

DRAGON USER

International edition

The independent Dragon magazine

95p US\$3.25

May 1985

Dragon — write on!

*Dragon DOS
First Aid*



Dragon answers

Adventure Trail

WIN £225 of software
from Oasis

OASIS SOFTWARE

present . . . TWO NEW RELEASES



SPRINT BASIC COMPILER

A rapid step forward in Home Programming.

The newly released 1.1 upgraded compiler written by Dr. David Gray for Dragon 32 and 64 owners. By converting your own BASIC programs into intermediate code, Sprint accelerates them by up to 5 or even 10 times their normal running speed. Supporting virtually all the integer BASIC and cassette and printer commands. Sprint programs are not only compiled from tape but also run independently of the compiler.

DRAGON 32 & 64

DRAGON CHESS

- Six levels of play.
- All legal chess moves including en-passant, castling and pawn to queen promotion.
- List of previous moves stored which can be displayed or printed.

- Loading and saving of games positions from tape.
- High resolution graphics which can be flipped round to make black or white play from either end.
- Simultaneous text and graphics.

- Sides can be exchanged at any stage.
 - Best move hint.
 - Set up from any position.
 - Opening move library.
 - Moves may be taken back and play resumed from any point.
- "...I thought this was an excellent version of the game. Well worth buying" (Home Computer Weekly)

- Change level of play at any point in the game.
 - Will adjudicate games between humans.
 - Very high standard of play.
 - Professional packaging and lifetime guarantee.
- "Dragonchess is without doubt the best value chess on the market today" (Microdeal)



MIND GAMES COMPENDIUM.

All five games for just £19.95

Oasis Products are available from and all good software suppliers, including: Websters, Games & Computers, Microdeal, The Dragon Dungeon, PCS Distribution, Pilmist, Goal Computers (France), Falck Computers (Scandinavia) and Joylab (Germany).

If your local dealer does not stock these products then let us know his address and we will contact him.

Access orders taken by phone 24 hours a day.



0934 419921

Every product carries a lifetime guarantee. All prices include VAT and p & p.

BACKGAMMON
The well known game of backgammon complete with full instructions and computer demonstration for beginners.

REVERSI
At last! Reversi running on your Dragon 32 or 64. 2 levels of play, full instructions and computer demonstration for beginners.

INVADER CUBE
As well as being one of the best games of skill written for the Dragon 32 and 64 it also has some of the best pure machine code graphics we have ever seen.

DOMINOES
Two games in one with full instructions. Hours of frustrating fun this program has 6 levels of play and on the higher levels adapts its play to its assessment of your ability.

PETITE PASCAL

Not just a language - an education in structured programming.

This extended integer subset of the structured programming language is the ideal introduction, not only to a language widely used in schools and universities but also to programming itself. As an appreciation of PASCAL is generally accepted as the best way to increase your understanding of structured languages, this is a must for anyone who takes computing seriously.

OASIS SOFTWARE
Oasis Software, 9a Alexandra Parade, Weston-super-Mare, Tel: 0934 419921

Please send me
SPRINT BASIC COMPILER £14.95
PETITE PASCAL £14.95

I enclose cheque/PO for £ _____
Name _____
Address _____



Oasis Software, 9a Alexandra Parade, Weston-super-Mare, Tel: 0934 419921

	Dragon 32	Dragon 64
DRAGON CHESS	£9.95 <input type="checkbox"/>	<input type="checkbox"/>
BACKGAMMON	£5.95 <input type="checkbox"/>	<input type="checkbox"/>
REVERSI	£5.95 <input type="checkbox"/>	<input type="checkbox"/>
DOMINOES	£5.95 <input type="checkbox"/>	<input type="checkbox"/>
INVADER CUBE	£5.95 <input type="checkbox"/>	<input type="checkbox"/>
MIND GAMES COMPENDIUM	£19.95 <input type="checkbox"/>	<input type="checkbox"/>

NAME _____
ADDRESS _____
I enclose cheque/PO for £ _____

DRAGON USER



Telephone number
(All departments)
01-437 4343

Editor
MARTIN CROFT

Production Editor
BARBORA HÁJEK

Software Editor
GRAHAM TAYLOR

Editorial Secretary
GERALDINE SMYTH

Group Advertisement Manager
DAVID LAKE

Administration
THERESA LACY

Managing Editor
DUNCAN SCOT

Publishing Director
JENNY IRELAND

Subscriptions
UK £10 for 12 issues
Overseas (surface) £16 for 12 issues

ISSN 0265-0177. 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

ABC

Published by Sunshine Books, Scot Press Ltd. © Sunshine Books 1985
Typesetting by Chesham Press, Chesham, Bucks. Printed by Eden Fisher (Southend) Ltd, Southend-on-Sea, Essex
Distributed by S.M. Distribution, London SW9. 01-274 8611. Telex: 261643
Registered at the Post Office as a newspaper

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, to a very great extent depend on the quality of the discoveries that you can make with your Dragon. The Dragon computer was launched on 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 3000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a tape of the program.

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

Contents



- Letters** 4
A case of the uppers, booting the Exec, transatlantic troubles with Dragonquest, printer dump, and a flight of fancy
- News** 7
Eurohard and Compusense, Design Design, Mailbox, Combat Air Patrol, and more
- Software Review** 9
Games and utilities for your Dragon
- Dragon Writer** 10
Phil Brooks shows how to write text over graphics, and provides a useful program for redesigning character sets
- Dragon DOS** 17
Useful patches for your EPROMs to help you avoid some of the more common faults and problems of Dragon DOS, from P G Scott
- Open File** 21
Pages of games and useful routines for you to type in — this month, a screen dump, a disc wipe, and a new command to flash words on screen
- Ket Trilogy Offer** 24
You can save £1.00 off the recommended retail price of Incentive Software's famous trilogy of adventures in this Dragon User Special Offer.
- Adventure Trail** 27
Mike Gerrard offers succour for brain weary adventurers, and reviews the latest Scott Adams' offering for the Dragon, The Sorcerer of Claymorgue Castle.
- Dragon Answers** 31
Brian Cadge with his pick of the reader's queries — this month, an arrays problem, EXEC queries, Dragon 64 questions, and memory loss with Dragon DOS.
- Competition Corner** 34
This month, you can win one of fifteen copies of Sprint Basic Compiler, donated by Oasis Software — if you can solve tricky Gordon Lee's latest mathematical mind boggler.

Editorial

EUROHARD, the Spanish company which bought the rights to manufacture the Dragon, has appointed North London-based Compusense as the UK distributors for the new, Spanish-built Dragons.

Eduardo Merigo, President of Eurohard SA, has gone on record as saying that he sees the future role of the Dragon as primarily an educational and small-business machine.

Ted Oprychal of Compusense endorses that view. He said that his company will not be importing the Dragon 32, and instead will be pushing the Dragon 64 with disk drives as an entry level business machine. His view is that the Dragon is dead as a games machine.

Compusense is lobbying Eurohard for the development of a new generation of Dragon micros and peripherals, biased towards the business and home applications market.

Eurohard's plans for the future include a 128K machine, networking, and hard disks, all of which seem aimed more at the serious rather than the games side.

On the other hand, while software for the Dragon has been harder to find in the shops in the last six months, there are plenty of games on the mail-order market, as a browse through the advertisements in *Dragon User* will show.

Some companies have moved into the Dragon market after Dragon Data got into trouble — Incentive, for example, did well with *Backtrack*, and has just converted its best-selling adventure, the *Ket Trilogy*.

Eurohard and Compusense may be right. Perhaps the future for Dragon does lie with the small business market. But on the other hand, there do seem to be large numbers of existing Dragon owners who want games.

Eurohard should be careful about being over-zealous in the attempt to move the Dragon up-market. A substantial potential customer base could quite easily be alienated by bald statements concerning the death of the Dragon games market.

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.

On your uppers

IN REPLY to Mr Harrington's request for an alternative method for switching between upper-case and lower-case letters, the answer is quite simple. "SHIFT+0" (not "SHIFT+@") alters the alpha lock flag at address \$149 which normally contains the default setting \$FF for upper-case letters. To enter lower case from a program, all you need to do is clear the flag using either: CLR \$149 in assembly language or POKE&H149,0 in BASIC. I suggest that you enter lower-case mode at the beginning of the program and then use the SHIFT key for upper-case letters.

I K Barker
32 Meadow Drive
Wheatley
Halifax
West Yorkshire HX3 5JZ

How to boot the Exec

THE FOLLOWING may be of interest to DRAGON USER readers who own Dragon 64s:

Although it is easy to "Boot" from 32K mode to 64K mode, by entering "EXEC", it seems no provision is made to reverse back to 32K mode again. This is probably no real problem but it does mean that disk drive owners cannot make use of the extra memory and save their programs to disk, they either use a tape or do their programming in 32K mode. The following routine may therefore be useful as it allows a "Reverse Boot" to be made, ie from 64 to 32 mode, without loss of the basic program in memory.

Obviously the size of the program must not be larger than the memory available in 32K mode but large basic programs that contain a "PCLEAR8" or large arrays, which would normally give an "OM" error in 32K mode, can now be loaded, "Booted" into 64K mode, run (and edited if necessary) then transferred back to 32K mode for saving to disk.

First a short m/code routine

must be saved on a disk (or tape) and kept for whenever the "Reverse Boot" is needed. This can be done using the following basic program:

```
10 FOR I = &H7000 TO &H700E
20 READ A$
30 POKE I,VAL("&H"+A$)
40 NEXT
50 DATA 9E,19,BD,83,F3,30,2,9F
60 DATA 1B,9F,1D,9F,1F,39,0
```

After entering, type "RUN" then save the resulting m/code to disk using: SAVE'REVERSE.BIN', &H7000,&H700E,&H7000

To go to 32 mode from 64 simply type 'POKE 115,0' and press reset (this will produce the familiar DRAGON copyright screen) then, with the disk containing "REVERSE.BIN" in the drive, type 'RUN "REVERSE.BIN"' and the original basic program that existed in 64K mode will be restored.

D R Quinnell
10 Fountain Road
Strood
Rochester
Kent ME2 3SJ

Dragonquest query

I RECENTLY acquired a Dragon 64, in fact we received three of them.

Our problem is that none of us can solve the Dragon Game that came with it. We have had quite a number of people try the game but none of us can quite solve it.

If you could possibly give us some clue (please don't say "try examining things") it would be greatly appreciated.

The game is called *Dragon-*

quest and if anyone has any ideas on how to find the alchemist, the hut, the ruby or the shield or where to use the shovel, we would really like to know.

Still Trying,

Barbara Seay
6920 Woodman Ave
Van Nuys Ca 91405
USA

Dump to printer

I READ with interest Alan Wrigley's article in the February issue of *Dragon User* about dumping the high resolution screen on an Epson printer.

I have a "KDC FT-5001" printer that is very similar to the Epson, so I entered the program, only to find that it would not work.

Upon closer inspection, I found this was due to the program using the ESC "*" instruction which my printer does not use.

I then set about modifying the program so that it would work with my printer, and I thought other readers with similar printers may be interested in these modifications.

Add the following six bytes at the beginning of the program, starting at location 7E55:

```
B7,7F,F4,80,4B,39
```

Change these locations to:

```
7F1E : 8B
7F1F : 1A
7F20 : BD
7F21 : 7E
7F22 : 55
7F32 : EF
7F3A : F3
7F41 : F3
7FF2 : 00
7FF3 : 1B
```

The program now starts at location 32341 (7E55 hex) so when CLEARING space for it, the message is now:

```
CLEAR 200,32340
```

When saving the program, the message is now:

```
CSAVEM "PROGNAME",  
32341, 32767, 32347
```

The routine is called in the same way as before, ie:

```
PMODE4,1:SCREEN,0:  
EXEC32347
```

John Wardle
27 Magpie Way
Winslow
Bucks MK18 3JT

Flights of fancy?

BRIAN CADGE's flight simulator review omitted two minus points on the 747 simulator.

As the flight progresses, the computer memory is gradually used up until the game crashes with an OM ERROR, or at least mine does. On take off PRINT MEM = around 4000, and after a long flight PRINT MEM = around 100 to 200, hence the error message. The flight can be continued, losing no information, with a GOTO, when PRINT MEM = 4000 again, but this is not what should occur in a £9.95 game.

Secondly, you can presumably fly forever, as no fuel gauge is included. But, being Basic, it is not too difficult to add the gauge to the engines on/off and throttle control program lines. I've done this, and labelled the larger dials with their initials, which does improve the screen display somewhat.

Now, help required. Does anyone know the memory locations concerning the number of lives in Cable Software's 35 screen *Fantasy Flight*? I can't get beyond the first five or six screens with the five lives given. Otherwise it's an excellent game. Also I have a string of questions concerning *The Ring of Darkness*, so if anyone who has become fairly expert at this would care to contact me, postage would be returned along with my thanks and a list of queries.

M R Vine
120 Auriel Avenue
Dagenham
Essex RM10 8BU

Software Top 10

1 (1)	Manic Miner	S/Projects
2 (2)	Hunchback	Ocean
3 (3)	Chuckie Egg	A & F
4 (4)	Dragon Chess	Oasis
5 (-)	Bug Diver	M. Tronic
(-)	Chess	Dragon Data
7 (-)	Stock Control	MST
(-)	Mailer/Address Book	MST
9 (-)	Business Accounts	MST
(-)	Database	MST

Chart compiled by Websters Software

If you're into program writing...

Get this into an envelope

If the programs you are writing involve sophisticated graphics, you have two choices, a severe headache or Touchmaster.

Obviously you'll want to consider the matter, so in the mean time send away for your free Touchmaster literature and find out more about the best value/performance graphics tablet available... or take two pain killers!

TOUCHMASTER



Touchmaster Limited, PO Box 3,
Port Talbot, West Glamorgan, SA13 1WH.

To Touchmaster Limited, FREEPOST, Port Talbot, West Glamorgan, SA13 1ZZ.

Please send me free Touchmaster literature.

DU 5/85

Name

Address

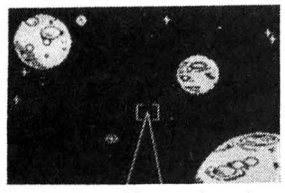
Make of
computer

SIMPLY

The best value for money software
you will ever buy for your
DRAGON 32......and that's not just our opinion...
9 superb full length games
on one cassette
for only **£3.95**

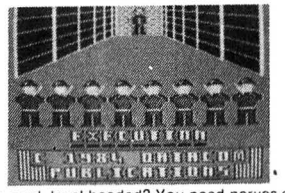
Dear Sir,
After purchasing your games cassette for my Dragon 32 I felt I had to write and say you are crazy! I have purchased many good games for my Dragon and have been pleased with them but your games tape is absolutely amazing value. I can honestly say that I would be happy to pay £3.95 for any one of these games, especially, Interplanetary Trader, Empire and Execution. They are extremely addictive.
I want to wish your company the very best with this cassette, it deserves to be a No. 1 seller.
Yours sincerely
Mr C Davis
W. Midlands

INTERPLANETARY TRADER




Pirate Attack! Just one of the many hazards encountered as you strive to become first ever GALACTIC MEGABILLIONAIRE! Success depends on ability to make lightning decisions, accurate forward planning. Should you brave the Meteor Storm to save precious time? Pay the outrageous protection demanded by Space Pirates? This massive 28K game provides compelling entertainment.

EXECUTION



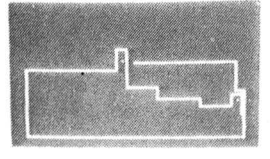
Are you cool, level headed? You need nerves of steel to play EXECUTION. Standing before the awesome firing squad you realise this is your last chance to receive a pardon, but time is fast running out...Features full high res moving graphics and sound. Hours of fun guaranteed in this massive 30K game.

WUMPUS MANSION



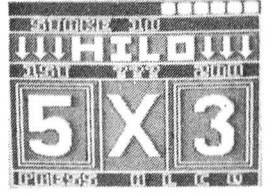
Only a crazy person would go near WUMPUS MANSION. You however, have ventured INSIDE it!!! Tempted by hoards of priceless treasures your mission is to raid the mansion and leave through the maze of tunnels. Will you outwit the dreaded WUMPI?? Can you avoid the time bombs?? Incredible fun!! Uses 29K.

WIPEOUT



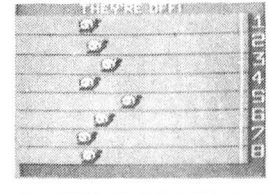
BE WARNED - THIS IS NOT EASY!!
A challenging multilevel graphic game demanding fast, accurate reaction. It begins easily enough, but gets progressively more difficult. Features 4 colour high resolution graphics, sound, bonus points and high score.

HILO



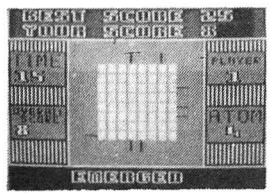
Is it skill or luck? Can you turn your humble £50 stake into £1,000,000?? This simple yet highly compelling game supported by excellent colour graphics and brilliant sound effects. Over 20K of clever programming!

SNAIL PACE



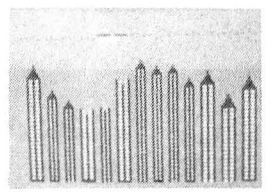
The excitement is almost unbearable as you watch 1-8 'thoroughbred racing snails' thrash it out on the racecourse!! Game features sensible odds and form guide to assist you. This superb piece of complex programming supported by magnificent graphics will ensure hours of excitement. A massive 26K!!

ATOM HUNT



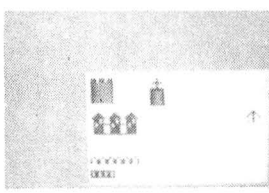
A superb feat of programming to make your brain ache and stretch your Dragon's memory chips to the absolute limit!! This game is played almost entirely in the 4 colour graphic modes and features a unique repeat game facility, individual ratings, and 1-4 players. Uses over 20K!!

AIR ASSAULT



MAYDAY! MAYDAY! Your crippled helicopter is rapidly losing altitude and face certain death unless you blast a landing space in the deserted city of Kroywen. Total concentration and precision required if you intend to stay alive. A super addictive game supported with exceptional sound and graphics!!

EMPIRE



From a knight to a KING! Can you build up your empire in the face of stiff opposition? Will you keep your subjects happy and balance the economy. This is an exciting multilevel game of strategy for up to 4 players. Includes a save game facility.

DATAKOM PUBLICATIONS DEPT D3, 407F Hockley Centre, Birmingham B18 6NF Tel: 021 233 1800

9 SUPERB FULL LENGTH PROGRAMS ON ONE CASSETTE. AN INCREDIBLE 220K OF IMPRESSIVE PROGRAMMING, SPECTACULAR COLOUR GRAPHICS AND SOUND EFFECTS!!!

Send Cheques or P.O. to: DATAKOM PUBLICATIONS DEPT D3, 407F Hockley Centre, Birmingham

Name Quantity Required

Address Please find enclosed my cheque/P.O. for
£

..... Post Code Signed

Telephone: Cheque/P.O. No.

DEALER ENQUIRIES WELCOMED: TELEPHONE: 021 233 1800
DATAKOM PUBLICATIONS DEPT. D

Eurohard — plans for the Dragon

THE DRAGON 32 is dead in the UK, but not in Europe.

That is the message from Eurohard, the Spanish company which bought the rights to manufacture the Dragon, and Compusense, the North London company appointed to distribute Spanish Dragons in the UK.

According to Juan Carlos Montero, Eurohard's Head of PR and International Relations, the 32 will be made in Spain, unchanged from the original Welsh machine.

But Ted Oprychal of Compusense confirmed that the 32 will not be imported into Britain. "The Dragon 32 is still being sold in Spain, but it is not their preferred machine," he said.

Eurohard will also be continuing to sell the Dragon 64, both in its original form, and in a redesigned case with a new Spanish keyboard. There may also be keyboards for other languages.

The new version of the 64 will be renamed the Dragon 200, according to Senor Montero.

Eurohard has a prototype of the 200, and may be showing it at the 6809 Show.

Compusense is committed to selling the Dragon 64 as an



Ted Oprychal of Compusense. entry level business machine, states Ted Oprychal.

"It is our total intention to push the 64 with disk drives. The only way forward for Dragon in this country is in a new market area."

Eurohard will not be manufacturing printers. Instead, it is likely that an externally bought printer will be marketed under the Dragon trademark.

Eurohard will be manufacturing a cassette recorder for use with the Dragon, aimed at the Spanish home market.

5¼" disk drives are being designed, with a 320K capacity. They will be compatible with the 32, the 64 and the 200, and have an official launch date of June.

Eurohard also has a 2.8" quick disk system in development, which should be ready by the end of April.

Compusense is unlikely to import the quick disk, however.

"I have my doubts about the applicability of this machine in the British market," Ted Oprychal says.

According to Senor Montero, the sales of the Dragon in Spain are going very well. In the last three months of 1984, Eurohard sold 20,000 units, he claimed.

"The Christmas campaign was a little smaller than envisaged but that affected micros across the board in Spain, not only the Dragon," he says.

January and February were slow, but that was expected.

Eurohard is apparently planning a new marketing tactic in Spain — door-to-door sales of the Dragon.

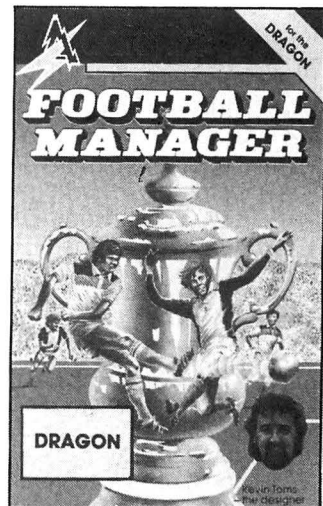
Ted Oprychal appears to believe that a 128K machine is in the pipeline, probably using OS9 Level Two as an operating system.

"Towards the end of the year, some fairly attractive systems should be produced, especially if Eurohard put in the networking system," he says.

Football crazy

ADDICTIVE Games has just converted its best selling title *Football Manager* for the Dragon.

Kevin Toms, who runs Addictive, was responsible for the conversion, and the program includes all the features which have made *Football Manager* number one in the charts across all makes of micro.



On the Dragon, *Football Manager* sells for £5.95.

Addictive Games are at 7a Richmond Hill, Bournemouth, Dorset BH2 6HE.

Vidipix

VIDIPIX is a new company with two games for the Dragon, *Jigsaw* and *Combat Air Patrol*. The Corby based company also makes Dragon peripherals to order.

Jigsaw comes with four different screen pictures, which are randomly disassembled into 192 different square blocks. The objective is to recreate the picture.

Combat Air patrol is a flight simulator, with three separate sections. The first involves combat with other aircraft; then comes air to air refuelling, and finally landing.

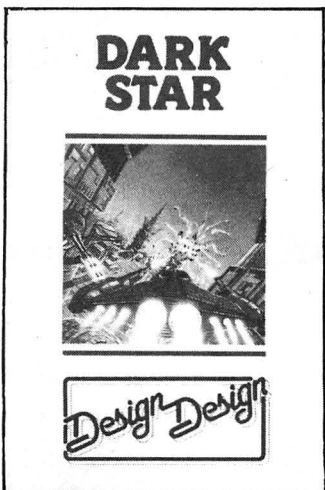
Both games cost £3.95. Vidipix will also make a printer interface to order. Called the Printerface, it changes to Centronics port to an RS232 printer interface. Full modem versions may be available later. Printerface costs around £35.00.

Vidipix is at 125 Occupation Road, Corby, Northants NN17 1EG.

Dark Star

DESIGN DESIGN has just launched a conversion of *Dark Star* for the Dragon.

Dark Star is a space combat



game played on a 16 by 16 grid. Each square is a section of a galaxy, and contains a certain number of enemy forces, fuel pods and such. Also dotted about the galactic grid are various planets occupied by the forces of an evil empire.

The player's objective is to get through to each planet, destroy the planetary defences, and liberate the oppressed world. Only after freeing every planet in the galaxy from the yoke of oppression is victory achieved.

Dark Star will cost £7.95. For more information contact Design Design, 2 Ashton Way, East Herrington, Sunderland SR3 3RX.

Mail box

MAILBOX is a new program from Hounslow-based Harris Micro Software for the Dragon 32/64 with Dragondos.

Following the success of the company's personal accounts program, *Moneybox*, *Mailbox* is a name and address database program, on a 42 column by 24 line screen.

It allows the user to store names and addresses with short notes or flags attached. The program can sort files, only printing those with common flags, for example.

Also included are routines for merging and purging files. *Mailbox* comes on a Dragondos disk, at £14.99. For further information, contact: Harris Micro Software, 49 Alexandra Road, Hounslow, Middlesex TW3 4HP.

DRAGON HARDWARE

NOW IN STOCK



DRAGON 64	£195
SINGLE DISK DRIVE — COMPLETE.....	£249
DOUBLE DISK DRIVE — COMPLETE.....	£399
UPGRADE KIT SINGLE TO DOUBLE DISK.....	£120
DOUBLE SIDED 40 TRACK UPGRADE.....	£170
SAM CHIP.....	£25
DRAGON 64/SINGLE DISK/FLEX/EDITOR/ASSEMBLER/DBASIC.....	£499.99
DRAGON 64/DOUBLE DISK/FLEX/EDITOR/ASSEMBLER/DBASIC.....	£649.99
COLOSSAL CAVE ADVENTURE FOR DRAGON 64 WITH DRAGON/DELTA DISK.....	£9.95

FLEX IS BEST

Of all the operating systems available on the DRAGON — FLEX is the only one to give you ALL of the following:

- 48K Bytes free user RAM
- 51 by 24 character Hi-Res Screen
- Supports up to four disk drives, Single/Double Sided — 40/80 Track — Single/Double Density
- Huge Choice of Available Software from Numerous Suppliers
- Compatibility with most DRAGON 32 BASIC and Machine Code software
- Fully Supported and Maintained in the UK
- Available for the DRAGON or DELTA Controller (and TANDY COLOUR)
- Reliable, Friendly and Easy to Use

FLEX

For DRAGON or DELTA disk systems with Editor and Assembler **£86.25** special price with DBASIC **£99.99** a reliable and easy to use operating system. It is the ideal operating system for the DRAGON — especially when combined with our DBASIC package. Requires DRAGON with 64K RAM.

- 48K Bytes FREE USER RAM
- 51 by 24 Hi-Res Screen with true lowercase, autorepeat, redefinable character sets, windows, etc
- Supports single and double density for interchange with other FLEX systems
- Includes over 30 standard utilities
- Powerful Macro Assembler
- Versatile Text Editor

RMS **£69.95**

A complete **DATABASE MANAGEMENT SYSTEM**. Versatile and very easy to learn to use. Ideal for accounting, business records, management information systems, customer records, customised data entry, stock control and much more. RMS can be readily configured to do many different jobs which require: data entry, online data retrieval/update and printing of reports without any programming knowledge. An RMS database is stored as a standard FLEX random file and is accessible to user written programs

FLEX UTILITIES **£35.00**

An invaluable collection of useful utilities for FLEX including DEMON MONITOR, 6809 disassembler, improved file copy, single sector copy, extend file, better CAT, change memory end, fill memory, map binary file, graphics dumps, RS232 terminal interface — and more.

DBASIC **£30.00**

Disk BASIC for FLEX. Get all the benefits of FLEX and run existing DRAGON programs with little or no changes

- Standard 32K DRAGON BASIC
- 32 by 16 Screen and 51 by 24 Screen
- Send Commands to FLEX from BASIC
- Use up to 8 sequential or random access files simultaneously
- ERROR GOTO statement to intercept errors
- ERROR command shows you exactly where BASIC detected an error
- Load/Save programs as FLEX disk files
- Includes 5 example programs

DYNAFAST

with DYNAMISER/DYNAXREF DRAGON BASIC COMPILER with Optimiser and Cross Reference Utilities
 Cartridge **£29.95**
 Dragon DOS disk **£19.95**
 DRAGON FLEX disk..... **£19.95**

EDIT +

EDIT+ is a Full Screen Editor and Programmer's Tool Kit. It's an excellent aid for writing programs in BASIC and is easy to use for the novice as well as the experienced programmer. EDIT+ includes all the facilities of HI-RES. Up to 23 lines of your program are displayed on the screen and can be changed by overtyping, inserting, or deleting characters. Functions include: Find String, Change String, Copy Text, Goto Specified Line, Scroll up Down, Append From Tape and Enter Basic Command. No Dragon is complete without an EDIT+

Cartridge **£34.50**
 Dragon DOS disk **£24.00**
 Dragon FLEX Disk **£19.95**

CROSS ASSEMBLERS

FOR ANY FLEX SYSTEM
 6800/2 6801/3 6301 6805 6502 8080/5
 Z80 macros, library file calls — all the features of the FLEX 6809 assembler
£51.75 each **all 7 for £201.25**

SEND SAE FOR FULL CATALOGUE

FAST MAIL ORDER SERVICE 01-882 0681

COMPUSENSE

COMPUSENSE LTD.

PO Box 169 286D Green Lanes London N13 5XA

Tel: 01-882 0681/6936

Telex: 8813271 GECOMS G



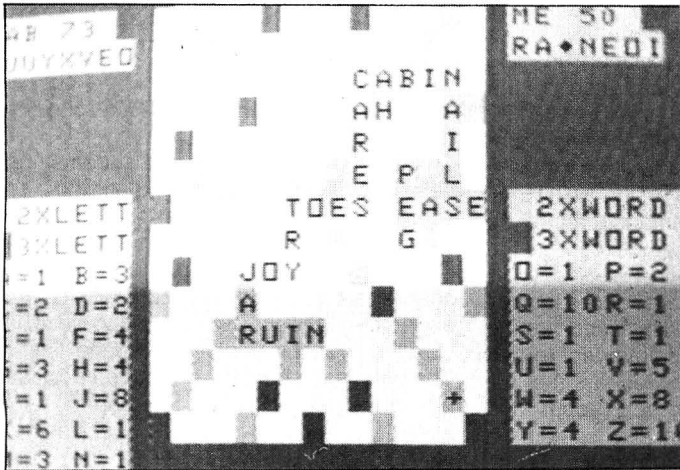
POSTAGE & PACKING £1 PER ORDER
PRICES INCLUDE VAT

Scrabbling for points

Programs: *Linkword*, *Darts* Computerware, PO Box 318, Stoke-on-Trent ST6 6OX
Price: £5.50 each

TO VIEW an epic film, however good, on TV after having seen it in true shape and size on the big screen is often something of a disappointment. The same is true of versions of real games mimicked by computer. *Linkword* and *Darts* are cases in point.

Linkword is computerised *Scrabble*, *Darts* is self evident.



In real *Scrabble*, you make your own destiny — you choose the titles, you try to outguess your opponent. The factor which gives most satisfaction in the game is physically handling the letters, arranging and rearranging them on your stands. Keeping the score also gives little Johnny something to do between his turns.

Now much of this is denied to players of *Linkword*. Your letters are chosen by the computer and displayed on the screen for all to see. Your score is automatically added to your total and the double and triple letter and word squares automatically accounted for.

Now all of this does add up to some neat programming. Letters can be placed on the multi-coloured board via a cursor, and options exist for players to exchange any number of letters for others unseen in the pool. End-game facilities are strong.

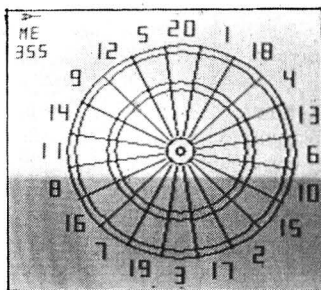
Even so, all of this adds

nothing that cannot be had from a £5.99 "real" *scrabble*.

There is no "acceptable word set" which would delineate the words you are allowed to use (obviously for reasons of memory) and no check is made to allow illegal moves (a new word not connecting with any already on the board, for example). The game does feature a delay so that opponents can object to a move, however.

Linkword seems to be an excellent program, with much enjoyment to be had from it — but it's not a patch on the real thing.

My caveat about *Darts* is much the same. A hi-



resolution dart board is at the mercy of a cross between Jocky Wilson and a Dalek, whose right arm is under your control. The flight of the released dart is shown, and its hit point on the target shows up as a dot.

The hardest part of playing real darts — the subtraction — is taken care of by the computer.

The on-screen player can be moved to any part of the screen for better trajectory. The normal rules for darts are adhered to, including the need to end on a double or bull's eye.

The PMODE 4 graphics are

fine, the speed of the program is OK, and the players can have some fun. The variables involved in aiming a dart amount to much more than could ever be simulated in a program.

Once again Computerware has produced some excellent coding maximising the fea-

tures of the Dragon in all respects. But the games themselves are but pale imitations of the real things.

Mike Harrison



Joust a minute

Program: *Sky Joust*, J Morrison Micros, 4 Rein Gardens, Tingley, W Yorks WF3 1JR.
Price: £3.95.

SKY JOUST is loosely based on the arcade game "Joust". The game involves controlling your Ostrich in a duel against other birds, snakes and nasties using your laser lance to zap them. Failing to kill birds will result in them landing and laying eggs which eventually hatch into even more baddies.

The game begins with just one bird to kill and becomes

progressively harder as you continue with a total of three different screens. Pmode 3 graphics are used and are quite impressive, but by no means the best that J Morrison have produced, and apart from the music on the title screen the sound effects are uninspired.

The best thing about this game is its price — just £3.95. The software is not as sophisticated as other versions, such as *Buzzard Bait* by Microdeal and is therefore not so addictive.

Brian Cadge



Blockbuster quiz

Program: *Blockbuster*, Computerware, PO Box 318, Stoke-on-Trent ST6 6OX
Price £5.50

WHEN Charades and Postman's Knock have worn a bit thin over Easter and you've put off that walk you were going to take, the family might turn to a quiz for some competitive entertainment.

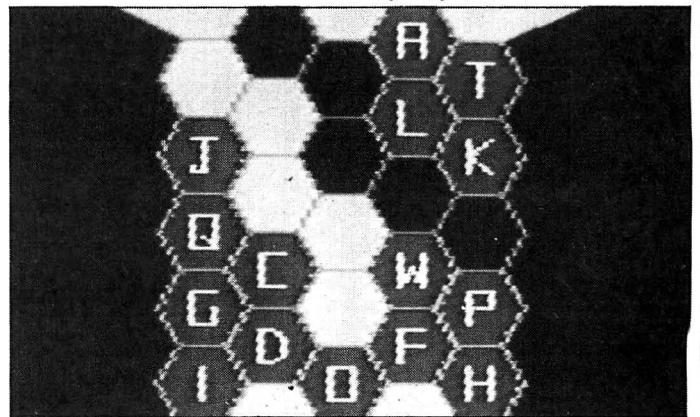
They could do worse than play *Blockbuster*, which follows the style of the TV game of the same name. The idea is to guess answers beginning with a given letter, and trace a route from one side of the screen to the other.

Computerware present the quiz in an efficient and compelling way. Just as in the TV game, you may try to guess the answer before the question is complete — but something like "what W is the opposite of . . ." can leave you in a mess. If you are wrong, your opponent gets the full question. A time limit also applies.

The data is cleverly ordered such that even on completing a round the same questions do not come up again. There are 500 questions altogether to keep you going.

If your general knowledge needs repair or you are a quiz fan, this could be the one for you.

Mike Harrison



Write on!

Phil Brooks shows how to mix text and graphics on your Dragon

SEVERAL ROUTINES have been published which attempt to overcome the Dragon's inability to mix text and graphics. Most utilise the "Draw" command to build up the text on the graphics screen. This is a slow process, and if any flexibility is required then a great deal of memory is taken up by all the strings required for a complete set of alphanumeric characters. If lower case is also needed, then even more space is lost. The machine code routine in listing 1 provides a fast, flexible and friendly way to display upper or lower case text and user designed graphics in PMODE4, with the added bonus of double size characters in PMODE2.

WRITE

The machine code contains an extension to the Dragon's Basic interpreter which allows it to recognise the new command "WRITE". This is almost exactly analogous to the usual "PRINT" command, with one or two exceptions. The characters are made up on an 8 x 12 matrix, the lower case letters having true descenders, and WRITING can begin on any of the 192 lines of the screen and in any of the 32 columns by means of the command WRITE @ x, exactly as in PRINT @ x,. In this instance, x defines the upper edge of the first character to be written, so that to move down the page by one text line x must be increased by 12x32. As with the PRINT command, x can be a constant, a variable or an expression, so that WRITE @ 15*32*12+5, SP\$ will place SP\$ in the fifth column of the fifteenth text line. If there is insufficient space at the bottom of the screen for the first character to be written, or if the position specified is outside the screen, then a BS error will be flagged. If, however, the start position is within limits but the string to be written exceeds the space available then the entire display will scroll up until there is enough space for a complete line of text.

In order to simplify the coding as much as possible, the WRITE command can only operate on strings. To display a constant or a variable it must first be stored

as a string, so to write the value of the variable ZZ, use ZZ\$=STR\$(ZZ):WRITE ZZ\$. Pre-defined or immediate strings are accepted, but string manipulation is not possible. Thus 10 WRITE "FREDERICK" and 10 FRED\$="FREDERICK" 20 WRITE FRED\$ are both acceptable, but WRITE FRED\$+"THE GREAT" or WRITE CHR\$(65) are not. Single letter string names, such as A\$, are not accepted, and will cause a SN ERROR. String arrays are not directly accessible. The required element of an array must first be redefined as a simple array, as in PLACES\$=TOWNS\$(2,4):WRITE PLACES\$.

As with the PRINT command, the line terminators ";" or ",'" can be used to control the write position counter. Two or more strings can be included in one program line if they are separated by one of these separators, as in WRITE AZ\$;"THE";DSS\$. The write position counter is initially set at 0, but is not reset by a PCLS. It can be reset by using WRITE @ 0,",'" ;. The WRITE command cannot be used in multistatement lines except as the last statement in such a line.

Lower case letters are accessed by means of the shift 0 key, and during programming appear as inverted (green on black) capitals. As well as the full alphanumeric character set (upper and lower case) the program also contains a number of user definable graphics. These are accessed by using a program line such as

```
60 ALPHA$=CHR$(10):WRITE @
3000,ALPHA$;
```

The program in fact contains 122 characters. Listing 2 will enable you to redefine any of the characters to your own specification, and to display the full character set complete with the appropriate ASCII code for each character. For ASCII codes below 33 and from 91 to 96 inclusive the string to be written must first be defined using the CHR\$ function as described above. The character set as described in Listing 1 contains 10 special characters, CHR\$(0) to (9), which may be used to display the numbers 0 to 9 when in PMODE3. Some string manipulation will be necessary, but it will make it possible to

display a running score in a game, for example. CHR\$(10) to (31) inclusive have been pre-defined as the most used Greek letters, but like every other character, can be redefined using listing 2.

In addition to its use in graphics displays, the routine can of course also be used in text displays.

It is possible to write a complete program in which the normal text screen is never used. Listing 2 is an example of this, and a study of the subroutine in which a string is input to the program without using the normal text page should prove useful.

OWRITE

The routine also recognises three other commands, all with the same structure, limitations and syntax as WRITE. These are: OWRITE, for use when it is required to superimpose text on an existing graphic display, IWRITE for producing inverted characters, in this case black on green or black on buff, and finally IOWRITE, which combines the two. The use of OWRITE or IOWRITE in MODE3 may produce rather strange results.

The routine automatically corrects for whichever page of the graphic memory is in use, so that the WRITE@ position remains constant.

Naturally a change of page after a string has been WRITTEN will result in the screen position of that string changing along with the rest of the display. If PMODE2 is called with the write position counter set at the bottom of the PMODE4 page then a delay will result while it is scrolled to within the normal page limits. The cure is to specify the required position by means of a WRITE@ command.

After typing in listing 1., and before RUNNING it, CSAVE it. The checksum method used will kill 99 per cent of all known bugs, but is not foolproof.

After the program has been RUN type in EXEC 30596, and your extension interpreter will be installed and running. It has no effect on the speed of normal BASIC programs as it only comes into use when the normal interpreter meets an unfamiliar command. To save the machine code, type WRITE@0,",'" ; to reset the position counter, followed by CSAVEM "WRITER", 30596,32767,30596.

Remember always to CLEAR 30596 before reloading the machine code file, and to EXEC it once loaded. If Listing 2 is used to redesign characters then the entire listing should be resaved. Listing 3 is a simple demonstration program to display some of the features of the routines.

Listing 1 BASIC LOADER

```
10 REM**"WRITER". AN EXTENSION
INTERPRETER FOR THE DRAGON 32 BY
PHIL BROOKS, 104 BARGATES, LEOMINSTER**
20 CLEAR200,30596
30 FDR CT=30597 TO 32757 STEP 10
40 CS=0:FOR CC=0 TO 9:READ PK$:PK=VAL
("&H"+PK$):CS=CS+PK:POKE CT+CC,PK:NEXT CC
50 READ CK:IF CK<>CS THEN PRINT"DATA ERROR
IN LINE":CT-30497:STOP
60 NEXT CT:POKE32767,0
100 DATA 8E,77,91,BF,1,7A,86,7E,B7,1, 1164
```

```
110 DATA 79,39,81,80,25,1,39,10,8E,77, 807
120 DATA D2,9E,A6,C6,A,A6,A0,B1,2B,27, 1279
130 DATA D,A1,84,26,1D,C1,3,25,19,30, 679
140 DATA 1,5A,20,ED,31,A5,E6,3F,9E,A6, 1191
150 DATA 30,85,9F,A6,34,36,AD,BB,FD,35, 1275
160 DATA 36,86,83,39,31,A5,A6,A4,B1,2A, 1091
170 DATA 26,CD,9E,A6,A6,84,39,57,52,49, 1164
180 DATA 54,45,2B,2B,2B,7B,1D,4,4F,57, 601
190 DATA 52,49,54,45,2B,2B,7B,13,5,49, 611
200 DATA 57,52,49,54,45,2B,2B,7B,9,5, 615
210 DATA 49,4F,57,52,49,54,45,2B,77,FF, 964
```

220 DATA 6,2A,86,1,B7,7B,7E,B7,7B,7D, 1040
230 DATA 20,1A,86,1,B7,7B,7E,7F,7B,7D, 994
240 DATA 20,10,86,1,B7,7B,7D,7F,7B,7E, 984
250 DATA 20,6,7F,7B,7E,7F,7B,7D,10,9E, 957
260 DATA B7,31,A9,FE,A0,10,BF,7B,7A,7F, 1391
270 DATA 7B,74,9E,A6,30,1,A6,80,81,20, 1064
280 DATA 27,FA,81,40,26,40,9F,A6,BD,8E, 1240
290 DATA 83,1F,10,D3,BA,1F,3,11,B3,7B, 925
300 DATA 7A,10,24,1,ES,FF,7B,76,BD,89, 1223
310 DATA AA,D6,B9,1D,FD,7B,7B,1F,30,93, 1317
320 DATA BA,10,B3,7B,7B,25,5,B3,7B,7B, 1082
330 DATA 20,F5,F7,7B,7C,9E,A6,20,28,0, 1164
340 DATA 10,6,0,27,E9,1C,A0,0,0,0, 482
350 DATA 9E,A6,30,1,FE,7B,76,11,B3,7B, 1181
360 DATA 7A,23,3,17,1,F,11,93,BA,24, 585
370 DATA B,DE,BA,FF,7B,76,7F,7B,7C,A6, 1446
380 DATA 80,81,20,27,FA,81,22,26,1A,9F, 964
390 DATA A6,A6,80,81,22,27,B,7C,7B,74, 1033
400 DATA 81,0,10,27,1,7B,20,EF,BF,7B, 890
410 DATA 7B,9E,A6,20,41,10,9E,1B,30,1F, 821
420 DATA 9F,A6,9E,A6,A6,80,A1,A4,27,B, 1318
430 DATA 31,21,10,9C,1D,10,27,1,5A,20, 461
440 DATA F1,31,21,A6,80,81,80,27,13,BA, 1070
450 DATA 80,A1,A4,26,DF,A6,80,81,24,27, 1212
460 DATA 7,81,0,26,F6,16,1,3D,31,21, 586
470 DATA E6,A1,BF,7B,7B,F7,7B,74,AE,A0, 1639
480 DATA 7D,7B,74,26,15,A6,1,81,0,10, 732
490 DATA 27,1,E,81,3B,10,27,0,B2,30, 523
500 DATA 1,A6,84,16,0,CC,A6,80,C6,C, 1029
510 DATA 3D,C3,7A,3C,1F,2,11,B3,7B,7A, 909
520 DATA 23,2,8D,71,96,B9,C6,C,81,20, 997
530 DATA 26,19,A6,A0,7D,7B,7E,27,1,43, 867
540 DATA 7D,7B,7D,27,2,AA,C4,7F,C4,33, 1191
550 DATA CB,20,5A,26,E9,20,1C,A6,A0,7D, 1104
560 DATA 7B,7E,27,1,43,7D,7B,7D,27,2, 764
570 DATA AA,C4,A7,C4,33,CB,10,A7,C4,33, 1410
580 DATA CB,10,5A,26,E4,33,C9,FE,81,FF, 1462
590 DATA 7B,76,7C,7B,7C,B6,7B,7C,91,89, 1362
600 DATA 26,1B,8D,2,20,17,33,C9,1,60, 612
610 DATA FF,7B,76,7F,7B,7C,96,B9,81,10, 1344
620 DATA 26,6,33,CB,10,FF,7B,76,39,7A, 983
630 DATA 7B,74,27,34,16,FF,7D,34,36,9E, 993
640 DATA BA,31,8B,20,EC,A1,ED,81,10,9C, 1338
650 DATA B7,25,F7,CC,0,0,ED,81,9C,B7, 1376
660 DATA 25,FA,33,CB,EO,11,B3,7B,7A,24, 1236
670 DATA EO,FF,7B,76,35,36,39,11,B3,7B, 1197
680 DATA 7A,25,2,8D,DO,39,BE,7B,7B,A6, 1163
690 DATA 84,9F,A6,81,0,27,42,81,3B,26, 917
700 DATA 9,A6,1,81,0,27,E2,16,FE,9B, 998
710 DATA 81,2C,10,26,0,45,96,B9,47,87, 885
720 DATA 7B,75,B1,7B,7C,25,10,B0,7B,7C, 1131
730 DATA 33,C6,B6,7B,75,B7,7B,7C,FF,7B, 1470
740 DATA 76,20,A,96,B9,80,7B,7C,33,C6, 1164
750 DATA 17,FF,6D,A6,1,81,0,10,26,FE, 991
760 DATA 65,20,AA,30,1F,9F,A6,96,B9,80, 1218
770 DATA 7B,7C,33,C6,FF,7B,76,7F,7B,7C, 1357
780 DATA 17,FF,4F,20,94,C6,2,7E,83,44, 1062
790 DATA C6,10,7E,83,44,0,0,30,CC,CC, 995
800 DATA CC,CC,CC,CC,30,0,0,0,0,F0, 1104
810 DATA 30,30,30,30,30,30,FC,0,0,0, 540
820 DATA 0,30,CC,C,C,30,30,CO,FC,0, 816
830 DATA 0,0,0,30,CC,C,30,C,C,CC, 540
840 DATA 30,0,0,0,0,CO,CO,CO,CC,CC, 1032
850 DATA FC,C,C,0,0,0,0,FC,CO,CO, 912
860 DATA FO,C,C,CC,30,0,0,0,30, 564
870 DATA CC,CO,F0,CC,CC,CC,30,0,0,0, 1296
880 DATA 0,FC,C,C,30,30,CO,CO,CO,0, 948
890 DATA 0,0,0,30,CC,CC,30,CC,CC,CC, 1116
900 DATA 30,0,0,0,0,30,CC,CC,CC,3C, 768
910 DATA C,CC,30,0,0,0,0,0,62, 362
920 DATA 94,88,94,62,0,0,0,0,10,28, 586
930 DATA 44,44,7B,44,44,7B,40,40,40,0, 704
940 DATA 0,0,0,44,A2,12,14,8,10,20, 324
950 DATA 20,0,1B,20,20,10,2B,44,44,3B, 368
960 DATA 0,0,0,0,0,0,0,1C,20,7B, 180
970 DATA 20,1C,0,0,0,0,14,8,10,10, 120
980 DATA 10,8,4,8,0,0,0,0,0,0, 36
990 DATA 0,70,4B,4B,4B,4B,8,8,4,0, 420
1000 DATA 0,10,2B,44,7C,44,2B,10,0,0, 372
1010 DATA 0,0,0,20,50,8,1B,24,42,42, 312
1020 DATA 0,0,0,0,0,0,0,44,44,44, 204

1030 DATA 44,7B,40,40,80,0,0,0,0,7E, 570
1040 DATA 24,24,24,22,0,0,0,0,0, 142
1050 DATA 0,1B,24,44,44,7B,40,40,40,0, 508
1060 DATA 0,0,0,3E,50,48,48,30,0,0, 334
1070 DATA 0,0,0,0,2,3C,50,10,14,8, 186
1080 DATA 0,0,0,0,8,10,10,3B,54,54, 264
1090 DATA 54,3B,10,10,20,0,0,8,10,92, 374
1100 DATA 92,92,54,3B,10,10,20,0,7E,42, 688
1110 DATA 40,40,40,40,40,40,0,0,0, 384
1120 DATA 0,0,0,44,82,92,92,6C,0,0, 598
1130 DATA 0,0,10,10,2B,2B,44,44,82,FE, 632
1140 DATA 0,0,0,0,10,10,2B,2B,44,44, 248
1150 DATA 82,82,0,0,0,0,7E,20,10,8, 442
1160 DATA 8,10,20,7E,0,0,0,0,3B, 238
1170 DATA 44,82,82,44,2B,EE,0,0,0,0, 674
1180 DATA 0,0,0,0,0,0,0,0,0,0, 0
1190 DATA 0,0,10,10,10,10,10,10,0,10, 112
1200 DATA 0,0,0,0,2B,2B,2B,0,0,0, 120
1210 DATA 0,0,0,0,0,0,0,2B,2B,7C, 204
1220 DATA 2B,7C,2B,2B,0,0,0,0,10, 260
1230 DATA 3B,50,3B,14,3B,10,0,0,0,0, 284
1240 DATA 64,64,8,8,10,10,26,26,0,0, 324
1250 DATA 0,0,10,2B,2B,10,2A,2A,10, 248
1260 DATA 0,0,0,0,10,10,10,0,0,0, 48
1270 DATA 0,0,0,0,0,0,8,10,20,20, 88
1280 DATA 20,20,10,8,0,0,0,0,20,10, 136
1290 DATA 8,8,8,8,10,20,0,0,0,0, 80
1300 DATA 0,0,54,3B,7C,3B,54,0,0,0, 404
1310 DATA 0,0,0,0,10,10,7C,10,10,0, 188
1320 DATA 0,0,0,0,0,0,0,0,0,0, 0
1330 DATA 1B,8,10,0,0,0,0,0,0,0, 48
1340 DATA 0,7C,0,0,0,0,0,0,0,0, 124
1350 DATA 0,0,0,0,1B,1B,0,0,0,0, 48
1360 DATA 4,4,8,8,10,10,20,20,0,0, 120
1370 DATA 0,0,10,2B,44,44,44,44,2B,10, 384
1380 DATA 0,0,0,0,10,30,10,10,10,10, 128
1390 DATA 10,3B,0,0,0,0,3B,44,4,8, 208
1400 DATA 10,20,40,7C,0,0,0,0,3B,44, 360
1410 DATA 4,3B,4,4,44,3B,0,0,0,0, 192
1420 DATA 8,1B,2B,4B,7C,8,8,8,0,0, 292
1430 DATA 0,0,7C,40,40,7B,4,4,44,3B, 504
1440 DATA 0,0,0,0,3B,44,40,7B,44,44, 444
1450 DATA 44,3B,0,0,0,0,7C,4,8,8, 268
1460 DATA 10,10,20,20,0,0,0,0,3B,44, 220
1470 DATA 44,3B,44,44,44,3B,0,0,0,0, 384
1480 DATA 3B,44,44,44,3C,4,44,3B,0,0, 448
1490 DATA 0,0,0,0,0,0,1B,1B,0,1B,1B, 96
1500 DATA 0,0,0,0,0,0,0,0,1B,1B,0, 48
1510 DATA 1B,8,10,0,0,0,0,0,6,1B, 78
1520 DATA 60,1B,6,0,0,0,0,0,0,0, 126
1530 DATA 0,7C,0,0,7C,0,0,0,0,0, 248
1540 DATA 0,0,60,1B,6,1B,60,0,0,0, 246
1550 DATA 0,0,3B,44,4,1B,20,20,0,20, 248
1560 DATA 0,0,0,0,3C,42,9A,AA,AA,94, 768
1570 DATA 40,3B,0,0,0,0,10,2B,44,44, 312
1580 DATA 7C,44,44,44,0,0,0,0,3B,44, 420
1590 DATA 24,3B,24,24,24,3B,0,0,0, 256
1600 DATA 1B,24,40,40,40,40,24,1B,0,0, 376
1610 DATA 0,0,3B,24,24,24,24,24,3B, 328
1620 DATA 0,0,0,0,3C,20,20,3B,20,20, 244
1630 DATA 20,3C,0,0,0,0,3C,20,20,3B, 272
1640 DATA 20,20,20,20,0,0,0,0,1B,24, 188
1650 DATA 40,40,4C,44,24,1B,0,0,0,0, 332
1660 DATA 24,24,24,3C,24,24,24,24,0,0, 312
1670 DATA 0,0,3B,10,10,10,10,10,3B, 208
1680 DATA 0,0,0,0,1C,8,8,8,8,8, 68
1690 DATA 4B,30,0,0,0,0,44,4B,50,60, 436
1700 DATA 60,50,4B,44,0,0,0,0,20,20, 380
1710 DATA 20,20,20,20,20,3C,0,0,0,0, 220
1720 DATA 82,C6,AA,92,82,82,82,82,0,0, 1164
1730 DATA 0,0,24,24,34,34,2C,2C,24,24, 336
1740 DATA 0,0,0,0,3B,44,44,44,44,44, 396
1750 DATA 44,3B,0,0,0,0,3B,24,24,24, 288
1760 DATA 3B,20,20,20,0,0,0,0,10,2B, 208
1770 DATA 44,44,54,4C,2C,12,0,0,0,0, 358
1780 DATA 3B,24,24,24,3B,30,2B,24,0,0, 344
1790 DATA 0,0,1B,24,20,1B,4,4,24,1B, 184
1800 DATA 0,0,0,0,7C,10,10,10,10,10, 204
1810 DATA 10,10,0,0,0,0,44,44,44,44, 304
1820 DATA 44,44,44,3B,0,0,0,0,44,44, 396
1830 DATA 44,2B,2B,2B,10,10,0,0,0,0, 220

```

1840 DATA 82,82,82,82,92,AA,C6,82,0,0, 1164
1850 DATA 0,0,42,42,24,18,18,24,42,42, 384
1860 DATA 0,0,0,0,44,44,28,28,10,10, 248
1870 DATA 10,10,0,0,0,0,7C,8,8,10, 188
1880 DATA 10,20,20,7C,0,0,0,0,10,10, 236
1890 DATA 10,92,54,38,10,0,0,0,0, 318
1900 DATA 8,10,20,7E,20,10,8,0,0,0, 238
1910 DATA 0,0,10,8,4,7E,4,8,10,0, 182
1920 DATA 0,0,0,0,18,24,20,78,20,20, 276
1930 DATA 20,7C,0,0,0,0,10,38,54,92, 458
1940 DATA 10,10,10,0,0,0,0,0,20,20, 112
1950 DATA 10,10,8,8,4,4,0,0,0,0, 56
1960 DATA 0,0,0,38,4,3C,44,3A,0,0, 246
1970 DATA 0,0,40,40,40,78,44,44,44, 636
1980 DATA 0,0,0,0,0,0,0,38,40,40, 184
1990 DATA 40,38,0,0,0,0,4,4,4,3C, 192
2000 DATA 44,44,44,3C,0,0,0,0,0,0, 264
2010 DATA 0,38,44,7C,40,38,0,0,0,0, 368
2020 DATA 18,24,20,38,20,20,20,20,0, 276
2030 DATA 0,0,0,0,0,3C,44,44,44,3C, 324
2040 DATA 4,4,38,0,20,20,20,38,24, 288
2050 DATA 24,24,0,0,0,0,0,0,10,0, 88

```

```

2060 DATA 30,10,10,38,0,0,0,0,0, 136
2070 DATA 8,0,18,8,8,8,8,30,0, 120
2080 DATA 20,20,20,24,28,30,28,24,0, 296
2090 DATA 0,0,30,10,10,10,10,10,38, 200
2100 DATA 0,0,0,0,0,0,0,28,54,54, 208
2110 DATA 54,54,0,0,0,0,0,0,38, 224
2120 DATA 24,24,24,24,0,0,0,0,0, 144
2130 DATA 0,38,44,44,44,38,0,0,0, 316
2140 DATA 0,0,0,78,44,44,44,78,40, 572
2150 DATA 40,0,0,0,0,3C,44,44,44, 388
2160 DATA 4,4,4,0,0,0,0,2C,30,20, 136
2170 DATA 20,20,0,0,0,0,0,0,0,38, 120
2180 DATA 40,38,4,38,0,0,0,0,0,20, 212
2190 DATA 20,3C,20,20,24,18,0,0,0, 216
2200 DATA 0,0,0,24,24,24,24,1C,0, 172
2210 DATA 0,0,0,0,44,44,28,28,10, 232
2220 DATA 0,0,0,0,0,0,44,54,54, 236
2230 DATA 54,28,0,0,0,0,0,0,44, 192
2240 DATA 28,10,28,44,0,0,0,0,0, 164
2250 DATA 0,24,24,24,24,1C,4,4,18, 204
2260 DATA 0,0,0,7C,8,10,20,7C,0,0, 304

```

Listing 2 CHARACTER DESIGNER

```

10 REM CHARACTER DESIGNER FOR USE WITH 'WRITER' EXTENSION INTERP
RETER BY PHIL BROOKS, 104 BARGATES, LEOMINSTER, HEREFORDSHIRE.
20 DIM CS(10),BL(10):BL$=STRING$(18,32)
30 PMODE 4,1:PCLS:WRITE@0,"*";
40 GET(0,2)-(6,8),CS,G:GET(10,2)-(16,8),BL,G:WRITE@0," ";
50 PCLS:SCREEN 1,1:IWRITE@38,"CHARACTER DESIGNER";
60 WRITE@1152," 1. Redesign a character";
70 WRITE@1536," 2. Display the full character set";
80 WRITE@3072,"Please select the option you require by pressi
ng the appropriate key"
90 OP$=INKEY$: IF OP$="" OR OP$<"1" OR OP$>"2" THEN 90 ELSE OP=VA
L(OP$):ON OP GOTO 100,500
100 PCLS
110 WP=3840:WRITE@1536,"Please input the ASCII code for the char
acter you wish to change";
120 GOSUB 610
130 PCLS
140 IWRITE @ 38,"CHARACTER DESIGNER";
150 FOR Y=16 TO 112 STEP 8:LINE(8,Y)-(72,Y),PSET:NEXT Y
160 FOR X=8 TO 72 STEP 8: LINE(X,16)-(X,112),PSET:NEXT X
170 WRITE@522,"Move the cursor with";
180 WRITE@906,"the arrow keys";
190 WRITE@1482,"Press 'S' to set a";
200 WRITE@1866,"point, 'C' to clear";
210 WRITE@2250,"it";
220 WRITE@2826,"Press 'E' to enter";
230 WRITE@3210,"design into memory,";
240 WRITE@32*13+3210,"'A' to abandon design"
250 CD$="ASCII"+STR$(AS)+" at present looks like "
260 WRITE@4160,CD$
270 LINE(119,141)-(128,154),PSET,B
280 CH$=CHR$(AS):WRITE@4559,CH$
290 X=9:Y=17:FL=0
300 PUT(X,Y)-(X+6,Y+6),CS,PSET
310 FOR T=1 TO 30:NEXT
320 IF FL=0 THEN PUT(X,Y)-(X+6,Y+6),BL,PSET ELSE PUT(X,Y)-(X+6,Y
+6),BL,PRESET
330 FOR T=1 TO 30:NEXT
340 RR$=INKEY$: IF RR$="" THEN 300
350 IF RR$="S" THEN PUT(X,Y)-(X+6,Y+6),BL,PRESET ELSE IF RR$="C"
THEN PUT(X,Y)-(X+6,Y+6),BL,PSET
360 IF RR$="E" THEN 420 ELSE IF RR$="A" THEN 50

```

```

370 RR$=INKEY$
380 X=X-8*(PEEK(344)=223)+8*(PEEK(343)=223):IF X>65 THEN X=9 ELSE
IF X<9 THEN X=65
390 Y=Y-8*(PEEK(342)=223)+8*(PEEK(341)=223):IF Y>105 THEN Y=17 ELSE
IF Y<17 THEN Y=105
400 IF PPOINT(X+3,Y+3)=0 THEN FL=0 ELSE FL=1
410 GOTO 300
420 PS=31292+12*AS
430 FOR Y=20 TO 108 STEP 8
440 X=68:BV=0
450 FOR CT=0 TO 7
460 IF PPOINT(X,Y)<>0 THEN BV=BV+2^CT
470 X=X-8:NEXT CT
480 POKE PS,BV:PS=PS+1:NEXT Y
490 GOTO 50
500 PMODE4,1:PCLS:SCREEN1,1
510 WRITE@0,"Display may be started and","stopped by pressing the
spacebar"
520 GOSUB590:FOR CT=0 TO 122
530 CT$=STR$(CT)+" ":WRITE CT$;
540 CH$=CHR$(CT):WRITE CH$,
550 HD$=INKEY$:IF HD$=" " THEN GOSUB 590
560 NEXT CT:WRITE""
570 WRITE"Press spacebar to continue";
580 GOSUB590:GOTO 50
590 RT$=INKEY$:IF RT$=" " THEN RETURN ELSE 590
600 REM ***SUBROUTINE TO INPUT A TEXT STRING IN HI-RES***
610 WRITE@WP,"?":REM**SET POSITION FOR DISPLAYING INPUT**
620 IN$="":REM**IN$ WILL HOLD THE FINAL INPUT STRING**
630 IP$=INKEY$:IF IP$=""THEN 630 ELSE IF IP$=CHR$(13) THEN 690:REM**
CHECK FOR KEY PRESSED. IF 'RETURN' THEN 710**
640 IF IP$=CHR$(8) AND LEN(IN$)>0 THEN IN$=LEFT$(IN$,LEN(IN$)-1)
ELSE 660:REM**CHECK FOR BACKSPACE AND SHORTEN IN$ ACCORDINGLY**
650 WRITE@WP,IN$:BL$:REM**DISPLAY IN$ SO FAR**
660 IF IP$<"0" OR IP$>"9" THEN 630:REM**LIMIT INPUT TO INTEGER NUMERALS,
MAY BE OMITTED FOR STRING OR DECIMAL INPUTS**
670 IN$=IN$+IP$:WRITE@WP,IN$:BL$:REM**ADD LAST KEY PRESSED TO IN$**
680 GOTO 630:REM**GO BACK TO CHECK FOR NEXT KEY PRESSED**
690 AS=VAL(IN$):IF AS>9 AND AS<123 THEN RETURN ELSE IWRITE@WP,"UNACCEPTABLE
ENTRY":REM**CONVERT IN$ INTO AN NUMERIC VALUE AND CHECK THAT IT IS WITHIN
LIMITS. RETURN IF O.K. ELSE DO AGAIN**
700 GOTO 620

```

Listing 3 DEMONSTRATION PROGRAM

```

10 REM **DEMONSTRATION PROGRAM FOR 'WRITER' EXTENSION INTERPRETER
BY PHIL BROOKS**
20 PMODE 4,1:PCLS:SCREEN1,1
30 IWRITE @ 38,"QUADRATIC EQUATIONS";
40 WRITE @ 32*15,"There are three normal methods for solving quadratic
equations"," 1. Graphical"," "," 2. By factorising",
" 3. By use of the formula"
50 WRITE""
60 WRITE"This program will attempt to demonstrate each of the
steps in turn."
70 WRITE"Solve";
80 WRITE@4490,"x +3x-4=0"
90 WRITE @ 4363,"2";
100 WRITE@5186,"Press spacebar to continue"
110 GOSUB 900
120 PCLS
130 LINE(16,150)-(236,150),PSET:FOR C=16 TO 246 STEP 20:LINE(C,1
48)-(C,152),PSET:NEXT C
140 XX$="-x":WRITE@4608,XX$;

```

```

150 XX$="+x":WRITE@4638,XX$;
160 LINE(156,6)-(156,186),PSET:FOR C=6 TO 186 STEP 6:LINE(154,C)
-(158,C),PSET:NEXTC
170 WRITE@18,"y";
180 WRITE@5745,"-y";
190 FOR X=-7 TO 4:XX$=STR$(X):IFX=0 THEN 220
200 XA=4865+((7+X)/12)*30:XA=INT(XA)
210 DWRITE@XA,XX$;
220 NEXT X
230 YA=83
240 FOR Y=24 TO 4 STEP -4:YY$=STR$(Y):DWRITE@YA,YY$;
250 YA=YA+32*24:NEXT Y
260 YA=1+YA+32*22:DWRITE@YA,"-4";
270 YA=YA+32*12:DWRITE@YA,"-6";
280 WRITE@68,"Graph of";
290 WRITE@708,"y=x +3x-4";
300 WRITE@711-32*5,"2";
310 FOR X=-7 TO X=0 STEP 0.02:GOSUB340:NEXT X
320 FOR X=0 TO 4 STEP 0.02:GOSUB 340:NEXT X
330 GOTO380
340 Y=X^2+3*X-4
350 XX=156+20*X:YY=150-6*Y
360 PSET(XX,YY,5)
370 RETURN
380 WRITE@1190,"when y=0";
390 WRITE@1579,"x=-4";
400 WRITE@1960,"or x=+1";
410 DWRITE@5185,"Press spacebar";
420 WRITE@5569,"to continue";
430 GOSUB900
440 PCLS:IWRITE@42,"FACTORISING";
450 WRITE@32*24,"The equation"
460 WRITE@24*32+15,"x +3x-4=0"
470 WRITE@19*32+16,"2"
480 WRITE@38*32,"can be factorised and written"
490 WRITE@52*32+12,"(x-1)(x+4)=0"
500 WRITE@64*32,"for this to be true then either"
510 WRITE@78*32+4,"(x-1)=0 or (x+4)=0"
520 WRITE@100*32,"this means that either"
530 WRITE@135*32+6,"x=+1 or x=-4"
540 WRITE@179*32+3,"Press spacebar to continue";
550 GOSUB900:PCLS:IWRITE@44,"FORMULA"
560 WRITE@20*32,"any equation in the form"
570 WRITE@38*32+8,"ax +bx+c=0"
580 WRITE@33*32+10,"2"
590 WRITE@50*32,"can be solved by substituting in the formula"
600 WRITE@80*32+9,"x="
610 LINE(88,85)-(168,85),PSET
620 DWRITE@76*32+11,"-b= b -4ac"
630 WRITE@73*32+16,"2"
640 LINE(107,78)-(107,83),PSET
650 LINE(112,81)-(114,83),PSET:LINE-(122,72),PSET:LINE-(168,72),
PSET
660 DWRITE@85*32+15,"2a"
670 WRITE@105*32,"to give x="
680 LINE(88,110)-(208,110),PSET
690 DWRITE@101*32+11,"-3= 3 -(-4) 1 4"
700 DWRITE@100*32+22,"x x"
710 WRITE@97*32+16,"2"
720 LINE(107,103)-(107,108),PSET
730 LINE(112,105)-(114,107),PSET:LINE-(122,97),PSET:LINE-(208,97
),PSET
740 DWRITE@110*32+17,"2 1"
750 DWRITE@109*32+18,"x"
760 WRITE@124*32,"i.e. x= or x="
770 LINE(64,129)-(125,129),PSET:LINE(170,129)-(232,129),PSET
780 DWRITE@120*32+8,"-3+ 9+16"
790 DWRITE@120*32+21,"-3- 9+16"
800 LINE(90,126)-(92,128),PSET:LINE-(96,119),PSET:LINE-(127,119)
,PSET:LINE(193,126)-(195,128),PSET:LINE-(200,119),PSET:LINE-(232
,119),PSET
810 DWRITE@129*32+11,"2 2"
820 WRITE@150*32,"i.e. x=1 or x=-4"
830 WRITE@179*32+3,"press spacebar to continue";
840 GOSUB900
850 PCLS
860 WRITE@0," There is another method for solving a quadratic
equation which is beyond the scope of this demonstration,
although it is particularly suited to use in computer applicatio
ns. It is known as 'Iteration', and is a"
870 WRITE"means of solving by making a series of approximatio
ns to the true value until a satisfactory match is found"
880 WRITE@160*32,"push spacebar to end"
890 GOSUB900:CLS:END
900 IF INKEY$="" THEN RETURN ELSE 900

```

CUMANA Special Price Offer!

DOUBLE DENSITY DISK INTERFACE FOR THE DRAGON 32/64 FROM CUMANA

Dragon owners take full advantage of the speed, convenience and reliability of Cumana's 5 1/4" or 3 1/2" floppy disk drive systems (storage capacities of up to 1.6MB). Cumana are now offering 4 complete systems which come complete with a double density disk interface for the 32/64.

SYSTEM OFFER 1:

Double density interface with Cumana's 5 1/4" DS 250 single drive
£189.95

SYSTEM OFFER 2:

Double density interface with Cumana's 5 1/4" DD 500 dual drive
£304.95

SYSTEM OFFER 3:

Double density interface with Cumana's 3 1/2" DS 315
£199.95

SYSTEM OFFER 4:

Double density interface with Cumana's 3 1/2" DD 352 dual drive
£289.95

Limited offer, all products are subject to availability.
All prices are inclusive of VAT. Delivery extra E&OE.



ORDER FORM

To: CUMANA LIMITED, THE PINES TRADING ESTATE, BROAD STREET, GUILDFORD, SURREY, GU3 3BH. TEL. 0483 503121.

I wish to order (Qty) System 1 (€ £189.95 System 3 (€ £199.95
 System 2 (€ £304.95 System 4 (€ £289.95
 D/D interface only (€ £99.95
 I enclose cheque/PO* for or debit my which includes
 access/visa* card no. Delete as applicable
 £9.14 for postage and packing

NAME:
ADDRESS:

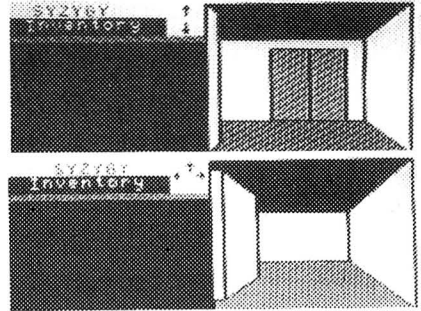


MICROMAIL

SYZYGY

NEW FROM MICRODEAL DRAGON 32/64

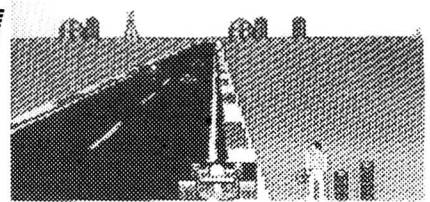
You are trapped aboard a section of the Deathstar!! You have already had one near fatal encounter with 'Vader' and another could prove disastrous. He's somewhere nearby guarding the central computer which just happens to hold some information essential to your survival. To have any chance at all you must find and retrieve your light sabre, presently being guarded by one of Vader's huge ugly aliens. Gosh . . . there is just so much to do . . . over 250 different graphic pictures and 300 locations make this our best ever graphics adventure. 1 Joystick required for light sabre fight 64 different commands, 100% machine code . . . High Res graphics. *Post & Packing 50p* **£8.00**



NEW FROM MICRODEAL DRAGON 32/64 & TANDY COLOUR 32K



Atari & Commodore 64 owners, eat your hearts . . . this has got to be the best Grand Prix game ever. Fast action, super smooth scrolling "crisp" graphics, and loads of extras, such as . . . 4 circuits to choose from, a tyre change if they burn their tyres out too quickly, plus a set number of cars to pass in order to qualify. Its fast and very very good. 1 Joystick required **TANDY COLOUR**

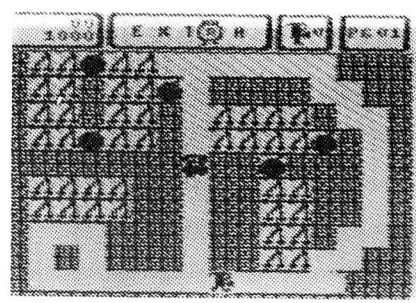


Post & Packing 50p **Tape £8.00**

SMASH HIT FROM MICRODEAL Mr. DIG

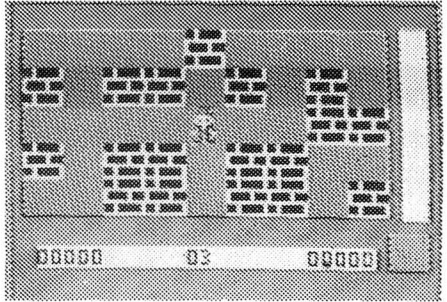
DRAGON 32 ATARI 32K & COMMODORE 64 TANDY COLOUR 32K

Everybody's favourite "MR DIG" must dig for the hidden food supplies in the "MEANIES" territory below the ground. As he digs he can eat cherries or crush the "MEANIES" with apples. Special treats earn MR DIG extra points and a magic power ORB can kill the "MEANIES" Full colour Hi-Res graphics . . . *Tandy Colour version available from* **MICROMAIL** *Tape* **£8**



NEW FROM POCKET MONEY Software PIT FIEND

You are stranded on the middle floor, of a five floor maze and your task is to find the pieces of a broken shield, which are strewn around the maze. As if this wasn't enough there are pit fiends after you one touch from which is fatal and also there is a limited supply of oxygen. A terrific game . . . Keyboard only. *Post & Packing 50p* **GREAT VALUE AT £1.99**



TO ORDER ☎ **0726 73456** or post to

MICROMAIL

41 TRURO ROAD, ST. AUSTELL CORNWALL PL25 5JE **P&P 50p per order**



8 LINES · 24 HOURS

Correcting the faults and problems with Dragondos

P G Scott solves the problems that face unwary users of Dragon DOS.

FOR SOME TIME it has been known that there are a number of faults and problems associated with DRAGONDOS 1.0, over and above the documentation. This article is intended to identify and highlight some of these problems and propose solutions (which have been running successfully on my own system). While I do not advocate "patching" object code, in this instance, without the source, there is no alternative.

The rest of the article has been separated into three areas:

Faults, where the system performs erroneously and it is not possible to overcome the error without manual interaction,

Problems, where it is possible to program around the problem or there is need of information not provided in the manual, and

Lack of information, where facilities exist that are not documented.

In what follows, a single sentence description of the error is given followed by amplification of the cause and effects of the error together with a simple test, if applicable, and a patch to correct the error. Within the patches, the format is:

+xxxx yy zz

where +xxxx is the location address in the EPROM and corresponds to run-time address &HC000+&Hxxxx and yy zz are the Hex values to be programmed into consecutive locations.

FAULTS

Fault 1: USR09 address is corrupted and Drive 4 is not set to "unused" at RESET.

These two faults have no apparent link, but are actually caused by a single erroneous byte in the RESET initialisation sequence. As a result of the error, any attempt to use the USR09 function before setting the address will cause program corruption rather than ?FC error, while a change of disk format (from single sided to double sided for example) will not be detected for drive 4, but will for the other drives (see hints).

It is possible to issue commands to cancel this fault, but it requires the sequence

POKE &H69A,0 : DEF USR9=&H8B8D
to be obeyed after EVERY reset.

Test: A=USR09(A)

Patch: +00BF

Fault 2: System "hangs" if in graphics mode and drive not ready.

This error occurs because the system tests for graphics mode (for some unknown reason) and, if set, waits for an interrupt which cannot occur. This can be avoided by ensuring a disk is always available when in graphics mode.

Test: SCREEN 1,1 : DIR

Patch: +02EB 21

+0316 21

Fault 3: Directory track 16 update failure — results are not predictable.

After writing to disk, directory track 16 has to be updated to match track 20. The effect of this fault is that a failure while reading track 20 or writing track 16 will cause the processor to return to a random address as the stack is not reset properly. This can only be fully overcome by applying the specified patch.

Test: POKE &H6AB,1 : EXEC &HC734

with a) no disk, and b) disk write protected

Patch: +0771 26 21

+0793 5F 32 48

+07A8 32 48

Fault 4: Track 19 sector 36 is corrupted when files are killed.

This fault is only encountered when using double-sided 80 track disks. Directory sectors 1 and 2 contain a "bit map" showing whether a disk sector is in use or free. When a file using sectors on tracks 40 to 79 is "KILLED", the sectors allocated to it are returned for re-use, but track 19 sector 36 is written instead of track 20 sector 2. This can only be corrected by applying the patch.

Test: DIR : CREATE "FILE",400000 : KILL "FILE.DAT" : DIR

Patch: +1027 21

Fault 5: Filename validation exits to the BASIC error routine.

This error only affects machine code users, as calling the file specification validation routine will exit to BASIC if a ?DN error occurs, instead of returning the

error code in the B accumulator (the method of using this and the other 17 routines available to machine code users will need to be the subject of a later article). This is only correctable by applying the patch.

Patch: +0802 23 04 81 04 23 04
C6 28 39 12

Fault 6: BASIC file protection and rename routines addressed instead of the machine code routines.

This error only affects machine code users, as the routines referenced in DRAGONDOS 1.0 use the "character getter" routine at &H9F to get a file specification and return to BASIC if a file protection or rename error occurs. The routines that are called by the BASIC commands and should be called from machine code can be used by making the changes detailed.

Patch: +001C D0 9D CF

Fault 7: Errors in freeing a disk buffer cause random effects.

As there are only four disk buffers available, accessing more than four files requires these buffers to be re-allocated. This fault occurs when writing to a file to free a disk buffer for re-use. If a failure occurs, the stack is not reset properly and the command returns to a random address. Only patching the EPROM will correct the fault.

Patch: +1297 27 02 E7 61

Fault 8: Only five files may be opened by a BASIC program.

The manual states that 10 files may be open at one time, clearly in conflict with the actual situation. It is caused by allocating file control blocks to ".BAK" files (whether a ".BAK" file is created or not) and not freeing them when no longer required. Without a re-write of DOS, it is not possible to totally eliminate this fault, but the patch described will allow 10 files to be referenced (note that "KILLing" or "PROTECTing" a file counts as a file reference, while "CREATEing" a file with backup counts as two file references).

This patch also has the effect of removing one carriage return from the end of the DRAGONDOS sign-on message, in order to gain sufficient space in the EPROM.

Test: FOR I=1 TO 10 : PRINT I :
CREATE "FILE"+CHR\$

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



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 150 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:

- **Elmer's Arcade**—enjoy old-fashioned arcade style games on *your* computer
- **The Basic Beat**—learn everything you need to program in Basic
- **The Educated Guest**—discover how to use your computer as a teaching tool
- **Doctor ASCII**—get answers to your technical questions
- **Graphically 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:

- Candid 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 wise 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 13th 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 • 80 Pine Street • Peterborough, NH 03458 • USA

73DFDU

(64+I) : NEXT I

Patch: +0F3C 6D 03
+0F45 27 0A
+0F4F 30 0C 6F 14 BD
DF CA 27 11
+1FC9 00 B6 06 7D 6D
9F 06 78 39

Fault 9: CLOSE always closes all files.

This fault also contradicts the manual. Indeed CLOSE #-1 closes all disk files as well as the cassette file. The facility for selective closure was partially programmed and never implemented, however.

Patch a (which requires correction of problem 2 first) will permit the CLOSE command to operate as described in the manual. In addition, the patch uses &HF7 as a control and if this is set to a non-zero value the patch will close the last file referenced, provided CLOSE has a parameter in the range 1 to 4. **Patch b** ensures that CLOSE operates as described in the manual after a reset or "DSKINIT".

The suggested method of closing individual files is as follows. Use POKE &HF7,1 to turn on the facility (and POKE &HF7,0 to turn it off), then in the enabled state use

CLOSE EOF ("file1"),EOF("file2")

to close the files only when the end of file is reached (CLOSE 0 is ignored), or

CLOSE 1+EOF ("file1"),1+EOF("file2")

to close the files independent of the EOF condition (note that more than one parameter may be specified with CLOSE). The use of EOF here ensures that the required file is the last accessed. This method has to be used as CLOSE will only accept numeric parameters.

Test: FREAD "FILE";A\$: PRINT A\$: CLOSE #-1 : FREAD "FILE", A\$: PRINT A\$

Patch a: Correct problem 2

+0EBC 09
+16FC 09
+170B 5D 2F FC 0F 6F
32 62 0D F7 26 0A
+1720 BD CE D3 20 F6
+1EA3 D6 FB D7 0B

Patch b: +00C0 DC 8A ED 84
ED 02 DD F6
+00D4 12 12

Fault 10: Disk motor control assumes DP set to zero.

This fault affects machine code users, where use is made of direct pages other than page zero. The motor countdown routine assumes that DP = 0 for tests on the flag, and can cause data or disk corruption if this is zero.

Patch: +0700 20 22

+71E 20 0D

+724 34 04 4F 1F 8B 0D
F6 20 D5 35 04 7E 9D 3D

PROBLEMS

Problem 1: LOC/LOF/FREE functions sometimes return a negative value.

All three functions use the same routine to convert a 24 bit integer to BASIC numeric format. Because the sign is not cleared, this routine returns a value with the sign of the value calculated immediately before calling the function. It can be corrected by applying the patch supplied

or using the ABS function to ensure a positive value is returned.

Test: PRINT #-2,FREE or I=-1 : PRINT FREE

Patch: +1D94 12 5F
+1D98 DD 53
+1D9E DD

Problem 2: INPUT/LINEINPUT cause all disk files to be closed.

If you have tried writing a simple file edit program, you will have met this problem. It is caused by the need to ensure all files are closed at the end of a program. The problem can be overcome by using LOC and FREAD FROM to reset the read pointers (FWRITE does not suffer from this problem), or by applying the patch to correct problem 1 above and then applying patch a. Alternatively, without applying the problem 1 patch, memory can be reserved (from &H7FEF for example) containing patch b and the hook vector changed by using:

POKE &H182,&H39 : POKE &H184,&HEF :
POKE &H183,&H7F : POKE &H182,&H7E

This patch is position independent, so can be put anywhere in memory, provided locations &H183/4 are set accordingly. This change will remain effective until a cold start occurs.

Test: FREAD "FILE",A\$: PRINT A\$: INPUT B\$: FREAD "FILE",A\$: PRINT A\$

Patch a: Correct problem 1

+1AB7 BD DD 95 7E 95
82 34 56 8E 83 7D AC
68 26
+1AC5 05 BD D6 FB 20
5E 35 D6
+1EAD DA BD

Patch b: +FEF 34 56 8E 83 7D
AC 68 26 06 BD D6 FB
7E DB 29 35 D6

Problem 3: "SAVE" can create a file entry which cannot be "KILLED".

This is an avoidable problem, but can occur if ENTER is hit instead of —. The remedy is to alter the directory entry for the file (by using SREAD and SWRITE) to a name that will allow the file to be killed. The alternative of marking the directory entry as killed is not recommended as this does not return any sectors allocated to the file. The patch listed rejects a null file specification as ?FS error.

Test: SAVE ""

Patch: +07BE 7E DF F3
+1FF3 5D 26 03 C6 96
39 B6 06 0A 7E C7 C1

Problem 4: Files "KILLED" within a program are left open, causing data written immediately after "KILL" to be lost.

This problem can be overcome by inserting extra program statements around the "KILL" either to create a zero length file for the same name before or after "KILL" (provided a ".BAK" file does not exist that is still required, as this action causes the ".BAK" file to be killed), or to close all files after "KILL" is used (remembering to retain any input file pointers through LOC). Alternatively, the patch listed can be applied (after correction problem 2 above). This patch also pre-

vents sectors being "lost" due to a ?PE error occurring when attempting to write to a zero length file after it is "KILLED" in a program. It also returns the file control block for re-use on completion of the "KILL" command (see also fault 8).

Test: A\$="FILE.DAT" : FWRITE A\$,"TEST": KILL A\$: FWRITE A\$; "NEXT LINE"

Patch: Correct problem 2

+1720 BD CE D3 20 F6
+177C 27 A2
+179D 20 DD 12
+17BF 20 BB 12

Problem 5: Drives (other than drive 1) incorrectly assumed to be restored to track zero at first access.

With this problem, the first drive access after startup assumes the head is at track zero and steps on 20 tracks to read the disk format from the directory, then corrects by issuing a restore and stepping correctly to track 20. This can cause the drive to attempt to step beyond its last track. The patch described restores the drive to track 0 the first time it is accessed after startup.

In order to insert this patch, some reset features have been changed — Drive 1 no longer restores to track zero at switch on, the copyright and DRAGONDOS messages all remain on screen and the system becomes ready more quickly.

Test: DIR 2

Patch: +009E 8E DF BA BD 90
E5 7E 83 71 A7 C8 10 6D
44 26 07
+00AE BD C1 65 24 02
32 62 39
+1197 BD C0 A7

Problem 6: "BACKUP" to an unformatted disk is not allowed, "DSKINIT" does not check for a formatted disk, and "DISKINIT"/"BACKUP" are available in program mode.

Lack of free space in the EPROM prevents patches to correct or change this remaining group of problems, which are included for information (and warning).

HINTS

The "FWRITE" command uses "PRINT", with &H6F set to 1, to output data to the disk, hence ANY "PRINT" format is acceptable after the filename parameter and delimiter: for example FWRITE "TESTFILE"; USING "TEST LINE FOR FWRITE,###.###" 2*3.14

As "PRINT" uses the character output routine accessed through [&HA002], it is possible to use this routine to output to disk from machine code programs. However, this requires knowledge of other routines accessible within DRAGONDOS and is beyond the scope of this article.

The disk directory contains information on the disk format (number of tracks and sectors) which is loaded during the first disk access after a reset.

Thus single/double sided disks may be interchanged in a double sided drive and will be updated correctly provided either the system is reset or location (&H696 + drive number) is set to zero between disk accesses. ■

Datapen

A QUALITY LIGHTPEN

for the DRAGON 32 microcomputer

Datapen

£25

inclusive of VAT, P&P. Two different drawing programs provided free with each lightpen. "SKETCH" and "SHAPE-CREATE". SKETCH is a superb high resolution colour drawing program allowing both precise drawing and freehand sketching, painting etc. SHAPE-CREATE is a high resolution library shape drawing program.

SUPERIOR PROGRAMS

- * Tape storage of your work
- * Good documentation
- * User routines provided on tape and on printout

Also available for:— VIC-20, CBM-64 or BBC B. Please state your micro when ordering.

Send cheque or P.O. for £25 to:—

D.U.3 Datapen Microtechnology Limited,
Kingsclere Road, Overton, Hants. RG25 3JB

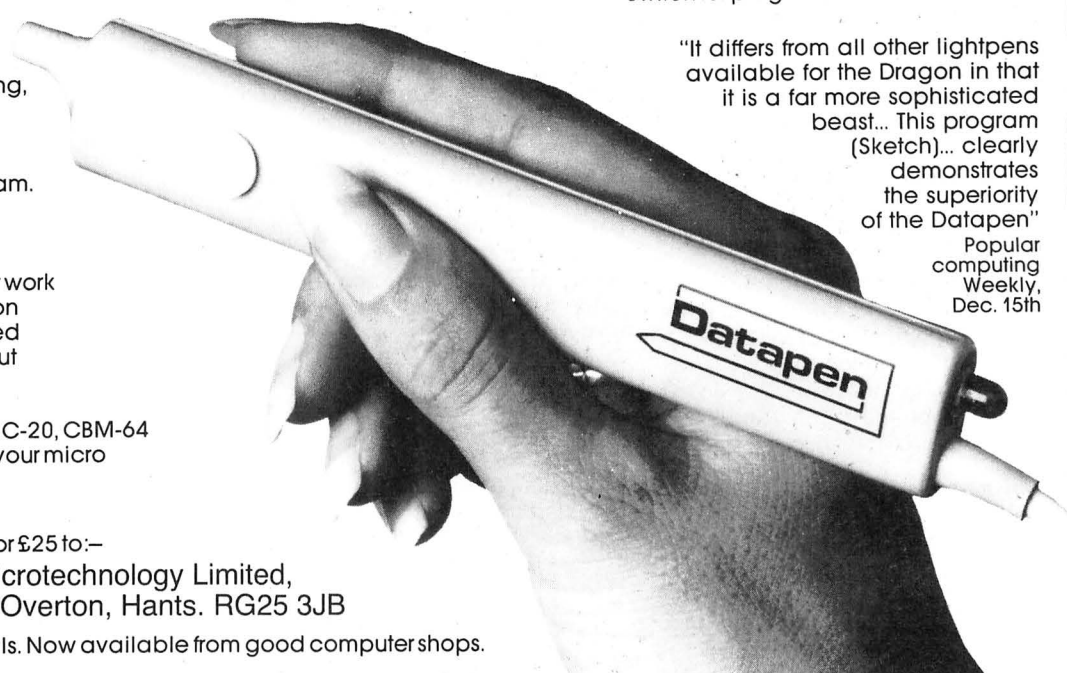
Or send S.A.E. for details. Now available from good computer shops.

SUPERIOR PERFORMANCE

- * Insensitive to ambient lighting
- * Responds to different colours
- * Program accessible LED lamp readout
- * Switch for program control

"It differs from all other lightpens available for the Dragon in that it is a far more sophisticated beast... This program (Sketch)... clearly demonstrates the superiority of the Datapen"

Popular computing Weekly, Dec. 15th



Buy two and get a third one free

... MST ... MST ... MST ...

DRAGON DISKETTE AND CASSETTE BUSINESS SOFTWARE FOR DRAGON COMPUTERS DISKETTE PROGRAMS FROM £16.95 INC. VAT — CASSETTE PROGRAMS £11.95 INC. VAT

MST DATABASE

Computerised card index filing system. Choose your own card headings — nine in all. Add cards and delete cards. Sort them, search them, amend them, print them, view them. Total fields. Flexibility at the touch of a button.

MST INVOICES & STATEMENTS

Seeing is believing. The power of this program is too great to be described in detail here. It stores up to 50 customer addresses. It prints superb Invoice and Statement pages. A separate CREATOR program allows user details to be added — and AMENDED. Variable VAT rate calculations. Discount calculations. Carriage costs are automatically incorporated to produce an accurate AMOUNT DUE. All this PLUS user-defined footer messages. Even poor quality printer paper produces superb invoices and statements.

MST MAILER/ADDRESS BOOK

This highly-acclaimed dedicated database prints selected ranges of address and other labels by SEARCHKEY or RECORD RANGE. Select addresses by street, by town, by region. Screen and printer options. Browse. Records etc. A superb little program. 1,000 records in all on five files.

MST CALC

The MST-Calc Spreadsheet is designed to replace pen, paper and basic calculator with a standard Dragon tape recorder. TV set and printer. Each program comes with a 20-page booklet describing MST-Calc and its operation.

The Spreadsheet enables work to be carried out on 21 rows and 20 columns.

Numbers relating to headings can be orientated horizontally or vertically. They can be

added, multiplied, subtracted, divided, formatted etc. across rows and down columns.

Ten levels of bracket pairs can be used to establish operator precedence in equations. Rows, part-rows, columns, part-columns can be summed or averaged. Equations placed in one location can be repeated (replicated) across rows and down columns to save typing-in time. Recalculation procedures allow powerful WHAT-IF? projections to be carried out at the touch of a button. Business data so obtained can be stored on tape or disk.

MST STOCK CONTROL

Computerised stock control. Alpha numeric references. Stock description, user-defined stock units, cost/sell prices, re-order levels, supplier details.

1,000 stock items on five files on a single-sided disk. Produces stock evaluation over user-selected range of stock, stock lists, re-order reports, screen/printer options.

MST BUSINESS ACCOUNTS

Another gem of a program. What won't it do? is a more suitable question than what will it do. A unique search facility enables all data entry problems with a 32-character screen to be overcome. Transaction List, Debtor/Creditor Lists. Search/Amend selected customer records, Bank Summary, Year-to-date, Manual Bring Forward options make this a superb program. Credit/Cash sales and purchases are all neatly linked with Bank Account option to allow an up-to-date statement of your financial status.

MST HOME ACCOUNTS

A lovely program. Keep track of your household budget. Menu options include Estimated and Actual budgets, up-to-the-minute bank statements, current balance etc. Graphical representations of past and present months, printouts of surplus and deficit, and much more.

... DOWN TO EARTH DISK SOFTWARE FOR SMALL BUSINESSES ... READY NOW USE STANDARD DRAGONS ... WITH DRAGON DRIVES ... NO MODS NEEDED ...

MST STOCK (PR) STANDARD £49.95 INC. VAT

All stock details are held on one-sided floppy diskette to produce screen displays and printed reports on stock status, stock movement, stock shrinkage, dead stock, stock sales, stock purchase, re-order costs, and much more. Records may be referenced by number or part-description, and analysis code gives additional flexibility. 1,000 stock items per disk.

MST-EXEC (PR) STANDARD £49.95 INC. VAT

Super Invoices/Statements formatter with integral Mailer. A working package. Use it to generate selective Mailshots, customer analysis, save typing time for invoices and statements. Spool documents to disk, and despool to printer. 200 addresses can be saved.

TICK THE APPROPRIATE BOX. PRICES INCLUDE VAT AND POSTAGE.

TAPES £11.95 inc. each

CD DISKS £16.95 inc. each

Mailer

Invoices/Statements

Stock Control

Business Accounts

MST-CALC

Home Accounts

Database



PR Series

Stock Control — STANDARD £49.95

MST-EXEC — STANDARD £49.95



Cost effective business software for home computers

Cheques etc. should be made payable to MST CONSULTANTS

Name:.....

Address:.....

Card Number:.....

Signature:.....

MST Consultants, Newton Road, Bovey Tracey, Devon TQ13 9BB. Telephone (0626) 832617

DRAGON OPEN FILE

Send us your Dragon programs, beginning with a general description and then explaining how the program is constructed. Take care that the listings are all bug free, enclosing a cassette and, if possible, a printout. We pay £6 for each original bug-free program published, double for the program of the month. If you have any problems with the listings, please send your queries to the appropriate author, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Flash

From Ashley Watson

THE FOLLOWING 230-byte machine code program gives the Dragon 32 an extra command to flash certain words etc on the screen at a certain speed even while the Dragon is doing something else.

To use the routine type in the BASIC listing — listing one. If the data statements have been entered correctly then the program should be saved on cassette. If the message ERROR IN DATA appears then the data should be rechecked and RUN again.

The machine code is saved on cassette with

CSAVEM "FLASH",32300,32530,32300
EXEC should then be typed to initialise the new command. The new command which is created is PRINTF. Note that there is no space between the PRINT and the F. To use the command see the examples below:

PRINTF@200,"test";
This would flash the word test on the screen at position 200. The PRINTF has the same features as the PRINT command except that it flashes characters on the screen. If you wish to use the normal PRINT command and you wish to print the variable F then there must be a space between the PRINT and the F, for example PRINT F.

Location \$7E88 is the flash rate. This is the number of interrupts which will occur between each flash and is a number between 1 and 255. As 50 interrupts occur every second then

POKE &H7E88,25
would give flash every half second. To stop the flashing type
POKE &H7F12,0
as in the following example:
10 PRINTF "press enter to continue";
20 INPUT A\$
30 POKE &H7F12,0

This example will cause the message to flash on the screen until ENTER is pressed, the the message would stop flashing.

Listing 2 shows the assembly listing of the program and may be typed in if you have an assembler.

LISTING ONE — BASIC LISTING

```
10 REM *****
20 REM * FLASH COMMAND *
30 REM * (C) 7/3/85 *
40 REM * *
50 REM * BY *
60 REM * ASHLEY WATSON *
70 REM *****
80 CLEAR 100,32299 : T=0
90 FOR A=32300 TO 32530
100 READ A$ : I=VAL("&H"+A$)
110 POKE A, I : T=T+I
120 NEXT A
130 DATA 7F, 7F, 12, 8E, 7E, A4, BF, 01
140 DATA 68, 8E, 7E, 4A, BF, 01, 7A, 8E
150 DATA 7E, 81, BF, 01, 0D, 86, 7E, B7
160 DATA 01, 67, B7, 01, 79, 39, 81, 87
170 DATA 27, 01, 39, 32, 62, 10, 9E, A6
180 DATA 10, BF, 7F, 0E, 9D, 9F, 27, 22
190 DATA BE, 7F, 0E, A6, 01, 81, 46, 26
200 DATA 19, 86, 01, B7, 7F, 12, B7, 7F
210 DATA 11, 9D, 9F, BD, 90, 3D, BE, 7F
220 DATA 08, BF, 7F, 0A, 9E, 88, BF, 7F
230 DATA 0C, 39, 7E, 90, 3D, 7C, 7F, 10
240 DATA B6, 7F, 10, 81, 19, 26, 16, 7F
250 DATA 7F, 10, B6, 7F, 12, 27, 0E, BE
260 DATA 7F, 0A, A6, 84, 8D, 38, A7, 80
270 DATA BC, 7F, 0C, 26, F5, 7E, 9D, 3D
280 DATA 34, 32, B6, 7F, 11, 81, 01, 26
290 DATA 08, 9E, 88, BF, 7F, 08, 7F, 7F
300 DATA 11, 9E, 88, 8C, 05, FF, 25, 04
310 DATA 8D, 22, 20, 0F, 35, 02, 34, 02
320 DATA 81, 0D, 26, 07, 8C, 05, E0, 25
330 DATA 02, 8D, 11, 35, 32, 39, 81, 7F
340 DATA 22, 09, 81, 3F, 23, 03, 80, 40
350 DATA 39, 8B, 40, 39, BE, 7F, 0A, 30
360 DATA 88, E0, BF, 7F, 0A, 10, BE, 7F
370 DATA 0C, 31, A8, E0, 10, BF, 7F, 0C
380 DATA 10, BE, 7F, 08, 31, A8, E0, 10
390 DATA BF, 7F, 08, 8C, 03, FF, 22, 03
400 DATA 7F, 7F, 12, 39, 00, 00, 00, 00
410 DATA 00, 00, 00, 00, 00, 00, 00
420 IF T<>20800 THEN PRINT"ERROR
IN DATA" : STOP
```

~~NOW AVAILABLE~~ — New De-Luxe
Light Pen for The Dragon — £17.25

~~SPECIAL OFFER~~ for limited
period. Now only £14.95 inclusive

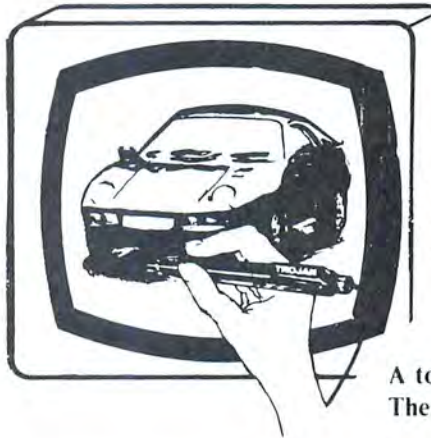
TOP VALUE LIGHT PEN

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 DESIGNATED AREAS
- * SAVE AND LOAD PICTURES TO AND FROM TAPE
- * FULL ERASE FACILITIES

All in Hi-Res screen in any of 4 colours for the Dragon/Tandy, and 8 colours for the Spectrum.



- * 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
166 Derlwyn, Dunvant, Swansea SA2 7PF
Tel: (0792) 205491

TROJAN



Micro Computer Software & Accessories

DEALERS CONTACT TROJAN NOW FOR DETAILS OF EXTRA SPECIAL DISCOUNTS



blaby computer games

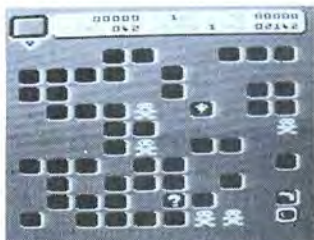


DRAGON 32 and TANDY COLOR

MONO



COSMIC CRUSADER — Venture where no man has dared to go before. View the galaxy from within the safety of your starship, but not for long — no less than 34 screens of interplanetary alien life will challenge your reflexes and fire power. Superb sounds and graphics. JS/KB. **£3.99**



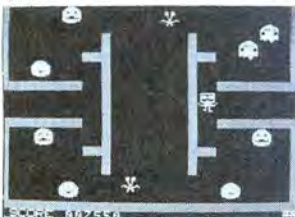
* **RUBY ROBBA** — There is a complex defence system guarding the precious ruby. Snakes, guards and mines. You have only one minute to carry out the operation but you can do it. I know you can. **£3.99**



OLYMPIA — Compete in five athletic events — 100 metres, discus, long jump, hurdles and high jump. Features include: high graphics sound, world records and hall of fame. KB. **£3.99**



MORBID MANSION — Ten rooms in this old mansion must be negotiated before you come face to face with the dreaded Morbid. You are alone then suddenly the clock gets to 12! 10 screens arcade adventure. JS. **£3.99**



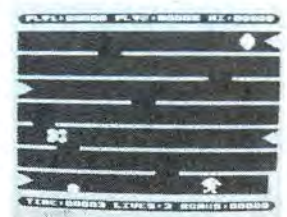
MUTANT WARS — Fifteen screens of constant zapping for all you arcade freaks. Spinning wheels, rotating robots, spaggy birds and the dreaded Yum Yum monsters. Superb Hi-Res graphics. **£1.99**



* **THE BELLS** — You have probably read the novel or seen the film — now you can play the game. Rescue Esmeralda from the bell tower. 14 screens of danger for you to challenge. JS/KB. **£1.99**



BARMY BURGERS. Baps, Burgers, Cheese and Lettuce. They are all there all you have to do is put them together — sounds easy doesn't it — but not when you are being chased by a fried egg and sausages. JS. **£1.99**



* **BORIS THE BOLD** — Urgent telegram for Boris. Stop. Please come home. Stop. Beware of the patrollers, lasers and bombs. Stop. Please grab a few diamonds on your way, Stop. JS. **£1.99**

*These games are available for the Tandy Color 32 Computer at £3.99 each.

ORDER NOW DIRECT FROM THIS COMPANY OR ASK AT YOUR LOCAL DRAGON STOCKIST. PLEASE ADD 50p POST AND PACKING PER GAME. SEND S.A.E. FOR FULL LIST OF SCREEN SHOTS. WE NOW HAVE 17 TITLES.

BLABY COMPUTER GAMES
CROSSWAYS HOUSE
LUTTERWORTH ROAD, BLABY, LEICESTER
TELEPHONE: 0533-773641. TELEX: 342829 DYNA-G



LISTING TWO - ASSEMBLY LISTING

```

3000 *****
3000 *   FLASH COMMAND *
3000 *   FOR DRAGON 32 *
3000 *   WRITTEN BY   *
3000 *   ASHLEY WATSON *
3000 *       7/3/85   *
3000 *****
3000                ORG 32300
7E2C 7F 7F 12      CLR POKE
7E2F 8E 7E A4      LDX£PRINT
7E32 BF 01 68      STX 360
7E35 8E 7E 4A      LDX£GO
7E38 BF 01 7A      STX 378
7E3B 8E 7E 81      LDX£INTERUPT
7E3E BF 01 0D      STX 269
7E41 86 7E         LDA£126
7E43 B7 01 67      STA 359
7E46 B7 01 79      STA 377
7E49 39            RTS
7E4A 81 87         GO CMPA£135
7E4C 27 01         BEQ NEXT
7E4E 39            RTS
7E4F 32 62         NEXT LEAS 2, S
7E51 10 9E A6      LDY $A6
7E54 10 BF 7F 0E   OE STY DATA
7E58 9D 9F         JSR 159
7E5A 27 22         BEQ EXIT
7E5C BE 7F 0E      LDX DATA
7E5F A6 01         LDA 1, X
7E61 81 46         CMPA£70
7E63 26 19         BNE EXIT
7E65 86 01         LDA£1
7E67 B7 7F 12      STA POKE
7E6A B7 7F 11      STA FLAG
7E6D 9D 9F         JSR 159
7E6F BD 90 3D      JSR 36925
7E72 BE 7F 08      LDX STORE
7E75 BF 7F 0A      STX ADD1
7E78 9E 88         LDX $88
7E7A BF 7F 0C      STX ADD2
7E7D 39            RTS
7E7E 7E 90 3D      EXIT JMP 36925
7E81 7C 7F 10      INTERRUPT INC NOINT
7E84 B6 7F 10      LDA NOINT
7E87 81 19         CMPA£25
7E89 26 16         BNE END
7E8B 7F 7F 10      CLR NOINT
7E8E B6 7F 12      LDA POKE
7E91 27 0E         BEQ END
7E93 BE 7F 0A      LDX ADD1
7E96 A6 84         LOOP LDA, X
7E98 8D 38         BSR INVERT
7E9A A7 80         STA, X+
7E9C BC 7F 0C      CMPX ADD2
7E9F 26 F5         BNE LOOP
7EA1 7E 9D 3D      END JMP 40253
7EA4 34 32         PRINT PSHS A, X, Y
7EA6 B6 7F 11      LDA FLAG
7EA9 81 01         CMPA£1
7EAB 26 08         BNE NOFLAG
7EAD 9E 88         LDX $88
7EAF BF 7F 08      STX STORE
7EB2 7F 7F 11      CLR FLAG
7EB5 9E 88         NOFLAG LDX $88
7EB7 8C 05 FF      CMPX£1535
7EBA 25 04         BLO CHECK
7EBC 8D 22         BSR SCROLL
7EBE 20 0F         BRA RETURN
7EC0 35 02         CHECK PULS A
7EC2 34 02         PSHS A
7EC4 81 0D         CMPA£13
7EC6 26 07         BNE RETURN
7EC8 8C 05 E0      CMPX£1504
7ECB 25 02         BLO RETURN
7ECD 8D 11         BSR SCROLL
7ECF 35 32         RETURN PULS A, X, Y
7ED1 39            RTS
7ED2 81 7F         INVERT CMPA£127
7ED4 22 09         BHI BACK
7ED6 81 3F         CMPA£63
7ED8 23 03         BLS NERD
7EDA 80 40         SUBA£64
7EDC 39            RTS
7EDD 8B 40         NERD ADDA£64
7EDF 39            BACK RTS
7EE0 BE 7F 0A      SCROLL LDX ADD1
7EE3 30 88 E0      LEAX -32, X
7EE6 BF 7F 0A      STX ADD1
7EE9 10 BE 7F 0C   OC LDY ADD2
7EED 31 A8 E0      LEAY -32, Y
7EF0 10 BF 7F 0C   OC STY ADD2
7EF4 10 BE 7F 08   08 LDY STORE
7EF8 31 A8 E0      LEAY -32, Y
7EFB 10 BF 7F 08   08 STY STORE
7EFF 8C 03 FF      CMPX£1023
7F02 22 03         BHI JUMP
7F04 7F 7F 12      CLR POKE
7F07 39            JUMP RTS
7F08 00 00         STORE FDB 0
7F0A 00 00         ADD1 FDB 0
7F0C 00 00         ADD2 FDB 0
7F0E 00 00         DATA FDB 0
7F10 00            NOINT FCB 0
7F11 00            FLAG FCB 0
7F12 00            POKE FCB 0

```

Ket Trilogy Special Offer

The Mountains of Ket, The Temple of Vran, and The Final Mission form the Ket Trilogy, one of the classic adventure series.

Previously only available for the Spectrum, Incentive Software has now converted the trilogy for the Dragon. On one tape, all three programs are £9.95.

Now Incentive, in conjunction with Dragon User, offers readers the chance to buy the Ket Trilogy for only £8.95 — that's a saving of £1.00 off the recommended price.



Just fill in the attached coupon and send your cheque or postal order, made payable to Incentive Software, to the address given.

This is a special launch offer, and all coupons must be received by June 30.

Payment Method:

- I enclose a cheque payable to Incentive Software
- I enclose a postal order payable to Incentive Software

Name

Address

..... Postcode

Send this complete form, with your payment, to:

Ket Offer
 Dragon User
 12/13 Little Newport Street
 London WC2H 7PP

GO SUB DRAGON USER

Don't lose out — make sure you receive the next twelve issues of your favourite microcomputer magazine by sending away for a year (or two years) subscription today.

Just complete this special subscription order form now, and send it with your cheque or postal order to our subscription department.

And if you subscribe for **two years**, you can claim a **free book**. Choose from any one of these superb Sunshine microcomputer books — *The Working Dragon 32*, *Dragon 32 Games Master*, *The Dragon Trainer*, *Advanced Sound and Graphics for the Dragon computer*, or *Artificial Intelligence on the Dragon computer*.

FREE BOOK CLAIM FOR 2 YEAR SUBSCRIPTIONS

Subscription type:

- 1 year at £10 UK
- 2 years at £20 UK
plus free book
- 1 year at US\$33.95 US/Canada airspeed
- 2 years at US\$67.90 US/Canada airspeed
plus free book
- 1 year at £16 Rest of World surface
- 2 years at £32 Rest of World surface
plus free book

Other overseas airmail rates available on request

Payment Method

- I enclose a cheque payable to Dragon User
- I enclose a postal order payable to Dragon User

I claim my free book (title)

Name

Address

Postcode

Send this complete form, with your payment, to:

Dragon User
 Subscription Department, Oakfield House,
 Perrymount House Road, Haywards Heath,
 Sussex RH16 3DH

Discwasher

From Graham Smith of Bristol

This short program is one of several I have stored on my utility disc. I keep this disc

write protected with a label over the notch. With this utility you can run through a pack of new discs in a few minutes.

```

10 ***** DISC FORMATTER *****
20 ***** FOR DRAGONDOS *****
30 * SAVE ON DISC AND FIT WRITE *
40 * PROTECT LABEL TO PREVENT *
50 * ACCIDENTAL ERASURE *
60 *****
70 '
80 CLS
90 PRINT "THIS UTILITY WILL WIPE THE
DISC"
100 PRINT "CLEAN, SO MAKE SURE YOU
HAVE"
110 PRINT "THE RIGHT DISC INSERTED."
120 PRINT @ 224, "HAVE YOU REMOVED
THE UTILITY DISC."
130 Y$=INKEY$: IF Y$(">") THEN 130

```

```

140 PRINT @ 384, "ARE YOU SURE?";
150 Y$=INKEY$: IF Y$(">") THEN 150
160 PRINT
170 PRINT "O.K. HERE GOES."
180 DSKINIT 1,1,40
190 CLS
200 PRINT "I HOPE YOU HAD THE RIGHT
DISC"
210 PRINT "BECAUSE NOW IT IS CLEAN!!"
220 PRINT
230 PRINT "DO YOU WANT TO DO ANOTHER
ONE";
240 Y$=INKEY$
250 IF Y$="N" THEN END
260 IF Y$="Y" THEN 80
270 GOTO 240

```

Dump

From Steve Gathercole

AS the program is written the screen dump is in single density mode ... change line 50 to the following for double density mode.

```

50 PRINT@-2,CHR$(27) (27)
;CHR$(14);CHR$(80F);CHR$(80F4);
Remember to switch dip switch 2 to 'ON'

```

before running the program. LISTING 1 is the screen dump and LISTING 2 is a short machine code routine which when EXECuted will invert the high res screen. This is useful if you want a 'negative' of the screen. To use the dump first load a game or screen you like, press 'break' (your picture will still be in memory), then type in LISTING 1 and run it. The program will show you the screen as it dumps ... be warned the program is fairly slow especially in double density, so go off and have a cup of tea!

To use the screen invert first type in

LISTING 2 and run it. The code is now in memory, so just type EXEC 32000 to use the invert.

A point to note — due to the printer used a 'E' is used in place of the HASH mark (#).

If any readers would like to experiment, line 40 controls the position of the dump on your paper. Line 120 controls the 'Y' depth of the dump. Interesting results are obtained when loading a pmode 3 screen and calling up pmode 4 before dumping the screen. This is because of line 70 which checks to see if a pixel is on or off.

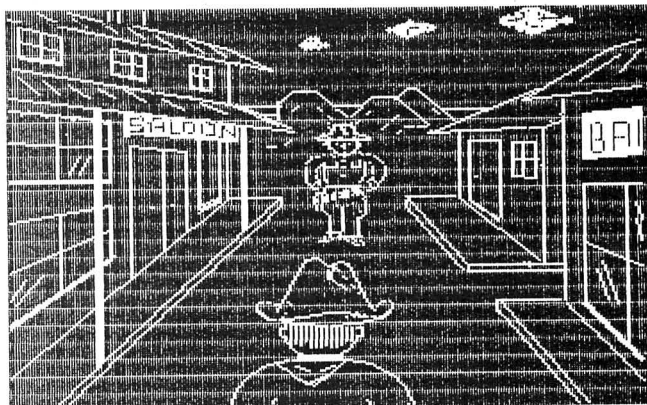
SCREEN DUMP LISTING 1

```

10 REM PUT SWITCH 2 TO ON
20 PMODE 4,1:SCREEN 1,0
30 Y=0
40 PRINT@-2,CHR$(9);CHR$(9);
50 PRINT@-2,CHR$(27);"K";CHR$(800)
);CHR$(801);
60 FOR X=0 TO 255
70 A=PPOINT(X,Y)*128+PPOINT(X,Y+1)
*64+PPOINT(X,Y+2)*32+PPOINT(X,Y+3)
*16+PPOINT(X,Y+4)*8+PPOINT(X,Y+5)*
4+PPOINT(X,Y+6)*2+PPOINT(X,Y+7)*1
80 PRINT@-2,CHR$(A);
90 NEXT X
100 PRINT@-2,CHR$(27);CHR$(48)
110 PRINT@-2,CHR$(10);
120 Y=Y+8:IF Y=>191 THEN END ELSE
GOTO 40
130 PMODE 4,1:SCREEN 1,0:GOTO 130

```

SCREEN DUMP

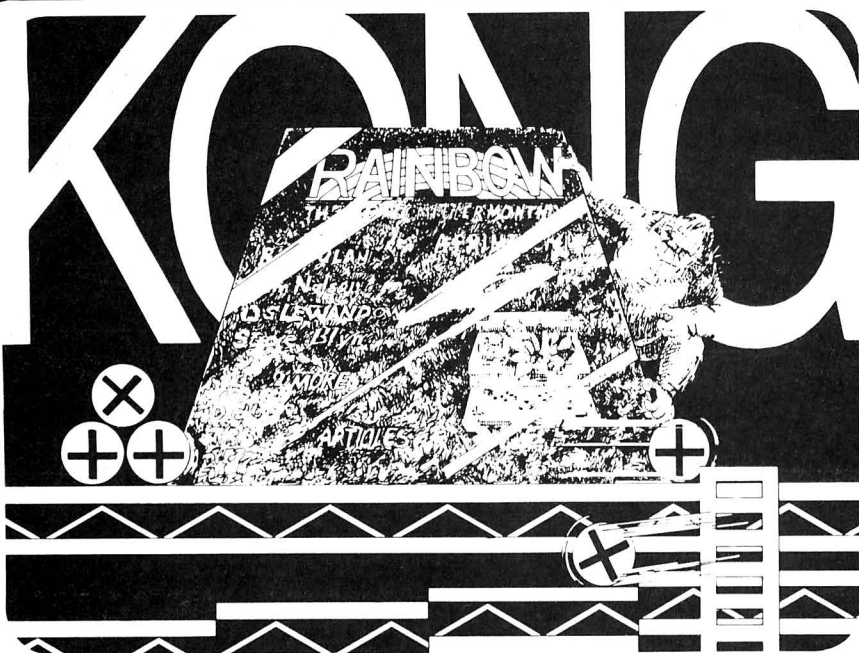


SCREEN DUMP LISTING 2

```

10 CLEAR100,32000
20 A=31999
30 FOR N=1 TO 14:READ A$
40 POKE A+N,VAL("&H"+A$):NEXT
50 DATA 8E,06,00,A6,80,43,A7,1F,8C
,1E,00,26,F6,39

```



of the hill!

The RAINBOW is the biggest and best magazine available for the TRS-80® Color, TDP-100, MC-10 and Dragon-32 Computers.

And no wonder! It's over 300 pages thick each month . . . pages brimming with programs, product reviews, tutorials, columns, hints and tips about 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 Kong of the Hill too!

U.K. Subscription rates
U.S. \$65 surface rate
U.S. \$100 air rate

© 1983 The Rainbow

Registered trademark of Faxon Inc.

Registered trademark of Tandy Corp.

the Rainbow 9529 U.S. Highway 42
 502/228-4492 PO. Box 209
 Prospect, Ky. 40059

YES! Sign me up for a year (12 issues) of the RAINBOW.

Name _____
 Address _____
 City _____ State _____ Zip _____

Payment Enclosed _____
 Charge VISA MasterCard American Express
 My Account# _____ Interbank# (MC only)
 Signature _____ Card Expiration Date _____



Subscriptions to the RAINBOW are \$28 a year in the United States. Canadian and Mexican rate U.S. \$35, surface rate to other countries U.S. \$65, air rate U.S. \$100. All subscriptions begin with the current issue. Please allow up to 5-6 weeks for first copy.

Just for your
 TRS-80® COLOR
 TDP System 100
 Dragon-32
 MC-10



CASTLE BLACKSTAR

"A cut above the usual standards, could well become a classic."
POPULAR COMPUTING WEEKLY

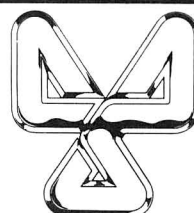
"Highly recommended!"
HOME COMPUTER WEEKLY

"Where this program really scores is in the description of its locations and the large (200 word plus) vocabulary."
MICRO ADVENTURER

"Great game and I look forward to Artemis Quest 2".
CRASH

"An excellent, absorbing, detailed and tough adventure."
COMPUTER AND VIDEO GAMES

£6.95 inc. P. & P. Dragon 32/64



CDS SOFTWARE LTD.
 Silver House, Silver Street,
 Doncaster DN1 1HL
 Tel: (0302) 21134

MIKE GERRARD'S ADVENTURE TRAIL

LOTS OF letters are now arriving every month, and it's surprising to discover how geographically wide the Dragon user-base is. Why, only this month I received a letter from The Orion Nebula, which the post-mark suggests is just outside Motherwell. Does the GPO know something Patrick Moore doesn't? Three correspondents from Orion offer advice on *El Diablero*, such as making regular use of the words REMEMBER, DREAM and AWAKE, and they're seeking advice on *Escape From Pulsar 7*. Next time you're near the Nebula, why not call in on the God of Psychodelia and his chums?

Moving slightly nearer home, Lionel Depeux of 5 rue Henri Martin, 92600 Asnieres, France, needs some help on *Return of the Ring*, but has just completed *El Diablero*, so if you want to trade clues write to Lionel, who sends very funny letters. He wonders if anyone is still sane after playing *The Cricklewood Incident*, and his English is so good I think he must have secretly acquired a Babel Fish from some other adventure.

Bob Bernasconi of 16 Woodland View, Lanivet, Bodmin, Cornwall PL30 5HQ asked me how to get rid of "that flipping snake" in *Shenanigans*, and I advised him to try KCORMAHS EHT GNIPPORD (read the clue backwards if you want to know the answer). Bob also wants some general tactical advice on *Ring of Darkness*, so anyone who can shed some light on finding Shedir, get in touch, but do send a stamped addressed envelope if you're writing to anyone whose address I include, especially if you're asking for advice.

That certainly applies if you're writing to Jane and Ken Kennedy, who seem to have completed every known Dragon adventure, and some unknown ones besides. "We consider *El Diablero* and *Knife of Kishtu* the best adventures that we have played so far for the Dragon," they say. I can't share their enthusiasm for the latter, but everyone to their opinions, and they are kindly offering to help anyone out of sticky corners in the likes of the Franklin trilogy, *Keys of the Wizard*, *Death Mines of Sirus*, *Circus* and *Waxworks*. No room to list all the titles, but whatever you want help on you can always write to me and if I'm unable to assist you myself I shall refer to my ever-increasing database of clues and addresses (don't tell the editor, but I'm doing it on a Commodore 64, so I can have

both the database and the Dragon working at the same time). Meanwhile, Jane and Ken's abode is 6 Portland Row, Edinstowe, Notts NG21 9JB.

There's rather a sorry letter from Kieran Cleary of Ballyogue, Nine-Mile-House, Carrick-on-Suir, Co Tipperary, Eire, who's finding it very hard to track down Dragon adventures over there in Eire, with shops winding down their stocks. Kieran's also stuck in *Cimeeon Moon*, so if you can help him find some equipment, or maybe would like to swop some adventures if you've finished with them, then Kieran's your man.



A tip from Mark Gadsby of Farnborough on *Death Mines of Sirus*, the arcade-adventure combination from Phoenix. If you can't get through the arcade game to discover the running code for the adventure, then don't type CLOADM but try instead SKIPF "D": CLOAD "D" and then LIST the adventure password, though this does also list clues for the adventure. And a tip too from John Martin of Peterborough. Before you EXEC any machine code adventures, type MOTORON: AUDIOON and adventure away to your favourite music. Yes, play Madness while playing *Madness and the Minotaur*, or Black Sabbath with *Black Sanctum*. Any other suggestions?

I'll have to be brief with the next few letters, or I'll never make it to review the new Scott Adams. Help on *El Diablero* offered by Jules Bowen, 72 Manor Drive North, New Malden, Surrey HT3 5PR, and by Peter Ward, 7 Bakery Way, Landkey, Barnstaple, N. Devon, and help's wanted

on that one by Helen Johnstone, 46 Chatsworth Drive, Rushmere Park, Ipswich, Suffolk IP4 5XD. David Hulme of Stafford and Paul Edwards of Manchester both praised Ken Kalish, the author of *El Diablero*, and if you haven't tried it yet then Microdeal are now selling it at only 99p (plus 50p postage), having taken over Dragon Data's stock of the game. A real bargain, that.

More letters next time, but now to Scott Adams and the thirteenth in his series of adventures, *The Sorceror of Claymorgue Castle* at £7.95 from Adventure International. The Dragon version is text-only, and terse text at that. Scott doesn't go in for glowing descriptions, but he does go in for puzzling puzzles . . . and groan-inducing puns. You take the role of a certain Beanwick, an apprentice sorceror, and your task is to retrieve 13 Stars of Power from the Castle, for reasons I've no room to go into here.

"I am in a field," is the first brief description, and you can see a moat, castle and raised drawbridge. No good adventurer should go anywhere without an INVENTORY, and this shows us to be holding six spells, of Fire, Seed, Light Squared, Yoho, Lycanthrope and the Wicked Queen's Spell. One of these will get you into the castle, with a terrible pun, and inside you'll find a courtyard containing a Magic Fountain. Casting caution to the wind I leapt into the fountain and lo and behold, I saw A Star. Treasure number one, I thought, but soon after I was seeing stars, as whatever's in the fountain makes you feel a little odd. I'll get even, I decided, fighting pun with pun and casting my fire spell to frazzle the fountain's contents. No dice, I'm afraid. No star, either.

Off the courtyard is a ballroom containing a chandelier and the tied end of a piece of rope. All right, I'm a sucker for anything. UNTIE ROPE. Ker-ash! One descending chandelier and one deceased adventurer. I bet the chandelier contains another star, too. Scott Adams strikes again, and here's another essential addition to the collection. Adventure International is converting Scott's other titles for the Dragon at the moment, which is marvellous news, but I can see the bottom of the page looming so I'd better stop. After all, we have to get the magazine together and send it all the way to the Orion Nebula, just outside Motherwell, don't we? ■

PEAKSOFT



48 QUEEN STREET, BALDERTON, NEWARK, NOTTS. NG24 3NS.
TEL. (0636) 705230

We hold a permanent stock of all titles, and goods ordered by post are despatched within 24 hours. Access, Visa, Mastercard and Eurocard holders may telephone their orders to 0636 705230 (24-hour answering).

- ★ **TIM LOVE'S CRICKET (£8.95).** The most advanced cricket game ever produced for any home micro. Joystick control over batting, bowling and fielding. 1 or 2 players.
 - ★ **CHAMPIONS! (£6.95).** Our all-time best-seller — now with even more features. 4 divisions, promotion, relegation, goal highlights, goal-scorers' chart, transfers, injuries, suspensions, European Cup, game save, etc, etc, etc.
 - ★ **PHOTO-FINISH (£6.95).** Terrific graphics, authentic race-cards, with odds based on actual form, real-time races from 5f to 2 miles, and an incredible photo-finish feature. Can you outwit the bookies? 1-4 players.
 - ★ **OSSIE (£2.50).** Totally original arcade action — 100% machine code. Dive for your dinner and plaster the poachers!
 - ★ **SAS (£2.50).** Tactical maze war game in 100% hi-res.
 - ★ **DEATH'S HEAD HOLE (£2.50).** And now for something completely different! Lead a pothole rescue team on a mission of mercy! (Text based with limited graphics.)
 - ★ **LIONHEART (£2.50).** Lo-res graphics adventure.
 - ★ **DON'T PANIC! (£2.50).** Two classic Clive Johnson text adventures at a bargain price.
- ★ Games marked ★ also available for Tandy 32K Colour Computer with ECB.

I enclose a cheque or PO.

Please rush me.....

Name.....

Address.....

I have a Dragon/Tandy (please delete).

TIRED OF TRAMPING ROUND THE SHOPS SEARCHING FOR DRAGON SOFTWARE?

We can supply any popular title by any major producer — so the game you've been searching for is only a phone call away for Access/Visa card-holders. (We are also, of course, pleased to accept orders by post.)

DATA TAPE:

C15 tape of the highest professional quality, specially wound for us by our duplicators — you can't buy better! **£5 for 10 pack.**

AT LAST — A CASSETTE RECORDER GUARANTEED SUITABLE FOR YOUR COMPUTER!

That's right — an absolute, cast-iron guarantee! It's the sort of deal that someone should have offered long ago, but we believe we are the ONLY firm prepared to take the time and trouble to give you this type of assurance. We've selected the superb Alba Programmer for its record of long-term reliability. Before despatch, our technical staff test and adjust EACH INDIVIDUAL MODEL for tape speed, head alignment, signal characteristics, and general performance. A practical save/load test is then made. **If the recorder passes these tests, the technician concerned signs an individual certificate, which is sent to you with the recorder.** WE DON'T BELIEVE ANYONE COULD POSSIBLY DO MORE TO ENSURE YOUR SATISFACTION. The Alba Programmer has a neat matt black/silver case, with a smoked perspex cassette cover, and a digital revolution counter. It will work off batteries or the mains, and has a full one year manufacturer's guarantee. The cost? **Just £24.95**, including post and packing!

APPROVED JOYSTICK

If you want to make a big hit at Britain's No. 1 Dragon game, you need a potentiometer joystick that's sensitive, sturdy and reliable. Tim Love's team recommend the Pro-Stick for ALL Dragon games, and at £5.50 each or £9.95 a pair, they won't break the bank.

(Switch-type joysticks, such as the Quickshot, are designed for computers such as the Spectrum and CBM64, and are inadequate for many Dragon games, such as TLC and Worlds of Flight.)



MONEYBOX

Personal Accounts Program for Dragon 32/64

MONEYBOX program for personal accounts can analyse your income and expenses, control your bank account, credit card, building society, etc, forecast your bank balance, estimate your taxable income and much more.

On Cassette Price £9.99

DRAGONDOS DISK VERSION: prints 42 by 24 legible characters on Hi-Res screen, with true lower-case, £ sign, etc. Features direct access filing, large capacity, budgeting, optional VAT analysis.

"presents itself as a powerful and versatile package" — "Home Computing Weekly"

"an easy to use program that builds in a range of powerful facilities" — "Which Micro"

On DragonDOS

Price £14.99

NEW! MAILBOX

Stores names, addresses and up to 10 user-defined fields. Fast retrieval by full/partial matching. Select batches of records by name, town, region and multiple user-defined tests. Uses IF/EITHER/OR LOGIC, Inter-field comparisons, "WILDCARDS", etc.

Prints address labels, name and salutation, record cards and can print or display user-defined reports

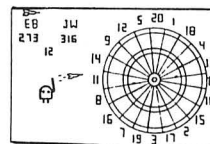
On DragonDOS (with Lower-case, etc.) Price £14.99

Cheques/POs/Further details/Dealer enquiries to:

HARRIS MICRO SOFTWARE

49 Alexandra Road, Hounslow, Middlesex TW3 4HP
Tel: (01) 570 8335

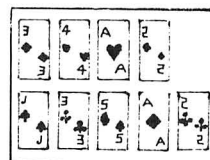
FOR THE DRAGON 32/64



DARTS

An entirely original idea is used to produce a near approximation to the actual game. This fast game is for 2 players, and keyboard skill is needed to aim and fire the darts so that they hit any chosen part of the board. (YES even 180 may be achieved!!!). The personalised scoreboards are continually up-dated by the computer, and standard rules apply, including the requirement of having to finish each game with a 'double' or 'bulls-eye'!

Only £5.50



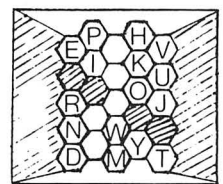
PONTOON

Full-colour high-resolution graphics. Ace counts 1 or 11 and special combination of 3 x 7s, 6, 7, 8 etc taken into account. **£3.50**

LINK WORD

The game is for 2 to 4 players, the object being to score points by forming words on the board using only the letters randomly provided in your personalised 'rack'. The computer automatically calculates all scores, for both direct and indirect word formations, including double and triple word scores, 50 bonus etc. Full cursor control is provided so that letters may be easily placed anywhere on the board. The game features bright, colourful graphics, with facilities for correcting mistaken spelling or exchanging 'difficult' letters from your rack.

A Bargain Game at £5.50



BLOCKBUSTER QUIZ

All the fun of the TV game adapted for 2 players. The game contains 500 questions covering a wide range of topics and varying in difficulty from easy to hard. Colourful, high resolution graphics are used to display the board, from which a player makes his letter choices and plots his winning path! **Only £5.50**

Also: **THE PUZZLER £3.50**

CONNECT 4 (New Edition) £3.50

"USEFUL PEEKS & POKES"

The booklet describing how to disable BREAK, LIST, CSAVE, etc. etc. £1 post paid or free on request with all orders over £3

All prices include postage

Cheque/POs payable to

COMPUTERWARE

PO Box 318, Stoke-on-Trent, ST6 6UX

MAKE THE MOST OF YOUR DRAGON 32

Two great books to help you tap the power of your Dragon 32.

MAKING THE MOST OF YOUR DRAGON, by Clive Gifford, leads you through programming the Dragon from first principles, and includes more than 150 complete programs, including major arcade games. **£5.95.**



DYNAMIC GAMES FOR THE DRAGON 32 — Tim Hartnell and Robert Young. Thirty magnificent games for the Dragon are lurking in this 180 page book, to make your computer behave just as you hoped it would when you bought it. Programs include MAGIC CASTLE, SNARK ATTACK, SPACE RESCUE, REVERSI/OTHELLO, CHECKERS and CUBIK'S RUBE. Just **£4.95.**

Interface Publications, Dept. DU, 9-11 Kensington High St. London W8 5NP.
I enclose £..... Please send me the books indicated.

- Dynamic Games for the Dragon 32
 Making the most of your Dragon.

Name

Address

The Dragon Speaks Out!

"Speakeasy" Speech Synthesiser

Only **£24.95**



Only **£24.95**

- ★ Unlimited vocabulary through using allophones.
- ★ Easy to use in your Basic programs (and in machine code).
- ★ Clear, audible speech.
- ★ Complete with Dragon interface lead.
- ★ 12 months guarantee.
- ★ 2 FREE programs to get you started: Word Factory and Word Compiler.

ORDER NOW!



Telephone (0532) 537507
and use your Access card
or send a cheque or PO



until 10 pm Guaranteed same day despatch orders £5 or over

Action-packed
100% machine code
arcade software

£3.95

COPTER PATROL

Fly your helicopter over hostile territory to rescue your stranded troops from the enemy. Your men will wave to you to attract your attention and then run to the helicopter when you land. Unfortunately, the enemy fighter planes and battleship guns home in on you to give you very little time for a safe pick-up.

£3.95

TASKSHIP

This game in the Scramble series has two great innovations. The first is that YOU can design your own scenario (with rockets, mountains, buildings and radar dishes where you want), or use the ready-designed format. The second is the black holes which pull you off course. If you are unfortunate enough to disappear into a black hole, you get time warped to another part of the landscape. Brilliant graphics.

£3.95

MAURICE MINOR

Out for a quiet drive in your Morris Minor you inadvertently wander on to a race track and find yourself in the middle of a Grand Prix!

£3.95

POGO-JO

Q-Bert type game with amazing sound and graphics, unlike anything seen before on the Dragon. The player can choose to start on any one of 15 completely different screens, and select one of the 4 skill levels. Features include Hall of Fame, return to last screen on which killed for next game. positive joystick control.

£3.95

RIVER OF FIRE

An adventure: Superb machine code animated graphical scenes make this probably the best adventure yet for the Dragon. The volcano erupts on your island. Can you save yourself and help the hospital patients to safety. You'll need cunning and perseverance.

£3.95

STARFIGHTER

The hostile landscape scrolls beneath your starfighter. You bob and weave under joystick control and you seek and destroy the enemy fighters and ground installations.

£3.95

EDITOR/ASSEMBLER + DISASSEMBLER + MONITOR

Two pass global type. Supports labels of six characters. Directives: ORG, RMB, FCB, FDB, FCC, REM. Hexadecimal Arithmetic. Powerful debug Monitor includes 14 commands plus set break points, selection of useful sub-routines and Disassembler. Altogether a powerful program package with information for the serious user or interested beginner. Supplied on cassette.

NOW ONLY £7.95

Add 50p P&P for orders under £5.00. Send Cheque/PO to:

J. Morrison (Micros) Ltd
Dept DU585, 4 REIN GARDENS
TINGLEY, WEST YORKSHIRE WF3 1JR

Send
SAE
for list of
more games

Wizard Software



TRACE CHASE

£4.95

A colourful 100% machine code game presented in high resolution graphics. Move your man around the lines of the grids but beware of the chasers unless you can 'STOP' them. Nine grids are provided. Number of lives, STOPS, and score are continuously displayed. One joystick required.

STARTING FRACTIONS

£5.95

A teaching program designed by teachers, for primary school children, which presents and teaches the concept of a fraction. There are four units contained in the program, the first three deal respectively with HALF, QUARTER and THIRD, the fourth unit deals with the concept of "Fractions of Numbers" consolidating the material learned in the first three units. After each unit there is a test to assess readiness to proceed with the next stage.

TIME PORT — The Staff of Life

£6.45

The second adult strategy adventure game in the Time Port series, containing a complex lexical and logic analyser that allows instructions to be input as sentences containing articles, nouns, verbs, adjectives etc. A game of logic and manipulation structured to exercise your powers of deduction, observation and association. Contains a game save facility.

COMPUTA FRUITA

£5.95

A de-luxe fruit machine simulation presented in colourful high resolution graphics featuring: 4 drums, Spin, Respin, Hold, Gamble, Collect, Nudge, Bounce, Blind, Cancel, Jackpot, Hi-Lo, Bonus, Roller, and Auto-Win. New drums manufactured for each game.

TIME PORT 1	£6.45	EVICTOR	£4.95	SMASM	£3.95
DRAGON STARTREK	£6.45	RED ALERT	£4.95	DISMON	£3.95
STRATEGY	£6.45	ALIENS +	£4.95	STARWORD	£2.95
DECATHLON	£5.95	CLOWNS	£3.95	TRIPLET	£2.95
TOUCHDOWN	£5.95	CRAZY PLUMBER	£3.95	SIRIUS IV	£2.95
		WIZARD	£2.95		

All prices inclusive, mail order, cheques or postal orders to:

**WIZARD SOFTWARE, DEPT. DU, PO BOX 23
DUNFERMLINE, FIFE KY11 5RW**

Send large SAE (7in x 5in) for full program catalogue.
Royalties paid for machine code DRAGON software.

MICROBYTE TOP TEN BEST SELLERS

1 SPEED RACER	£7.95
2 MANIC MINER	£7.95
3 ROBIN HOOD	£1.99
4 BACK TRACK	£6.50
5 ROMMEL'S REVENGE	£7.95
6 MUD PIES	£7.95
7 TIM LOVES CRICKET	£8.95
8 TEATIME	£1.99
9 SYZYGY	£7.95
10 FOOTBALL MANAGER	£5.95

This chart is produced from actual counter sales (ie, tapes bought after the customer has tried them). If you are lucky enough to live near Microbyte pop in and test any software before you buy it. If you have to rely on mail order join hundreds of other satisfied customers by becoming a member of the MONSTER SOFTWARE CLUB.

Benefits include: ★ FREE life membership when you buy one tape. ★ All software at discount prices (at least 10%). ★ All the latest titles. ★ Up to date Top Ten lists sent to members.

Send Cheque/PO to:

MIRCOBYTE COMPUTER SHOP
19A Lower Warrengate
Wakefield WF1 1SA

DRAGON IN FARNBOROUGH

Commercial and General Typewriter Co. Ltd.
Approved Dragon Service Agent

WE SPECIALISE ONLY IN DRAGON COMPUTERS

Lots of software always in stock. Try before you buy

Latest titles available include: World of Flight, Manic Miner, Backtrack, Cashman, Time Bandit, Fury, Speedracer and Cuthbert in The Cooler

★ Books ★ Cassette Recorders ★ Printers and Printer Leads

Come and see us at:

Commercial and General Typewriter Co. Ltd.
165 Lynchford Road
Farnborough, Hampshire
Telephone: Farnborough (0252) 540125

S.P. ELECTRONICS

GP	£99.95
NEC 8023	£199.00
CP80A Dot Matrix Printer inc Cables	£230.00
PRINTER CABLE (Centronics)	£12.90
CANON PRINTER 160CPS	£350.00

Large selection of new Salamander and Microdeal software
SAE for free list

All prices include VAT, carriage extra

S.P. ELECTRONICS, 48 Limby Road, Hucknall, Notts
(Nottingham 640377)



Complete repair service



Comuptape

27 COOMBE ROAD
SOUTHMINSTER, ESSEX CM0 7AH
Tel: MALDON 772589

Comuptape's new catalogue has over 260 Software Titles on Tape, Cartridge and Disk. Arcade Games/Adventure/Educational/Board Games/Utilities

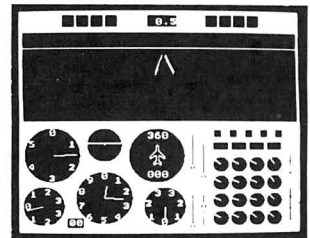
MICRODEAL Cashman Pennon Fury Worlds of Flight NEW PROGRAMS ★ Time Bandit ★ Athletyx ★ Speed Racer ★ Mudpies RSP £8.00 OUR PRICE £6.95	SPECTRAL Ice Castles RSP £8.00 OUR PRICE £6.95 WINTERSOFT Return of the Ring Ring of Darkness RSP £9.95 OUR PRICE £8.95 IMPSOFT Chicken Run RSP £7.95 OURS £6.95 Fruity RSP £4.95 OURS £3.95	CABLE SOFTWARE Superbowl Zak-son RSP £6.95 OUR PRICE £5.95 PEAKSOFT Tim Loves Cricket RSP £8.95 OUR PRICE £7.25 Champions RSP £6.95 OUR PRICE £5.95 Joystick £5.50 Each £9.95 Pair	A & F SOFTWARE Chuckie Egg RSP £7.90 OUR PRICE £6.90 HEWSON CONSULTANTS 3D Luna Attack 3D Seidda Attack 3D Space Wars RSP £7.95 OUR PRICE £6.95 MELBOURNE HOUSE Horace Goes Skiing RSP £5.95 OUR PRICE £4.95
--	--	---	---

Order from the above sending Cheque or Postal Order made payable to Comuptape and we'll send our Catalogue free of charge. For catalogue only send SAE.

Comuptape THE ONLY SOFTWARE COMPANY TO MAKE YOUR DRAGON CHIPS FRY NOT CRY.

DRAGON/32 BBC MODEL/B ATARI 400/800 TRS80 C/C 32K ELECTRON 747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in lifelike simulation which includes emergencies such as engine fires and systems failures. This program uses high resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 25 other indicators (see diagram). Your controls operate throttle, ailerons, elevators, flaps, slats, spoilers, landing gear, reverse thrust, brakes, etc. You see the runway in true perspective. Uses joysticks and includes options to start with take-off or random landing approach. "A real simulation, not just another game" (*Your Computer*, April 19 83).



Cassette £9.95 (p&p and VAT included):

DACC Ltd (Dept. DU)

23 Waverley Road, Hindley,
Greater Manchester WN2 3BN.
(Despatch within 48 hours)



DRAGON OWNERS!

Honeyfold have 450 Dr Watson Beginners BASIC for the Dragon left in stock. This is a complete course in learning to program in BASIC to let you use the full potential of the computer. To clear this stock we will send a copy to the first 450 users to send £1.00 and their name and address to:

**Honeyfold, Standfast House, Bath Place,
Barnet, Herts EN5 1ED.**



ACE HIGH (MK2)
Machine gun warfare in the sky £6.95

TIME ATTACK
The armed TIME MACHINE £6.95



Send £10.00 only for both of these full 32K games:
Telephone: 021-557 9286. Personal callers welcome

TUDOR WILLIAMS

15 Summerhill Road, Bilston, West Midlands WV14 8RD

If you've got a technical question write to Brian Cadge. Please do not send a SAE as Brian cannot guarantee to answer individual inquiries.

Dragon Answers

Arrays game

I AM trying to write a program that consists of three different formulas that can be written about 30 different ways. You will find a small subroutine that I have enclosed.

```
10 CLS
20 FORA=1TO3
30 READA$(A)
40 NEXTA
50 DATA=SQR(A^2-B^2)
60 DATAB/A=SIN
  ((B*3.141)/180)
70 DATA=90-B
80 FORA=1TO3
90 PRINTA$(A):NEXTA
100 LIST
```

I am putting them in to an array and then calling them up when the program needs them. This way the program can grow. My problem is how can I get the program to work with a variable that has come from an array? The program is starting with working out trig problems with the smallest amount of information available, ie if A(1) = \sqrt{A^2 - B^2}$ and A and B have been defined. then if you say $X=A$(1)$, all that happens is that either X becomes A(1)$ or a sn error will be prompted. Am I asking too much of my machine?

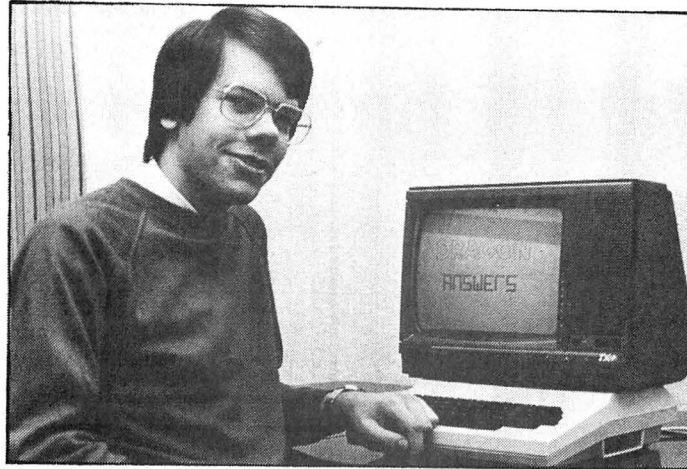
J R Griffin
1 Garrard Rd
Britwell Est
Slough
Berks

YOU ARE not asking too much of the Dragon, but to achieve the result you want, you need to use the DEF FN command. Rather than assigning a formula to a string, use the command: DEF FNA(X)=SQR(A^2-B^2)

When you want to get the result, use $R=FNA(0)$. You can also substitute a value for X in both the DEFine stage and the R=FN stage. The function name can be any normal variable name (up to two characters long).

A Basic problem

I HAVE two questions for you. When I type EXEC 34640 why does a '?' appear below it?



When I type EXEC 33640 why does it say below it IN 65535?
Duncan Chambers
30 Park Avenue
South Shields
Tyne and Wear NE34 8QE

EXEC 34640 is part of the Basic's input routine, the part that prints the '?' character and accepts a line of characters into the buffer. It is of no use from Basic as an SN Error will be generated when you press Enter.

Exec 33640 is a routine which prints IN 'n' where 'n' is the current line number — this is set to 65535 in direct mode. This subroutine is part of the error reporting routine.

It is generally not a good idea to call routines such as these from Basic, as you might end up losing your program!

Lost for words

I HAVE some queries concerning the Dragon 64, and hope that you can help.

a) Why is it that when trying to use SPELLCHECK, I continually get an error message when the program checks the Supplementary dictionary?

b) How do I build a user's Supplementary dictionary?

c) I have configured STYLOGRAPH to suit my printer (a Mannesmann Tally MT80), but why does it occasionally come to a standstill and go off line when printing text? Printer cable is OK.

d) Are there any books covering the use of Dragon Disk Drives?

e) In the Dragon 64 Supple-

ment book (page 6), there is a Keyboard Auto-Repeat Facility. The pokes work, but when I use my disk drive, the disk won't stop revolving! Why?

Only pressing RESET or switching the computer off will stop it. Is there another way of getting this facility on the 64 (in 32K mode)?

G J Tuttiatt
32 Heol Calfin
Foresthall
Swansea
SA5 5EH

TAKING your questions in order:

Losing memory with Dragon DOS

I HAVE recently purchased a Dragon 64 with Dragon Disk Drive, but I am having difficulty in using the extra 32K memory with Dragon DOS. Typing EXEC merely sets up the standard operating system, not DOS. How can the extra memory be used with DOS?

David Forgan
56 Rectory Road
Farnborough
Hants GU14 7HZ

YOU CANNOT access the full 64K RAM and the cartridge area (where the DOS is stored) at the same time. Therefore, the DOS is not available in 64K mode. It is possible to write a machine

(A) The problem with the SUPP dictionary supplied with the Stylograph disk is that it is an empty file, and this is what is causing the error with the Spellchecker. To stop the error occurring you must have at least one entry in this file.

(B) The SUPP dictionary is a simple text file stored in the STY directory. You can use Stylograph to create one, there should be one word per line.

(C) I cannot see any reason for this — perhaps your printer is at fault.

(D) I do not know of any books that concentrate on the Dragon disk drives, although there is certainly a need for one, judging by the number of questions regarding these we get.

(E) The auto repeat pokes reset the interrupt routine to the Dragons' Basic ROM. The Disk ROM uses interrupts to control the motor off delay, and this is why the disk motor never stops. If you must use these pokes, you can type POKE &HFF48,0 to stop the disk drive at any time.

ORCC	#255	Disable IRQ's
LDX	#32768	Start of Basic
LOOP STA	\$\$FFDE	ROM mode
LDA	,X	Get byte from ROM
STA	\$\$FFDF	RAM mode
STA	,X+	Store in RAM
CMPX	#57344	All copied?
BLO	LOOP	No branch again
ANDCC	#255-16	Enable IRQ's
RTS		Return to Basic in 64K mode

The only figures that count

The circulation of this
magazine is certified
independently to
professional standards
administered by the Audit
Bureau of Circulations

January-June 1984

35,379



The Hallmark of Audited Circulation

QUICKBEAM SOFTWARE

ARCADE
Presents

DICKIES DEN — Poor old Dickie is in trouble again. The builders have been scared off by the Ghouls and Ghosts which inhabit the many rooms of his new den. Your task: to help Dickie collect the materials necessary to complete his dream home. Produced with machine coded action. Keyboard/joystick £6.95

DICKIE SPACE MAN — Dickie fights for survival while attempting to re-build his space ship on a futuristic planet. Only you can help him defeat the marauding aliens and collect the rewards. May the force be with you!!! Pure machine code action with keyboard/joystick options £6.95

ADVENTURES

TERROR CASTLE — A classic adventure where you have to rescue the princess £5.95

THE SHRUNKEN SCIENTIST — You are only 1in tall, will you get to the antidote and regain your height? Pick of the Month — March Dragon User £5.95

TOMBSTONE AND COD CREEK — Two classic games on one cassette. Excellent value for all the family. £5.95

UTILITIES

DUPLICAS 3 — Cassette back-up utility will make back-ups of most of your present software. Even the latest dongle software!!! "Of the numerous back-up programs I have, Duplicas out-performs them all." D.M., Warrington £7.95

Please send SAE for full details
Add 50p P&P to all orders, overseas £1.00

67 Old Nazeing Road, Broxbourne, Herts EN10 6RN

GROSVENOR SOFTWARE

ALLDREAM — Editor/Assembler/Monitor/Disassembler

"The best Editor Assembler in the world." "A dream to use."
Cassette £12.95, Cartridge £2.95, Disk (Dragonodos) £19.95 (disk version supports direct disk to memory assembly). Send your cartridge with £10.00 to convert to disk version.

DREAMPRT: A utility for use with Dream/Alldream to give 64 characters per print line for letter writing, etc. Tape £4.50.

A Programmer's Guide to Dragon DOS — a detailed information booklet with programmed examples in Basic and machine code £2.50.

AMATEUR RADIO SOFTWARE BY G4BMK

RTTY+ASCII Transceiver: Will receive without a terminal unit. Split screen, type ahead, etc. Tape £12 Cartridge £22.

CW Transceiver. Automatic speed tracking. 5-200 WPM. Tape £10.75.

Return RTTY or RTTY/CW Cart. with £29 to add AMTOR software.

All supplied with full manuals. Please add 40p P&P (£1 export).

22 GROSVENOR ROAD, SEAFORD, EAST SUSSEX BN25 2BS
Tel: (0323) 893378

QUALITY PRINTERS . . . BARGAIN PRICES

Complete with cables ready to plug into Dragon
Superb Shinwa CPA80P, Epson Compatible
Fantastic 13 x 9 dotmatrix (Epson is 9 x 9) 100 CPS

True descenders
friction AND tractor

BI DIRECTIONAL
Up to 96 columns

Normal, double and italic print

Many, many other advanced features
Delivery, VAT and insurance included in price of £237
Add £2.00 CONTINENT, £5.00 OUTSIDE EUROPE

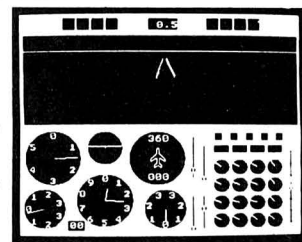
CHEQUES/POs to:

BUSINESS MICROS AND COMMUNICATIONS LTD

18 OSWALD STREET
MILLFIELD, SUNDERLAND SR4 6HN
TEL: 0783 674944

DRAGON/32 BBC MODEL/B ATARI 400/800 TRS80 C/C 32K ELECTRON 747 FLIGHT SIMULATOR

Superbly realistic instrumentation and pilot's view in lifelike simulation which includes emergencies such as engine fires and systems failures. This program uses high resolution graphics to the full to produce the most realistic flight-deck display yet seen on a home computer. There are 21 real dials and 25 other indicators (see diagram). Your controls operate throttle, ailerons, elevators, flaps, slats, spoilers, landing gear, reverse thrust, brakes, etc. You see the runway in true perspective. Uses joysticks and includes options to start with take-off or random landing approach. "A real simulation, not just another game" (*Your Computer*, April 19 '83).



Cassette £9.95 (p&p and VAT included):

DACC Ltd (Dept. DU)

23 Waverley Road, Hindley,
Greater Manchester WN2 3BN.
(Despatch within 48 hours)

**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 hobbyists, schools, colleges and industry. 8-bit A-to-D and D-to-A converters, bipolar buffered amplifiers, nine lines of TTL I/O, led status indicators, relay control.

SPECIAL PRICE £27.00 (+98p p&p)

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

NEW

NEW

NEW

BUSINESS ACCOUNTS PROGRAMS FOR DRAGON 32/64 By SOFTWARE DESIGN ASSOCIATES

Written in MACHINE CODE and BASIC for SPEED and ECONOMY

The following 3 programs may be used individually or together to form a double entry book-keeping system up to trial balance . . . suitable for both VAT and none VAT accounts. All programs support the following facilities as well as their own individual attributes.

Up to 400 transactions per program. Search / Browse / Edit / Insert / Delete / Sort / Printout individual, multiple or all records.

SEARCH FACILITY OVERCOMES ALL PROBLEMS OF 32 CHARACTER WIDTH SCREEN . . . ABILITY TO MERGE DAYBOOK AND CASHBOOK INTO LEDGER CUTS DATA ENTRY BY HALF.

SALES/PURCHASE LEDGER

List Accounts . . . Balance to date . . . Automatic carry forward . . . See at a glance all outstanding accounts . . .

CASHBOOK

Search any field . . . Balance check on data entry . . . View totals and balance to date . . . Carry forward.

SALES/PURCHASE DAYBOOK

Search any field . . . Totals (monthly, quarterly, year to date). Select any number of analysis columns, no need to re-define. £9.95 per program

SPECIAL OFFER . . . Purchase all 3 programs for only £24.95

Cheques etc, should be made payable to SOFTWARE DESIGN, and sent to:
80 Woodroyd, Golcar, Huddersfield, West Yorks. Tel: (0484) 642670.

Classified

RS232 OUTPUT MODULE

Simply plugs into printer port for connection to printers requiring a RS232 input. No additional software is required. can be used with existing programs. £49.95 + £1.50 p&p.

NON VOLATILE RAM MODULE

Retains data even when your dragon is switched off, plugs into the cartridge port, available in four types — 2K — £39.95, 4K — £44.95, 8K — £54.95, or pcb only with sockets fitted for up to four 2516 eproms for your own programs — £34.95.

Please enclose £1.50 p&p with all orders.

G.N. ELECTRONICS

396 Tamworth Road, Long Eaton, Nottingham.

LIBRA SOFTWARE

presents for Dragon 32/64
Escape from Hell House & Invaders from Space

Harry goes Bananas & Missile Commander

2 new cassettes with 2 games on each, Hi-Res colour and sound — Mail order only £6.95 each Cassette

Special Offer — Both for £11.95

Cheques/PO to

LIBRA SOFTWARE, 4 Marlborough Close, Clacton-on-Sea, Essex

MEDIA CALC SPREADSHEET

AMAZING VALUE

+ - * / % Average
Plus all Dragon functions supported 756 cells plus overlay feature.

Full instructions included, all for only £9.99 inc

MEDIA MAGNETICS, Freepost

West Bromwich, West Midlands B70 6BR

Agents required in countries other than Sp., S.A. & U.K.

DRAGON CHIPS, 68096 and 74L5783: £4.00 each, £30 for 10; 2764: £3.50 each, £30 for 10. Phone Nick, evenings, 0892 44070.

COMPUTER TUTOR this limited company has never traded. For sale, £200. Phone Hereford 58183.

STOCK CLEARANCE, mainly Microdeal, Morrisons, tapes from £2. SAE for details: 70 Acomb Crescent, Gosforth, Newcastle-upon-Tyne NE3 2BB.

KANU 1000 New game for 1985. 4-event challenge, Bowling, Darts, Cricket, Soccer. Joystick required £3 D. Lockheart, 54 Shelley Road, East Grinstead, Sussex, RH19 1SY.

ASTROLOGY for beginners

Special Starter Pack for only £11.50

Consists of a simple program to calculate a horoscope, an introductory booklet and two self-teaching programs (how to interpret the horoscope)

No previous knowledge required

For the Dragon and many other home micros. Also wide range of programs for more experienced astrologers

Cash with order (add 50p outside UK) or large sae for free catalogue to:—

ASTROCALC (Dept DU)

67 Peascroft Road
Hemel Hempstead, Herts HP3 8ER. Tel: 0442 51809

DRAGON 32 ten games and books. £75 ono. Tel: West Malling 843640.

DRAGON CARTRIDGE cases and bare printed circuit boards for sale. Cases at £1.25 each. PCBs at £1.75 each. PCBs will accept 2 × 2716, 2 × 2732 or 2 × 2764 Eproms. Prices plus postage and VAT. Call for 100+ prices. Windrush Micro Systems Ltd, Worstead Labs, Worstead, North Walsham, Norfolk. Tel: 0692 40486.

THE CANAL GAME!! 100% machine code, excellent sound and PMODE4 graphics, £5. Also screen copier for GP-115, includes colour dump!! £3. Send to: Unique Software, 5 Milton Drive, Poynton, Cheshire SK12 1EZ.

SOFTWARE 40 TITLES including Dragon Bait £1.00, also Sprite Magic £3.00, sae Paul Brady, 27 Wykeham Street, Scarborough, N. Yorks YO12 7SA.

DRAGON DOS USERS. Load all your Basic and none autorun programmes from disk and then run them without problems. Diskable £2.50. Martin Armitage, Kaelsoft, 101 South Terrace Wales-Bar, Sheffield S31 8QL.

"ELECTRONIC AUTHOR", full machine code, advanced word processor, geared to run on an Epson MX-80 but can be changed to run on any printer. Facilities include: automatic centring, page numbering, justified print or literal print, 51 or 64 × 24 character display, repeat key, full screen editing, superior loading/saving allowing names up to 20 characters, good and bad blocks are loaded in so IO errors are unheard of, absolutely any control command can be sent to the printer. Full documentation included. Cost is £19.95, cheques payable to Smithson Computing, 24 Coalhill Green, Bramley, Leeds 13. Tel: (0532) 551631 for more details.

DRAGON 32 for sale, plus extras, offers wanted. Ring 061-928 1009.

DRAGON 32 HI-TEXT: place text on the hi-res screen with this machine language utility, features full upper lower case, reverse field, double height characters, 448 definable characters, 51 × 24, 32 × 24 displays, 16 CLS colours, 6 display modes, £4.95; Super Basic (all Dragons): a machine language utility adding 58 commands to Basic, features 4 channel sound, alarm clock, function keys, procedures, error trapping, 33 colours, autorun on loading and lots more! £4.95. To: R. Thompson, 7 Brindley Way, Southall, Middlesex UB1 3JN. Tel: (01) 571 3610.

SEIKOSHA GP100A PRINTER, compatible with Dragon, with leads and spare ribbons, £100. Assorted Dragon cartridges, £5 each. Telephone Bedford 218536.

CUMANA DISK DRIVE, Delta interface, used one month only, warranty April 1985, demonstration disk and book, £150. Telephone 0491-36063 (Oxfordshire).

WANTED! Premier Scribe and toolkit (cassette, disc or Deltados — inherent) and Dragon 32 Premier upgraded 64k. Sam Chips 74LS783, full specification devices, as used in the Dragon 32/64 or Tandy, colour, only £15. Trade enquiries welcome. R. Vowles, 3 Orchard Way, Uxbridge Middlesex (0895) 54720.

FRUSTRATED BY MANIC MINER? Menu driven add-on program, infinite lives, access all 22 screens and more, 100 per cent machine code, £1 and S.A.E. for instructions and listing. David Brown, 331 Mossy Lea Road, Wrightington, Lancs WN6 9SB.

SHOVE HA'PENNY, popular pub pastime for two players. Send £3. K. Doble, 18 Court Road, Barry CF6 7EP.

PROGRAMS WRITTEN to your individual needs in Basic and Machine Code, reasonable rates. Telephone Hoddesdon 445140.

BRAND NEW Dragon 64's, guaranteed with software, £140. Telephone (0733) 64312 (evenings).

AMERICAN COLOUR Computer magazines, some back issues left. S.A.E. lists. Quickshot II Joysticks Tandy/Dragon, £14.95 plus £1.50 p+p. Dragon Cruncher — converts Dragon to Tandy and vice-versa (Basic only), £7.95. Dragon Eye mains indicator (LED), £3.95. Elkan Electronics, 11 Bury New Road, Prestwich, Manchester, M25 8JZ. Telephone 061-798 7613.

Here's my classified ad.

(Please write your copy in capital letters on the lines below.)

£0.20	£0.40
£0.60	£0.80
£1.00	£1.20
£1.40	£1.60
£1.80	£2.00
£2.20	£2.40
£2.60	£2.80
£3.00	£3.20
£3.40	£3.60
£3.80	£4.00

Please continue on a separate sheet of paper

I make this words, at 20p per word so I enclose £.....

Name

Address.....

Telephone

Please cut out and send this form to: Classified Department, Dragon User, 12-13 Little Newport Street, London WC2H 7PP

ADVERTISERS INDEX

B	M
Blaby Computers..... 22	Microdeal..... 16
	Monster 30
C	Morrison Micros..... 29
Commercial and General 30	MST..... 20
Compusense 8	
Computer Ware 28	O
CPS..... 26	Oasis..... 2
Cumana..... 15	
	P
D	Peaksoft 28
Datacom..... 6	
Data Pen 20	Q
	Quick Beam..... 32
E	
Electroanalytical Technology 32	R
	Rainbow 26
G	
Grosvenor 32	S
	SP Electronics..... 30
H	
Harris..... 28	T
Hot Coco 18	Touchmaster 5
	Trojan 22
I	Tudor Williams..... 30
Incentive 24	
Interface 29	W
	Wintersoft 34
K	Wizzard 29
E. Kershaw..... 32	

The race is on to win the sprint

Gordon Lee sets the problem — Oasis software provide the prizes

LOOKING BACK over the last two years, I hope that readers will have found something to show that mathematics is not necessarily the dry subject that it is often thought to be, and instead is a rich source of the unusual and the unexpected.

This type of maths — "Recreational" mathematics — is by no means a new phenomenon. Its roots can be traced back over 4,000 years, and yet it is still a science that is bang up to date, with computers playing an important part in some of the recent developments. Nowhere is this more apparent than in the search for prime numbers of increasing magnitude. Beginning in the time of the Greek mathematician Eratosthenes of Cyrene (250 BC) who invented a simple means of listing the smaller prime numbers, numerous mathematicians have since devoted much time and labour to the quest for these enigmatic numbers. Nowadays the search is usually limited to the so-called "Mersenne" primes — that is numbers in the form $2^n - 1$. These numbers are named after the Frenchman, Father Marin Mersenne (see this page — Dragon User, November 1983) who in his

Cogitata of 1644 correctly stated that $2^{127} - 1$ was prime. How he arrived at this calculation, given the methods then available, is unknown. Curiously, he also stated — although this time incorrectly — that $2^{257} - 1$ was also prime. It was not until 1947 that this was shown to be erroneous, since when, with the aid of high speed computers and sophisticated programs, the frontiers of primality have been pushed back even further. On this page in November 1983 the highest prime known was given as the 25,000 digit $2^{86243} - 1$. Since then this has now been superseded by the 39,751 digit $2^{132049} - 1$, which at the time of writing is now the highest known prime, although, I am sure, the discovery of a yet larger one is not far away.

Consider also Fermat's "last" theorem, so-called because it is the last of his theorems to be proved. This states that the expression $x^n + y^n = z^n$ has no integral (whole number) solutions when n is greater than 2. When n is equal to 2, the equation is, of course, the basis of Pythagoras' theorem with an infinite number of integral solutions. But try to find two cubes that sum to a third cube and the task

seems impossible. Computers have checked all integral combinations of cubes up to several millions without a single solution being found. Of course, this does not prove that there is not an as yet untried combination, and so it is necessary to look for an algebraic proof that the problem is impossible. Curiously, there is no such proof available which either proves or disproves Fermat's theorem, and in the three hundred years since Fermat's death mathematicians have sought in vain for this elusive proof.

Fermat's last word

Perhaps the last word should go to Fermat himself. After his death in 1665, in the margin of one of his books was found a scribbled note: "It is impossible to separate a cube into two cubes, . . . or any power except a square into two powers with the same exponent. I have discovered a truly marvellous proof of this, which however, the margin is not large enough to contain".

Could it be that he had indeed found the proof that has since eluded mathematicians for over three centuries? Could it be that this great mathematical mind could have been mistaken? Surely not. Or could it be that, realising the impossibility of such a proof, Fermat pulled what must be the greatest mathematical joke of all time. Perhaps somewhere the ghost of this great man is still having a quiet chuckle at our expense!

And now to this month's competition. Consider, if you will, a number system based not on the usual decimal system but on a base of 26. Thus, the digits could be represented by our normal alphabet: A=1, B=2 and so on up to Y=25. The letter Z would represent zero.

As a consequence of this any word in the English language (or for that matter any random sequence of letters) would have a numeric equivalent. So, for example, the word 'DRAGON' would have a decimal equivalent of 55773784. Now if such a system were in regular use it is quite conceivable that a table of squares would be printed just as there are such tables available in the decimal system.

If I had such a table covering the squares from A to NUT, how many of the squares would form recognisable English words? ■

Prize

THIS MONTH, Oasis Software has donated 15 copies of *Sprint Basic Compiler* for the Dragon as competition prizes. *Sprint* enables you to convert your Basic programs into intermediate code with ease, speeding up run time by up to five times normal.

Rules

TO WIN a copy of Oasis' *Sprint Basic Compiler*, you must both show the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon. Please do not send in a cassette containing the answer.

As a tiebreaker, complete the following sentence in 12 words or less: "I would really like to win a *Sprint* because . . ."

Your entry must arrive at Dragon User by the last working day in May. The winners and the solution to the problem will be published in our

August issue. Entries will not be acknowledged and we cannot enter into correspondence on the result.

February winner

THE ANSWER to February's competition is 4 red blocks, 4896 blue blocks and 14700 green.

Twenty readers were perspicacious enough to win themselves copies of Channel 8's *Waxworks* adventure for the Dragon. They are A Thomas of Bury St Edmunds, M Stentiford of Kingskerswell, T Vetterlein of Knutsford, O Kringlebotn of Norway, Rachel Edmunds of Sedgfield, Ned Skelton of Thornbury, M Chaker of Denmark, Mark Heaps of Wokingborough, Paul Derwent of Mossley, T Potter of Chisleton, Z Chen of Bristol, L Turner of Epsom, Graham French of Northampton, T Flack of Royston, P Scott of Malbon, Keith Watson of Clacton, F Willers of Stone, Kevin Desmond of Cork, P Fairbairn of Kilmaurs and R Morris of Rogerstone.

RETURN OF THE RING

THE RING
OF
DARKNESS
PART II

At last the saga continues...

The Guardian of Shedir is defeated, the Hell spawned hordes of the Evil Sage lie at bay. Now Ringbearer, wielder of the Four Bright Rings, must face the greatest challenge: to return the Ring Of Darkness to its creators on the hidden planet Ringworld... And somewhere at the ends of time the forces of evil are preparing their revenge.

After one year of development, Wintersoft are proud to present the most sophisticated game ever created for the Dragon 32. Written 100% in machine code, RETURN OF THE RING is an astounding multi program blend of superb high resolution colour graphics and advanced routines that allow you to communicate with your computer in complete sentences. You will face challenge and excitement as you and your Ringworld companions travel a mysterious planet and brave the dangers of an amazing three-dimensional forest moon. An epic adventure unrivalled for its wealth of detail and diversity.

May luck travel your path.

Please note: RETURN OF THE RING is a complete adventure. You need not buy THE RING OF DARKNESS to play it.



WINTERSOFT
SOFTWARE

DEALERS PHONE
01-367 5720

WINTERSOFT
SOFTWARE

30 UPLANDS PARK ROAD,
ENFIELD, MIDDLESEX,
EN2 7PT

ALSO AVAILABLE:-

DRAGON 32

Return of the Ring £9.95
The Ring of Darkness £9.95
Dragon Trek £6.95

SPECTRUM 48K

The Ring of Darkness £9.95

ORIC-1 48K

The Ring of Darkness £9.95
Operation Gremlin £6.95

PRICES INCLUDE P&P, VAT, AND OUR LIFETIME
GUARANTEE.

SELECTED TITLES AVAILABLE FROM
LARGER BRANCHES OF



PLEASE RUSH ME:-

QUANTITY	TITLE	COMPUTER

I ENCLOSE MY CHEQUE/P.O. FOR £.....

NAME: _____ ADDRESS: _____

INCENTIVE

FOLLOWING THE EXEMPLARY BACKTRACK – INCENTIVE NOW PRESENTS FOR THE DRAGON

THE KET TRILOGY

BY JOHN MARTIN AND RICHARD McCORMACK



* THE KET TRILOGY – THE CELEBRATED ADVENTURE CLASSIC *

THE STORY SO FAR...

The Lords of Ket rule a strife-torn land where magic and mayhem are common place. Raiders from the east sweep in and devastate the countryside, spurred by the villainous Priest-King Vran Verusbel, arch-mage of the cult of mad monks and by the beautiful, though utterly evil, Priestess Delphia.

Unjustly condemned for a murder you did not commit, you have been offered the chance of escaping the hangman's noose by undertaking a perilous quest. Naturally you accept, but to ensure your loyalty to the cause, the Lords have placed a magic assassin bug on your neck, ordered to sink his poisonous fangs into you at the slightest sign of cowardice.

Poised at the brink of the unknown village, you stand alone with the daunting mission before you. . . With just a handful of coins, your trusty sword and the will to succeed. . .

Your task is to travel beyond the mountains and then underground via Vran's Temple to the ultimate confrontation with Vran himself, penetrating his inner sanctum, beyond the Guardians of the Gates. . .

**THE THREE 30K ADVENTURES
TOGETHER FORMING THE
CLASSIC AND COLOSSAL
KET TRILOGY**

MOUNTAINS OF KET

TEMPLE OF VRAN

THE FINAL MISSION



THE KET TRILOGY Series of adventures are available from selected Software Dealers nationwide. In case of difficulty, please use our fast and efficient mail order service.

PLEASE NOTE Each part of the Trilogy is a COMPLETE ADVENTURE IN ITSELF which can be played totally independently of the other two.

REGISTERED OFFICE 54 London Street, Reading RG1 4SQ.

TRADE AND CREDIT CARD ORDERS Telephone direct (0734) 591678.

ORDER FORM

Please rush me the titles as indicated for the Dragon 32/64 Computer

BACK TRACK £6.50
THE KET TRILOGY £9.95



I enclose cheque/PO or please debit my credit card No.

Name/address

INCENTIVE SOFTWARE LTD, 54 LONDON STREET, READING RG1 4SQ. TELEPHONE: (0734) 591678