

# DRAGON USER

International edition

75p US\$3.25 January 1985

*The independent Dragon magazine*

Who is  
KING  
of the  
HILL?

6809 show  
highlights

Adventure

Blowing on  
an Eprom

Discount Club

WIN £300 of s/w  
from Cable

# Salamander

## SOFTWARE DISCOUNT CLUB

FREE  
POSTAGE  
AND  
PACKING

FREE  
POSTAGE  
AND  
PACKING

Dear Dragon's Lair,  
As you know of my love for the best of the best, I am writing to you to tell you that I have just received a copy of the new Salamander Software Discount Club. I am sure that you will find it a most interesting and valuable addition to your collection of software.

As my personal favourite, I am sure that you will find it a most interesting and valuable addition to your collection of software.

First, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Second, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Third, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Fourth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Fifth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Sixth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Seventh, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Eighth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Ninth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

Tenth, the Salamander Software Discount Club is a most interesting and valuable addition to your collection of software.

### Happy Christmas

FREE  
POSTAGE  
AND  
PACKING

#### ARCADIE ACTION

**ARCADIE ACTION**  
All machine and 16-bit digital game  
comparable to other software.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### LAUNCH POINT

**LAUNCH POINT**  
Machine and 16-bit digital game  
comparable to other software.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### LAUNCH POINT

**LAUNCH POINT**  
Machine and 16-bit digital game  
comparable to other software.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### STRATEGIC DRAGON TRICK

**STRATEGIC DRAGON TRICK**  
A real time version of this  
classic game.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### STRATEGIC DRAGON TRICK

**STRATEGIC DRAGON TRICK**  
A real time version of this  
classic game.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### STRATEGIC DRAGON TRICK

**STRATEGIC DRAGON TRICK**  
A real time version of this  
classic game.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### UTILITIES

**UTILITIES**  
A complete set of utilities  
including disk management,  
file management, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### UTILITIES

**UTILITIES**  
A complete set of utilities  
including disk management,  
file management, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### UTILITIES

**UTILITIES**  
A complete set of utilities  
including disk management,  
file management, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### EDUCATIONAL

**EDUCATIONAL**  
A complete set of educational  
software including geometry,  
algebra, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### EDUCATIONAL

**EDUCATIONAL**  
A complete set of educational  
software including geometry,  
algebra, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### ADVENTURE

**ADVENTURE**  
A complete set of adventure  
software including fantasy,  
science fiction, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### ADVENTURE

**ADVENTURE**  
A complete set of adventure  
software including fantasy,  
science fiction, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### ADVENTURE

**ADVENTURE**  
A complete set of adventure  
software including fantasy,  
science fiction, and more.  
£7.99 — was £19.99  
NOW ONLY £4.99

#### THE DRANKLIN'S TIME TRILOGY

**THE DRANKLIN'S TIME TRILOGY**  
1. — Franklin's Trick  
2. — Lost in Space  
3. — Holy Grail  
All three available for only £14.99 (illustrated version)  
£14.99 — was £29.99  
NOW ONLY £14.99

#### THE DRANKLIN'S TIME TRILOGY

**THE DRANKLIN'S TIME TRILOGY**  
1. — Franklin's Trick  
2. — Lost in Space  
3. — Holy Grail  
All three available for only £14.99 (illustrated version)  
£14.99 — was £29.99  
NOW ONLY £14.99

#### THE DRANKLIN'S TIME TRILOGY

**THE DRANKLIN'S TIME TRILOGY**  
1. — Franklin's Trick  
2. — Lost in Space  
3. — Holy Grail  
All three available for only £14.99 (illustrated version)  
£14.99 — was £29.99  
NOW ONLY £14.99

### EXTRA SPECIALS

**£4 off each of these six fabulous games**

GAMES COMPENDIUM

NIGHTLIGHT

STAR JAMMER

GOLF

VULCAN BOUTHS & CROSSES

SUPER SKILL MAN

Usually £7.99

**£3.95**

each

Name \_\_\_\_\_ Price \_\_\_\_\_ Quantity \_\_\_\_\_

Please make cheques P.O. payable to Salamander Software

Name \_\_\_\_\_

Address \_\_\_\_\_

Total £ enclosed \_\_\_\_\_

☐ Please send me your latest catalogue

**Salamander Software Discount Club**

**17 Norfolk Road, Brighton, East Sussex. BN1 3AA**



# DRAGON USER



Telephone number  
(All departments)  
01-407 4943

Editor  
BRENDON COPE

Assistant Editor  
GORDON ROSS

Software Editor  
GURHAM TAYLOR

Editorial Secretary  
GERALDINE SMYTH

Group Advertisement Manager  
DAVID LAKE

Advertisement Manager  
SIMON LANGSTON

Administration  
THERESA LADY

Managing Editor  
DUNCAN SCOT

Publishing Director  
JERRY IRELAND

Subscriptions  
UK £10 for 12 issues  
Overseas (surface) £18 for 12 issues

0145 6261177, Telex 296075  
Dragon User, 12-13 Little Newport Street,  
London WC2N 7PP

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



Published by Sunshine Books, Scot Press  
Ltd (Publishing Rights) 1984  
Typesetting by Cheatham Press, Cheatham,  
Bristol. Printed by (John) Palmer (Southern)  
Ltd, Southampton-New, Essex.  
Distributed by G.M. Distribution, London  
SW9, 01 075 8871, Telex 282 6643

Registered at the Post Office as a news-  
paper

Dragon and its logo are trademarks of  
Dragon Data Ltd

## How to submit articles

The quality of the material we can publish in  
Dragon User each month will, 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 accom-  
panied by a tape of the program.

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

# Contents



## Letters

Including this month information on key  
functions, a plea from Incentive Software  
and a special offer from Snap

5

## King of the hill

Colly Cobas and Splunge are out to get  
you in P Thompson's O'best game — our  
programs of the month (Front cover by Mike  
Barrett)

23

## News



A round-up of the latest news, details of  
Premier's download and the latest on new  
software and peripherals

8

## Reach for recursion

Paul Grives shows how to program in  
recursion — a special type of program  
structure

31

## Open file

Reader's programs this month include a  
sound to light tester, a short utility for  
LISA drive users, a slithering pattern and a  
skating game

33

## Bookbytes

Two basic books and an adventure game  
guide are put under scrutiny

41

## Dragonsoft

Our reviewers tackle the latest arcade,  
educational, utility and graphics packages

11

## Adventure trail

Mike Gerrard offers his help-to-adventurers  
in need and tackles the latest adventure  
from Charmed II

43

## Bargain software

Your last chance to obtain a selection of  
games and adventures from Computer  
Rentals at a reduced rate of £1.50 off for  
readers of Dragon User

15

## EPROM blowing

Kath and Steven Brian review the well-  
designed EPROM programmer from  
Steve's Electronic Supply company

16

## Dragon Answers

Brian Cadge offers advice on moving  
DRAWed characters, saving graphics and  
obtaining the start- and end-exec locations  
with the DragonDOG cartridge attached

45

## Made in Spain

Gordon Ross interviews Eduardo Merino,  
president of Eurohard SA, the Spanish  
manufacturers of the Dragon

19

## Competition corner

Cable Software offers the prizes to Gordon  
Lee's puzzle

50

# Editorial

IF THE 8808 show has any message at all, it is that the Dragon is not dead yet. Rumour of the Dragon market's imminent demise, which have been rife since Dragon Data folded, are somewhat exaggerated.

There was an excitement about the 8808 show not seen since the early ZX Microfairs, when the Central Hall at Westminster was filled with wall-to-wall people. Software and books, admittedly on offer at discount prices, were shifting like there was no tomorrow. But then many Dragon owners are worried that there will be no tomorrow.

Dragon's future has been the subject of considerable debate ever since Dragon Data went into receivership and sold the manufacturing rights to the 32- and 64-bit Spanish company Eurohard. The pundits have been predicting a rapid end to the machine, with software companies refusing to support a declining market.

Certainly the retail chains have emptied their shelves of Dragons and Dragon software as fast as possible. Equally, those software companies specialising in the Dragon have been converting their programs to other machines. Few of them are writing new Dragon programs. Commodore, Sinclair, Acorn and Amstrad are the 'hot' machines now.

Nevertheless, the Dragon has undergone something of a mini-revival in recent weeks. Stores anxious to rid themselves of unwanted machines have found out price Dragons being snapped up by bargain hunters. Similarly, mail-order software houses have seen a resurgence in business as Dragon owners discover they can no longer buy software in their local stores.

Perhaps the most encouraging news comes from Eurohard's plan to sell an enhanced 64 in the UK. Whatever the size of the existing Dragon User base, the machine will only have a long-term future if it is followed by new models.





# 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 WC2N 7PP.

## Missing manual

I PURCHASED a Dragon 32 (secondhand) and the previous owner left the instruction manual. If any reader has a spare manual or doesn't use their manual and would be willing to part with it I'd be grateful if they would get in contact with me.

B. Elder  
4 Langrove  
Dorchester  
Dorset

their home address and the Post Office from which they obtained their postal order, so that I can clear up these orders and send off copies of the game.

Darryl Self  
Operations Manager  
Jaguar Software  
34 Lyndon Street  
Reading RG1 4DD

## Twist or stick

MANY THANKS for your review of Cecil Plays 21. Having taken Brian Cudge's comments very much to heart we have immediately corrected the faults.

As we have sold a number of these tapes we do feel a responsibility to our customers and would like to inform them that anyone who has a copy of Cecil Plays 21 can return it to us as we will, by return of post, send out not only a corrected version but also another one of our games by way of compensation.

Howard Davies  
Jag Software  
PO Box 28  
Maiden  
Surrey GU21 3BN

## Smooth operator

WITH reference to the raster program by Neil Skjelden in the November issue of Dragon User (Open the window) I would like to improve on the program by making the 3-D graphics smoother.

Load the type in the program as listed in November, and then type in the following lines of program:

```
1 POLAR 5:PMODE 4.5:POL5
485 FOR N=1 TO 4:PODFIN=4
TO N:NEXT N
486 PMODE 4.5:POL5
545 PMODE 4.5
725 FOR N=1 TO 4:PODFIN=4
TO N:NEXT N
780 PMODE 4.5:POL5
```

The program will now draw the frame of the cube or triangle on page five then copy it to page one. The effect involves the program off well.

Leon Reynolds  
Leicester

## In search of Trackers

WE HAVE had a fantastic response from readers to our offer for Back Track using the £1.50 off token published in the October issue of Dragon User. However, we have received some orders that we are unable to send as all we have received is a postal order and the coupon with no name and address.

Any readers who have sent a postal order to incentive and have yet to receive their copy of Back Track please either write to me at the address below, or phone me on 0734-581578 giving details of

## Function key routines

I WAS interested to read Peter Whittaker's article on function key routines in the October issue of Dragon User. I have been experimenting with his method of calling Basic ROM routines, and found that for some routines at least, it does not work. Inspection of the ROM instructions at their entry points shows why: these routines need not the token, but the next character after it is to be loaded into the A register. Also, the CC register is unimportant and does not need to be set with

ANDCC #0FE in the ones I have tried. Below is a listing that calls the ROM routines in sequence. To execute type:  
PMQ004:PCLS:SCREEN1,1:  
CPCLE:128,98,85.

The technique can also be used with other languages. I use it to call Basic functions from FORTRAN as my MICROFANES has screen 1. I don't not have Basic calls, but does allow machine code calls using Z8.

Dr John Nash  
West Kirby  
Merseyside

```
7930          00100      DRG 38008
7930 9E 4C 00118  START LDR 8848
7932 54 18 00120  PSHSR
7934 8E 7958 00150  LDR #10001
7937 9F 4C 00140  STX 8848
7939 A6 84 00150  LDR X
793B 8D 45AF 00160  JST 8848
793E 4F 00170  CLRA
793F 8D 482C 00180  JST 884C
7942 5E 7960 00190  LDR #10002
7945 9F 4C 00200  STX 8848
7947 A6 84 00210  LDR X
7949 8D 48FE 00220  JST 884E
794C 8E 7961 00230  LDR #10003
794F 9F 4C 00240  STX 8848
7951 A6 84 00250  LDR X
7953 8D 8D38 00260  JST 8838
7956 35 18 00270  PLSX
7958 9F 4C 00280  STX 8848
795A 39 00290  RTS
7960          3480 00300 1041  FDS 82409
7960          312C 00310 1042  FDS 82125
796F          3180 00320  FDS 82100
7971          3531 00330 1043  FDS 82814
7973          3239 00340  FDS 82259
7975          3C39 00350  FDS 82C08
7977          3629 00360  FDS 82629
7979          3C39 00370  FDS 82C08
797B          3528 00380  FDS 82660
797D          3038 00390  END
8060 1014 (F84C)
START 7960
10K1 7968
10K2 7990
10K3 7981
```

## Scramble to the rescue

I HAVE had several inquiries regarding my program Scramble. Scramble published in the October issue of Dragon User. Most problems are caused by incorrect data entries in lines 2970-3130. The program is correct as listed, however, any readers having problems can send me (via Dragon User) a blank tape and a large SAE for a free copy of the program.

Dave Galloway

## Software Top 10

- |        |                          |                 |
|--------|--------------------------|-----------------|
| 1 (1)  | Hunchback                | Ocean           |
| 2 (3)  | Hungry Horace            | Melbourne House |
| 3 (8)  | Dragon Chase             | Chico           |
| 4 (2)  | Mystery of the Java Star | Shant           |
| 5 (7)  | Chuzzlewit Egg           | A & P           |
| 6 (4)  | We Dig                   | Mindwheel       |
| 7 (5)  | Outburst in Space        | Mindwheel       |
| 8 (1)  | Kingship                 | Bayard          |
| 9 (1)  | Bug Driver               | Maschinen       |
| 10 (1) | Sports Magic             | Knight Software |

Chart compiled by Whistlers Software

## Bulletin boards

CAN anybody provide me with details of bulletin boards (either free access or charged access) suitable for use with the Dragon. Also, any person interested in setting up a bulletin board for the Dragon in my area can contact me at 8 Knights Hill, Severn Soaks, Worcestershire.

D J Sutton  
Worcester

# THE MICRODEAL WONDERLAND

These terrific games from Microdeal are available in Tandy Stores Nationwide for the

# Tandy

TRS 80™ COLOUR  
COMPUTER



Ripper-our-Yello! Outboard  
 Fight Deadly Subaquatics  
 Near Dungeness Harbor through  
 Sea Devil's Claws, at Pinnacles  
 Fight Deadly-Spores with  
 Pungent the Penguin  
 In gale, real time  
 adventures with  
 the King of the  
 Waves, it's all there with  
 (M)arcus' voice



ALL THESE CITIES  
HARBOR FREE TRADE  
ZONES ARE ECONOMICALLY  
VIBRANT AND  
GROWING TRADE  
CENTERS IN ASIA/PACIFIC  
AND THE MIDDLE EAST

**Figure 6**

**£7.95**

1000



# Tandy

**THE 60-MINUTE COMPUTER**  
The IBM PC Junior computer is ideal for students who want to explore video games in a hands-on way. It can be used for many other educational business and educational uses. It's great for beginners who want a computer that's easy to learn on. Includes exciting built-in games for business, education and fun. Features a built-in keyboard and a built-in screen. Includes a built-in screen. Includes a built-in screen.



## MICRODEAL

© 2000 Blackwell Publishers Ltd. *Journal of Internal Medicine* 247: 389–398

# OASIS SOFTWARE

present... TWO NEW RELEASES

## SPRINT BASIC COMPILER

1. ready-to-use program in BASIC format  
2. easy to learn and use  
3. fast and efficient  
4. no need for a separate compiler  
5. no need for a separate interpreter  
6. no need for a separate linker  
7. no need for a separate loader  
8. no need for a separate debugger  
9. no need for a separate assembler  
10. no need for a separate linker/loader/assembler/debugger/assembler



**SPRINT**  
Basic Compiler  
For the DRAGON 32

**DRAGON**



**PAS**  
Basic Compiler  
For the DRAGON 32

## DRAGON 32 & 64

## DRAGON CHESS

1. ready-to-use program in BASIC format  
2. easy to learn and use  
3. fast and efficient  
4. no need for a separate compiler  
5. no need for a separate interpreter  
6. no need for a separate linker  
7. no need for a separate loader  
8. no need for a separate debugger  
9. no need for a separate assembler  
10. no need for a separate linker/loader/assembler/debugger/assembler



## MIND GAMES COMPENDIUM

All five games for just £19.95



Over 1000 puzzles and challenges in five games: **Brain Busters**, **Brain Benders**, **Brain Benders II**, **Brain Benders III**, and **Brain Benders IV**. Each game contains 100 puzzles and challenges. The games are designed to be played on the Dragon 32 and 64. They are suitable for all ages and are a great way to test your brain power.



## PETITE PASCAL

Over 100 puzzles and challenges in five games: **Brain Busters**, **Brain Benders**, **Brain Benders II**, **Brain Benders III**, and **Brain Benders IV**. Each game contains 100 puzzles and challenges. The games are designed to be played on the Dragon 32 and 64. They are suitable for all ages and are a great way to test your brain power.



Dragon 32  
Dragon 64  
Dragon 128  
Dragon 256  
Dragon 512  
Dragon 1024  
Dragon 2048  
Dragon 4096  
Dragon 8192  
Dragon 16384  
Dragon 32768  
Dragon 65536  
Dragon 131072  
Dragon 262144  
Dragon 524288  
Dragon 1048576  
Dragon 2097152  
Dragon 4194304  
Dragon 8388608  
Dragon 16777216  
Dragon 33554432  
Dragon 67108864  
Dragon 134217728  
Dragon 268435456  
Dragon 536870912  
Dragon 1073741824  
Dragon 2147483648  
Dragon 4294967296  
Dragon 8589934592  
Dragon 17179869184  
Dragon 34359738368  
Dragon 68719476736  
Dragon 137438953472  
Dragon 274877906944  
Dragon 549755813888  
Dragon 1099511627776  
Dragon 2199023255552  
Dragon 4398046511104  
Dragon 8796093022208  
Dragon 17592186044416  
Dragon 35184372088832  
Dragon 70368744177664  
Dragon 140737488355328  
Dragon 281474976710656  
Dragon 562949953421312  
Dragon 1125899906842624  
Dragon 2251799813685248  
Dragon 4503599627370496  
Dragon 9007199254740992  
Dragon 18014398509481984  
Dragon 36028797018963968  
Dragon 72057594037927936  
Dragon 144115188075855872  
Dragon 288230376151711744  
Dragon 576460752303423488  
Dragon 1152921504606846976  
Dragon 2305843009213693952  
Dragon 4611686018427387904  
Dragon 9223372036854775808  
Dragon 18446744073709551616  
Dragon 36893488147419103232  
Dragon 73786976294838206464  
Dragon 147573952589676412928  
Dragon 295147905179352825856  
Dragon 590295810358705651712  
Dragon 1180591620717411303424  
Dragon 2361183241434822606848  
Dragon 4722366482869645213696  
Dragon 9444732965739290427392  
Dragon 18889465931478580854784  
Dragon 37778931862957161709568  
Dragon 75557863725914323419136  
Dragon 151115727451828646838272  
Dragon 302231454903657293676544  
Dragon 604462909807314587353088  
Dragon 1208925819614629174706176  
Dragon 2417851639229258349412352  
Dragon 4835703278458516698824704  
Dragon 9671406556917033397649408  
Dragon 19342813113834066795298816  
Dragon 38685626227668133590597632  
Dragon 77371252455336267181195264  
Dragon 154742504910672534362390528  
Dragon 309485009821345068724781056  
Dragon 618970019642690137449562112  
Dragon 1237940039285380274899124224  
Dragon 2475880078570760549798248448  
Dragon 4951760157141521099596496896  
Dragon 9903520314283042199192993792  
Dragon 19807040628566084398385987584  
Dragon 39614081257132168796771975168  
Dragon 79228162514264337593543950336  
Dragon 158456325028528675187087900672  
Dragon 316912650057057350374175801344  
Dragon 633825300114114700748351602688  
Dragon 1267650600228229401496703205376  
Dragon 2535301200456458802993406410752  
Dragon 5070602400912917605986812821504  
Dragon 10141204801825835211973625643008  
Dragon 20282409603651670423947251286016  
Dragon 40564819207303340847894502572032  
Dragon 81129638414606681695789005144064  
Dragon 162259276829213363391578010288128  
Dragon 324518553658426726783156020576256  
Dragon 649037107316853453566312041152512  
Dragon 1298074214633706907132624082305024  
Dragon 2596148429267413814265248164610048  
Dragon 5192296858534827628530496329220096  
Dragon 10384593717069655257060992658440192  
Dragon 20769187434139310514121985316880384  
Dragon 41538374868278621028243970633760768  
Dragon 83076749736557242056487941267521536  
Dragon 166153499473114484112975882535043072  
Dragon 332306998946228968225951765070086144  
Dragon 664613997892457936451903530140172288  
Dragon 1329227995784915872903807060280344576  
Dragon 2658455991569831745807614120560689152  
Dragon 5316911983139663491615228241121378304  
Dragon 10633823966279326983230456482242756608  
Dragon 21267647932558653966460912964485513216  
Dragon 42535295865117307932921825928971026432  
Dragon 85070591730234615865843651857942052864  
Dragon 170141183460469231731687303715884105728  
Dragon 340282366920938463463374607431768211456  
Dragon 680564733841876926926749214863536422912  
Dragon 1361129467683753853853498429727072845824  
Dragon 2722258935367507707706996859454145691648  
Dragon 5444517870735015415413993718908291383296  
Dragon 10889035741470030830827987437816582766592  
Dragon 21778071482940061661655974875633165533184  
Dragon 43556142965880123323311949751266331066368  
Dragon 87112285931760246646623899502532662132736  
Dragon 17422457186352049329324779900506532426552  
Dragon 34844914372704098658649559801013064853104  
Dragon 69689828745408197317299119602026129706208  
Dragon 139379657490816394634598239204052259412416  
Dragon 278759314981632789269196478408104518824832  
Dragon 557518629963265578538392956816209037649664  
Dragon 1115037259926531157076785913632418075299328  
Dragon 2230074519853062314153571827264836150598656  
Dragon 4460149039706124628307143654529672301197312  
Dragon 8920298079412249256614287309059344602394624  
Dragon 17840596158824498513228574618118689204789248  
Dragon 35681192317648997026457149236237378409578496  
Dragon 71362384635297994052914298472474756819156992  
Dragon 142724769270595988105828596944949513638313984  
Dragon 285449538541191976211657193889899027276627968  
Dragon 570899077082383952423314387779798054553255936  
Dragon 1141798154164767904846628775559596109106511872  
Dragon 228359630832953580969325755111919221821303744  
Dragon 456719261665907161938651510223838443642607488  
Dragon 913438523331814323877303020447676887285214976  
Dragon 1826877046663628647754606040895353774570429952  
Dragon 3653754093327257295509212081790707549140859904  
Dragon 7307508186654514591018424163581415098281719808  
Dragon 14615016373309029182036848327162830196563439616  
Dragon 29230032746618058364073696654325660393126879232  
Dragon 58460065493236116728147393308651320786253758464  
Dragon 116920130986472233456294786617302641572507516928  
Dragon 233840261972944466912589573234605283145015033856  
Dragon 467680523945888933825179146469210566290030067712  
Dragon 935361047891777867650358292938421132580060135424  
Dragon 1870722095783555735300716585876842265160120270848  
Dragon 3741444191567111470601433171753684530320240541696  
Dragon 7482888383134222941202866343507369060640481083392  
Dragon 14965776766268445882405732687014738121280962166784  
Dragon 29931553532536891764811465374029476242561924333568  
Dragon 59863107065073783529622930748058952485123848667136  
Dragon 119726214130147567059245861496117904970247697334272  
Dragon 239452428260295134118491722992235809940495394668544  
Dragon 478904856520590268236983445984471619880990789337088  
Dragon 957809713041180536473966891968943239761981578674176  
Dragon 1915619426082361072947933783937886479523963157348352  
Dragon 3831238852164722145895867567875772959047926314696704  
Dragon 7662477704329444291791735135751545918095852629393408  
Dragon 15324955408658888583583470271503091836191705258786816  
Dragon 30649910817317777167166940543006183672383410517573632  
Dragon 61299821634635554334333881086012367344766821035147264  
Dragon 122599643269271108668667762172024734689533642070294528  
Dragon 24519928653854221733733552434404946937906728414058912  
Dragon 49039857307708443467467104868809893875813456828117824  
Dragon 98079714615416886934934209737619787751626913656235648  
Dragon 19615942923083377386986841947523957550325382731247136  
Dragon 39231885846166754773973683895047915100650765462494272  
Dragon 78463771692333509547947367790095830201301530924988544  
Dragon 156927543384667019095894735580191660402603061849977088  
Dragon 313855086769334038191789471160383320805206123699954176  
Dragon 62771017353866807638357894232076664161041224739990832  
Dragon 125542034707733615276715788464153328322082449479981664  
Dragon 251084069415467230553431576928306656644164898959963328  
Dragon 502168138830934461106863153856613313288329797919926656  
Dragon 1004336277661868922213726307713226626576659595839853312  
Dragon 2008672555323737844427452615426453253153319191679706624  
Dragon 4017345110647475688854905230852906506306638383359413248  
Dragon 8034690221294951377709810461705813012613276766718826496  
Dragon 16069380442589902755419620923411626025226553533437652992  
Dragon 32138760885179805510839241846823252050453107066875305984  
Dragon 64277521770359611021678483693646504100906214133750611968  
Dragon 128555043540719222043356967387293008201812428267501223936  
Dragon 257110087081438444086713934774586016403624856535002447872  
Dragon 514220174162876888173427869549172032807249713070004895744  
Dragon 1028440348325753776346855739098344065614499426140009791488  
Dragon 2056880696651507552693711478196688131228998852280019582976  
Dragon 4113761393303015105387422956393376262457997704560039165952  
Dragon 8227522786606030210774845912786752524915995409120078331904  
Dragon 16455045573212060421549691825573505049831990818240156663808  
Dragon 32910091146424120843099383651147010099663981636480313327616  
Dragon 65820182292848241686198767302294020199327963272960626655232  
Dragon 131640364585696483372397534604588040398655926545921253310464  
Dragon 263280729171392966744795069209176080797311853091842506620928  
Dragon 526561458342785933489590138418352161594623706183685013241856  
Dragon 1053122916685571866979180276836704323189247412367370026483712  
Dragon 2106245833371143733958360553673408646378494824734740052967424  
Dragon 4212491666742287467916721107346817292756989649469480105934848  
Dragon 8424983333484574935833442214693634585513979298938960211869696  
Dragon 16849966668969149871666884429387269171027958597877920423739392  
Dragon 33699933337938299743333768858774538342055917195755840847478784  
Dragon 67399866675876599486667537717549076684111834391511681694957568  
Dragon 134799733351753198973335075435098153768223668783023363909915136  
Dragon 269599466703506397946670150870196307536447337566046727819830272  
Dragon 539198933407012795893340301740392615072894675132093455639660544  
Dragon 1078397866814025591786680603480785230145789350264186911279321088  
Dragon 2156795733628051183573361206961570460291578700528373822558642176  
Dragon 4313591467256102367146722413923140920583157401056747645117284352  
Dragon 8627182934512204734293444827846281841166314802113495290234568704  
Dragon 1725436586902440946858688965569256368233262960422699058046913728  
Dragon 3450873173804881893717377931138512736466525920845398116093827456  
Dragon 6901746347609763787434755862277025472933051841690796232187654912  
Dragon 13803492695219527574869511724554050945866103683381592464375309824  
Dragon 27606985390439055149739023449108101811732207366763184928750619648  
Dragon 55213970780878110299478046898216203623464414733526369857501239296  
Dragon 110427941561756220598956093796432407246928829467052739715002478592  
Dragon 220855883123512441197912187592864814493857658934105479430004957184  
Dragon 441711766247024882395824375185729628987715317868210958860009914368  
Dragon 883423532494049764791648750371459257975430635736421917720019828736  
Dragon 1766847064988099529583297500742918515950861271472843835440039657472  
Dragon 3533694129976199059166595001485837031901722542945687670880079314944  
Dragon 7067388259952398118333190002971674063803445085891375341760158629888  
Dragon 14134776519904796236666380005943348127606890171782750683520317259776  
Dragon 28269553039809592473332760011886696255213780343565501367040634519552  
Dragon 56539106079619184946665520023773392510427560687131002734081269039104  
Dragon 113078212159238369893331040047546785020855121374262005468162538078208  
Dragon 226156424318476739786662080095093570041710242748524010936325076156416  
Dragon 452312848636953479573324160190187140083420485497048021872650152312832  
Dragon 904625697273906959146648320380374280166840970994096043745300304625664  
Dragon 1809251394547813918293296640760748560333681941988192087490600609251328  
Dragon 3618502789095627836586593281521497120667363883976384174981201218502656  
Dragon 7237005578191255673173186563042994241334727767952768349962402437005312  
Dragon 14474011156382511346346373126085988482669455535905536699324804874010624  
Dragon 28948022312765022692692746252171976965338911071811073398649609748021248  
Dragon 57896044625530045385385492504343953930677822143622146797299219496042496  
Dragon 115792089251060090770770985008687907861355644287244293594598438992084992  
Dragon 231584178502120181541541970017375815722711288574488587189196779984169984  
Dragon 463168357004240363083083940034751631445422577148977174378393559968339968  
Dragon 926336714008480726166167880069503262890845154297954348756787119936679936  
Dragon 1852673428016961452332335760139006525781690308595908697513574239873359872  
Dragon 3705346856033922904664671



## Premier go under

PREMIER microsystems, manufacturer of DataDisk, the first disk drive system for the Dragon 32, has ceased trading.

All telephone lines to the company have been disconnected and none of the directors could be contacted at the time of going to press. Lack of sales following Dragon data's demise is thought to be the reason for the wind-up.

Cumans, distributors of Pre-

mier's disk system would make no comment as to what had happened, but did disclose that they would be selling off what remaining stock they had. Prices were marked down at the 9999 show.

Ted Corysall of Compentase said that Compentase will be selling a Flex implementation for Premier's controllers.

No further details are available.

## Hareraiser

HARERAISER FINALE, the computer program which puts you in search of the Jewelled Hare of Misqu Coast, is now available for the Dragon 32 and 64. Retailing for £9.95, the program, and its precursor Hareraiser Prelude, are essential for treasure hunters in search of the golden hare.

The hare is worth £30,000 and the winner has the option of either keeping the hare or £30,000. The first person to locate the hidden treasure wins the prize.

Each tape is specially



coded and has its own registration number. The winner must produce both tapes, registration number and winning location. Further details from Hareraiser on 01-365 0910.

## Versatile software

FARMERS and pharmacists are now making use of the Dragon with the arrival of versatile programs from two software houses.

Mumps, a high level structured language which is upwards compatible with mini-computers and mainframes is being used by Thoth Data to market a pharmacy labelling package.

The pharmacy labelling and automated stock recording system works on the Dragon 64 using Asist standard mumps. The package provides facilities for printing labels for medicines as well as automatic warning instructions to patients for the drugs dispensed. An optional stock check can be tied against each product.

The Dragon contains order codes and wholesale pack sizes for 400 stock lines. Products are accessed by typing the first few letters of their name, abbreviations are then automatically expanded and irrelevant prompts are suppressed if extra information is

given. Online help is available by answering each prompt with a "Y".

Mumps is a block structured language, similar to Logo in structure and modularity, with some commands resembling Basic. It was developed in the late 80ies as a computer operating system and programming language designed to cope with large hospital information systems. Its success in coping with this resulted in it being adopted in the business and commercial field. Further details from Thoth Data at 64 Main Street, Cuddy, Leicester LE18 3LU.

From Farmfax comes several agricultural programs covering arable and dairy farming. These is a pig program, an individual milk prediction program, management and ration formulation programs, cash accounts and cash planning programs.

Using aspace for its programs, Farmfax adopted the Dragon 32 after looking at 11 home computers, comparing such things as price, chips and ports.

Further details from the company at Farmfax Sales, Sheep Marsh, Petersfield, Hampshire.

Now £14.95... New Dragon  
Last Price for the Dragon... £17.95

## 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 Darbys, Buncut, Swansea SA2 7PF  
Tel: (0782) 265491

**TROJAN**   
Micro Computer Software & Accessories

ALSO AVAILABLE FROM GOOD COMPUTER DEALERS



# Dragonsoft

Now software for review should be sent to: Dragon User, 52-53 Little Newport Street, London WC2N 7PP

## Air attack

Program: Fury, Microdeal, 41 Trans Road, St. Aspley, Cornwall PL25 5JL. Price: £3.90

ALTHOUGH sports are not offered as one of the features on the Dragon, games writers are managing to produce them to good effect in some of the recent games I have seen. Fury is one of these, and they first appear in the title frame.



The theme is aerial combat in a cloud-filled sky, for some reason, somewhere in South America. You control a tiny plane in the centre of the screen that does not change its position, merely turning to face a different direction as you move the joystick around. The background moves in the opposite direction to the plane across the screen and this creates the illusion of movement.

Pressing the fire button produces a stream of bullets that go in the direction in which your plane is pointing. These can be aimed at the nasty enemy gunships that come after you, and this naturally increases your score. There are also several parachutes that float gently across the display.

The effect is visually very good, and would look excellent if the Dragon produced sharp colours, but as it is, it shows up best in black and white. If you can cope with the slowness that comes through staring too long at the fully loaded passing by, you may be awarded another aeroplane as you score the last.

I'm not sure about this game; it looks good but doesn't really get anywhere. On one occasion I hit the plane pointing at the top of the screen and just kept on firing. Whether I was simply lucky I don't know, but anything that came close disappeared with a bang, my points continued to rise, and I almost gave up after two minutes or so out of boredom. Then suddenly a magnetic mine appeared from nowhere and blew up my remaining plane in seconds — so beware! If you fancy your chances against the Red Baron you may enjoy this game, but I found it a little on the lame side.

John Schwen



## Hunchback

Program: The Bells, Blazy Computer Games, 10 Crossways, Lutterworth Road, Blazy, Leicester. Price: £1.99

IT SEEMS that the latest game to get the "Space Invader" treatment is the "Hunchback" type of game. Yet another version, The Bells, has been produced by Blazy Computer Games.

The notable features of this version are that there is both a joystick and keyboard version included on the one tape and that it is VERY fast, so fast that I found it almost unplayable with a joystick, as the

nearest touch went Quadrimode halfway across the screen. All the other usual features of Hunchback are here: arrows, guns, and so on. There are 14 screens to get through — I didn't get to the end, so I can't say what happens in this version.

Personally, I prefer Gosan's version of "Hunchback".



which is much more playable and has one extra screen. If you really want a "Hunchback" game then take a look at all of these available —

you pays your money . . .

Blair Cadge



## Evil Orbis

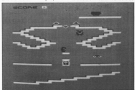
Program: Perilous Pit, Blazy Computer Games, 10 Crossways, House, Lutterworth Road, Blazy, Leicester. Price: £1.99

PERILOUS PIT is an arcade-style game set in the rather original location of a mine. The player has to guide Boris the miner past "The Dreaded Orbis and his Grones", collect some crystals, and put them in his truck. This is achieved using the joystick to move, and the fire button to jump.

keep the crystals mentioned above.

Strangest of all is the fact that while Boris can run around within a pool of The Inanimate Orbis without the latter bating an eyelid if he has one, jumping up and down right over the other side of the screen sends The Inanimate Orbis into a frenzy.

The graphics are not at all they could be: the movement is very jerky and Boris flickers continually. The sound effects during the game are almost non-existent, and those during the title sequence are only up to basic standard. It should be



Jumping around too much brings to life The Dreaded Orbis, who turns out to be a little too congenial with flashing light, and enjoys nothing more than a quick chase around the crystal mines. Exactly who or what The Inanimate Orbis is, is never explained (it certainly isn't obvious from the graphics) neither is his reason for wanting to

said, however, that this game does sell for £1.99, and I have seen worse games go for £9 or more, but then that is totally inexcusable. A range of cheap software is a very good idea, but only if the quality is maintained.

David Rowntree



## Educational

Program: Matreux and Spelbox, P.J. Post, The Pirelands, Red Lion Street, Chatham, Bucks HP5 1EZ. Price: £3.75

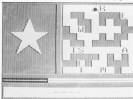
BOTH of these programs have been devised to enable children (university to 10-year-olds, according to the instructions) to test their knowledge of sim-

ple arithmetic and spelling of English words. As such they fit firmly into the "Educational type" of program packages.

The packaging in this case is an ordinary cassette box with a typewritten instruction sheet. The instructions, provided both on the sheet and on the program are clear and easy-to-use; however, if children are to use the programs an adult would probably have to read them first and then

4 explain how to use them. I found, however, that my seven- to 10-year-olds were able to work out how to use the programs even without the instruction sheet. Now to the programs themselves.

**Spelling** is the simpler of the two programs. The screen display appears to be designed to represent a television set production line with a supply of suitably animated working parts. To the accompaniment of suitable noises a piece is lowered on to the "line" on to which either a word or an arithmetic expression is written. The player has a limited length of time to express the view whether the said display is correct or not by depressing the "W" or "E" keys for an incorrect spelling or turn while the "R" or "C" key needs to be pressed if they are considered to be correct.



If a set of five questions are answered correctly then the game will proceed to the next level of difficulty. There are six levels in all and it is possible to start a game at any of the levels. This works quite well for the arithmetic problems but falls down on the spelling one in that I found that my children were finding difficulty in deciding what word they were attempting to spell in some cases, as they only had an incorrect rendering of the word as a guide to what it was. There were no pictures to help. However, if a word was incorrectly spelt and the player assumed that it was correct, the correct spelling was given.

In the spelling test version of *Maximised* the player is given a simple picture together with a maze which contains a number of mobile letters which are "latched" by a little man who is himself

moved around the maze by means of the cursor keys. When he reaches the desired letter the player must press the spacebar and the letter is entered in the first blank available on the bottom line of the screen. The correct number of blanks are given to spell the required word. More letters are provided than are required to spell the word.

Similarly in the arithmetic version of the program, the player is given a specific task to perform given a number of digits and operators which are to be found in the maze. They are assembled to give the required expression in the same way as the spelling program. In both cases the player is corrected upon giving the incorrect answer.

This is quite a good program in that the graphics and sound are attractive and my children enjoyed playing with it.

be able to enter a new set of words to be used. These could either be entered by the teacher or parent, or as a

separate data file.

John Jayne



## Mathematical

**Program:** Teach Me, AC Software, 434 Corn Exchange Building, Halingford, Dutch, Manchester M4 3EY. Price: £3.45.

**THIS TAPR**, aimed at junior school children aged seven to 11, deals with everyday mathematics — the four rules of numbers.

Children are asked to choose between addition, subtraction, multiplication and division, and hard and easy options exist within each set. They get three chances to

do so. Any program purporting to "teach" should at least leave the user with some extra skill or knowledge. This does neither.

Translate this sort of program into the adult world. Imagine buying a program which says it will teach you Russian. It flashes a word on the screen and you have to translate it. If you get it wrong three times it gives the translation and then goes on to another word.

After a hundred or so times I might repeat itself but I doubt if you will remember that fleeting glance at the Russian and English equivalents — and

make the right decision and are told "too high" or "too low" after a mistake.

Each response is timed to one-hundredth of a second and this information is printed on the screen when the child answers the question correctly. After 10 questions they are graded from "You must try harder" onwards.

Now what trying harder has to do with hitting the right answer to a series of random questions, I don't know. Presumably it helps them to take 271 from 559 they would do it, but one thing is for sure — if they couldn't when they started the test they could use "Teach Me" for 100 years and get no nearer to being able to

How long would it take for you to be able to converse with the "man in the street in Russian"? More than a life-time I suspect. Now for adults this would be laughed out of court but we put this sort of thing in front of children and expect them to learn from it.

The program is only linked up by some appalling spelling and grammatical errors.

What is 774 divided by 9?

or how about:

Go on have another five minutes!

Now on earth software companies can put out this sort of thing is quite beyond me.

Mike Hamblin



## Graphical data

**Program:** Instant Graph Plotter, R & P International Computer Services, PO Box 129, Wombey, Middlesex HA0 2UG. Price: £7.50.

**THE display of data in graphical form — and I use the term in its strictly mathematical, rather than computer,**

sense — is the most common form of presenting data visually. Instant Graph Plotter is a program that does just that, but it is much more than its title suggests.

Once the basic data is entered, guided by on-screen prompts, the graph is drawn on its own, or in conjunction with other graphs held by the com-



puter. Space doesn't permit mentioning the many control functions in full, but some of the main features are: addition, deletion or change of individual points, superposition of grids, axis markers and lines and calculation of the area under the curve.

The graph can be instantaneously redrawn in logarithmic form, or with data converted to a power, root, reciprocal, or other multiplication factor.

If all this seems a little daunting, the package is amply supported by a 27-page manual, and half an hour spent with this, and using the

excellent on-screen prompts, will make its use simplicity itself. Apart from its educational value, Instant Graph Plotter is useful in displaying graphic data, and would be handy for sales conferences, science fairs and exhibitions.

Written in Basic, it is readily accessible for modification, although as it stands, there is little memory left to spare on a 32K machine. Users with particular problems are invited to contact the suppliers, R & P International, for help.

(London) Lee



## Machine code

**Program:** Programmers Utilities, Microtel, 41 Truro Road, St. Austell, Cornwall. Price: £3.90

This cassette contains nine short programs that each make up a lesson about machine-code programming in general and using the 6800C in particular. Some lessons are terminated with a short question and answer section sometimes using multi-choice answers.

The first lesson introduces the ideas behind machine code programming and how the different registers in the

illustrate particular points and to demonstrate the advantages over Basic.

Subsequent tutorials go through addressing modes, branching and the whole instruction set, and later sessions touch upon pointers and short machine-code routines used to speed up video displays in your own programs. The style is rather compact but friendly, and is not beyond the comprehension of an able secondary school pupil.

Although I feel there could have been more question and answer sessions, and that the computer is frequently used merely as an electronic black-

## Utilities

**Program:** Tape Doctor, Computel, 22 Grove Park, Burgess Hill, Sussex BN24 3BU. Price: £4.95

This is a utility program which has been written to enable the Dragon User to obtain more information about what has been recorded on tape by the Dragon and also to be able to salvage programs of tapes that have been damaged in some way.



How many times have you tried to load a program only to find that the header block has been corrupted in some way? Well this cassette contains the answer to your problems. It also enables the merging of different Basic programs, a facility which is sadly missing on the basic Dragon.

The copy which I received gave quite a few problems with loading. This is very un-

The cassette, packed in an ordinary cassette box, comes with an 18-page manual on how to use the program. This is well written and I followed it with difficulty should be experienced in learning how to use this facility. Some useful information is given on how the Dragon stores files on tape. Also on the tape is a Basic program which generates shipping lists, supplied in ordinary form, ASCII form and in a couple of damaged versions so that program repair can be practised. Following these there are three short Basic programs for learning how to merge or append programs.

If you have a printer the "Doctor" also enables you to dump the contents of files (in blocks of hexadecimal numbers) on to paper as well as printing out catalogues of cassette contents, with useful details such as the length of a file and memory locations associated with Machine Code files. It also identifies whether files are Basic, ASCII, machine code or DATA types. This is formatted to fit on 80mm wide self-adhesive labels, just the job for sticking on to cassette boxes. This information can also be obtained without a printer of course.

Once loaded normal Basic programs can be loaded into the computer and the "Doc-

### 1. DRAGON INSTRUCTOR — CLOAD "DRAGONINT" and RUN

This utility is a great aid to a student debugging machine language programs. The commands are:

- R — Display 8000s of memory
- M — Memory memory
- S — Set memory
- L — Load memory
- B — for branches
- P — for instructions
- E — Execute program
- D — Display 16,000H registers

that instructions are included within this program.

### 2. BURN TEST — CLOAD "BURNTEST" and EXEC

This utility will determine if all areas free of RAM are correct. If the RAM is OK, the message "RAM OK" will appear. If a fault is found, no action will be displayed.

### 3. SEARCH POINT — CLOAD "SEARCH POINT" and EXEC

This utility is used to copy the test cases to the printer without having to change PRINT commands.

### 4. TAPE INDEX THEORY — CLOAD "TAPEINDEX" and RUN

There is a directory in front of your eyes for a quick reference. Full instructions are included within this program.

### 5. BASIC ANALYSIS UTILITY — CLOAD "BASICANAL" and RUN

6800C processor operates. The second session talks about different number systems and why hexadecimal and binary are used in computers rather than base 10. Many of the sessions use examples of machine code programming to

board, this cassette does go some way to demystifying the world of machine language and that can't in itself be a bad thing.

(John) Soutter



+++ CATALOG +++				
NAME	TYPE	BLOCKS	EXEC	LOAD
DOCTOR	MYCODE	97	7338	7538
SHOPPING	BASIC	26	OK	
SHOPPING	BASIC	12	OK	
EXAMPLE	DATA	21	OK	
BAD CHECKSUM				
DOCTOR	MYCODE	28	HALT	
DOCTOR	MYCODE	21	HALT	

usual with the recorder I have and therefore I feel inclined to believe that the quality of the recording leaves something to be desired. However, by using the "Doctor" program I was able to find out where the program was stored in memory and was then able to CLOAD a copy of it on to another cassette. Ever since I have done this I have had no trouble at all with the program.

for" called upon at any time simply by entering EXEC.

All in all, this is a very good package and I give it a top rating for anyone who does a lot of programming, and could well need all its facilities. My only move is that the manual is written in American and not in English.

(John) Soutter





**EUROHARD  
S.A.**

**EUROHARD S.A.**

**Españoleto 25, Madrid 28010**  
**Tel: 010-34-1-4103498. Telex: 45845 ICSG**

## Clubs

The Dragon User discount club will save you money. Software companies interested in joining the scheme should write to: Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

Save £1.50

# Dragon software at a bargain

Save £1.50 on each of these games

Discount software is now available through the medium of the Dragon User club — this month save £1.50 on each of these games and adventures from Computer Rentals

THE Dragon User Discount Club is designed to save you money. This month's special offer, which is only open to readers of this magazine, features six software titles for the Dragon 32 from Computer Rentals. Each game has been reduced to £5.45, down from £6.95. To order your game(s) simply cut out the coupon on this page and send it, together with a cheque or postal order, to: Dragon User Discount Club, 12-13 Little Newport Street, London WC2H 7PP.

giant slalom runs, negotiating a series of stone gates and avoiding the trees. The program is a 3D perspective simulation with five runs.

wish to be taken into account.

### Laser Racer

Designed by Martin Software for Computer Rentals, Laser Racer puts you inside a huge computer. As the driver of a space-age laser racer, it is up to you to reach the computer's central processor and destroy it. Joystick or keyboard control.



### St George and the Dragons

Slippery bridges and fire-breathing Dragons impede your progress as you attempt to enter the hapless saint across the screen to smite the magic stone and lift the curse from the castle and its residents. Musical interludes accompany your failures. Joystick or keyboard control.



### Keys of Nath

An adventurer in search of the keys, you must use your powers of deduction and determination to overcome the mysteries of the caverns. Orcs, trolls and the giant Jabbaroo are out to stop you in your quest.



### Froglet

A busy main road and a fast flowing river are the obstacles you must overcome in guiding the Froglet family back to the safety of their home. The faster you get, the happier the task.



### Skier

Try your hand at skiing down a



### Handicap Golf

Bogey, birdie, an albatross or par are all possible on this one- or two-player 18-hole handicap game. There are bunkers, lakes, trees, gorse bushes, the rough and putting

## Dragon User Discount Club

Please tick software required

Price £5.45 each

Laser Racer

☐

St George and the Dragons

☐

Skier

☐

Keys of Nath

☐

Froglet

☐

Handicap Golf

☐

I enclose a cheque/PO/creditcard for £

Name

Address

Telephone

Signed

All cheque PCs to be made payable to Dragon User. Please cut out and send this form to: Dragon User Discount Club, 12-13 Little Newport Street, London WC2H 7PP.

# Blowing on an EPROM

Kath and Steven Brain review an EPROM programmer

IN THE September 1984 issue of Dragon User we reviewed the impressive PDS22 I/O port interface from Steve's Electronics Supply Company, and in this issue we return to take a look at a new EPROM programmer from the same source.

EPROMs differ from RAM in that they are non-volatile (retain their information when the power is removed), and a blank (empty) EPROM has all of its bits set to logical "1". A new EPROM is initially in this state, and a "used" EPROM can be returned to its original condition by suitable treatment with ultra-violet light in a special erasing unit. The actual programming ("blowing") of an EPROM involves selectively setting appropriate bits in the device to logic "0" to code for the required machine code routines, by applying a suitable voltage.

## One-time device

The essential difference between a ROM and an EPROM is that the former is a "one-time" device whose contents can never be changed. In addition, preparing the "mask" for a ROM is a costly procedure, and they are therefore only really useful for long runs of unchanging routines. In fact a quick glance many home micro's reveals that the "ROM" is really an EPROM.

At first sight the programming unit looks familiar as it uses essentially the same custom ABS cartridge as the PDS22 and I/O port, with its supporting legs and secure connection to the Dragon cartridge slot. Portable differences, however, are a 2P (zero insertion force) socket on the top to hold the EPROM safely and securely, and a pair of LEDs (green for power-on, and red for programming voltage indication) on the front.

Lifting the lid reveals a densely packed circuit board (once again bearing the logo of Pace Electronics). The programmer tested was a "production" unit (priced at

£79.00), but a kit version (£59.95) is also available for the electronics enthusiast, and the PCB (£11.95), control EPROM (£70.00) and case (£3.95) are also sold separately.

A fair degree of skill in welding a soldering iron is essential in construction of the kit, and a number of the most useful features of the unit, including overvoltage protection and Intelligent Programming are omitted from the specification of the kit version. Unless you are a really dedicated "do-it-yourself" enthusiast (or on the bread-line!) then the ready-built version is the one recommended.

The power supply is taken directly from the Dragon bus, so that no extra rail connections are needed, but at present the

unit is only recommended for the Dragon 32 as the extra power consumption could possibly overload the fanless-wired supply on the 86. A DC-DC converter switching at about 20 KHz is used to provide the suitably voltage levels required for different devices (which range from 3.5 to 25 V) and the resonance of the ferrite core produces a variable muted whistle as it works. Accompanying the unit is a comprehensive 11 page "user guide" which describes the operation in clear detail.

An important feature of this programming unit is its "user-friendly" face which uses a menu driven software structure (figure 1) to ensure that even the novice programmer can operate the unit without difficulties, and constant recourse to the manual. On boot up the memory map is rearranged (figure 2) with a 16K block of RAM (formed the "map") set aside to provide an "image" of the EPROM contents. When an EPROM is programmed it always uses the current "map" contents as the data source.

## Automatic configuration

Up to 12 different types of single rail EPROM are supported (figure 3), with the unit being automatically configured for the current EPROM type by simple software selection via the keyboard, with the SET DEVICE TYPE option (rather than the usual system of having to set up a complicated series of DIP switches).

Intel 2708	Texas 2808
2716	2816
2732	2832
2764A	
2784	
27164	
27128	
27128A	
27256	27A option

Figure 3: EPROM types supported by ready-built unit

The 28 pin DIP socket is used for both 28 pin and 26 pin devices, and the ready-built unit is effectively "bomb-proof" against incorrect insertion of an EPROM. First of all the socket is normally in a "shut-down" condition, so that an EPROM cannot be inserted into an active socket, and secondly the unit automatically monitors the supply rails for error conditions, which cause automatic shut-down and display of appropriate error messages (figure 4).

The designers have also considered the possibility of a hardware fault occurring, making it impossible to turn off the Vpp supply, when a screen prompt warns you not to insert any more valuable EPROMs. The only potential disaster remaining is incorrect selection of the standard 2704 or 27128 device instead of the equivalent 2764A or 27128A chips (which use a lower programming voltage), so reading the small print on this particular type of chip before programming is essential.

The target EPROM type can be changed at any time so that it is possible to combine the contents of more than one

- 0: VERIFY
- 1: LOAD FROM EPROM
- 2: PROGRAM EPROM
- 3: EMPTY CHECK
- 4: EXAMINE CHANGES
- 5: CLEAR DATA
- 6: COMPLEMENT/FILL DATA
- 7: LIST
- 8: SET ADDRESS LIMITS
- 9: LOAD FROM MEMORY
- 10: SET DEVICE TYPE
- 11: MOVE MEMORY BLOCK
- 12: QUIT

Figure 1: main menu functions

VICTORS SAM	0000
PROGRAMMER SW	FF00
1002	FF40
1101	FF20
	FF80
	00FF
PROGRAMMER OPERATING SOFTWARE	
	1800
BASIC INTERPRETER	
	8000
	7000
PROGRAMMER "NEW MAP"	
RESERVED	3000
BASIC STRING	38FF
	3A7F
BASIC PROGRAM STORAGE	
	0200
GRAPHICS PAGES	
	0400
SCREEN	
	0400
SYSTEM VARIABLES	0400
	8000

Figure 2: rearranged memory map

small EPROM onto a larger device and the massive 32K 27256 device is necessarily dealt with as two separate 16K halves. Lower and upper address limits can be specified, so that operations may be restricted to only certain parts of an EPROM.

### Continual checking

Intel's interactive Intelligent Programming Algorithm (IPA) is available on the larger devices. Although it may be necessary to apply a voltage for up to 50 milliseconds to change the state of a location, this time can often be reduced and IPA uses repeated one-millisecond pulses. It drastically reduces the time taken to "blow" a device by continually checking whether the required data has already been "burnt-in" at the current location, moving on to the next position as soon as it is successful.

LOAD FROM EPROM transfers an image of an EPROM inserted into the ZIF socket into the "map", and allows you to read (and hence copy) the contents of any EPROM, from any source. EMPTY CHECK examines each location in an EPROM to ensure that it is blank before use, while CLEAR DATA sets all bytes in the "map" area to the equivalent FF state.

EXAMINE/CHANGE provides direct access to the "map" data which is displayed as a hexadecimal dump, and LOAD FROM MEMORY transfers the contents of any block of Dragon memory to the "map" (so for example you could transfer the contents of the Dragon's Basic EPROM). Normal Basic commands are still accessible,

so that loading, saving and modification of programs can be carried out easily.

OUT takes you into Basic from where you can return to the programmer with EXEC MHC002 for a "cold" start, or EXEC MHC005 for a "warm" start where the "map" data is preserved. COMPLEMENT/FILL DATA provides inversion (it's complement) of "map" data or fills with any user-selected byte. MOVE MEMORY BLOCK allows rearrangement within the



"map", and LIST dumps the current "map" contents to screen or printer.

The SET ADDRESS LIMITS function provides selectivity by allowing the action of these commands to be restricted to defined address ranges. VERIFY provides comparison of "map" data and EPROM contents, returning "PASSED" or "FAILED" appropriately, together with error locations and EPROM data. Useful

OVERLOAD ON ZIF SOCKET  
CHECK EPROM CORRECTLY  
INSERTED

Figure 1: Example error message

screen prompts are provided to guide you through each of the functions.

A look at the prices and facilities of small dedicated EPROM programmers shows that the Dragon/programmer combination is a cost-effective solution for users who need to blow relatively small numbers of EPROMs for development or small-scale commercial applications.

Of course the unit allows you to "simulate" EPROMs developed for any machine and although ready availability of an easy-to-use EPROM copier may send shudders through the hearts of cartridge manufacturers, there are home applications which do not raise such moral difficulties. For example, utility programs transferred to EPROM are instantly accessible and do not eat into available RAM.

### High standard

All in all the EPROM programmer is well designed and constructed, very user-friendly, and well up to the high standard set by the earlier Dragon add-on from Steve's Electronics.

(For a photograph of the RS232C I/O port interface review published in the September issue send a large, stamped addressed envelope to Dragon User.)

Steve's Electronics is currently working on a card supporting software-selectable sideways ROMs which will allow you to have a whole suite of "firmware" instantly available. For further details contact Steve's Electronics Supply Company, 35 Castle Arcade, Cardiff CF1 2BW, telephone (0332) 41005. ■

# BACK TRACK

AVAILABLE NOW!

From **INCENTIVE** and all other good Software Suppliers.

Also at **INCENTIVE** on special request.

by CHRIS ANDREW. For the DRAGON 32, £6.50

**INCENTIVE**  
(0734) 591678

RETAILERS Contact TIGER, MICRODEAL, CENTRESOFT, LEISURESOFT and TWINS.

# BACK TRACK

**PRIORITY  
MAIL  
ORDER**



**INCENTIVE SOFTWARE LTD.**

54 London St., Reading  
Tel: (0734) 591678

### ORDER FORM

Please return 3 copies of BACK TRACK for the Dragon 32 Computer by 1st Class Post, enclosing a cheque for £6.50 or debit my credit card.

ACCORD ☐ VISA ☐ NO ☐

Name/Address:

\_\_\_\_\_

\_\_\_\_\_

INCENTIVE SOFTWARE LTD. 54 London Street, Reading RG1 4JG



# COMPUSENSE

PO BOX 169, PALMERS GREEN, LONDON N13 5XA  
Telephone: 01-882 0651 (24 Hr) and 01-882 6936



*A Merry Christmas to all our customers and friends  
Thank You for your support*



**EDIT + DASM/DEMOM DYNABASIC still the best for DRAGON and TANDY**  
— call for details

## FLEX

with Editor and Assembler **£86.25 inc VAT**  
special price with DBASIC **£99.99 inc VAT**

Our implementation of FLEX is now available for both the DRAGON and DELTA disk systems. FLEX is a reliable and easy to use operating system with many happy users all over the world. It is the ideal operating system for the DRAGON — especially when combined with our DBASIC package. Requires DRAGON with 64K RAM

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

## DBASIC

**£39.00 inc VAT**

Now you can get all the benefits of FLEX and run your existing DRAGON BASIC programs with little or no changes. DBASIC moves the BASIC ROM into RAM and gives you extra commands to interlace with FLEX.

- Standard 32K DRAGON BASIC — graphics page NOT moved
- Standard 32 by 16 Text Screen and 51 by 24 Hi-Res 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

## CRUNCH COBOL

**£115.00 inc VAT**

The most widely used business computer language is now available for FLEX. Runs on any FLEX system with 48K free RAM. Ideal for educational use as well as serious business applications. Contains most of ANSI Level 1 and many features of Level 2.

### DRAGON HARDWARE — WHILE STOCKS LAST

DRAGON 64 **£185.00**. Single DRAGON Disk Drive with controller **£195.00**

Special Offer DRAGON 64 + disk drive + FLEX/ED/ASM/DBASIC **£399.99 inc VAT**

### ***XMAS SPECIAL OFFERS***

Single disk drive + FLEX/ED/ASM/DBASIC only..... **£260.00 inc VAT**

**FREE 10 DISKETTES** with every order over **£250.00**

Please phone or write for availability of FLEX/DBASIC for TANDY, Double Disk Drives, Disk Drive Upgrade kits, OS9 software





later, it is hoped, will do away with the need to use cassette recorders. It will cost about a third of the price of a drive and will take at most eight seconds to load.

Its success depends on Eurohard's ability to reach agreement with software companies to sell software on the drives.

On top of all this, Eurohard also expects to begin production of an MSX machine by the middle of this year. The machine will not be Dragon compatible, and will be sold as a separate line to Eurohard's Dragon products. In Britain it will be distributed by BBC.

### Games machine

Eduardo confirmed that Eurohard obtained the Microsoft license for \$250,000. He sees the MSX micro as a games machine. "MSX is designed for a given market. I do not see it as upwards compatible. It will be produced largely for export and kept for entertainment."

In contrast, Eduardo sees the role of the Dragon as primarily an educational and small business machine. An intensive advertising campaign has begun on Spanish television and, by the middle of next

year, a television programme will start, with Eurohard taking a similar role to that undertaken by Acorn for the BBC.

The Dragon has already been bought by one regional educational authority in Spain, and in some schools there exists a small networking system. A master Dragon is used by teachers, with pupils refreshing on other, smaller Dragons.

Eurohard is keen to encourage and utilize other people's ideas. "It is important to use the creative efforts of other people," said Eduardo. Software writers can contact the company with potential programs for appraisal.

At present most software for the Dragon in Spain has been converted from British titles, but recently Spanish software companies have been getting into the act.

For the small business user, Eurohard intends to use OS-9 as the standard



Five hundred units a day are being produced

operating system. "Fax," said Eduardo, "is a very British product and is not found elsewhere." OS-9 on the other hand is "fairly widespread and through it we hope to introduce people to UNIX".

### Complete system

A complete package, called the Dragon 300, may also be offered to the small business user. This would incorporate a disk drive, operating system and micro — similar to what Compuserve is offering users at present, rather than a product along the lines of the ill-fated Dragon Professional.

A six-month warranty is being offered to purchasers of the Dragon in Spain and Europe. At present, Dragons are being sold in Spain, France, Italy, Greece, Israel and the Scandinavian countries. Once Spain joins the EEC, Eurohard will have an even bigger potential market, and it also intends to take on the Latin American market.

When Eurohard begins operation of its board manufacturing plant, it will also produce add-on boards for the IBM PC and MSX. An agreement has already been reached with two US manufacturers to produce boards for the European market.

Beginning this month, Eurohard intends to start advertising in the UK. "We can't abandon a user base of that size," said Eduardo. "The new peripherals, in particular the sequential drive, should be of interest to British owners of the Dragon." ■

## NEW!!! Dragon 14D interface for Voltmace Delta 14B Handsets

Interface plugs into cartridge port and joystick port. A delta 14B handset (A joystick with a 14 button keypad) plugs into the interface. You can now write programs with many functions controlled from a single, neat, hand held unit. Ideal for flight simulators and graphics programs.



## FREE!!! With every Delta 14D interface

A CAD program using hi-res graphics. LINES, CIRCLES, ELLIPSES, BOXES, TRIANGLES, ALL in different shades, SCROLL, up and down screen using joystick, GET and PUT to move or repeat shapes. Two sizes of text or graphics cursor. All this controlled from the hand held Delta 14B Handset. (Except text typing).



Dragon 14D interface  
Delta 14B handset

£14.95 each  
£14.95 each



Please send me further information about Delta 14D interface.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Voltmace delta 14

Voltmace Ltd, Park Drive, Baldock, Herts, SG7 6ED Tel: (0462) 894410



## MONEYBOX PERSONAL ACCOUNTS PROGRAM for DRAGON 3244

MONEYBOX is a powerful and versatile new program for personal accounts. It can analyse your income and expenditure, control your bank account, credit card, building society deposit etc, forecast your bank balance, estimate your taxable income, and much more. CASSETTE VERSION features large capacity, user-defined periods, password protection, automatic date-sorting, user-defined account names, multiple reports to screen or printer, flexibility operation and comprehensive instructions.

**CASSETTE VERSION price £9.99**  
(incl. VAT, p&p)

**NEW DRAGON32 DISK VERSION**

Prints 42 by 24 characters on Hi-Res screen, with true lower-case, E-sign etc. Beautiful clean characters, suitable for family TV!

All the features of the cassette version PLUS:

- Fast, easy direct access filing
- Files can be as big as the disk
- More accounts — up to 80
- Monthly budgeting facility
- Option to have VAT analysis, for business use.

**All for only £14.99**  
(incl. VAT, p&p)

Checklist PCs/Further details Dealer enquiries to:

**HARRIS MICRO SOFTWARE**

48 Alexandra Road, Runcorn, Merseyside WA9 4HP  
Tel: (071) 575-5255

Tim Lowe's  
Dragon 32 — £9.99

## CRICKET

"BETTER THAN THE  
REAL THING!" —  
Central TV



"INGENUOUS ... BRILLIANT" — Personal  
Computer Games

"REMARKABLE ... FANTASTIC DETAIL ...

GRAPHICS 100% ... VALUE 100%" —  
Home Computing Weekly

"Superb ... Many other computer cricketers will wish they had bought a  
Dragon" — *PC*

"I would not hesitate to say that this is the best game I have" — *ME*

"Best of my 50 games" — *PC*

"Brilliant ... I've been playing a few 2 weeks, and I still can't hardly believe it's  
cricket!" — *PC*

The team is set to be taken to Africa, India and Australia after extensive testing, with  
testing and testing still to be done. Subsequent to the game, the team is set to be taken to  
Africa, India and Australia after extensive testing, with testing and testing still to be done.

## CHAMPIONS!

Take your team from the 4th Division to the  
European Cup! Features 4 divisions, promotion,  
relegation, goal highlights, transfers, injuries,  
suspensions, weekly results and league tables.  
Receive team, player transfers, and all the fun,  
drama and excitement of managing a league-side  
team at the most popular Dragon sports of all  
time — over 15,000 satisfied customers —  
REAL.



PHOTO-FORMER! Superb new horse race action. Tactico  
graphics, authentic race cards, score based on actual form, REAL  
TIME! scores from 10 to 2 miles, "Sporting Life" result cards with  
distances, times, etc. and an incredible photo finish feature. 1 of  
players. £7.95



To read a user's Guide with your team, visit the Dragon, or phone  
your nearest dealer. Offers covered information and support  
directly to the user.

MANUFACTURED BY: DRAGON 32/33, BARNSTON, WILSON, NUTTS. Tel: 069  
70000 (9-11am weekdays)

License to develop in PC, and other the following programs for family order order.  
Dragon 32/33 (P&P £5.00)

Name

Address

WE  
SUPPORT  
THE DRAGON

STATCOM  
COMPUTERS LTD  
HAVE MOVED TO A NEW  
LARGER SHOP  
OPEN NOW

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

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

**DISK DRIVES**  
STATCOM DISK DRIVES LTD  
100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278,

ONLY  
**£8.95**  
EACH

# OUR BEST EVER GAMES AND OUR BEST EVER OFFER

ONLY  
**1 FREE**  
GAME

## Fantasy fight

The ultimate multi screen arcade adventure for the Dragon.

- 35 different screens with full colour animation (Jet-Set Willy — eat your heart out!)
- 25K of pure machine code action.
- Choice of nine weapons and spells.
- 20 adventures to combat.
- Joystick or keyboard play option.



## HOME BASE

Full colour arcade action 100% machine code with joystick control and super smooth image graphics.

Protect your craft from laser balls and energy bolts whilst manoeuvring your spherical power shield and using your laser cannon to destroy all in your path.

## LACER EDNA

Brilliantly programmed using split screen technique which gives 25 screens over a nine sector play field.

Caricose character animation in full colour and 100% machine code.

Face and chase through the swivelling doors, avoiding the Troglabites and searching for the keys to open the central chamber.



**FREE**

### HAVE A MERRY CHRISTMAS WITH CARLE

With every game ordered at the full price choose any one game from our special box below, completely free of charge.

**FREE**



**SPECIAL OFFER ON THESE GAMES:** 1 title £5 — any 2 titles £9 — any 3 titles £12 (inc. P&P and VAT)

Please supply me with:

- \_\_\_ FANTASY FIGHT \_\_\_ HOME BASE \_\_\_ LACER EDNA  
\_\_\_ SNAKE'S EYE \_\_\_ QUADMODE \_\_\_ SUPERSONIC

① **£8.95 each** (indicate below your choice of two games.)

- \_\_\_ LIVING STONE \_\_\_ DECAHARTY \_\_\_ DRONE  
\_\_\_ DRAGONRIDERS \_\_\_ TRACE BACK \_\_\_ CAVE FINGERS  
\_\_\_ BACCANT \_\_\_ DRAGON RACER/WARP BOY/SON

**SEE SPECIAL PRICES ABOVE**

\_\_\_ PRO FILE @ £14.95 each \_\_\_ TROJAN HORSE @ £11.50

Send cheque with order to:

**P.L.L. MARKETING,  
FRIEPORT, LUTON, BEDS. LU2 8HR** (No stamp required)

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**ORIENT CARD ORDERS:** (0945) 50440 (2-5pm) 094511 (24 hrs)

**ALL PRICES INCLUDE P&P and VAT**



# NOW!

## MORE THAN EVER IT'S CHANNEL 8 SOFTWARE FOR THE FAMOUS



**NOW  
DOWN TO**

**£6.95**

For DRAGON,  
BBC, COMPTON,  
AT&T,  
OR SAMSUNG,  
SPECTRUM.



To Channel 8 Software,  
51, Fishergate, Preston, Lancashire, PR1 8 5SL.

Please send me the following Mysterious Adventures:

- |  |   |                          |
|--|---|--------------------------|
| <input type="checkbox"/> THE GOLDEN KEY          | <input type="checkbox"/> PERILOUS PASSAGE     | <input type="checkbox"/> |
| <input type="checkbox"/> THE TIME MACHINE        | <input type="checkbox"/> ESCAPE FROM PULSAN?  | <input type="checkbox"/> |
| <input type="checkbox"/> QUIZ                    | <input type="checkbox"/> FUGGLESBY EXPERIMENT | <input type="checkbox"/> |
| <input type="checkbox"/> AIR ROW OF DEATH PART 1 | <input type="checkbox"/> IS LITTLE IN BLANK   | <input type="checkbox"/> |
| <input type="checkbox"/> AIR ROW OF DEATH PART 2 | <input type="checkbox"/> BLANDINGS            | <input type="checkbox"/> |
| <input type="checkbox"/> THE WARD OF ARVIZ       | <input type="checkbox"/>                      | <input type="checkbox"/> |

TOTAL CASHED IN £.....  
BANK OF ENGLAND

Cash, Cheque, P.O. ordered or Access/Barclay Card.

Forward To: £.....

NAME: .....

ADDRESS: .....

To start play on a MYSTERIOUS ADVENTURE is to take a step out of the world of reality and into the world of dreams. Your Computer is your guide to these fantastic adventures in time and space where danger is ever present and solutions to problems seldom come easy. By using computerized guide and text it what your own words are to the Channel 8 Mystery Circuit & The Little Island and in the Great Mysterious Play.

### CHANNEL 8 SOFTWARE

51 Fishergate, Preston,  
Lancs PR1 8 5SL  
Tel: 01772 50057



Selected titles available from larger branches of  
Gordon's, Debenhams, Linn's, Spectrum dealers and  
good computer shops everywhere, in case of difficulty send P.O. or Cheque direct.

[illegible]

**ACKNOWLEDGMENTS**

**We Guarantee you'll think we're CRAZY!!!**  
*9 superb full length games on one cassette to feed  
 your hungry Xmas Dragon*

for only **£3.95**

[illegible]

For more information, contact the American Society of Human Resources, 1000 17th Street, N.W., Washington, D.C. 20036, (202) 462-6080.



**EXCEPTION**  
 Are you cool, level-headed? How much trouble?  
 Movie-play **EXTRA! EXTRA!** Standing before the  
 cameras, being asked you repeat "I do" to your fan  
 (she's a member of a special "turn-on-it-hot"  
 tuning out... Features full-on sex-music  
 graphics and sound. Hours of fun guaranteed in  
 the member **EX** room.



**TEMPERATURE MONITORING**  
 Only a limited amount of space is used for the 100,000-  
 1,000,000. You however, have unlimited space  
 for Temperature Records of numerous measures  
 your system has used the 100,000-1,000,000  
 through hours of service. With your system you  
 should be able to find the 100,000-1,000,000  
 100,000-1,000,000 hours of service.



1998

**DE WINTER - THE FIRST LADY**  
A challenging multidisciplinary game demanding fast, accurate reaction. Players easily enough find gets progressively more difficult. Features a color high-resolution graphics, sound, bonus levels and lots more.



1111

Is it still on in it's peak? Can you turn your humble £500k stake into £1,000,000? This is a simple yet highly compelling game supported by excellent colour graphics and brilliant sound effects. Can you do clever programming?



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

[illegible]

**Figure 1**

A superb local programming suite  
your best value and most-powerful  
memory chips to the absolute best. This game  
played almost entirely in the 4 color palette  
mode and features a unique, original  
narrative, excellent ratings, and 1-4 players.  
A free demo CD is

[illegible]

More than 100,000 tons shipped nationwide to nearly every state's private and public health systems, including a leading source of the donated city of Chicago. Total contributions are projected to exceed 100,000 tons, says a state health department spokesman.



## Wait & See!

722

**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: DATACOM PUBLICATIONS, 4007 MOORELTON CENTRE, BIRMINGHAM B15 2JG. (021) 914 1111

Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_

Quantity Required \_\_\_\_\_  
Please find enclosed my check/P.O. for £ \_\_\_\_\_  
\_\_\_\_\_

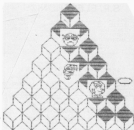
Post Code \_\_\_\_\_  
Signed \_\_\_\_\_

DEALER INQUIRIES WELCOME: TELEPHONE 021-233-5800

```

100 DRAW=0000,100,0,0,0,0,0,0,0
101 DRAW=00100,100,0,0,0,0,0,0,0
102 DRAW=00110,100,0,0,0,0,0,0,0
103 DRAW=00100,100,0,0,0,0,0,0,0
104 DRAW=0000,100,0,0,0,0,0,0,0
105 DRAW=0000,100,0,0,0,0,0,0,0
106 DRAW=0000,100,0,0,0,0,0,0,0
107 DRAW=0000,100,0,0,0,0,0,0,0
108 DRAW=0000,100,0,0,0,0,0,0,0
109 DRAW=0000,100,0,0,0,0,0,0,0
110 DRAW=0000,100,0,0,0,0,0,0,0
111 DRAW=0000,100,0,0,0,0,0,0,0
112 DRAW=0000,100,0,0,0,0,0,0,0
113 DRAW=0000,100,0,0,0,0,0,0,0
114 DRAW=0000,100,0,0,0,0,0,0,0
115 DRAW=0000,100,0,0,0,0,0,0,0
116 CIRCLE 150,100,0,0,0,0,CIRCLE 150,100,0,0,0,0
117 CIRCLE 150,100,0,0,0,0,CIRCLE 150,100,0,0,0,0
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999

```



Continued on page 69







# BLABY COMPUTER GAMES

## THE DRAGON SOFTWARE COMPANY



**PERILOUS PIT** — Descend underground in the crystal mines, rescue the distressed Orlos and his crystals, who are hell bent on stopping the attempts of Boris the miner to fill his truck full of crystals — four screens. £1.99



**THE BELL** — You have probably read the novel or seen the film — now you can play the game. Rescue Elmerella from the hell town. 14 screens of danger for you to challenge. £1.99



**BARRY BURGERS** — Buns, Burgers, Cheese and Lettuce. There 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 food egg and sausages. £1.99



**LASER RUN** — Fly your star fighter down the trench and take on Don's vader's crack pods. 3D graphics and arcade action. £1.99

*Watch out for next months ad for Dragon Gold at £3.99*

Send SAE for full list. Please add 50p P&P on each game. Most games will shortly be available on the TRS-80.

*We wish to thank you all for your terrific support at The 6809 show.*

BLABY COMPUTER GAMES, CROSSWAYS HOUSE, LUTTERWORTH ROAD, BLABY, LEICESTER  
Telephone: 0533-773641 Telex: 342629 JRMHGB

Designed and produced by qualified professional educationalists

## EDUCATIONAL SOFTWARE

Physics (O level/CSE Revision)  
Biology (O level/CSE Revision)  
Computer Studies (O level/CSE)  
Maths (O level Revision)  
Maths (CSE Revision)  
Science (Revision 12/14 years)

Maths (Revision 12/14 years)  
English (Revision 12/14 years)  
Reasoning (11+ Revision)  
English Practice (8/11 years)  
Mathematics Practice (8/11 years)  
Arithmetic Practice (7/10 years)

Tables (Practice 7/11 years)  
Spelling (Improver 8/99 years)  
Knowledge Quiz (8/99 years)  
Sports Quiz (8/99 years)  
Typing (Improve your speed and accuracy — timed tests in upper and lower case letters — 100% high res.)

**UNBEATABLE VALUE AT £4.95 EACH POST FREE**

### O LEVEL/CSE COMPUTER STUDIES

A set of four cassettes jam-packed with up-to-date knowledge covering the O level/CSE syllabuses. Full tutorial with revision questions. Subject areas include:

Data Coding, Data Storage, Computer Arithmetic, Computer Logic, Processing Information, Society and Computers, Computer Structure, Backing Storage.

And much, much more.

Also suitable as a general introduction to the computing world (Mums and Dads please note).

**FANTASTIC VALUE AT £14.95 PER SET POST FREE.**

### PRO-FILE

The original and best cassette-based filing system. Use your Dragon as a data filing and retrieval system. Hundreds of uses throughout the home and small business — used by doctors, dentists, farmers, etc.

Output to screen or printer.  
56-page easy-to-use manual with full instructions.

"Profile does everything it claims and does it well (Which Month) November 1983."

"One of the best manuals of its type I have seen, ideal for the novice" (PCW December 1983).

£5 less than our nearest rival.

**£9.95 post free**

## MICRO DE-BUG CONSULTANCY

Dept U, 60 Sir Johns Rd, Selly Park  
Birmingham B29 7ER. Tel: 021-472 7610

*Also suitable for Tandy-CoCo Computer.*

# Reach for recursion

Paul Gieves introduces programming in recursion

MANY readers may have heard of the term "Structured Programming" and of how Basic isn't capable of such programming. Structured programming really means "ordered", as the writer notes all the various stages in the production, rather than just throwing some code together.

Experts on the subject often throw scorn on humble Basic criticizing it for being unable to support structured programming techniques. However, with a little thought, I believe you can support most ideas. In recent years Pascal has become a popular language because it supports "structured programming". One very interesting feature of Pascal is its ability to support a special type of program structure, called Recursion. This is the subject I wish to convert to Microsoft Basic.

Recursion is a very useful and elegant technique to program with. It allows an enormous amount of code to be reduced to just a few lines. In fact, some problems are so difficult that recursion is the only solution.

In order to understand recursion you must first accept the idea of a "variable". This is the name given to a specific address in the computer's memory that is used to perform calculations. Until now the idea was that if a variable is given a value at the start of the program, then in any subroutines it will have the same value. This is easy to implement and is easier to understand.

```
10 DIM S(100)
20 INPUT N
30 V=1
40 GOSUB 1000
50 PRINT N*FACTORIAL
  V=V*N
60 GOTO 40
1000 IF N=1 THEN
  RETURN
1010 GOSUB 2000
1020 V=V*N
1030 N=N-1
1040 GOSUB 1000
1050 GOSUB 2000
1060 RETURN
2000 "PUSH N
2010 S(N)=N
2020 N=N-1
2030 RETURN
3000 "POP N:3020 N=S(N)
3010 N=N+1 3030 RETURN
```

Listing 1: The factorial routine

However, recursion takes the idea that every program and every subroutine have different variables. That is, if the variable *x* is used in the program and *x* is also used in a subroutine, then they are entirely separate. Changing the value of *x* in the subroutine will have no effect to the *x* in the main program unless you specifically program it to.

When you look at the structure of the DEF FN instruction you will see this is used there. The variable name used to describe the function isn't affected by using it elsewhere. For example:

```
10 DEF FN(X)=SIN(X)/32
```

## Function process

Here the variable "X" is used simply to show how the function is to process its data and not as a specific operation on the contents of "X". Once you have accepted this, also you can proceed to recursion. Recursion uses this idea of "Local Variables" to create its effect. The best way to show this is by the following example.

To find the factorial of a number, it is necessary to multiply itself by one less than the number and by one less than that and so on, until the number is equal to 1. Therefore

```
FACTORIAL OF N = IF N = 1 THEN
  ELSE N * FACTORIAL OF (N-1)
So if N=4 this is how it works:
FACTORIAL OF 4 = 4 * FACTORIAL OF 3
FACTORIAL OF 3 = 3 * FACTORIAL OF 2
FACTORIAL OF 2 = 2 * FACTORIAL OF 1
FACTORIAL OF 1 = 1
Therefore FACTORIAL OF 4 = 4 * 3 * 2 * 1 = 24
```

In order to solve this problem, you can use recursion and so need a language that will allow you to call a subroutine from within itself without destroying the data it holds. That is, the routine FACTORIAL needs to call itself but it mustn't destroy N.

Since Basic does not support "local variables" programmers must do this themselves by using an array as a form of store. Here, whenever the routine is called, its data is stored in a specific section of the array. Then a pointer is moved to another section. This continues until it is time to return from the routine. When this happens, the pointer is moved back to its last lot of data which is then removed. The removal of data continues until the array is empty. This supports the "local variables" and Basic itself will support the repeated call upon a subroutine.

Type in the simple statement below and run it.

```
10 GOSUB 10
```

After a few seconds you will get the message "OM - ERROR", the "Out of Memory" error. This is because the statement has called itself continuously. When a subroutine is called, the position in memory it is called from is saved so that when the routine ends it can return to that point and continue on. Therefore, this statement keeps saving its return address until there is no more room left. This shows that Basic can call a subroutine from within itself.

With this information you can now type in Program listing 1 which is the factorial routine. Here N is the number typed in and V is the value of the factorial. Subroutine 1000 is the factorial part, routine 2000 saves or "pushes" the variable N into storage and routine 3000 restores or "pops" it back out.

Once this is understood, recursion can be used to create really impressive results. Type in program number 2 and run it. Here, the program first draws a circle on the test screen and then paints it. This routine is handy for low resolution graphics as it is quite quick to type in and is very accurate at filling in a shape.

It works by calling a subroutine to paint the circle at a certain x,y location. The routine first checks if the x,y is in range, if it isn't then it will end. Then the point selected is tested to see if it has already been painted. If it has, then again the routine will return. Once past this point the routine will set the x,y location and will see if it can paint first in the east direction then south, west and finally north.

Once the x,y values are only changed by adding or subtracting 1, there is no need to save them as they will be restored when the routine returns by reversing the addition or subtraction. The routine seems to stop once the shape has been painted, however, the program is still in

```
10 CLS
20 G=0
30 GOSUB 1000
40 G=32:G=0
50 GOSUB 2000
60 X=0:Y=100:Z=0
70 GOTO 70
1000 "CIRCLE ROUTINE
1010 "C:COLOUR OF CIRCLE
1020
1030 X=X+1:Y=Y+1:Z=Z+1
1040 DEF FN(X)=X-V
1050 DEF FN(Y)=Y-V
1060 DEF FN(Z)=Z-V
1070
1080 DEF FN(X)=10-110000
1090 Z=Z+1
1100 G=Z:Z=0:Y=100:Y=0:Y=32
1110 GOTO 7
1120
1130 "PRINT POSITION:
1140 "X=Y=Z:GOSUB 2000:Y=Y+1
1150 "C:COLOUR OF PAINT
1160
1170
1180 IF Z=0 OR Z=32 OR Y=0 OR Y=32 THEN RETURN ELSE IF
  FN(X)=0 OR FN(Y)=0 THEN RETURN
1190 GOTO 1130
1200
1210 G=Z:Z=0
1220 X=X+1:GOSUB 1000:GOTO 1130
1230 Y=Y+1:GOSUB 2000:Y=Y+1
1240 Z=Z+1:GOSUB 3000:Z=Z+1
1250 Y=Y+1:GOSUB 2000:Y=Y+1
1260 X=X+1
```

Listing 2: A circle is drawn and painted

```

10 CLS: CLEAR 1000
20 DIM RK(30),A(30),B(30)
30 INPUT "PLEASE ENTER YOUR WORD " : L$
40 J=1: H=LEN(L$): M=1
50 FOR T=1 TO H: V=VAT-NEXT T
60 CLS
70 PRINT "THERE ARE " V " POSSIBLE"
80 PRINT "WAYS TO WRITE " L$
90 P=J
100 IF H<(P-1) THEN P=P/2: GOTO 100
110 P=P-H
120 S0$=L$
130 GOSUB 1000
140 END
1500 IF 1<N THEN 1550
1510 MID$(S0$,N,1)=MID$(L$,N,1)
1520 PRINT S0$: STRING$(P,128)
1530 GOSUB 4000
1540 RETURN
1550 FOR J=1 TO N: 4030 RETURN
1560 GOSUB 2000
1570 MID$(S0$,1,1)=MID$(L$,1,1)
1580 GOSUB 3000
1590 J=J+1: GOSUB 1000
1600 IF J=N THEN GOSUB 4000: GOTO 1100
1610 NEXT J
1620 RETURN
2000 'SWAP L$ (1,J)
2010 T$=MID$(L$,1,1)
2020 MID$(L$,1,1)=MID$(L$,J,1)
2030 MID$(L$,J,1)=T$
2040 RETURN
3000 'PUSH 1:J,L$
3010 R$(0)=J: B$(0)=J: RK(0)=L$
3020 N=N+1
3030 RETURN
4000 'POP 1:J,L$
4010 N=N-1
4020 J=R$(N): J=B$(N): L$=RK(N)
4030 RETURN

```

Listing 2 (continued) for use rather than understanding

4 running until you hear a loud buzz. This is because the program has to check all of the shape to ensure it has filled it in correctly.

The program can be speeded up by moving the part of line 3040 that checks if the x and y values are in range. This is only advisable if you are certain that the shape will not leak the paint out. If it does leak then this line must exist or an error will occur.

The final listing (program 3) is very difficult to explain as it is heavily involved

with recursion and so I merely present it for your use if not for your understanding. It is a better version of the various programs used to find the permutations of various letters and numbers.

Each permutation is given, rather than a random press sample dependent on the RND function. It will accept quite large letters, that is, the entire alphabet, but it takes a great deal of time to go through more than about 5 or 6 characters.

There are many textbooks available that discuss recursion (see panel) and I suggest

that you refer to these if you want to try any further experiments. Even if you don't understand this topic you can still use the "Paint" and "Permute" routines in your own programs. ■

**Pascal: An Introduction to Methodical Programming** by W. Finlay and D. A. Watt (Pitman)

**Inside the Dragon** by D. Smart and I. Sowerby (Addison-Wesley)

**Computer Science: A modern introduction** by Goodenough and Lister (Prentice-Hall)  
A structured programming approach to data by D. Coleman (Macmillan Press)

41-STATACOM-STATACOM-5

**NEW**

**4 Colour  
Printer/Plotter  
Sakata SCP800  
only £179 + VAT**



**Excellent  
display  
forms**

Prints and plots using four colour pens on plain paper from 4" to full A4 size, in single sheets or continuous.  
Available with standard centronics as well as serial interface (T.T.L. level) with RS232C adaptor option.

**Also available from Statacom**

**A full range of top quality 5¼", 3½" and 3" drives.**

Supplied with leads, cables and utility discs with or without power supply unit. All finished in attractive metal case. Delta Controller available **£120 inc. VAT.**

To order for your Christmas stock, or just for more information contact our sales dept. on **01 461-2266** or write to us at

**18 GROVE ROAD, SUTTON, SURREY**

# DRAGON OPEN FILE

Send us your Dragon program, 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 £5 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*, 10-13 Little Newport Street, London WC2H 7PP.

## Stitchet

From Graham Smith in Bristol

This is a short program to produce an interesting circle stitching pattern. My daughter enjoyed typing in a similar type of program which produced a rectangular

based pattern. I therefore produced this totally different program of similar length to maintain her interest. At present the shorter and simpler programs are much in demand by my children.

```
10 DIM X(30),Y(30)
20 P=0:C=0:D=0:E=2:F=0
30 FOR N=1 TO 10:F=P+20
40 X(N)=INT(122+(195-COS(P/(180/3.142)))
50 Y(N)=INT(196-(195+SIN(P/(180/3.142)))
60 NEXT
70 PHASE4,1:SCREEN1,B:PCLS
80 IF FC2 THEN PCLS
90 C=C+1:IF C=10 THEN 150
100 A=0:B=C
110 A=A+1:IF A=17 THEN GOTO 170
```

```
120 B=B+1:IF B=17 THEN B=1
130 LINE(X(A),Y(A))-(X(B),Y(B)),PB
140 GOTO110
150 C=C+5:E=1:IF E=5 THEN D=1
160 IF D=5 THEN E=2:D=0:C=0
170 F=F+1:IF F=4 THEN F=0
180 GOTO 70
190 FOR I=1 TO 10:PLAY"T1000G0DEFG
200 DEFSC":NEXT:GOTO 80
210 REM *70* CHANGE PHASE TO 3
220 REM *80* ADD E AFTER PCLS
```

## Sound

From R Storage in Cornwall

THIS PROGRAM makes good use of the Dragon's AUDIO command to produce a colourful display synchronised to the changes in a piece of music. You can use a cassette tape or feed the output of a HiFi system into the cassette input. Some cassette recorders output an amplified signal on their telephone output when set to record so you can even use a microphone as a sound source.

The program also demonstrates the use of USAF calls to pass parameters between

Basic and machine code. The first call simply counts the number of transitions on the cassette input. IOS PORT AD, is a time interval given by parameter T, the count being returned to variable A. After waiting for a significant change in pitch, a colour is chosen according to the value of A and two more user subroutines are used to shade one quarter of the text screen.

High frequency noise will ruin the effect, so a fairly "clean" sound input is required.

### Program notes

- 10-30 Clear screen, turn on cassette sound and reserve machine code space.
- 40-60 Machine code to read the cassette.

- 60-70 Machine code to colour the next quarter of the screen down.
- 80-90 Machine code to colour the next quarter of the screen up.
- 100-120 Initiate machine code, start tape and set up count period.
- 130-160 Read signal, modify T to accommodate to the signal and loop if the pitch has not changed much.
- 180 Select colour, roughly in order of luminosity.
- 200 Colour the screen, moving upwards for increasing pitch, downwards for decreasing pitch.
- 210-230 Tidy up and loop.
- 230-240 Pause machine code.

```
1 *****
2 ** SOUND-TO-LIGHT **
3 **
4 ** ROBERT STRANGE **
5 ** <C> AUG 1984 **
6 *****
10 CLSO
20 AUDIO ON
30 CLEAR200,17777:A=20000
40 DEF USR0=A:GOSUB230
50 DATA 80,88,20,1F,1,5F,86,FF,20,
Y1,FE,27,1,5C,97,FE,30,8F,26,FF,2,4F
,7E,BC,37,*
60 DEF USR1=A:GOSUB230
70 DATA 88,88,20,7E,FC,BC,6,0,24,3
,8E,4,0,86,80,E7,80,4A,26,FB,9F,FC
,37,*
80 DEF USR2=A:GOSUB230
90 DATA 80,88,20,7E,FC,30,89,FF,0,
BC,4,0,24,3,8E,5,80,86,80,E7,80,4A
,26,FB,9F,FC,39,*
100 POKESHPC,4:POKESHFD,0
110 ROTURON
120 T=8000
```

Continued on page 28



```

130 A=USR00(1)
140 C=INT(A/16)
150 IF C=0 THEN T=T+1.1
160 IF C=8 THEN C=0:T=T*.9
170 IF T>30000 THEN T=30000
180 IF ABS(A-C)>20 THEN 130
190 D=VAL(MID$(C"128,191,175,239,22
3,143,255,159,207",C*4+1,3))
200 IF A#E THEN D=USR02(D) ELSE S=
USR01(48)
210 E=A
220 GOTO130
230 READ D:IF D#>"*" THEN POKE A
,WAL("SH"+D):A=A+1:GOTO230

```

```

240 RETURN
250
260 * NOTES ON MACHINE CODE
270
280 * JSR #0020 CONVERTS THE
290 * BASIC NUMERIC VARIABLE
300 * TO AN INTEGER IN THE
310 * D-REGISTER.....
320
330 * JMP #0C17 CONVERTS THE
340 * VALUE IN THE D-REGISTER
350 * TO A BASIC VARIABLE AND
360 * RETURNS TO BASIC.....

```

## Ski-run

From Michael Oliver of North Yorkville  
SKI-RUN is a game for one player. When  
RUN, the computer will print out the  
instructions, they you will have to wait for  
about 3 minutes for the computer to set up  
the screen in MODE4. The program  
takes up approximately 18K of memory.

The idea of Ski-Run is to guide a skier  
from the top of a ski slope to the bottom.  
You have a set course to follow and you  
have to keep between the flags. You get  
four lives to start with and you lose one if  
there when you crash into a flag.

The cursor keys are used for moving the  
skier in the appropriate direction. When an

arrow key is pressed, the skier will auto-  
matically travel in that direction until  
another cursor key is pressed.

The data statements between lines 140  
and 375 consist of a number between one  
and three. Number one prints a fir tree on  
the screen, number 2 a flag and 3 a patch  
of snow on the screen.

### Program notes

#### Lines

10-680

The procedure for setting  
up the screen.

140-375

The data for printing the  
screen.

670-910

The main routine for the  
game.

990-1020

The procedure for when the  
game has ended.

1030-1110

The procedure for when the  
player has won.

1120-1170

Title page.  
Instructions.

#### Variables:

CHAR

The character

SCREEN

The variable to set up the  
screen.

OK

Checks the screen for colli-  
sions.

LIFE

How many lives you have  
left.

XX

The old position of the skier.  
(The "X" coordinate).

YY

The old position of the skier.  
(The "Y" coordinate).

X

The updated position of the  
skier.

Y

The updated position of the  
skier.

TM

The time it has taken you.  
The fastest time.

```

10 DIM CHAR(4,60),SCREEN(32,24)
20 DIMCK(32,24)
30 REM DOWNHILL SKI-ING
40 REM © 2/6/1984
50 GOSUB 1100
60 CLS
70 PRINT @ 135,"setting up screen."
80 PRINT
90 PRINT TAB(10);"PLEASE WAIT"
100 PRINT:PRINT TAB(5);"3 MINUTES,
15 SECONDS"
110 REM
120 REM DATA FOR PRINTING OUT THE
SKI RUN
130 REM
140 DATA 1,1,1,1,1,1,1,1,1,2,1,1,1
1,1,1,2,1,2,1,1,1,1,1,1,2,1,1,1,1
1,1,1
150 DATA 1,2,1,1,1,1,1,1,2,3,2,1,1
1,2,2,3,2,3,2,2,1,2,2,1,2,3,2,1,1,1
1,1,1
160 DATA 1,3,2,1,1,1,2,2,3,3,3,2,2
2,3,3,3,3,3,3,3,3,2,3,3,3,2,1,1
1,1,1
170 DATA 1,3,3,2,2,2,3,3,3,3,3,3,3
3,3,3,3,3,3,3,3,3,3,2,1
1,1,1
180 DATA 1,3,3,3,3,3,3,3,3,2,3,3,3
3,3,3,2,3,2,3,3,3,3,3,2,3,3,2
1,1,1

```

```

190 DATA 1,2,3,3,3,3,3,3,2,1,2,3,3
3,2,2,1,2,1,2,3,2,2,2,2,3,3,3,2,1
1,1,1
200 DATA 1,1,2,3,3,3,2,2,1,1,1,2,2
2,1,1,1,1,1,1,2,1,1,2,3,3,3,2,1,1
1,1,1
210 DATA 1,1,1,2,2,2,1,1,1,1,1,1,1,1
1,2,1,1,1,1,1,1,1,2,3,3,3,2,1,1,1
1,1,1
220 DATA 1,2,2,1,1,1,2,2,2,1,1,1,2
2,3,2,1,2,1,1,2,2,3,3,3,2,1,1,1,1
1,1,1
230 DATA 2,3,3,2,1,2,3,3,3,2,1,2,3
3,3,3,2,3,2,2,3,3,3,3,2,1,1,1,1,1
1,1,1
240 DATA 2,3,3,3,2,3,3,3,3,2,3,3
3,3,3,3,3,3,3,3,2,1,1,1,1,1,1,1
1,1,1
250 DATA 2,3,3,3,3,3,3,3,3,3,3,3,3
3,2,3,3,3,3,3,3,2,1,1,1,1,1,1,1
1,1,1
260 DATA 2,3,3,3,3,3,2,2,2,2,3,3,2
2,1,2,3,2,3,3,2,2,2,1,1,1,1,1,1
1,1,1
270 DATA 2,3,3,3,3,2,1,1,1,1,2,3,2,1
1,1,1,2,1,2,2,1,1,1,1,1,1,1,1,1
1,1,1
280 DATA 2,3,3,3,2,1,1,1,1,1,2,1,1
1,1,1,1,1,1,1,1,1,1,2,1,1,1,1
1,1,1

```

Continued on page 97

# COMPUTERWARE Present:

QUALITY SOFTWARE.....FOR THE DRAGON 32/64.....AT BARGAIN PRICES!!



## LINK WORD

(COULD THIS BE THE TOP SELLING DRAGON GAME OF 1987?)

The full colour capabilities of the computer are used in this game for 2 to 4 players, where the object is to score points by forming words on the board. The computer calculates all scores, for every possible word combination, including double and triple letter words, double and triple word scores, all bonus etc. Facilities provide for connecting into-playing or exchanging "difficult" letters from your personalised rack.

Our Bargain Price £5.99



## DRAGON DARTS

An accurate simulation of the game in which you may develop your shooting skill on the keyboard to achieve the high scores (YES... even 180s)

£5.99



## Also: THE POKER £5.99 CONNECT 4 £5.99

"SNAFU, PEERS & POKER"

The best card-playing game to date in double, triple, four, etc. etc. £1 each pack or free on request with all orders over £2. All prices include postage.

Dragon/PO payable to:

## COMPUTERWARE

PO Box 716, Stoke-on-Trent, ST6 6UX



## BLOCKBUSTER-GUE

All the fun of the TV game adapted for 2 players. Contains 100 questions ranging from very easy to very difficult. Full-colour high-resolution display.

£5.99

## POINTOON

Full-colour high-resolution graphics. Ace counts 1 or 11 and special combination of 5 in 7s, 8s, 9s etc taken into account.

£5.99

**Datapen**

## A QUALITY LIGHTPEN for the DRAGON 32 microcomputer

**Datapen**

### £25

Includes of FREE R&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, pointing etc. SHAPE-CREATE is a high resolution library shape drawing program.

### SUPERIOR PROGRAMS

- Large storage of your work
- Good documentation
- User routines provided on tape and on printer

Also available for: VIO-25, CSM-54 or BBC B. Please state your micro when ordering.

Send cheque or P.O. for £25 to:-  
D.U.1 Datapen Microtechnology Limited,  
Kingsdown Road, Overton, Hants. RG26 3JB

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

### SUPERIOR PERFORMANCE

- Insensitive to ambient lighting
- Responds to different colours
- Programmable 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!

Please  
contact  
computing  
Weeks  
Dec 1986





```

290 DATA 1,2,3,3,3,2,1,2,2,1,1,1,1
,1,1,1,1,1,1,1,1,1,2,3,3,1,1,2,2
,3,2
300 DATA 1,2,3,3,3,3,2,3,3,2,1,1,1
,1,1,2,1,1,1,1,1,1,2,3,3,3,2,2,3,3
,3,3
310 DATA 1,1,2,3,3,3,3,3,3,2,1,2
,1,2,3,2,1,1,1,1,2,3,3,3,3,3,3,3
,3,3
320 DATA 1,1,1,2,2,3,3,3,3,3,3,2,3
,2,3,3,3,2,2,3,2,3,3,2,3,3,3,3,3
,3,3
330 DATA 1,1,1,1,1,2,3,2,2,3,3,3,3
,3,3,3,3,3,2,3,3,3,2,1,2,3,3,2,2
,2,2
340 DATA 1,1,1,1,1,1,2,1,1,2,3,3,3
,3,3,2,3,3,3,3,3,2,1,1,1,2,2,1,1
,1,1
350 DATA 1,1,1,1,1,1,1,1,1,1,2,3,2
,3,2,1,2,3,3,3,3,2,1,1,1,1,1,1,1
,1,1
360 DATA 1,1,1,1,1,1,1,1,1,1,1,2,1
,2,1,1,1,2,2,3,2,1,1,1,1,1,1,1,1
,1,1
370 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1
,1,1,1,1,1,1,2,1,1,1,1,1,1,1,1,1
,1,1
380 REM STORE ALL DATA IN A 32*
  34 ARRAY
390 FOR Y=0 TO 23
400 FOR X=0 TO 31
410 READ A
420 SCREEN(X,Y)=A
430 CH$(X,Y)=A
440 A=0:NEXT X,Y
450 REM SET UP CHARACTERS
460 DATA 239,231,199,195,131,0,239
,255
470 DATA 143,179,188,179,143,159,1
59,255
480 DATA 255,255,255,255,255,255,2
55,255
490 DATA 239,131,49,49,245,187,187
,57
500 FOR CH=1 TO 4
510 FOR B=0 TO 7
520 READ C
530 CHAR$(CH,B)=C
540 NEXT B,CH
550 GOSUB 1120
560 REM SET UP SCREEN IN PMODE4
570 PMODE 4,1:PCL85
580 FOR Y=0 TO 23
590 FOR X=0 TO 31
600 A=SCREEN(X,Y)
610 PLAY"TS555"PLAY STR$(A)
620 FOR B=0 TO 7
630 POKE 1536+(Y*256)+(B*32)+X,CH$
R$(A,B)
640 NEXT B
650 NEXT X,Y
660 PCOPY 5 TO B
670 HT=484

```

```

680 CLS:PRINT:PRINT"PRESS spacebar
TO START THE GAME"
690 IF INKEY$="" THEN 670
700 PRINT:PRINT:PRINT TAB(10);"good
luck!"
710 FOR A=1 TO 3:PLAY"OST255CEDCED
CEDFEDFEDFEDBAGBAG":NEXT A
720 REM====GAME=====
730 TIMER=0
740 FOR LIFE=4 TO 1 STEP-1
750 PMODE 4,1:SCREEN 1,1:PCOPY 5 TO
B:B
760 X=2:Y=4
770 XW=0:YW=0
780 X=X:Y=Y
790 AH=INKEY$
800 IF AH=CHR$(8) THEN XW=-1:YW=
0
810 IF AH=CHR$(7) THEN XW=1:YW=0
820 IF AH=CHR$(94) THEN YW=-1:XW
=0
830 IF AH=CHR$(10) THEN YW=1:XW=
0
840 X=X+XW
850 Y=Y+YW
860 IF X=32 AND Y>1& THEN GOTO 103
0
870 IF CX(X,Y)<>3 THEN 940
880 FOR B=0 TO 7
890 POKE 1536+(Y*256)+(B*32)+X,CH$
R$(A,B)
900 POKE 1536+(Y*256)+(B*32)+X,2
55
910 NEXT B
920 GOTO 780
930 GOTO 930
940 FOR B=0 TO 7
950 POKE 1536+(Y*256)+(B*32)+X,2
55
960 NEXT B
970 PLAY"DT10BAGFESC"
980 NEXT LIFE
990 PLAY"PS11302L20L4CL13CL20L40B
L8DL4DL8CL4CDL18B02L2C"
1000 CLS0
1010 PRINT @ 139,"game"+STR$(M$(2,
128))+"over";
1020 FOR A=1 TO 2000:NEXT A:GOTO A
80
1030 FOR B=0 TO 7:POKE 1536+(X-1)+(
Y*256)+(B*32),255:NEXT B:FOR A=1 TO
5:PLAY"OST255CEDFEDBAGBAG":NEXT A
1040 CLS
1050 PRINT:PRINT TAB(19);"you have
made it"
1060 TH=INT(TIMER/50)
1070 PRINT"YOUR TIME IS";TH;"SECON
DS"
1080 IF TH=0 THEN HT=TH
1090 PRINT"FASTEST TIME";HT;"SECON
DS"
1100 FOR A=1 TO 5000:NEXT A
1110 GOTO 680

```

Continued on page 38



```

1120 CLS
1130 PRINT # 140,"ski"=STRING$(12,1
260+"run";
1140 PRINT # 207,"by";
1150 PRINT # 260,"michael"=CHR$(12
$)+$"silver";
1160 SCREEN 0,1
1170 RETURN
1180 CLS
1190 PRINT TAB(7);STRING$(10,"=")
1200 PRINT TAB(7);"WELCOME TO ski
run"
1210 PRINT TAB(7);STRING$(10,"=")
1220 PRINT:PRINT" THE IDEA OF
ski run IS TO GUIDE A SKIER FROM
THE TOP OF A HILL TO THE BOTTOM."
1230 PRINT:PRINT TAB(7);"SOUNDS EA
SY?"
1240 PRINT:PRINT" NOT IF YOU
HAVE A CERTAIN COURSE TO FOLLOW AN
D YOU HAVE TOKEEP BETWEEN THE FLAG
S."
1250 PRINT # 456,"press spacebar";
1260 SCREEN 0,1
1270 IF INKEY$<>" " THEN 1270

```

```

1280 FOR A=2 TO 4: SOUND A#50,1:INEX
T A
1290 CLS
1300 PRINT:PRINT:PRINT" USE TH
E FOUR ARROW KEYS TO MOVE THE SKIE
R. WHEN YOU PRESS AN ARROW KEY, T
HE MAN WILL TRAVEL IN THE SAM
E DIRECTION UNTIL ANOTHER KEY I
S PRESSED."
1310 PRINT" YOU HAVE FOUR LIVES
S TO DO AS BEST AS YOU CAN."
1320 PRINT # 456,"press spacebar";
1330 SCREEN 0,1
1340 IF INKEY$<>" " THEN 1340
1350 FOR A=2 TO 4: SOUND A#50,1:INEX
T A
1360 CLS:PRINT # 137,"good"+STRING
$(2,1280)+"luck"
1370 PRINT # 200,"(YOU'LL NEED IT)
"
1380 FOR A=1 TO 5:PLAY"OST255CFABE
D6FCBACFEDA":NEXTA:FOR A=1 TO 3000
:INEXTA
1390 RETURN

```

## Ultra utility

### From A Fielding in Home

THIS is a short utility which will help Ultradrive users. The ability to use the DIR function within a program enables a print-

out of the directory to be obtained. (In this note is a GP100A Printer.)

The main part of the listing are lines 120 to 230. These are a text screen dump. (That is converting the data in memory locations \$H400 to \$H6FF to ASCII character numbers, then sending characters to the printer in rows of 30 followed by a carriage return.)

I place this program on tape immediately

after finishing, making it easy to keep a current record of my data files and programs.

### Program notes

Lines 10 to 60 calculate the circular co-ordinates.  
Lines 70 to 190 draw the pattern.  
Lines 140 and 200 add sound.  
Lines 210 to 230 are for colour television.

```

10 "#####"
20 "A DIRECTORY TO PRINTER #
30 "S BY R.H.J.FIELDING #
40 "#####"
50 CLS
52 INPUT"THIS PROGRAMME CATALOGUES AN
ULTRADRIVE TAPE TO A GP100A PRINTER
J.PRESS enter TO CONTINUE."K
60 PRINT#2,CHR$(15)
70 INPUT"TAPE NO";T:INPUT"SIDE";S#
80 PRINT#2,"TAPE";T,"SIDE ";S#
90 PRINT#2
100 CLS
110 DIR
120 FOR Y=0 TO 15
130 FOR X=0 TO 31
140 P=PEEK(X+32KY+$H400)
150 IF P<64 THEN GOTO 170
160 P=P/96:GOTO 200
170 [PP]=64:NDP=(96 THEN NDP=160
180 [PP]=96:NDP=(128 THEN P=P-64
190 IF P=96 THEN P=32
200 PRINT#2,CHR$(P);
210 NEXT X
220 PRINT#2
230 NEXT Y

```

```

TAPE 1 SIDE B
-----
directory
FILENAME TYPE LEN START EXEC
-----
DIR BPBIC 00207
STATISTICS BPBIC 0158C
RM44 CODE 0208A 02000 04000
CGM#4 BPBIC 00R2A
END OF FILES

```



# Bookbytes

Send books for review to *Dragon User*,  
12-13 Little Newport Street, London  
WC2H 9PP.

**Book:** *Basic for your Dragon 64/32 made easy*  
**Author:** Gerry Marshall  
**Publisher:** Arrow Books  
**Price:** £3.95

THERE ARE more and more books for the Dragon coming on the market, each looking for a new angle and a new page to fill. This one is designed to capture the market created by the growing number of Dragon 64 owners. A good number of these are ex-32 owners who have upgraded their monies.

The thin addendum supplied by the manufacturers of the 64 posing inadequate, what is needed is a book exploring the differences between the machines and giving

is that the full run of all home graphics and many pages does not need to be commensated even with very large programs. However, only two pages of the book are devoted to home graphics. This is despite the forward stating that: "The Dragon 64 (has) ... impressive graphics and sound production."

Some very elementary Basic can be learnt from this book — but if you've got beyond PRINT, INPUT, READ, DATA and very simple file handling you will be wasting your time with this one. Only 20 statements are covered and the programs given for you to type in — for example a "Invaders" game on the test screen — will teach you little.

Mike Harrison



ing the user some new ideas on utilizing the 64's larger memory. Nevertheless also need a comprehensive guide to the full Dragon Basic. Unfortunately, this book fails to measure up on both counts.

I could find nothing on the whole book specifically pertinent to the 64. No mention of the use of the auto-repeat facility, nor the use of the RISC22 interface. The word EXEC — which puts the machine into 64K mode — does not appear, nor the use of the USB's function keys that the bug has been viewed out.

One chapter mentions buttons and robots that you can use with the machine, but the most important accessory for 64 users — a disk drive — and the difficulties caused by the overwriting of the cartridge port in 64 mode get no space.

One of the advantages of the increased memory space

With this in mind, it is a pity that a copy of *Programming the Dragon 32* is not included with every Dragon computer. Here is a clearly written account of how to use the Dragon, starting with the Basic principles, and in which the author never loses track of the fact that the reader might be programming for the first time. This is not to say that the more sophisticated commands are not dealt with, again in a straightforward and easy-to-understand manner. The author is obviously very well acquainted with the Dragon and some of its idiosyncrasies and gives some hints and advice throughout the book that even computer "buffs" might find very useful.

However, it is at the beginner that this book is primarily aimed, and it is packed with both short routines illustrating the effects of the various commands, and also with lots of complete listings (more of them particularly long), covering programs from "space-invaders" and fruit machines to digital clocks and Las Vegas games.

Throughout, it is extremely well-written and informative, and its easy-going style might be said to take the reader on a gentle stroll along the byways of Basic, as opposed to many manuals which appear to make programming resemble an assault on the north face of the Eiger. Definitely a read for all but the "expert".

Dorion Lee

rek and all. Anything is possible with the help of Clive Gifford's book.

The book not only teaches you how to structure and create adventure games but also how to customize them to your own whims and fancies.



Adventure gaming can offer a real challenge to those fond of alien juggling and this book contains five full programs each of a different type of adventure and each detailed in sections describing their function. As is the strength of this type of game — the whole is so much more than just the sum of the parts.

Clive Gifford's style is to show how four elements in the program: initialization, the control loop, handlers and the subroutines consequent upon these, interact and can be modified to suit your own ideas. These modules, and a few general purpose ones he also lists, are the key to adventure programming.

**Book:** *Programming the Dragon 32*  
**Author:** Peter Lafferty  
**Publisher:** Newnes Micro-computer Books  
**Price:** £5.95

ONE OF the most fearless tasks must be to write the instruction manual which accompanies every micro-computer. To have to acquire the absolute novice who has just unpacked his first computer, and, at the same time cover the intricacies of the many advanced features of the machine, must be a daunting prospect. It is perhaps inevitable, considering the dual role that these manuals have, that many come in for a fair amount of criticism.



**Book:** *Creating Adventure Games on your Dragon 32*  
**Author:** Clive Gifford  
**Publisher:** Interface Publications  
**Price:** £5.95

HOW ABOUT setting your next adventure game in your own home?

... attacked in porch by milkman ...  
... ran or fight?  
... spill coffee on carpet ...  
... move chair or hope it matches wire stain?

Well, perhaps nothing exciting happens around your house, but imagination can run riot. We now have adult oriented rock, so why not adult oriented adventure — Ed De-



The book is easily digested and the listings also include games procedures and techniques and a chapter on how to add sound and graphics to your programs.

Mike Harrison

## Wizard Software



### STARTING FRACTIONS

A teaching program designed for children, for anyone who's curious, which presents and explains the concept of fractions. Users can learn about equivalent fractions, how to add and subtract fractions, and how to multiply and divide fractions. The program includes a built-in calculator and a fraction table. Price: \$19.95.

### TIME PORT 2 — The Star of Life

A 4th grade level computer program designed to teach children about the concept of time. The program includes a built-in clock and a calendar. Price: \$19.95.

### COMPUTA FRUITA

A 4th grade level computer program designed to teach children about the concept of fractions. The program includes a built-in calculator and a fraction table. Price: \$19.95.

### TOUCHDOWN

A light touch screen program designed to teach children about the concept of fractions. The program includes a built-in calculator and a fraction table. Price: \$19.95.

### For Adults

Price: \$19.95.

Available on cassette, disk, or floppy. Order on credit card to:  
WIZARD SOFTWARE, DEPT. 22, P.O. BOX 22,  
CLIFFSIDE PARK, N.J. 07015

After analysis from software reviewers:  
Software Review (S.R.) is a 501(c)(3) not-for-profit corporation.  
Non-profit status is not a guarantee of quality.

## SPRITES FOR THE DRAGON

- UP TO 128 NON-DESTRUCTIVE SPRITES
- SIZE SINGLE PIXEL TO 1600 PIXELS
- COLLISION DETECTION
- AUTOMATIC ANIMATION
- AUTOMATIC PAGE ROLLING MODE
- AUTOMATIC JOYSTICK/KEYBOARD CONTROL
- REMOVED SOUND FACILITIES
- TEST IN ALL MODES, TRUE 4-LEVEL CASE ADD
- RECONFIGURABLE CHARACTER SET
- MIXED TEXT AND GRAPHICS IN ALL MODES
- AUTO REPEAT KEYBOARD
- DOZENS OF POWERFUL, NEW COMMANDS
- SIX FREE DEMONSTRATION PROGRAMS
- COMPREHENSIVE MANUAL

Sprite image comes on cassette in a double size audio box complete with manual for \$17.95 all inclusive.

### WHAT THE MAGAZINES SAY

"Excellent" and "Superb" — PCW, March 1984

"One of the best Dragon titles on the market today" —  
DRAGON WORLD, April 1984

"Fantastic... If you've got a Dragon what on earth else are you doing without Sprite Magic?" — PCW, May 1984

"This is a very professional program and can certainly be recommended" — DRAGON USER, June 1984

"Go out and buy it, it's worth every penny" — PCW, June 1984

Please phone your Access/Visa number or send cheque or PO to:

## KNIGHT SOFTWARE

(Merlin Microsystems)

52a High Street  
Bristol, Cleveland  
Tel: (0642) 454883

Available from  
selected Dealers  
or Direct

Distributed by  
Merlin  
Software Ltd

## SUPERIOR NEW GAMES FOR THE DRAGON FROM

### MAGIC MIDNIGHT

DEFEAT HIS EVIL CREATURES AND  
GAIN THE SPELL TO FIND

### LACHLAN!

YOUR TROUBLES ARE ONLY JUST STARTING  
FOR 1 OR 3 ADVENTURERS

INVEST IN THE STOCK MARKET,  
BUY PROPERTY OR JUST GAMBLE  
IT AWAY IN

### RAT RACE

WILL YOU BE THE FIRST TO MAKE A MILLION  
FOR 1-4 BUDDING BUSINESSMEN

PLAYABILITY IS THE NAME OF THE GAME

GAMES AVAILABLE MAIL, ORDER ONLY  
SEND ONLY £12.50 FOR BOTH OR £7.50 FOR ONE

### MAGIC MIDNIGHT

38 HANDEL CLOSE, BARNSTOCK, HANTS. RG22 4DU

WE WILL DISPATCH  
QUALITY PROGRAMS ALWAYS NEEDED

## DRAGON SOFTWARE



£1.99



£1.99



£1.99

Dragon Software is now available on cassette for sale.

SNIP

SNIP

SNIP

All Snip Products

Stock Clearance

£1.99

OR  
AS FROM CASCADY  
£1.99  
Call

DRAGON 3 & 4  
£7.50

DRAGON 3 & 4  
£7.50



THIS MONTH begins with a plea from reader M. A. Peakes of Doss in Norfolk, whose daughter was given a copy of *El Diablo* last Christmas, and Christmas 1984 finds the family Peakes still stuck in this diabolical adventure. The demise of Dragon Data means there's no one they can contact for further clues, and having only so far been able to obtain the Cross, they're anxious for some hints on how to proceed further. This is an adventure I've not seen, so if any readers out there have got beyond the Cross, perhaps they'd let me know and I'll print the clues or pass them on to Dossed of Doss. Of course, if anyone has a spare copy of the adventure ...

Talk of presents too is a letter from a reader in Kent, whose name I won't give as he was asking for advice on adventures he could give his son, who he describes as a bright nine-year-old. Resisting the temptation to suggest *El Diablo*, I recommended the various *Mysterious Adventures* from Channel 8 Software, who are now retelling their titles for £5.95 down from £9.95. I suggested the *Mysterious Adventures* because they're fairly straightforward, with every object having a purpose, and although it's difficult to know what will suit a particular person, I think the Channel 8 titles would suit that age adventurer.

Also recommended as possible gifts were the four recent Dragon Data graphics adventures: *Sea Quest*, *Calico Island*, *Black Sanctuary* and *Shenangoes*. Another reader has written in about *Calico Island*, which is quite a tricky one, and the letter is interesting because I'm not sure if the reader hasn't been led up the garden path somewhere along the way. *M. M. Blackwood of Bristol* (you readers are so formal: you are allowed to put your Christian names, you know!) says that "having found the treasure I have been unable to find out where to return it to. At the beginning of the adventure I did not locate the professor's notes, and perhaps these would have contained a clue. Another problem is that having dithered with Trader Jack for the keys he had, I could not then find the teleporter device, which had disappeared from the marshy field in order to return to the professor's study to find out if the keys held his keys."

I've a pressing suspicion that the tra-

sure this reader refers to may be the jewellery that you find fairly early on in the game. The reason for that is that what you want from Trader Jack is the machine, not the keys. You then use the machine to track a path through the jungle, and later on you find a cave for the jewellery, leading on then to enable you to get the main treasure, which is a crown. This you then take back to the professor's laboratory and drop it, to complete the adventure. Don't expect fireworks and razz-a-mazz, though, for like many adventures the ending is rather disappointing ... you get all that way and then the first thing they ask you is if you want to play again.

In *Calico Island*, I haven't located the professor's notes either, but it didn't stop me getting through, and I've never had the experience of losing the teleporter device that whisks you from the laboratory to the marshy field. Maybe other readers can shed some light on this mysterious disappearance.



A device of another kind in the Channel 8 series, *Time Machine*, is available for the Dragon 32 and 64 for £5.95, both versions being on the same tape. The running program knows which machine you're loading it into and reads accordingly. The *Mysterious Adventures* series all work to the same format, and regular readers will be getting as tired of reading what this is as I am of writing it, so we'll give it a miss this month ... and un-regular readers only have themselves to blame.

All adventures have a maze of some kind, but *Time Machine* starts you off in one: "It's in a dense fog on the moors.

East. NORTH SOUTH EAST WEST." Typing "T" for Inventory informs you that "I'm carrying: Not a sausage!" Fair enough, so nothing to chop, but simply trial and error to find your way out of the foggy moor. You can come back later when you are carrying objects and discover the maze is very simply constructed indeed.

The reason you're out on the moors, on such a winter night, instead of cosily staying indoors and watching "Minder", is that you see an odd news reporter from the *Talkingham* and *Dunsty Gazette*. You've been removed from your usual duties of reporting local flower shows and pensioners' birthdays to investigate strange goings-on at the deserted house on the moors. Having seen plenty of B-movies you should have more sense, but local people have seen strange lights and heard weird noises, so off you go to discover what the eccentric Dr Foster is up to.

From the moor you can make your way to the house, and a doorway containing gloves and a bell. RING BELL, of course, but two dings and two dings later nothing has happened, so round the corner to find a window. Years of brutal arcade-game playing ensure you don't hang about being all nimbly-parmy, you SMASH WINDOW! Having naturally taken the precaution of wearing the gloves first — we don't get caught like that! Inside the house you make your way to the cellar, where there's a Strange Machine and a cassette recorder, and the latter provides you with the message: "Find the three prisms that control my machine. Rescue me!"

Now don't worry your head about how someone who's obviously been sent off in a Time Machine can possibly have inserted a message like that if it is a cassette machine that's been left behind, but instead GO BACKWARDS to see that there are indeed three empty sockets just waiting you to INSERT PRISMS, not to mention two buttons marked "FOR" and "REW". The quip, then, is in for the prisms, and this will take you via dinosaurs in swamps to sailing ships and sphinxes — the usual *Mysterious* fodder, though there seemed to be less in this adventure than in some of the others ... or maybe I just haven't got far enough into it yet, if you've tried one before then you'll know what to expect, but if you haven't then I wouldn't particularly recommend starting with this one ■

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

# HOT CoCo

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

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 "nailed" 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 • 50 Pine Street • Freshborough, NS B2A8S • USA

7310101



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

# Dragon Answers

## Character DRAWing

Could you please tell me if there is any other way of moving DRAWed characters, other than using the SET and PUT commands on the high resolution screens. I understand that CTRL works but I don't know how.

Chris Murr  
Dorset  
Suffolk

I think the method you are referring to is to use the Draw command with variable x,y co-ordinates given using CTRL. To draw an image of x,y from the string 00 use the following:  
DRAW

"BM" + STRG(0) + "," + STRG(0) + 00

You can use a similar method to obtain visible colours, angles and scale sizes in the draw command.

## Cassette lead

COULD you please tell me where I can purchase a Dragon 32 lead which connects to the cassette recorder. I have tried everywhere in Exeter but no shop stocks them.

Harvey Staddon  
Topham  
Exeter

ONCE again the Dragon's similarity to the Tandy Color page up, in fact the Dragon's entire cassette lead is identical to the Tandy Color's. You can get one of these from your local Tandy store for a few pounds, ask for catalogue number 26-1207.

## Game error

I OWN a Dragon 64 computer and a few months ago I bought a game called Up Pericoose from Beyond. I enjoyed this game so I bought a similar one called Kingpistol, however, when I loaded this I got a syntax error in line two which was:

2 U = (USR 0000) RETURN

I have had the game replaced several times but I have always had this problem. Please could



you tell me if it is a problem with the Dragon 64 or the game.

Paul McLean  
Dunfermline  
Fife

ALTHOUGH the Dragon 64 operates as a Dragon 32 when first turned on, there are one or two bugs in the 32S machine which have been removed from the Dragon 64's Basic. One of these is the need to put an additional character before the USR number (in this case the "0"). To get the program to work on your Dragon 64, update line 2 with:  
2 U = (USR0000) RETURN

This is printed out in the Dragon 64 supplement booklet, but on reflection it would seem better if the bug had been left in the 64's ROM.

## Bridge partner

I HAVE noticed a few games for the Dragon 32 for simulated card games such as Crib and Pontoon. Could you please inform me if there is a game of Bridge on the market or if one is in the process of being written. I have tried all the shops in this area without success.

P G Fry  
Barnstable  
Devon

BRIDGE data had just released a Bridge game before they ran into difficulty. This program came on cartridge with games on an accompanying cassette. The game can be played with either the keyboard or joystick.

As with most of Dragon Data's software, the game can now be obtained from Touchmaster, Kandy Industrial Data, Wargame, Post Taitex, or Microgame

DATA 2PE. You should order article number 841000. The game costs £15.95 plus £1 post and packing.

## Graphics savings

I AM currently writing a graphics program for my Dragon 32 and I read recently that there was a command for saving a graphics page by the use of CLEAR00.

I would be grateful if you could tell me the command and also how to load it back into the computer.

Pam Draper  
Conford  
Hants

THE CLEAR command can be used to save graphics pages quite easily. To name the graphics currently displayed use:

CSAHEM "Bismare" , PEEK(100) + 256 + PEEK(101) , Peek(102) + 256 + PEEK(100), 0

This prints the start and end address of the current graphics selected and saves this block of RAM. If you know the addresses you can use them directly of course, but using this method will also take account of disks and so on.

To reload the graphics, simply use CLSROM "Bismare". You can specify an offset in the CLSROM command if you don't want the graphics loaded back in the same place.

## DeltaDOS or DragonDOS

I OBTAIN a Dragon 32 with a Dragon Data disk system and I am having a great deal of trouble with a file

handling system I am trying to write for my father's business.

I have heard that you can buy a separate Delta disk operating system for around £60 and I was wondering whether it would be compatible or could be made compatible with Dragon Data's drives.

W F Alexander  
Ingleton  
Lancs

THE FILE handling system included with DragonDOS is not particularly user-friendly, but is probably quite capable of doing what you need. You can buy the DeltaDOS from Canams, which will operate the Dragon Data drives, but this DOS will do no more than DragonDOS, certainly not enough to justify the extra cost. You would do better to invest the money in a professional operating system, such as DOS or Macs, both of these offer very good file handling. What is really needed is a good book on file handling using DragonDOS, but to my knowledge there isn't any.

## Clearing addresses

COULD YOU please help me with the following two questions:

(a) How is it possible to obtain the start, end and exec locations from a file on a "DragonDOS" disk?

(b) Is the ROM "clear-screen" routine available to assembler programs and if so what is its location?

David Reed  
Hornchurch  
Essex

WITH THE DragonDOS cartridge attached, the following locations contain the addresses you want. ROM hex:

1010/1010 - Start address of machine code  
1020/1021 - Length of machine code program  
1022/1023 - Entry (hex) address

The ROM clear screen routine can be used from assemblers to clear the screen to green, see JER 47106, and to clear to a particular character, load the "B" register with the code and use JER 47132. These routines also read the print position, which is stored in locations 10112/10113, to the top left of the next screen.

**THE FOLLOWING LINES WILL  
SHORTLY BE DISCONTINUED AND TO CLEAR  
EXISTING STOCKS WE ARE  
OFFERING LIMITED STOCKS  
AT THESE SPECIAL  
PRICES!**

**FILMASTR**  
DRAGON 32  
DATA MANAGEMENT SYSTEM

FROM  
**MICRODEAL**  
TO  
**SUM-MAK**

**Filmastr** This is a file handling programme which utilises the Dragon 32 as a capable filing system. Files are created as if writing on a card, with fields and subject titles. Up to 28 fields may be selected. Sort or Sum Total on any field, Add, Delete, Change and list facilities. Print to screen or printer, select format for printing.

NORMALLY £19.95  
**NOW £9.95** 1988 VERSION £11.95  
POST & PACKING 50p

**DRAGON-32  
TELE-TUTOR 1**  
5 TO ADULT

SPELLING TEST  
WORD DRILL  
MATHS DRILL  
ESTIMATE

FROM  
**MICRODEAL**  
TO  
**TOM MIX**

**Teleforth**  
Tired of BASIC?  
Try Teleforth. This fig-FORTH implementation is the logical next step for any BASIC programmer. It allows the use of a completely different programming language which runs many times faster than BASIC. A must for any serious Dragon programmer.

NORMALLY £19.95  
**NOW £9.95**  
POST & PACKING 50p

**Teletutor**

Versatile educational package, which includes a Maths Drill, Estimate (mental arithmetic), Spelling Test and a Word Drill (word evaluation quiz). Suitable for age five upwards. Comprehensive manual included.

NORMALLY £25.00  
**NOW £9.95**  
POST & PACKING 50p

**Telewriter**

A comprehensive word-processing package, completely software based. User-friendly, menu driven with full on screen editing facilities. Screen Display gives a 31 column x 24 characters per line, with real lower and upper case letters. Also has Tab function, and will tell you how much space you have left in the text buffer. Automatic page numbering, fast forward and reverse page scrolling. Block delete and copy. Word search and replace. Facilities for use with embedded format codes. Print Format menu controlled. Manual included.

NORMALLY £49.95  
**NOW £19.95**  
POST & PACKING 50p

**TELEWRITER**  
DRAGON 32  
WORD PROCESSOR



Post Your Order to  
**MICRODEAL**  
41 Truro Rd., St. Austell,  
CORNWALL PL25 5JE

OFFERS SUBJECT TO  
AVAILABILITY

Phone Credit  
Card Orders to  
**0726 73456**



# DRAGON 32

**NEW**

# LOW PRICES

## From MICRODEAL

Telewriter	£19.95
Tele-Tutor (Cassette)	£9.95
Alcatraz	£2.99
Cosmic Zap	£2.99
Cuthbert Goes Walkabout	£2.99
Flipper	£2.99
Glaxons	£2.99
Jerusalem Adventure	£2.99
Williamsburg Adventure	£2.99
Ultimate Adventure	£2.99
Scarfman	£2.99
Space Monopoly	£2.99
Space War	£2.99
Escape	£2.99
Galactic Ambush	£2.99
Tele-Forth	£9.95

Filmstrips	Disk £11.95	Cassette £9.95
Air Traffic Control		£2.99
Cuthbert Goes Digging		£2.99
Defense		£2.99
Frogger		£2.99
Golf		£2.99
Storm		£2.99
Mansion Adventure		£2.99
Caterpillar Attack		£2.99
Pinball		£2.99
Space Fighter		£2.99
Space Raiders		£2.99
Dragon Hawk		£2.99
Backgammon		£2.99
Dragon Invaders		£2.99

All the above versions are for  
Dragon Computers only

Post & Packing  
50p per Order

For details on any of the above lines Phone or write asking for our Dragon catalogue  
Post Your Order to

# MICRODEAL



Credit Cards  
Phone Order to **0726 73456**

41 Truro Road,  
St Austell CORNWALL PL35 5JE



**DRAGON SOFTWARE LIBRARY.**  
Life membership only £150. Two weeks free £125. Reply for details to: SLS, 4 Eastway Terrace, Newcastle, Kent ME1 3 JAR.

## OUTPUT PORT

Simply plugs into printer port and is easy to use from BASIC or MC. Features Open-Collector outputs to drive relays, led's etc. £200000 with relay information £14.95 inc. tax.  
**MCJ Electronics**  
12 Bedford Square  
Eire 0044  
read from S&P

**DRAGON 32** with systems and 119k tapes and cartridges worth £400 average £550. Telephone: 0787 470575.

**ELECTRIC CAR** design software: just type report £6.95. Eric Mayhew, 7 Montgomery Square, Epsom, Surrey.

**PROGRAMS WRITTEN** to your individual needs in BASIC and Machine code also programs altered and repaired for Dragon 32 reasonable 1990. Telephone/Holchester 443 143.

**MICROIDEAL TELETYPE**, word processor. Revs. £207. Telephone 0427 560714.

## ASTROLOGY for beginners

Special Starter Pack for only £11.50

Consists of a complete program to calculate a horoscope, an introductory booklet and two self-teaching programs (also to compare the horoscopes). No previous knowledge required.

For the Dragon and many other home PCs. Also with special programs for more experienced astrologers.

Cost with order (add £6p outside UK) or larger save for free (subject to—)  
**ASTROSCALE** (Start £6)  
67 Farnwell Road  
Hemel Hempstead, Herts HP3 8PJ. Tel: 0462 3 1829

**SCIENTIFIC DRAGON** is a game of internal security for building an insurance. Only £2.95 exclusive little Lowell, 40 Marlboro Crescent, Dunstable, Beds, LU6 2NR.

**D LEVEL, SEMESTER VERSION** for Dragon and Commodore Plus, see customer 33 including disk. (Pawest, PO Box 1, Penicuik, Midlothian).

## ADVERTISERS INDEX

<b>B</b>		<b>M</b>	
Baby Notes	30	Magic Mangle	40
Bashy Advertising	38	Minotaur 8, 28, 34, 44	52
		Mini-De-Bug	36
		Microtype	48
		J. Morrison (Mores)	10
<b>C</b>		<b>O</b>	
Channel 8	24	Osai Software	7
Chatterbox & General	47		
Computers	18	<b>P</b>	
Computerware	38	PGL Marketing	22
Costwell Computers	47	Plaksoft	21
		Prokader	47
<b>D</b>		<b>R</b>	
DAQC	38	R&P International	38
Datascam Publications	25	Rainbow	38
Dataparc	38		
<b>E</b>		<b>S</b>	
Eastward SA	14	S&S Co. Ltd	34
		SP Electronics	47
<b>F</b>		Selsameter	2
FlightLink Control	48	Temp Software	40
		Walsam	21
<b>G</b>		Walsam Distributors	52
Greenwater Software	47		
<b>H</b>		<b>T</b>	
Hardy Mores	31	Trojan Products	8
HonCo-Co	45	Tutor Williams	48
<b>I</b>		<b>V</b>	
Icon	40	Votmace	20, 5, 51
Innovative Software	17		
Interpage	47	<b>W</b>	
<b>K</b>		Wintersoft	4
Knight Software	42	Wizard Software	42

# Here's my classified ad.

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

£0.00	£0.00	£0.00	£0.00
£1.00	£1.00	£1.00	£1.00
£2.00	£2.00	£2.00	£2.00
£3.00	£3.00	£3.00	£3.00
£4.00	£4.00	£4.00	£4.00
£5.00	£5.00	£5.00	£5.00

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, WC2N 3LD

# Competition Corner

Answers to Competition Corner,  
Dragon User, 12-13 Little Newport  
Street, London WC2E 9PP.



THERE are times when an apparently straightforward piece of programming can give rise to problems if one of the basic — though rather esoteric — features of the Dragon is overlooked.

## Trigonometry

Take the following simple problem: You wish to determine the height of a flagpole, and find that at a distance of 80 feet, the top of the flagpole has an elevation of 35 degrees from the ground. Elementary trigonometry tells us that the side of a right-angled triangle opposite any given angle (the flagpole) is equal to the tangent of that angle multiplied by the side adjacent — in this case the distance along the ground to the flagpole.

# Record space

Gordon Lee sets the problem,  
Cable Software provides the prizes

radiant. Fortunately, it is easy to convert degrees to radians and vice versa.

To convert degrees to radians divide by 180 (approx. 57.29578). To convert radians to degrees multiply by 180.

Using this fact, the correct height of the flagpole mentioned earlier would be given by:

PRINT TAN(35/57.29578)\*80  
which gives 63.0185 ... i.e. the correct answer.

Whilst on the subject of trigonometric ratios, the sine, cosine and tangent of an angle can be accessed directly from the keyboard using the commands SIN, COS and TAN respectively. The inverse of the tangent is also available (ATN) but not, unfortunately, the inverse of either sine or



corresponding angle. The latter is in the formulae refers to half the perimeter — that is  $(a + b + c)/2$ .  
 $A + B + C = 180$  degrees or  $\pi$  radians  
 $A = \sin A = b / \sin B = c / \sin C$   
area of triangle =  $1/2 * (a-b)(a-b)(a-b) - (c^2)$   
 $TAN (A/2) = \sqrt{(s(s-a)(s-b)(s-c))}$

## Disc table

Here is this month's competition problem: I have two gramophone records, one 12 inches in diameter, and the other one 10 inches. They are lying on a table with the 10 inch disc on top. If this smaller disc is entirely contained within the area of the larger, the area of table covered will be at a minimum (equal to the area of the 12 inch disc), but the area of overlap of the two



So we might type in to the computer  
PRINT TAN (35/57.3)  
This would give us an answer of 42.6433  
but, which we might reasonably suppose is correct. However, there is one important feature of the Dragon — and most other computers — that we have forgotten. This is that all angles handled by the computer must be given in radians, not degrees. It is perhaps unfortunate that in a world where the degree is the standard unit of angular measure this should be the case. It is much easier to visualise what is meant by 35 degrees rather than 0.6108852382

cosine. These can be calculated indirectly using the ATN function using the formulae:  
Inverse sine = ATN (X/SQRT(1 - X^2))  
Inverse cosine = 1.570796 - (ATN(X/SQRT(1 - X^2)))

Note that the formulae given in the Dragon manual for these functions are incorrect. Following are some further formulae relating to triangles, which may be found useful. They relate to any triangle, the capital letters A, B and C referring to the three angles, and the lower case letters a, b and c the three sides. In each case each side is the one opposite the

sides will be at a maximum. By sliding the upper disc sideways, the area of the table covered will slowly increase, while area of overlap will decrease. Eventually, the two discs will be side by side giving maximum coverage on the table but with no overlap.

At some point during this operation, the area of overlap will be exactly equal to the non-overlapping parts of the discs. How far apart are the centres when this occurs? (In solving this problem the records should be regarded as solid discs — no allowance need be made for the two holes in the centres.)

## Prize

CABLE SOFTWARE is offering to readers a chance to win six six lateral games for the Dragon. The games, distributed by PSL Marketing, usually retail for £6.95 each. They are:

**Super Bowl** — a simulation of American Pro-Football starring Rod of the Dallas Cowboys. **Guerrilla** — a Hushbox type game with 10 screens and four levels of difficulty. **Zak McKracken** — featuring an ace helicopter pilot leading a dangerous mission into Vietnam. **Home Base** — a fight against laser bats and energy bolts. **Eager Edna** —

avoid the Troglodytes as you work your way around the maze searching for keys to enter the central chamber.

**Fighting Fantasy** — an arcade adventure with 35 different weapons and full colour animation.

## Rules

TO WIN the software you must show both the answer to the competition and how to solve it. Please do not send in a cassette containing the answer. As a tie-breaker complete the following sentence in 15 words or less: "I want Cable Software's six lateral games for my Dragon because ..."

Your entry must arrive at Dragon User by the last working day of January. The winner and the solution to the competition will be published in our April issue. Entries will not be acknowledged and we cannot enter into correspondence on the result.

## October winner

THE WINNER of the October competition and recipient of £200 worth of software from Salamander is D C Pauliner of Macclesfield in Mid-Cheshire, who had a score of 40, beating the joint runners-up by one.

# St. George now has two choices!

## Red or green will slay the Dragon

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

## Complete control at your fingertips

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

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



Made in England

DELTA 3d JOYSTICK (115.00)  
Two DELTA 3d JOYSTICKS (115.00)  
PLEASE STATE COLOURS REQUIRED

Prices include VAT and P&H.

# Voltmace *delta 3d*

Callers welcome at the factory - Monday to Friday.

Dragon dealers come out of your cavern!

Phone stock list required in some areas.

**VOLTMACE LTD**  
**PARK DRIVE**  
**BALDOCK**  
**HERTS**  
**SG7 6ED**  
Tel: (0462) 894410



Available for  
**DRAGON 32**  
**TANDY COLOUR 32 K**

# TIME BANDIT

Tired of games that have only a few screens or force you to follow strict levels?

Well despair no more! In Time Bandit, you virtually create your own game! You can choose from "twenty" places throughout the game, with more than "fifteen" distinct variations and levels of difficulty in each place; this means over 300 different variations!

You must use the "Time-Gates" to travel to each of the 2 different Worlds of Time, each containing a multitude of colourful and unique adventuring areas. Visit the medieval Dungeons of Fantasy World, recapture the days of yesteryear in Western World, and reach for the Stars in Future World. Do battle with the Evil Guardians, Looking Lurkers, Angry Alms, and the Killer Smurphs! Find the keys and escape with the treasures of time.

Crisp Graphics, Full Colour Animation, Great Sound,  
 300 Screens and 100% machine code.  
 It's all Here!!

Requires 1 Joystick



*Tandy colour version requires 32K non-extended basic and is available only at Tandy Stores.*

Mail Order Sales from  
 Microdeal Mail Order 41 Trump Rd.  
 St. Austell Cornwall PL25 5JE

Credit Card Sales      
 Phone 0726 73456



## MICRODEAL

Dealers Contact  
**MICRODEAL DISTRIBUTION**  
 0726 73456

MOORE TRADING 0925 26222  
 TRADING WHOLESALE 0726 800200  
 COLUMBIA 021 354 5000

Selected Microdeal titles available from computer dealers nationwide or from larger branches at

