593), **Communication** (21.594), **Recreation** (21.595), **Religion** (21.596), **Philosophy** (21.597), **Law** (21.598), **Politics** (21.599), **Social Studies** (21.600), **Business** (21.601), **Finance** (21.602), **Insurance** (21.603), **Banking** (21.604), **Stocks and Bonds** (21.605), **Real Estate** (21.606), **Travel** (21.607), **Transportation** (21.608), **Communication** (21.609), **Recreation** (21.610), **Religion** (21.611), **Philosophy** (21.612), **Law** (21.613), **Politics** (21.614), **Social Studies** (21.615), **Business** (21.616), **Finance** (21.617), **Insurance** (21.618), **Banking** (21.619), **Stocks and Bonds** (21.620), **Real Estate** (21.621), **Travel** (21.622), **Transportation** (21.623), **Communication** (21.624), **Recreation** (21.625), **Religion** (21.626), **Philosophy** (21.627), **Law** (21.628), **Politics** (21.629), **Social Studies** (21.630), **Business** (21.631), **Finance** (21.632), **Insurance** (21.633), **Banking** (21.634), **Stocks and Bonds** (21.635), **Real Estate** (21.636), **Travel** (21.637), **Transportation** (21.638), **Communication** (21.639), **Recreation** (21.640), **Religion** (21.641), **Philosophy** (21.642), **Law** (21.643), **Politics** (21.644), **Social Studies** (21.645), **Business** (21.646), **Finance** (21.647), **Insurance** (21.648), **Banking** (21.649), **Stocks and Bonds** (21.650), **Real Estate** (21.651), **Travel** (21.652), **Transportation** (21.653), **Communication** (21.654), **Recreation** (21.655), **Religion** (21.656), **Philosophy** (21.657), **Law** (21.658), **Politics** (21.659), **Social Studies** (21.660), **Business** (21.661), **Finance** (21.662), **Insurance** (21.663), **Banking** (21.664), **Stocks and Bonds** (21.665), **Real Estate** (21.666), **Travel** (21.667), **Transportation** (21.668), **Communication** (21.669), **Recreation** (21.670), **Religion** (21.671), **Philosophy** (21.672), **Law** (21.673), **Politics** (21.674), **Social Studies** (21.675), **Business** (21.676), **Finance** (21.677), **Insurance** (21.678), **Banking** (21.679), **Stocks and Bonds** (21.680), **Real Estate** (21.681), **Travel** (21.682), **Transportation** (21.683), **Communication** (21.684), **Recreation** (21.685), **Religion** (21.686), **Philosophy** (21.687), **Law** (21.688), **Politics** (21.689), **Social Studies** (21.690), **Business** (21.691), **Finance** (21.692), **Insurance** (21.693), **Banking** (21.694), **Stocks and Bonds** (21.695), **Real Estate** (21.696), **Travel** (21.697), **Transportation** (21.698), **Communication** (21.699), **Recreation** (21.700), **Religion** (21.701), **Philosophy** (21.702), **Law** (21.703), **Politics** (21.704), **Social Studies** (21.705), **Business** (21.706), **Finance** (21.707), **Insurance** (21.708), **Banking** (21.709), **Stocks and Bonds** (21.710), **Real Estate** (21.711), **Travel** (21.712), **Transportation** (21.713), **Communication** (21.714), **Recreation** (21.715), **Religion** (21.716), **Philosophy** (21.717), **Law** (21.718), **Politics** (21.719), **Social Studies** (21.720), **Business** (21.721), **Finance** (21.722), **Insurance** (21.723), **Banking** (21.724), **Stocks and Bonds** (21.725), **Real Estate** (21.726), **Travel** (21.727), **Transportation** (21.728), **Communication** (21.729), **Recreation** (21.730), **Religion** (21.731), **Philosophy** (21.732), **Law** (21.733), **Politics** (21.734), **S**

# Competition Corner

Answers to Competition Corner,  
Dragon User, 12-13 Little Newport  
Street, London WC2H 7PP.

THE GAME of Nim is one of the oldest games for two players, and certainly it is a variation to be found in most countries and cultures. Nim is a game that can be played using the simplest of materials such as pebbles on the beach or coins on the table. It can also be adapted for playing by computer.

The rules of the game are simple. Several pebbles are laid out in a number of rows and players take it in turns to remove one or more pebbles. The only limitation is that at each go the pebbles must all come from the same row. The winner is the player to take the last pebble.

For example, in the game below a player could remove either one, two, three, or four pebbles from row 'A', or either one or both pebbles from row 'B', or he might elect to remove from one to all seven pebbles from row 'C'.

```
A * * * * *
B * *
C * * * * * *
```

In fact, the only safe move would be to take just one pebble from row 'C'. Unfortunately space doesn't permit a full discussion as to why this should be so, but readers who are interested might get some clue from analysing the program given below and seeing how the computer decides on its best move. That this method is related to the binary method of counting might suggest why the game of Nim is suited to computer analysis. Indeed a machine called the 'Nimron' was built by the Westinghouse Electric Corporation and exhibited in New York in 1949. This machine weighed a ton and was limited to playing with only four rows with a maximum of seven 'pebbles' in each. The version for the Dragon gives more adds variety to the game by generating a random number of rows with up to 50 'pebbles' in each row. You will find that as the computer prints out the 'pebbles', each block of five is in a different colour. This has no significance relating to the game and is done simply to make counting the pebbles in each row easier.

Have a happy Christmas!

For the Christmas Competition we are turning to the adventures of the well-known anthropologist and explorer, Mr. Symphysis Offenknighly who has just returned from the remote East European country of Pandemonia.

This country is so remote that the conventional Arabic system of numbers is still unknown. Instead of using the 10 digits which we recognise as zero to nine, the Pandemonians use 10 written symbols which bear a striking resemblance to our letters A, B, C, D, E, F, G, H, I and J

(though not necessarily in this order).

Not surprisingly books of mathematical tables are in sale in the local shops, and Mr. O-K, mistaking one for an English Pandemonian phrase book, caused a great deal of confusion by reading from a page of square numbers. This is perhaps understandable if it is realised that amongst this table of squares in the notation of Pandemonia are the words HAD, CABBAGE, and DEFIED.

Can you determine which letter represents which digit?

```
100 GOSUB L177, B177, C177, H177, I177, J177
101 GOTO 170
102 REM *****
103 REM *****
104 REM *****
105 REM *****
106 REM *****
107 REM *****
108 REM *****
109 REM *****
110 REM *****
111 REM *****
112 REM *****
113 REM *****
114 REM *****
115 REM *****
116 REM *****
117 REM *****
118 REM *****
119 REM *****
120 REM *****
121 REM *****
122 REM *****
123 REM *****
124 REM *****
125 REM *****
126 REM *****
127 REM *****
128 REM *****
129 REM *****
130 REM *****
131 REM *****
132 REM *****
133 REM *****
134 REM *****
135 REM *****
136 REM *****
137 REM *****
138 REM *****
139 REM *****
140 REM *****
141 REM *****
142 REM *****
143 REM *****
144 REM *****
145 REM *****
146 REM *****
147 REM *****
148 REM *****
149 REM *****
150 REM *****
151 REM *****
152 REM *****
153 REM *****
154 REM *****
155 REM *****
156 REM *****
157 REM *****
158 REM *****
159 REM *****
160 REM *****
161 REM *****
162 REM *****
163 REM *****
164 REM *****
165 REM *****
166 REM *****
167 REM *****
168 REM *****
169 REM *****
170 REM *****
171 REM *****
172 REM *****
173 REM *****
174 REM *****
175 REM *****
176 REM *****
177 REM *****
178 REM *****
179 REM *****
180 REM *****
181 REM *****
182 REM *****
183 REM *****
184 REM *****
185 REM *****
186 REM *****
187 REM *****
188 REM *****
189 REM *****
190 REM *****
191 REM *****
192 REM *****
193 REM *****
194 REM *****
195 REM *****
196 REM *****
197 REM *****
198 REM *****
199 REM *****
200 REM *****
201 REM *****
202 REM *****
203 REM *****
204 REM *****
205 REM *****
206 REM *****
207 REM *****
208 REM *****
209 REM *****
210 REM *****
211 REM *****
212 REM *****
213 REM *****
214 REM *****
215 REM *****
216 REM *****
217 REM *****
218 REM *****
219 REM *****
220 REM *****
221 REM *****
222 REM *****
223 REM *****
224 REM *****
225 REM *****
226 REM *****
227 REM *****
228 REM *****
229 REM *****
230 REM *****
231 REM *****
232 REM *****
233 REM *****
234 REM *****
235 REM *****
236 REM *****
237 REM *****
238 REM *****
239 REM *****
240 REM *****
241 REM *****
242 REM *****
243 REM *****
244 REM *****
245 REM *****
246 REM *****
247 REM *****
248 REM *****
249 REM *****
250 REM *****
251 REM *****
252 REM *****
253 REM *****
254 REM *****
255 REM *****
256 REM *****
257 REM *****
258 REM *****
259 REM *****
260 REM *****
261 REM *****
262 REM *****
263 REM *****
264 REM *****
265 REM *****
266 REM *****
267 REM *****
268 REM *****
269 REM *****
270 REM *****
271 REM *****
272 REM *****
273 REM *****
274 REM *****
275 REM *****
276 REM *****
277 REM *****
278 REM *****
279 REM *****
280 REM *****
281 REM *****
282 REM *****
283 REM *****
284 REM *****
285 REM *****
286 REM *****
287 REM *****
288 REM *****
289 REM *****
290 REM *****
291 REM *****
292 REM *****
293 REM *****
294 REM *****
295 REM *****
296 REM *****
297 REM *****
298 REM *****
299 REM *****
300 REM *****
301 REM *****
302 REM *****
303 REM *****
304 REM *****
305 REM *****
306 REM *****
307 REM *****
308 REM *****
309 REM *****
310 REM *****
311 REM *****
312 REM *****
313 REM *****
314 REM *****
315 REM *****
316 REM *****
317 REM *****
318 REM *****
319 REM *****
320 REM *****
321 REM *****
322 REM *****
323 REM *****
324 REM *****
325 REM *****
326 REM *****
327 REM *****
328 REM *****
329 REM *****
330 REM *****
331 REM *****
332 REM *****
333 REM *****
334 REM *****
335 REM *****
336 REM *****
337 REM *****
338 REM *****
339 REM *****
340 REM *****
341 REM *****
342 REM *****
343 REM *****
344 REM *****
345 REM *****
346 REM *****
347 REM *****
348 REM *****
349 REM *****
350 REM *****
351 REM *****
352 REM *****
353 REM *****
354 REM *****
355 REM *****
356 REM *****
357 REM *****
358 REM *****
359 REM *****
360 REM *****
361 REM *****
362 REM *****
363 REM *****
364 REM *****
365 REM *****
366 REM *****
367 REM *****
368 REM *****
369 REM *****
370 REM *****
371 REM *****
372 REM *****
373 REM *****
374 REM *****
375 REM *****
376 REM *****
377 REM *****
378 REM *****
379 REM *****
380 REM *****
381 REM *****
382 REM *****
383 REM *****
384 REM *****
385 REM *****
386 REM *****
387 REM *****
388 REM *****
389 REM *****
390 REM *****
391 REM *****
392 REM *****
393 REM *****
394 REM *****
395 REM *****
396 REM *****
397 REM *****
398 REM *****
399 REM *****
400 REM *****
401 REM *****
402 REM *****
403 REM *****
404 REM *****
405 REM *****
406 REM *****
407 REM *****
408 REM *****
409 REM *****
410 REM *****
411 REM *****
412 REM *****
413 REM *****
414 REM *****
415 REM *****
416 REM *****
417 REM *****
418 REM *****
419 REM *****
420 REM *****
421 REM *****
422 REM *****
423 REM *****
424 REM *****
425 REM *****
426 REM *****
427 REM *****
428 REM *****
429 REM *****
430 REM *****
431 REM *****
432 REM *****
433 REM *****
434 REM *****
435 REM *****
436 REM *****
437 REM *****
438 REM *****
439 REM *****
440 REM *****
441 REM *****
442 REM *****
443 REM *****
444 REM *****
445 REM *****
446 REM *****
447 REM *****
448 REM *****
449 REM *****
450 REM *****
451 REM *****
452 REM *****
453 REM *****
454 REM *****
455 REM *****
456 REM *****
457 REM *****
458 REM *****
459 REM *****
460 REM *****
461 REM *****
462 REM *****
463 REM *****
464 REM *****
465 REM *****
466 REM *****
467 REM *****
468 REM *****
469 REM *****
470 REM *****
471 REM *****
472 REM *****
473 REM *****
474 REM *****
475 REM *****
476 REM *****
477 REM *****
478 REM *****
479 REM *****
480 REM *****
481 REM *****
482 REM *****
483 REM *****
484 REM *****
485 REM *****
486 REM *****
487 REM *****
488 REM *****
489 REM *****
490 REM *****
491 REM *****
492 REM *****
493 REM *****
494 REM *****
495 REM *****
496 REM *****
497 REM *****
498 REM *****
499 REM *****
500 REM *****
501 REM *****
502 REM *****
503 REM *****
504 REM *****
505 REM *****
506 REM *****
507 REM *****
508 REM *****
509 REM *****
510 REM *****
511 REM *****
512 REM *****
513 REM *****
514 REM *****
515 REM *****
516 REM *****
517 REM *****
518 REM *****
519 REM *****
520 REM *****
521 REM *****
522 REM *****
523 REM *****
524 REM *****
525 REM *****
526 REM *****
527 REM *****
528 REM *****
529 REM *****
530 REM *****
531 REM *****
532 REM *****
533 REM *****
534 REM *****
535 REM *****
536 REM *****
537 REM *****
538 REM *****
539 REM *****
540 REM *****
541 REM *****
542 REM *****
543 REM *****
544 REM *****
545 REM *****
546 REM *****
547 REM *****
548 REM *****
549 REM *****
550 REM *****
551 REM *****
552 REM *****
553 REM *****
554 REM *****
555 REM *****
556 REM *****
557 REM *****
558 REM *****
559 REM *****
560 REM *****
561 REM *****
562 REM *****
563 REM *****
564 REM *****
565 REM *****
566 REM *****
567 REM *****
568 REM *****
569 REM *****
570 REM *****
571 REM *****
572 REM *****
573 REM *****
574 REM *****
575 REM *****
576 REM *****
577 REM *****
578 REM *****
579 REM *****
580 REM *****
581 REM *****
582 REM *****
583 REM *****
584 REM *****
585 REM *****
586 REM *****
587 REM *****
588 REM *****
589 REM *****
590 REM *****
591 REM *****
592 REM *****
593 REM *****
594 REM *****
595 REM *****
596 REM *****
597 REM *****
598 REM *****
599 REM *****
600 REM *****
601 REM *****
602 REM *****
603 REM *****
604 REM *****
605 REM *****
606 REM *****
607 REM *****
608 REM *****
609 REM *****
610 REM *****
611 REM *****
612 REM *****
613 REM *****
614 REM *****
615 REM *****
616 REM *****
617 REM *****
618 REM *****
619 REM *****
620 REM *****
621 REM *****
622 REM *****
623 REM *****
624 REM *****
625 REM *****
626 REM *****
627 REM *****
628 REM *****
629 REM *****
630 REM *****
631 REM *****
632 REM *****
633 REM *****
634 REM *****
635 REM *****
636 REM *****
637 REM *****
638 REM *****
639 REM *****
640 REM *****
641 REM *****
642 REM *****
643 REM *****
644 REM *****
645 REM *****
646 REM *****
647 REM *****
648 REM *****
649 REM *****
650 REM *****
651 REM *****
652 REM *****
653 REM *****
654 REM *****
655 REM *****
656 REM *****
657 REM *****
658 REM *****
659 REM *****
660 REM *****
661 REM *****
662 REM *****
663 REM *****
664 REM *****
665 REM *****
666 REM *****
667 REM *****
668 REM *****
669 REM *****
670 REM *****
671 REM *****
672 REM *****
673 REM *****
674 REM *****
675 REM *****
676 REM *****
677 REM *****
678 REM *****
679 REM *****
680 REM *****
681 REM *****
682 REM *****
683 REM *****
684 REM *****
685 REM *****
686 REM *****
687 REM *****
688 REM *****
689 REM *****
690 REM *****
691 REM *****
692 REM *****
693 REM *****
694 REM *****
695 REM *****
696 REM *****
697 REM *****
698 REM *****
699 REM *****
700 REM *****
701 REM *****
702 REM *****
703 REM *****
704 REM *****
705 REM *****
706 REM *****
707 REM *****
708 REM *****
709 REM *****
710 REM *****
711 REM *****
712 REM *****
713 REM *****
714 REM *****
715 REM *****
716 REM *****
717 REM *****
718 REM *****
719 REM *****
720 REM *****
721 REM *****
722 REM *****
723 REM *****
724 REM *****
725 REM *****
726 REM *****
727 REM *****
728 REM *****
729 REM *****
730 REM *****
731 REM *****
732 REM *****
733 REM *****
734 REM *****
735 REM *****
736 REM *****
737 REM *****
738 REM *****
739 REM *****
740 REM *****
741 REM *****
742 REM *****
743 REM *****
744 REM *****
745 REM *****
746 REM *****
747 REM *****
748 REM *****
749 REM *****
750 REM *****
751 REM *****
752 REM *****
753 REM *****
754 REM *****
755 REM *****
756 REM *****
757 REM *****
758 REM *****
759 REM *****
760 REM *****
761 REM *****
762 REM *****
763 REM *****
764 REM *****
765 REM *****
766 REM *****
767 REM *****
768 REM *****
769 REM *****
770 REM *****
771 REM *****
772 REM *****
773 REM *****
774 REM *****
775 REM *****
776 REM *****
777 REM *****
778 REM *****
779 REM *****
780 REM *****
781 REM *****
782 REM *****
783 REM *****
784 REM *****
785 REM *****
786 REM *****
787 REM *****
788 REM *****
789 REM *****
790 REM *****
791 REM *****
792 REM *****
793 REM *****
794 REM *****
795 REM *****
796 REM *****
797 REM *****
798 REM *****
799 REM *****
800 REM *****
801 REM *****
802 REM *****
803 REM *****
804 REM *****
805 REM *****
806 REM *****
807 REM *****
808 REM *****
809 REM *****
810 REM *****
811 REM *****
812 REM *****
813 REM *****
814 REM *****
815 REM *****
816 REM *****
817 REM *****
818 REM *****
819 REM *****
820 REM *****
821 REM *****
822 REM *****
823 REM *****
824 REM *****
825 REM *****
826 REM *****
827 REM *****
828 REM *****
829 REM *****
830 REM *****
831 REM *****
832 REM *****
833 REM *****
834 REM *****
835 REM *****
836 REM *****
837 REM *****
838 REM *****
839 REM *****
840 REM *****
841 REM *****
842 REM *****
843 REM *****
844 REM *****
845 REM *****
846 REM *****
847 REM *****
848 REM *****
849 REM *****
850 REM *****
851 REM *****
852 REM *****
853 REM *****
854 REM *****
855 REM *****
856 REM *****
857 REM *****
858 REM *****
859 REM *****
860 REM *****
861 REM *****
862 REM *****
863 REM *****
864 REM *****
865 REM *****
866 REM *****
867 REM *****
868 REM *****
869 REM *****
870 REM *****
871 REM *****
872 REM *****
873 REM *****
874 REM *****
875 REM *****
876 REM *****
877 REM *****
878 REM *****
879 REM *****
880 REM *****
881 REM *****
882 REM *****
883 REM *****
884 REM *****
885 REM *****
886 REM *****
887 REM *****
888 REM *****
889 REM *****
890 REM *****
891 REM *****
892 REM *****
893 REM *****
894 REM *****
895 REM *****
896 REM *****
897 REM *****
898 REM *****
899 REM *****
900 REM *****
901 REM *****
902 REM *****
903 REM *****
904 REM *****
905 REM *****
906 REM *****
907 REM *****
908 REM *****
909 REM *****
910 REM *****
911 REM *****
912 REM *****
913 REM *****
914 REM *****
915 REM *****
916 REM *****
917 REM *****
918 REM *****
919 REM *****
920 REM *****
921 REM *****
922 REM *****
923 REM *****
924 REM *****
925 REM *****
926 REM *****
927 REM *****
928 REM *****
929 REM *****
930 REM *****
931 REM *****
932 REM *****
933 REM *****
934 REM *****
935 REM *****
936 REM *****
937 REM *****
938 REM *****
939 REM *****
940 REM *****
941 REM *****
942 REM *****
943 REM *****
944 REM *****
945 REM *****
946 REM *****
947 REM *****
948 REM *****
949 REM *****
950 REM *****
951 REM *****
952 REM *****
953 REM *****
954 REM *****
955 REM *****
956 REM *****
957 REM *****
958 REM *****
959 REM *****
960 REM *****
961 REM *****
962 REM *****
963 REM *****
964 REM *****
965 REM *****
966 REM *****
967 REM *****
968 REM *****
969 REM *****
970 REM *****
971 REM *****
972 REM *****
973 REM *****
974 REM *****
975 REM *****
976 REM *****
977 REM *****
978 REM *****
979 REM *****
980 REM *****
981 REM *****
982 REM *****
983 REM *****
984 REM *****
985 REM *****
986 REM *****
987 REM *****
988 REM *****
989 REM *****
990 REM *****
991 REM *****
992 REM *****
993 REM *****
994 REM *****
995 REM *****
996 REM *****
997 REM *****
998 REM *****
999 REM *****
1000 REM *****
```

## Prize

THIS MONTH we have a special prize, one of the latest, and perhaps best games for the Dragon. Micro-rodex have kindly agreed to donate 25 copies of Treasures, their latest graphic adventure — and if you want to find out just how good it is, turn to the reviews page where Mike Gerard gives it the once over.

## Rules

50 WIN a copy of Treasures you must first show the answer to the above problem, and, secondly, demonstrate how you solved it with the use of a Basic program written on your Dragon.

Please do not send in a cassette

containing your answer.

Make sure your name and address is printed clearly on your entry and mark the envelope December competition. Envelopes which do not say which month you are entering will be disqualified.

As a tie-breaker, complete the following sentence in 10 words or less: "I want to visit a Dark Star because ..."

Entries must reach Dragon User by the last working day in December. The winners will be announced in the March 1986 issue. The editor's decision is final and no correspondence will be entered into.

WMS:RPS

IT NEVER ceases to amaze us —

every month, people win prizes! And September was no different.

The following clever 15 have managed to get themselves copies of such Chuckle Egg and Screaming Abacus from Art & Software. They are: Richard Byrne of Gloucestershire, Elna, Peter Culling of Putney, E. Herman of Addlestone, D. Medford of Storrington, M. Stanton of Stoke Newington, Karen Mowat of Harlow, R. Lawson of Kettering, D. Hunt of Bolton-le-Sands, C. Jones of Llanerch, Luis Martinez of San Sebastian, Spain, B. Hart of Knutsford, Kevin Desmond of Cork, Elna, Clive Fries Nielsen of Roldalsten, Norway, Rachel Edwards of Segetfield, and Kim Hooley of Rugby.

# St. George now has two choices!

Red or green will slay the Dragon

- ▲ Nylon encased-Steel shafted joystick with ball and socket joint.
- ▲ Fast sprung return to centre.
- ▲ Graphite wiper linear potentiometers.
- ▲ 12 Months Guarantee.
- ▲ 7 day Money back Guarantee.

## Complete control at your fingertips

The smooth control of the Voltmace delta sprung return joystick is now available to Dragon owners. Each joystick has been individually tested before it leaves our factory, following extensive robot testing to prove the design (we tested in more than a million times). This means that not only will your joystick be strong, tough and reliable, but it ensures long life, accurate control and with the choice of red or green fire buttons, gives instant recognition between the left and right joysticks.

If you are not completely satisfied with the delta 3d, return it to us within seven days for a full refund.



Made in England

DELTA 3d JOYSTICK (29.99)  
TWO DELTA 3d JOYSTICKS (49.95)  
PLEASE STATE COLOURS REQUIRED

Prices include VAT and P&P.

**Voltmace delta 3d**

Callers welcome at the factory - Monday to Friday.

Dragon dealers come out of your corner!

More stockists required in some areas.

**VOLTMACE LTD**  
**PARK DRIVE**  
**BALDOCK**  
**HERTS**  
**SG7 6ED**  
Tel: (0463) 894410



# THE DARK PIT



Dragon 32 software only

Action packed arcade adventure with 64 screens, monsters, ghosts, laser guns, shotguns & a smart bomb. Tandy version will run on Dragon 32/64

Available for  
Dragon 32/64 cassette £8.00  
Tandy colour 32K cassette £9.00  
Post & Packing 35p



or Use our 24 hour Mail Order Service  
**0726 68020**

By post to **MICRODEAL**  
41 Truro Rd. St Austell,  
Cornwall PL26 5JE

## MICRODEAL