

DRAGON USER

International edition

The independent Dragon magazine

95p US\$3.25 November 1985

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Clay Shoot!**

Dragon Bingo

**Coates on
graphics**

**WIN Design Design's
Dark Star!**

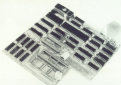
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How to submit articles

The quality of the material we can publish in
Dragon User each month will, to a very great
extent depend on the quality of the
discoveries that you can make with your
Dragon. The Dragon computer was 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
2000 words long. All submissions should be
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panied by a tape of the program.

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addressed envelope.

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Editorial

A YEAR ago, very few pundits in the computer industry would have
given the Dragon more than a couple of months to live — but here we
are, November 1985, and still kicking.

If you want evidence of that, then the place to go is the Third 6800
Show, which will be held at the end of this month. While the company
which was originally organising it has gone into receivership, the Show
has survived — another indication of the Dragon's resilience?

Some software and hardware houses may be missing from the
line-up of exhibitors, but there will still be enough to fill the halls.

There should be plenty of new pieces of hardware, new games and
utilities, new peripherals — even, if certain promises are kept, new
Dragons.

But, to be honest, it doesn't matter how many new bits and pieces are
on display if the most important element isn't there — and that's you.

Computers don't survive just because companies carry on making
things for them, although that is a major factor.

The real reason the Dragon has survived 1985 — and will continue on
into 1986 — is the continued loyalty and support of ordinary Dragon
owners.

There are, however, indications that further problems may lie ahead.
Certain companies are now selling their products by mail order only,
largely because the high street retailers and major distributors won't
touch the Dragon.

This only makes the 6800 Show even more valuable. See you there.

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MICRODEAL

Letters

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

6809 Show Blues

I AM writing to you asking for some information on the 6809 Show. I wrote away for tickets five weeks ago and I have not had anything back at all.

Christopher Leafe
3 Mirror Walk
Hareworth
Darlington
Co Durham DL2 2AR

COMPUTER Marketplace, the company originally organising the 6809 Show, has gone into liquidation — but the Show will be going ahead, however see news, page 7.

Exception

I AM writing regarding the "Coding the Word" article by Peter Whittaker in September issue of Dragon User.

I feel strongly about the program published being offered to readers on cassette for £3 when the designer receives £8 for publication. £12 if it is a program of the month, and also when £15 computer cassettes only cost 50p in the shops.

Craig Henderson
39 Woodbury Avenue
Waltham
Somerset

PETER WHITTAKER received rather more than £12 for his article — it was not in the Open File section. As to his charging for copies of the program on cassette, if you type in the listing yourself then you only pay the cover price of the magazine. You don't have to send him £3, which seems a reasonable price to pay considering the effort he put into it. It's just a service fee (and many other Dragon User contributors) offers for those who can't face typing in the listing.

Print L

THIS is the first time I have written to your wonderful magazine. I congratulate your success at staying alive after Dragon died.

Let me get to my point. I have found a function on the

Dragon that is not mentioned in the (pdf) manual. Typing "PRINT L" will produce the variable's value plus two spaces, followed by a zero. I have no idea what this means. Could you please help me.

Paul Jones
7 Cherrington
Streatley
Folkestone Kent

Super!

I HAVE read your letter about the Super Dragon Writer II in the September issue of Dragon User, and hope that my own experiences with this cartridge may be useful to you.

Like you, I initially experienced crashes, which I found to be caused by the cartridge being a loose fit in the expansion socket. Wedging the cartridge in the central position using two pieces of paper forced to the required thickness alleviated a complete cure.

With regard to your question about mains voltage dips, devices providing continuity of supply are available, but cost a lot more than your Dragon! A much cheaper alternative which would give some protection against very short term dips is to add high value resistors inside the Dragon on the DC power rails. The Super Dragon Writer II cartridge does not use the 12V supply, only the +5V.

I have also found that using <clear>=>shift down=>arrow to go to the end of a file after editing the middle sometimes causes a crash. So I try to use some other cursor movement first.

A few other idiosyncrasies I have noticed are: <shift>-<clear> does not work; I have to program another key to get ASCII 92 spaces immediately after a printer code marker <clear> are ignored; the solution is to make the first one a hard space. Programmed functions do not work in the LDCATE command, no solution found.

I hope you manage to crashproof your cartridge and are able to use it, it is certainly the best hot-plug-based word processor for Dragon I have seen.

Glyan Hayler
36 Laurel Close
Wiltshire
South West LA4 1TW

Thanks

SEPTEMBER Dragon User published a letter of mine seeking advice about problems with the Super Writer II word processing program, and I have had a number of direct replies (at least one of which may also be found here) to the effect that cartridges are prone to poor contact problems, which can be resolved by wedging a piece of Formica, or a fine thickness of paper etc. across the cartridge. I have used this, and the crashes appear so far to have been eliminated. Any implication on the reliability of Super Writer II is heavily withdrawn.

Dragon users should take heart from this. If they have problems, help is never far away!

Robert Hackett
4 Ladbroke Street
London SW6 6DR

Belgian answers

TO ANSWER Compuquest's question to what we want of the Dragon I can say this. Due to the lack of purchasing power in Europe (sometimes five or 10 times less than in the USA), European families are not in the position to buy expensive peripherals, monitors and printers or whatever. The outcome is if we want to classify the Dragon under a "home" computer, the manufacturers should hold that in mind. We have seen the problems that Apple or others have now to go greater and higher in memory expansion, the result is that the machines are too expensive for families to buy and they get into trouble and the stocks of the shops are bulking out of unsold and out of date "home" computers. Please better it to upgrade the graphics/video and sound and make the 6400 a better machine than to make a machine which is too expensive to buy. Motorola has now given the opportunity with the new 68MC and 68MM (MC68048T and MC68048B), and updated versions of the old ones — why not have them installed instead?

Homecomputers are for the

HOME and not for the business people, which market is completely different and have choice enough.

If we do not hold that in mind then the Dragon is lost for the home computer market anyway.

Martin Van Marrewijk
6809 Dragon Co-Co
Users Club
3 J. Janssenslaan
Oevelen 2030
Belgium

68 Micro Group

THE 68 Micro Group have a new Committee and all Membership enquiries should be addressed to Mr J. Turner, 68 Micro Group, 63 Milton Road, London E11 6JH.

All other enquiries should be addressed to Mr J. Cunningham, 68 Micro Group, 7 Harrowden Court, Harrowden Road, Luton LU2 0SR.

The Group is a user group which has its main interest in the 68000 CPUs. This of course includes the Dragon and Tandy Co-Co among others. Meetings are held every fourth Tuesday, upstairs in a private Room, at the Prince Albert of Camberland, Albany Street, Regents Park, London. The future meetings are September 3, October 1 and 29, November 26, and the Xmas Party on December 17. Subjects at the meetings cover a wide spectrum (jgr).

J Turner
68 Micro Group

DOS thanks

A J LONG last year gave me a printed article on Dragon DOS with 2 programmes, both of which are what I have been looking for since I bought a Desk Drive. I can now do away with my cumbersome Card Index.

I have unfortunately been unable to make Function 4 perform without getting error 154 (Read Path Error) in line 4100. I have checked and am unable to find out why. Any suggestions please!

P R Hovell
17 St Roman's Ave
Southsea
Hants PO4 0GB

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All the above include Dragon compatible DOS and controller (with utilities in ROM), instruction guide and all connecting cables. All drives include integral power supply and are approved to BS415 for electrical safety.

Other systems available - please ring us for full details. Limited offer, all products are subject to availability. All prices are inclusive of VAT + delivery.

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6809 Show blues!

COMPUTER Marketplace, the company which was organising the 6809 Show, amongst others, has gone into liquidation along with its parent company, the Flash-west Data Group.

The 6809 Show, however, will still be held on Saturday 23 and Sunday 24 November at the Royal Horticultural Halls, London under

the control of a new company, Edlionschema Ltd. According to Mark Simon of Edlionschema, "some of the directors of Computer Marketplace organised a management buy-out of the company's assets, and formed Edlionschema."

He said that the 6809 Show would continue with "no problems at all — the

venue is booked under the new company's name, and all the exhibitors have been informed."

Edlionschema is guaranteeing that all stands booked and tickets bought will be honoured.

Edlionschema can be contacted at 141 House, 447 High Road, Finchley, London N12 5AF.

Not the 6809 Show

HARRY MAGDOY of Computape has decided to organise his own Dragon Show at the beginning of November — Sunday 2 to be precise.

To be held at the Methodist Church Hall in Maidstone, Kent, admission will be 80p — or free with this issue of Dragon User.

There will be software, hardware, books, printers and cassette recorders for sale.

Computape can be contacted at 27 Coombe Road, Southminster, Essex CM8 3AL.

Eclipse

TOTAL ECLIPSE is the name of a new game from Eclipse Software of Birmingham.

Financial Director Denis Cooper described it as a "real time space arcade adventure." The game has 1,680 objects at present, 75 per cent of which are planets. Eclipse are working on routines to increase that number to 10,000 objects.

Your ship can carry up to 12 items to track. When you have amassed enough money, you can buy information which helps you to find a shard which unlocks the dimension game is the next part of the game.

According to Cooper, "people prefer the game to Elite and Asterix — and it's also the only Dragon game to be converted to other computers."

Total Eclipse will sell for £3.95.

Eclipse Software is at 11 Grasslands Grove, Harborne, Birmingham B17 6LP.

Wednesdays and Saturdays from 7.00 pm to 10.00 pm, and on Sundays from 10.30 am to 10.00 pm.

BBS09 can be reached on 0705 736025 at the times given. Sysop is John Dunster.

Microdeal drops distribution

MICRODEAL, the Cornish software house is no longer to distribute its products to other companies. This means that people who want to buy Microdeal, Pocket Money, Tom Me or Salamander games will only be able to get them by mail order from Microdeal, Microdeal's retail order unit.

John Symes, Microdeal's managing director, claimed that the company was not putting out of the Dragon market, however.

"We have decided to continue full support for the Dragon in 1988," he claimed.

Microdeal has already re-



leased one new game for the Dragon, and has another three planned for November.

The game that has been released is *Mobius Man*, a 16-screen arcade game.

The three in production are *Trooper*, a graphic adventure set in space in which the player has to save the human race from an alien plague, *Space Fleet*, a 3D space-arcade game, and *Shock Trooper*, a multi-screen arcade game.

All four titles are on the Microdeal label at £8 each.

"There will be more Dragon games," John Symes said. "We are close to signing contracts on three others at the moment."

Microdeal can be found at 41 Truro Road, St Austell, Cornwall PL25 5JZ.

Barons of Ceti V

WINTERSOFT has changed the name of the new game it was to launch soon, and has split it into two parts which will be released separately.

The first part of *Jurisdiction*, the Lords of Midnight style adventure game which is to be the company's first Dragon release since *Return of the Ring*, is to be renamed *Barons of Ceti Five*, and will cost £8.95. It should come out within the next month.

The second part is to be called *Daupier of Rame*, and will be released in a few months.

Wintersoft is at 30 Uplands Park Road, Enfield, Middlesex EN2 7PT.

Danish megabytes

Q99 USERS who wish to expand the capacity of their disk drives might want to contact Hans Christian Andersen, of H C Andersen Computing in Denmark.

He has created a system running on Q99 which can provide up to one megabyte storage per side of disk.

"If you have an Q99 system with 200K disks, then you can get an ex-

tra drive with two megabyte capacity — four on a double disk drive," he claims.

The cost of the add-on is around £90.

He has also written a software package for the Dragon which, he said, "makes it possible to link Dragons to other computers."

H C Andersen Computers is at Amager Strandvej 418, DK 2770 Kastrup, Denmark.

Jumper

PERFECT for building Harry Smith's *Show-Jump*, which lets any number of disks compete over time-different courses.

Show-Jump costs £9.99 from Computers, PO Box 318, Stoke on Trent ST9 6JL.

BBS 09

BBS09 is a new bulletin board dedicated to Dragons running Q99 software.

It functions on

Clay shooting!

Steve Gathercole gives you a chance to practise an outdoor sport indoors — without bloodshed!

THE OBJECT of Clay Shoot is quite simply to shoot everything that moves! You do this by using the right joystick for side-to-side, up and down, and diagonal movement of your sights, and the fire button to shoot. Be careful, though — you only have 20 shots.

Once you score five hits, one of the clay pigeons will speed up.

You score more for hitting the birds, or a clay pigeon more than half way up the screen.

The game is quite hard at first until you master the art of 'ticking' the sight sideways or diagonally, and then using the smooth-up and down movement to zero in on the target.

Don't be tempted to sit still and wait for the clay or bird at the beginning of each round, as nothing will happen until you move the sight.

The Listing

To play in the game, proceed as follows. First type in listing 1. This is the main 'runner' for the game and includes the Hall of Fame. Do not run this yet, as it will set up machine code routines which are not in memory at the moment. Check carefully, then save to tape as normal.

Next type in listing 2. This is the screen display. Run it, and, if everything looks okay, save this directly after listing 1 using CSAVEMSCRN, 1536, 7676, 6744.

Now comes the boring bit. Type in listing 3 — this is the hexcode for the machine code. Run this program; it will ask you for the start address. This simply means the number in the left hand column of listing 4, which in 19850. The program will then wait for you to enter the row of hex digits — the middle column of listing 4. After this, you must enter the checksum, which is the

right-hand column, including the = sign. If everything is all right, the program will carry on. If something is wrong, it will return an error.

When you have finished typing in listing 4, save it to tape directly behind listing 2 using CSAVEMCLAYSHOOT, 19850, 67688, 640288. Rewind the tape and you are ready to go. Just load in listing 1 and RUN.

If you have any problems, then write to me, Steve Gathercole, 18 Haskinsons Estate, Watpole St Andrew, Woburn, Cambs. CB24 9PL, enclosing a stamped addressed envelope. If the listing is too much for you, I can supply a copy of the game for £1.50.

If, like me, you are a beginner in machine code and are wondering how some of the routines work, then write to me, enclosing a stamped addressed envelope and I will tell you how I did them.

LISTING 1

```
10 *****
20 * * *
30 * CLAY SHOOT *
40 * * BY *
50 * * *
60 * STEVE *
70 * GATHERCOLE *
80 * *
90 *****
100 CLS
110 FCLEAR9
120 CLEAR 200,19900
130 CLS3
140 PRINT$196,"LOADING MACHINE CODE"
150 CLOADM:CLOADM
160 PCOPY1 TO 5
170 PCOPY2 TO 6
180 PCOPY 3 TO 7
190 PCOPY 4 TO 8
200 TB="STEVE":CB="DONALD":DB="TRIC
KY":EB="WINNIE":FB="FROBLET":A1#0:
A2=11:A3#0:AA#0:AS#0:AA#0
210 POK$H$302,6400
220 POK 6H$706,0:POK$H$707,0:POK
$H$708,0:POK$H$709,0
230 POK 31999,99
240 PCOPY 5 TO 1
250 PCOPY 6 TO 2
260 PCOPY 7 TO 3
270 PCOPY 8 TO 4
280 PRDE 4,1:SCREEN 1,1
290 EXEC 19950
300 EXEC $H$346
310 SC=PEEK ($H$706)+10+PEEK ($H$706
)
320 A1=#C:CLS RND 00:PRINT$09,"FIN
AL SCORE WAS":SC;
330 IF A1#66 THEN PRINT$96,"":IMP
UT "YOUR NAME":Z# ELSE 360
340 IF A1#2 THEN A6#05:A5#06:AA#0
3:A3#A2:A2#A1:FB#C#E#0#0#0#C#
#T#T#2#GOTO 360 ELSE IF A1#3 T
HEN A6#A5:A5#A4:AA#A3:A3#A1:FB#C#
E#0#0#0#C#C#2#GOTO 360 ELSE IF
A1#4 THEN A6#A5:A5#A4:AA#A1:FB#E
#C#0#0#0#2#GOTO 360
350 IF A1#05 THEN A6#A5:A5#A1:FB#E
#C#2#GOTO 360 ELSE A6#A1:FB#2#
360 PRINT$170,A2"BY "TB;PRINT$2
3#A3;"BY "C#;PRINT$270,AA;"BY
";0#;PRINT$362,AS;"BY "DB;PRIN
T$426,AA;"BY "FB;
370 PLAY $2T$V15CV16CV5CP160V15FV1
6FV5FP200V15EV15SV5CP200V15V160V5
0V15FV16FV5FP200V15AV15AV5A0CP160V
15CV16CV5CV2C"
380 PRINT$486,"ANOTHER GAME (Y/N)
?":
390 G#="NKEYS:IF G#="" THEN 390
400 IF G#="Y" THEN 210
410 IF G#="N" THEN END
420 GOTO 390
```


**IT'S ON
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28070 011F1827849018004E2386 = 340
 28089 00C61F17816C3000011400 = 348
 28098 4E200600C61F1785641781 = 354
 28111 98844E2234CB74E22004E31 = 44E
 28122 40B74E2117849635863436 = 348
 28133 06FF23888887FF237F8147 = 544
 28144 8EB786400001568888015 = 571
 28155 78814726F888FF20063787 = 527
 28166 FF2317846C17868A358688A = 419
 28177 814787FF2006414A26F039 = 488
 28188 3586342684E2181881927 = 322
 28199 842FB6815881932530813C = 208
 28210 1822886818004E2200480C = 240
 28221 1F17812A381F18864E2006 = 348
 28232 89C61F1784E317818F864E = 316
 28243 2148874E2117841C358688 = 359
 28254 4E228188182783F8864E21 = 348
 28265 81881827838F18884E2386 = 339
 28276 88C61F1788F13888FF1888 = 38A
 28287 4E200600C61F1784951788 = 2C7
 28298 85864E2234874E22004E21 = 441
 28309 44874E2117808B358688A = 444
 28320 2281381827808084E22181 = 378
 28331 881827838F18884E22004E = 27F
 28342 C61F17888038805F188C4E = 34F
 28353 288688C61F178468178894 = 3CC
 28364 884E224E374E22884E2188 = 204
 28375 874E2117839A35863A2888 = 3C5
 28386 4E22818818278374868158 = 288
 28397 813C18222F8681831822FF = 413
 28408 6418884E2234868C61F1788 = 2FD
 28419 5738888818884E200688C6 = 424
 28430 1F17841F804C864E224887 = 359
 28441 4E2217805935863436864E = 31C
 28452 2281381827803888815881 = 288
 28463 3C18222F8681831822FF8A = 38F
 28474 18884E223688C61F803738 = 344
 28485 888818884E288888C61F17 = 389
 28496 83DF808C864E2234874E22 = 414
 28507 1783193586343686878A38 = 317
 28518 1F26FC35863436A7C2A6A8 = 565
 28529 47883A864E24F732613586 = 544
 28540 3436864E23C818822831781 = 268
 28551 C9864E23C81812788818227 = 364
 28562 89818327848C4E3A28888 = 288
 28573 4E200600C61F17849635863436 = 355
 28584 33C181271CC1822753C183 = 338
 28595 18278888C1841827888FC1 = 323
 28606 851827888C18618278188 = 226
 28617 18884E238688C618178334 = 381
 28628 C682F74E23388888C1888 = 457
 28639 8884188F4E48F64E23C181 = 482
 28650 2788C1822789C18327888F = 284
 28661 8E3628888F4E3828888F4E = 321
 28672 38C2888888FF4818884E88 = 462
 28683 8688C618178123888888C = 32F
 28694 18884E78887C6181782E7 = 388
 21885 C682F74E23388888C1888 = 458
 21816 8884188F4E48F64E23C281 = 412
 21827 3888FF48188C4E88888C6 = 484
 21838 181788F6388888C18884E = 38F
 21849 898485C61817838C8C84F7 = 484
 21858 4E33888888C1888888418 = 38C
 21871 8F4848F4E2C18FF7C3888 = 517
 21884 FF88188C4E888888C61817 = 46F
 21897 88C1388888C18884E2888 = 444
 21910 48C618178278C888F74E33 = 5C1
 21923 388888C18888884188F4E = 398
 21936 48F4E2C18FF7C3888FF88 = 514
 21949 188F4E88888C618178888 = 38C
 21962 388888C18888888888C6 = 458
 21975 18178248F688F74E233888 = 37C
 21988 88C18888884188F4E48F8 = 415
 21991 4E2C18FF7C3888FF881888 = 447
 22004 4E88888C188888888888 = 419
 22017 C8188C4888888C6181782 = 38F
 22030 15178175C68FF74E2338888 = 394
 22043 FC8818888884188F4E48F8 = 491
 22056 4E2CC1812788C1822789C1 = 32F
 22069 8327888F4E3A28888F4E38 = 2E4
 22082 288888888888F74E23888 = 483
 22095 83C8188888888888C61817 = 3F3
 22108 8888FF74E5138883436A7 = 3F7
 22121 E28A18F8148A88A7883A8A = 6F2
 22134 8A28F333613586343688F7 = 535
 22147 88F8818C1842388C18924 = 489
 22160 88C1F82388C681F74E2C38 = 474
 22173 82C682F74E2C358C2888F7 = 542
 22186 4E2C35888888F74E231861F = 3C8
 22199 874E2288114F18884E2888 = 382
 22212 88C61F17819F881874E51 = 381
 22225 8881874E2348F74E24874E = 44C
 22238 3C188888C1188F4C3A888 = 394
 22251 8888188F4E38188888C18 = 38C
 22264 8F4E2A8C13888F4E2C888 = 582
 22277 148C4A8C881F74E2C268A = 517
 22290 74823C81531F888C8C881 = 463
 22303 F74E258FF74E46C18388F = 58F
 22316 88A88867217F82F888158 = 442
 22329 813C25831782C888441888 = 392
 22342 8E288888C61F8055188881 = 382
 22355 548183228317FC1882888 = 397
 22368 81588183228317FC888821 = 38C
 22381 888158813C258317FC888 = 492
 22394 1518884E48313F188F4E48 = 33C
 22407 188C888122831788C288A = 188
 22420 343688FF88817E268317F8 = 459
 22433 8881FE268317888438888 = 554
 22446 1F874E21358648F74E2135 = 3CA
 22459 884F74E22358888888888 = 482
 22472 22386343618881778313F = 2FC
 22485 26FC35863436A74E23188 = 4CD
 22498 278FF64E2C1812788C182 = 372
 22511 2718C1832271C358618884E = 358
 22524 48313F188F4E48188C8885 = 2FC
 22537 2283178C888881788C885 = 414
 22550 86178148C28863416C18127 = 339
 22563 88C1822788C1832718C184 = 2C4
 22576 271218884E8A258618888 = 386
 22589 E9358618884E235861888 = 418
 22602 48F883436888888888888 = 514
 22615 82FC68FF7FF28C268A88 = 638
 22628 1F26F4863887FF23388838 = 4F3
 22641 8888888888888888888888 = 8

IMPORTANT

ANNOUNCEMENT

TO

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The second decision was to increase support for the Dragon 3264 computer for 1985/6 including a Touring Roadshow in November with shows at many of the major cities in the UK.

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Dragon graphics

Key Codes on pictures for your Dragon

ACCESSING the Dragon's different graphics modes is very easy when done from Basic, but a little more involved when done from machine code. The method used to select a graphics mode, colour set and the base address of the screen has not to my knowledge been covered by one article before so that is what I shall try to do here.

Setting up the graphics modes of the Dragon is achieved in three steps. The base address of the screen must be defined, the 'bytes per page' must be defined, and finally the actual graphics mode to be used must be defined.

The first step is to set up the base address of the screen. This is an optional step and if omitted then the screen will reside at its default text screen location of \$400. Otherwise the screen may be located anywhere in memory from zero up to \$FFFF in steps of \$200. This is achieved by accessing memory locations \$FFC8 to \$FFD4.

The screen base address is represented by a seven-bit binary number. This number is the base address of the screen divided by \$200. For example a base address of \$400 divided by \$200 is two which, as a seven-bit binary number, is 0000010. The locations \$FFC8 to \$FFD4 need only be accessed for them to have an effect. I personally use a STA instruction as this is the quickest instruction that will access a location. The locations are assigned as follows...

Address	Function
\$FFC8	Clears bit 0
\$FFC9	Sets bit 0
\$FFCA	Clears bit 1
\$FFCB	Sets bit 1
\$FFCC	Clears bit 2
\$FFCD	Sets bit 2
\$FFCE	Clears bit 3
\$FFCF	Sets bit 3
\$FFD0	Clears bit 4
\$FFD1	Sets bit 4
\$FFD2	Clears bit 5
\$FFD3	Sets bit 5
\$FFD4	Clears bit 6
\$FFD5	Sets bit 6

An example would be to set the screen base address to its normal graphics location of \$600. First we divide the address by \$200 which gives us three. This as a seven-bit binary number is 0000011 so we would need to set bits 0 and 1, and clear bits 2 to 6. The following routine will do this.

```

STA  $FFC9 ;Set bit 1
STA  $FFCA ;Set bit 1
STA  $FFCA ;Clear bit 2
STA  $FFC8 ;Clear bit 3
STA  $FFC9 ;Clear bit 4
STA  $FFD0 ;Clear bit 5
STA  $FFD2 ;Clear bit 6
    
```

The above routine accesses all seven bits of the address. This is not normally necessary as the Dragon defaults to a base address of \$400 which only sets bit 1

(two by \$200 = \$400).

Now that we have the base address defined, the next step is to define the 'bytes per page' that the mode we wish to use requires. This is done in much the same way as the base address was defined. The 'Bytes per page' or more correctly the VDG memory mode is defined as being a three-bit binary number as described in the table below.

VDG mem mode	Bit	pattern	Bytes/page
0	000	.....	\$12
1	001	.....	\$24
2	010	.....	\$248
3	011	.....	\$256
4	100	.....	\$312
5	101	.....	\$312
6	110	.....	\$144

The addresses used to set these are \$FFC0 to \$FFC5 and are defined as follows...

Address	Function
\$FFC0	Clears bit 0
\$FFC1	Sets bit 0
\$FFC2	Clears bit 1
\$FFC3	Sets bit 1
\$FFC4	Clears bit 2
\$FFC5	Sets bit 2

An example would be to set the bytes per page to \$144, which is correct for modes three and four. The three-bit binary number for this would be 110 (6) and would be achieved by the following routine.

```

STA  $FFC3 ;Clear bit 0
STA  $FFC3 ;Set bit 1
STA  $FFC4 ;Set bit 2
    
```

The final step is to determine which graphics MODE is to be used. Using the table below, select the desired mode from the left hand column to obtain the number required from either the SCREEN 1,0 or SCREEN 1,1 column.

The number obtained from the table must then be 'poked' into location \$FFD0 which is the VDG control. Only the five most significant bits are used by the VDG so it is wise to mask off the three remaining bits. The routine given below would be used to select PMODE3 SCREEN 1,0.

```

LDA  $FFD0 ;
AND# #B07 ;MASK OFF 3 LSB
ORA  #B03 ;SELECT PMODE3
      ;SCREEN 1,0
STA  $FFD0 ;AND STORE
    
```

As a complete example, the routine given here would be used to select PMODE4 SCREEN 1,1 with a screen base address of \$200.

Finally, it may be worth pointing out that the setting up of graphics modes from machine code does not affect the locations in the Dragon's direct page which hold such information as current base address, current graphics mode etc. For the benefit of Basic users I have listed these locations at the end of this article. Basic users wishing to use the information in this article may POKE the addresses given above to obtain the same effect.

Location Contents

\$E	Current graphics mode
\$F-\$0	Top address of current screen
\$9	Bytes per row of current graphics screen
\$A-\$B	Base address of current graphics screen
\$C	Page number of current graphics screen

Table 1

MODE	SCREEN 1,0	SCREEN 1,1	
Text/lines	00	00	TEXT SCREEN
128 x 96 2 colour	06	06	PMODE 0
128 x 96 4 colour	0C	0C	PMODE 1
128 x 192 2 colour	0E	0E	PMODE 2
128 x 192 4 colour	0F	0F	PMODE 3
256 x 192 2 colour	F0	F0	PMODE 4

Table 2

STA \$FFC7 ;Set bit 0	This section selects the base address to be \$200
STA \$FFC8 ;Clear bit 1	
STA \$FFC4 ;Clear bit 2	
STA \$FFC0 ;Clear bit 3	
STA \$FFC8 ;Clear bit 4	
STA \$FFD0 ;Clear bit 5	
STA \$FFC2 ;Clear bit 6	This section selects a screen size of \$144 bytes/page
STA \$FFC0 ;Clear bit 0	
STA \$FFC1 ;Set bit 1	
STA \$FFC3 ;Set bit 2	
.	
.	
LDA \$FFD0 ;	This section selects PMODE 4 SCREEN 1,1
AND# #B07 ;	
ORA #B03 ;	
STA \$FFD0 ;	

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Dragon Bingo!

No, not the latest in circulation boosters, but a basic listing for the kids from Pam D'Arcy

IN THE November 1985 issue of Dragon Lear, Boris Allen showed us how easy it was to get the Dragon to take charge of our party music. I quickly used his idea to provide impartially operated music for the likes of the children's games "Musical Chairs" and "Pass the Parcel", leaving me free to resolve the inevitable disputes without the distraction of operating the music at the same time.

My two children's current "fad" is Bingo, but neither (and certainly not *me*) wants to be "caller" — so we've handed the job over to the ever-trusty, uncompromising Dragon. The RND function is such a useful instruction

The resulting program allows for up to

80 number versions of Bingo and is written to use the right-hand joystick but should be easy enough to alter for non-joystick users. It uses simple chunky numbers built up from the yellow-text graphics characters in an eight by six character grid per digit that displays equally well on colour or black and white television sets. The minimal operating instructions are given in the program. As well as being a "number caller", a list of numbers still to be called can be displayed at any time (the new badge's lowering is an additional marker design hazard).

For your typing convenience, there are few tabs, no REMs and I haven't renumbered in order to retain the "chunks" that

the program was built up in round line numbers. Lines 3000+ are the large digits 0-9 (Subroutine 3000=0; 3100=1; 3200=3, etc) built up from the yellow graphics characters (page 135 of the manual, values 144-159 being read into the character string array CS in line 38) to cut down on the CHR\$ typing in the print subroutines.

I reckon that the joystick should be placed on the floor and the fire button before operated, leaving one's hands free to manipulate the markers. I somehow haven't had the opportunity to try this out as BOTH children now plead to be "caller"....

Have fun!

```
10 REM DRAGON BINGO - PAM D'ARCY JULY 1985
20 DIM CR(16)
30 FOR S=1 TO 16:CR(S)=CHR$(143+80*NEXT
50 GOSUB2000
80 PRINT
90 INPUT"TOP OF THE HOUSE NUMBER";H
100 IF INT(H)<0 OR H<1 OR H>90 THEN PRINT"BETWEEN 1 AND 90, PLEASE";GOTO9
110 DIM M(9)
115 PRINT
120 GOSUB1000
200 FOR S=1 TO H:N=C=0:NEXT
205 C=C+1:L=0
210 GOSUB2000
220 PRINT890,"LAST NUMBER: ";
225 IF L>0 THEN PRINT USING"##";L;
237 PRINT830,"TOTAL CALLED: ";
239 IF C>0 THEN PRINT USING"##";C;
250 PRINT830,"PRESS FIRE BUTTON TO GET NUMBER"
255 PRINT
260 PRINT"CENTRE JOYSTICK EXCEPT TO:"
265 PRINT" LIST UNCALLED NUMBERS; LF"
280 PRINT" NEW GAME      ; DOWN";
300 J=RND(40):GOSUB1000
310 IF J<16 THEN 700
320 IF J>48 THEN 800
330 IF (PEEK(48750) AND 1)=1 THEN 300
400 FOR P=104 TO 396 STEP 32
410 PRINTP,STRING$(16,CR(1));NEXT
420 IF C=H THEN PRINT8140,"";PRINT"ALL THE NUMBERS HAVE BEEN CALLED";STOP
500 J=RND(40):IF H<J<0 THEN 500
510 M(J)=1:C=C+1
520 D=INT(J/10)
530 F=J%10
540 ON D GOSUB3100,3200,3300,3400,3500,3600,3700,3800,3900
550 D=D+10;
555 F=144
560 ON D GOSUB3100,3200,3300,3400,3500,3600,3700,3800,3900
570 IF D=0 THEN GOSUB3000
580 IF L>0 THEN PRINT893,"";PRINT USING"##";L;
590 L=L-1
595 PRINT8349,"";PRINT USING"##";C;
600 GOTD300
700 GOSUB2000
720 PRINT"LIST OF THE";H-C; "UNCALLED NUMBERS"
730 PRINT8129,"";
```

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```

740 S=1
750 J=0+9;IF J<H THEN J=H
760 FOR S=5 TO J
770 IF M<0 THEN PRINT USING"## "S; ELSE PRINT " "
775 NEXT
777 PRINT;PRINT " ";
780 IF J<H THEN 750
785 PRINT#444,"CENTRE JOYSTICK AND PRESS FIRE BUTTON TO CONTINUE";
790 IF (PEEK(16#FF00) AND 1)=0 THEN 790
795 B000B1000;B010010
800 GOSUB2000
810 PRINT
820 PRINT"START NEW GAME?"
830 PRINT
840 PRINT"YES - JOYSTICK TO CENTRE"
850 PRINT"NO - JOYSTICK UP"
860 PRINT
870 PRINT"POSITION JOYSTICK THEN PRESS FIRE BUTTON"
880 IF (PEEK(16#FF00) AND 1)=0 THEN 880
890 J=JOYSTX(0);J=JOYSTY(0)
900 IF J=0 THEN 880
910 IF J<16 THEN 700 ELSE 200
1000 J=JOYSTX(1);J=JOYSTX(1);RETURN
1005 FOR J=1 TO 250:NEXT J
1008 B000B0000
1010 IF J<15 AND J<49 THEN 1000
1020 PRINT#444,"JOYSTICK NOT CENTRED. CENTRE IT & PRESS FIRE BUTTON
TO CONTINUE"
1030 IF (PEEK(16#FF00) AND 1)=1 THEN 1030 ELSE 1005
1040 RETURN
2000 CLS
2010 PRINT#10,"DRAGON KING"
2020 PRINT#40,"=====
"
2030 RETURN
3000 PRINT#P+2,C#10;C#13;C#13;C#13;C#13;
3010 PRINT#P+3,C#10;C#19;PRINT#P+37,C#15;C#11;
3020 PRINT#P+65,C#16;PRINT#P+70,C#16;
3030 PRINT#P+97,C#16;PRINT#P+100,C#16;
3040 PRINT#P+129,C#15;C#11;PRINT#P+133,C#10;C#19;
3050 PRINT#P+162,C#15;C#13;C#13;C#19;
3060 RETURN
3100 PRINT#P+2,C#12;C#16;C#11;
3110 PRINT#P+34,C#13;C#6;C#11;
3120 PRINT#P+67,C#16;C#11;
3130 PRINT#P+99,C#6;C#11;
3140 PRINT#P+131,C#6;C#11;
3150 PRINT#P+164,STRING#6,C#11;
3170 RETURN
3200 PRINT#P+1,C#12;C#10;C#13;C#13;C#14;C#13;
3210 PRINT#P+33,C#13;PRINT#P+36,C#16;
3220 PRINT#P+66,C#13;C#10;C#19;
3230 PRINT#P+99,C#14;C#15;
3240 PRINT#P+129,C#10;C#13;C#19;
3250 PRINT#P+164,STRING#6,C#13;
3260 RETURN
3300 PRINT#P+1,STRING#15,C#13;C#16;
3310 PRINT#P+36,C#14;C#15;C#13;
3320 PRINT#P+66,C#4;C#16;C#13;C#14;C#13;
3330 PRINT#P+100,C#16;
3340 PRINT#P+129,C#4;PRINT#P+133,C#12;C#11;
3350 PRINT#P+164,C#1;STRING#19,C#13;
3360 RETURN
3400 PRINT#P+4,C#10;C#16;
3420 PRINT#P+33,C#8;C#19;C#16;
3430 PRINT#P+66,C#8;C#19;C#11;C#16;
3440 PRINT#P+97,C#8;C#12;C#4;C#4;C#16;C#14;
3450 PRINT#P+133,C#16;
3460 PRINT#P+165,C#13;
3470 RETURN
3500 PRINT#P+1,C#16;STRING#15,C#13;

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 2520 PRINT#P+65, STR#MGR#5, C#1131 ; C#1321 ;
 2530 PRINT#P+97, C#1361 ; PRINT#P+100, C#1361 ;
 2540 PRINT#P+129, C#1361 ; C#1321 ; C#1131 ; C#1311 ; C#1311 ; C#1311 ;
 2550 PRINT#P+162, C#1361 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ;
 2560 RETURN
 2600 PRINT#P+2, C#1311 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ;
 2610 PRINT#P+31, C#1361 ; C#1361 ; PRINT#P+30, C#1311 ;
 2620 PRINT#P+65, C#1361 ; STR#MGR#14, C#1361 ; C#1311 ;
 2630 PRINT#P+97, C#1361 ; PRINT#P+100, C#1361 ;
 2640 PRINT#P+129, C#1361 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ;
 2650 PRINT#P+162, STR#MGR#14, C#1311 ;
 2660 RETURN
 2700 PRINT#P+1, STR#MGR#5, C#1131 ; C#1361 ;
 2710 PRINT#P+37, C#1361 ; C#1361 ;
 2720 PRINT#P+60, C#1361 ; C#1361 ;
 2730 PRINT#P+99, C#1361 ; C#1361 ;
 2740 PRINT#P+130, C#1361 ; C#1361 ;
 2750 PRINT#P+161, C#1361 ; C#1361 ;
 2760 RETURN
 2800 PRINT#P+1, C#1361 ; C#1361 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ;
 2810 PRINT#P+31, C#1361 ; PRINT#P+30, C#1361 ;
 2820 PRINT#P+65, C#1361 ; C#1321 ; C#1361 ; C#1361 ; C#1361 ; C#1361 ;
 2830 PRINT#P+97, C#1361 ; C#1361 ; C#1311 ; C#1311 ; C#1311 ; C#1311 ;
 2840 PRINT#P+129, C#1361 ; C#1361 ; C#1311 ; C#1311 ; C#1361 ; C#1361 ;
 2850 PRINT#P+162, C#1361 ; C#1361 ; C#1361 ; C#1361 ; C#1361 ;
 2860 RETURN
 2900 PRINT#P+1, C#1361 ; C#1361 ; STR#MGR#33, C#1131 ; C#1321 ;
 2910 PRINT#P+33, C#1361 ; PRINT#P+30, C#1361 ;
 2920 PRINT#P+60, C#1361 ; C#1321 ; STR#MGR#13, C#1311 ; C#1361 ;
 2930 PRINT#P+102, C#1361 ;
 2940 PRINT#P+129, C#1361 ; C#1361 ; C#1311 ; C#1311 ; C#1361 ; C#1361 ;
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A Plus for the Dragon

Roy Coates reviews the Plus cartridge from Andtek Data Design.

THE PLUS cartridge arrived in an extremely well-padded cardboard box along with a PLUS implementation guide and two floppy disks, one containing a FLEX system, the other a set of utilities. Some of these replace the standard FLEX utilities and others are Andtek's own. The three arrive wrapped in protective silver foil, but unlike packed batteries they should NOT be placed in the oven.

Physically, PLUS is well made and about twice the length of an ordinary Dragon games cartridge. The connector for the disk drives sits underneath the cartridge body and so provides 'legs' to support the unit, which leaves the ends of the Dragon's cartridge connector. At the end of the cartridge are the two optional RS232 connectors; these are of the standard nine-way 'D' type.

The PLUS cartridge is not only a floppy-disk interface, it also houses a battery backed Real Time Clock (RTC) with 80 bytes of RAM, a 48 Monitor on board called ACE, the optional twin RS232 interface with hardware baud rate generators, and an optional 8K of RAM to allow FLEX to be run on a standard Dragon 32.

The Real time clock (RTC) is powered

by a small NiCad battery housed within the cartridge and is charged by the Dragon when the Dragon is in use. Of the 80 bytes of RAM on board the RTC, 30 bytes are available to the user for whatever purpose is required. The remaining locations are used to hold information such as the date and time, all the terminal attributes normally set via the FLEX TTYSET command, the disk configuration normally set by the FLEX ASK command, the base address for the Dragon screen, the baud rates for the RS232 ports and which ports are to be used for Input and/or Output. Another location determines whether FLEX will automatically be booted on power-up. In practical terms this means that no setting up is required by the user when the system is booted.

Unlike the Dragon D08 or DELTA systems, PLUS does not interfere to BASIC by adding disk handling commands. PLUS is a system in its own right. With the cartridge installed and the Dragon turned on, instead of the usual Microsoft Copyright notice, the screen is cleared to blank and the ACE monitor heading appears followed by the ACE prompt '+>'. The text while in ACE is displayed as green text on

a black background which is much nicer and easier on the eyes than the Dragon's normal black on green display.

The ACE monitor contains some 25 commands each of which is initiated by typing the first two letters of the command. For example, the Display clock command 'DCLCLOCK' is called by simply typing 'DC'. Many of the ACE commands are intended for the machine code programmer as they perform such operations as examine and/or change locations in memory, read or write a physical disk sector, display the contents of the 8089 registers etc. Two of the commands are used for setting up the RTC with commands like 'Dclock' which displays the contents of the RTC's RAM, and 'Mclock' which enables you to alter the values held in the RTC RAM. There are two very useful commands in ACE for the BASIC user, these are BA (Basic) and CT (Cartridge). The first command simply puts the Dragon back into its native Basic (without corrupting memory). The second is a little cleverer in that it allows cartridge software to be run in the extra 8K of RAM available in the PLUS cartridge.

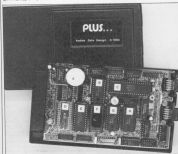
There are two ACE commands for booting in a disk operating system, these are '80' and 'D8'. The first command '80' searches the disk for a file called FLEX.SYS or FLEX.DOS and boots the system accordingly. The second command, 'D8', reads track zero of the disk to load in a custom boot routine such as that used by Commodore FLEX to generate the 31 column display. Having booted the FLEX disk the utility disk supplied with the cartridge was catalogued to reveal that there are literally dozens of utilities supplied, many of them having their source files available so that they may be modified to suit the user. Some of the utilities are peculiar to the PLUS system in that they perform such functions as setting the date and time for the RTC or pass control back to ACE from FLEX etc. The remainder of the utilities are either improved versions of standard FLEX utilities or are original Andtek programs.

If the FLEX disk was booted via the '80' command, the user may easily alternate between FLEX and ACE. This is very useful as it allows the setting of such things as the baud rates for the two RS232 ports without having to re-boot the system. The RS232 ports may be configured in such a way that a terminal may be used instead of the Dragon keyboard and display. This greatly enhances the Dragon with a proper 80 column display. The PLUS cartridge used for this review has been used with a DAC VT100 terminal, a DEC VT52 terminal and a 9800 micro running an emulation program, all at 9600

Key to photograph:

- A ... NiCad battery
- B ... RTC and RAM
- C ... Floppy disk controller
- D ... 8K RAM (optional)

- E ... 48 Monitor
- F ... 48 Monitor (optional)
- G ... RS232
- H ... ACE



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based with no problems encountered. Again the RTC can be used to some advantage as it allows the user to specify which ports are associated with I/O. This may be stored in the RTC RAM and these ports then become the default on power-up of the system.

The P8200 ports are not just for use with a terminal, they may also be used to interface PLUS with another computer system, a serial printer, a modem or just about anything else that uses P8200. It is not necessary to go to the expense of buying a terminal for use with PLUS, if you are using Compuserve FLEX then you will have a 51 column display. (Dragon 64 only) or you may use the new Hi-Res screen drivers from Andak which gives a choice of either a 52, 51 or 54 column display on either a 32K or 64K machine.

The manual supplied with the PLUS interface is a very thorough one and gives details of all the ACE facilities, the FLEX utilities supplied with the system, memory locations used by PLUS and for the technicality minded, the data sheets for the chips used in the PLUS interface are also given.

It would be impossible in the space of this article to review all the possibilities available with PLUS for the user to which the interface may be put will be determined by the individual users requirements.

PLUS has many things in its favour, it is about the only way of expanding a Dragon towards being a 'proper' development system. PLUS is primarily intended to be used with the FLEX operating system. This

is a well-established system which has a steadily growing user-base. There are a great many software packages currently available for it and it is a very easy system for the hobbyist to experiment with.

In conclusion, the price may seem high when compared to a Dragon 64 or

DS1, 1A cartridge. However, when the features of the different cartridges are compared then the price becomes very reasonable indeed, in fact if the components and software are priced individually then PLUS becomes something of a bargain.

'ACE' monitor commands

Command	Use
AA	Auto advance of ACE commands.
BA	Return to Dragon BASIC.
BD	Complement screen background from dark to light etc.
BC	Boot FLEX system disk.
CP	Continue program after SWI.
CT	Move BR of data from 02880 to 9C880 and jump to BASIC cold start.
DB	Boot system disk.
DC	Display contents of the RTC RAM.
DR	Display the contents of the 6801 registers.
J	Return to previously booted FLEX.
JJ	Jump to specified address.
LB	Load memory with text from the keyboard.
MC	Modify the contents of the RTC RAM.
MD	HexAscii dump of memory from specified address.
ME	Examine specified memory location.
MF	Fill specified portion of memory with specified byte value.
MP	Poke specified memory location.
MS	Shift specified block of memory to specified address.
PP	Run program from specified address.
RS	Reset a disk sector.
SB	Set the baud rate for the specified port.
SC	Change screen base address.
SI	Specifies input port.
SO	Specifies output port.
SI	Set disk stepping rate.
WS	Write a disk sector.

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Really Cosmic!

Program: *Cosmic Crusader*; Blaby Software, Crossways House, Lutbanwark Road, Blaby, Leicestershire

Price: £19.99

COSMIC CRUSADER is the best space shoot-em-up arcade game I have ever seen for the Dragon. You are in charge of a space ship flying through the galaxy trying to hit all the enemy forces.

The game plays in a strange mixture of 2D and 3D with a

ship at the bottom of the screen which doubles as a laser gun in the overall view.

There are 34 screens according to the author. To give some idea of their merit I will detail those I have completed (this may be a short review — the game is very difficult).

Screen one consists of happy smiling faces which beam at until three are present and attempt to cheerily blast you to

high hell! They're nice graphics, and they move smoothly and pleasantly.

The second and, so far, most graphically impressive screen contains TIE fighters from the Star-Wars mythology swooping in and out in 3D towards and away from your ship, dropping pulsating laser balls at you.

The third screen is a meteor storm — simply avoid the meteors — in 3D. Some find this screen very graphically impressive but I feel that it's a little disappointing.

The fourth screen has millions of indescribable space invaders swarming you, whilst screen five is similar but with rotating and gliding flying saucers.

If my memory serves me correctly (I have only got this far once) screen six is an anti-matter storm which is a meteor storm in 2D with the meteors shootable.

Screen seven gives the player flying saucers which hover just above the sight limit, swoop to drop a burst of

bullets, and run away again (space guerrilla's?).

And that, I confess, is as far as I've got. But this is not a game that makes me want to stop playing. I will survive. I will win. And all that.

The controls are either simple or complex depending upon your style of play. There are controls for left, right, and fire which are essential. But there is also a sight which can be moved up and down for those who love Stargate complexity on a game.

There is an added twist in this game in that the player has a continually decreasing fuel supply that needs to be regularly replenished. Although the refuelling is a simple procedure, keeping one eye on the fuel gauge is difficult when fighting off half of the galaxy's enemy forces.

A very good game, which should be a part of everyone's collection.

Jason Orban



Dashing Diamonds

Programs: *Diamond Dash* and *Diamond Dash 2*; Starship Software, 23 Telford Road, Chesham Vale, Cheshire SK5 7GF

Price: £5.00 each

THIS MONTH appears to be the month of the **MAKIN' C** MAKIN' C clone with no less than four versions arriving on my doorstep! These are the first two, from a company of whom I have never heard.

Sadly, this situation has now changed and *Starship Software* have taken under the axe of the ruthless editor (those who are physically scrolled by the sight of freshly drawn silicon should stop reading this review here).

The game does not adhere closely enough to the original formula to allow me to avoid describing it! The idea is to control Harry the Headbanger as he attempts to collect all the diamonds on the screen. He must climb ladders and jump holes, but the main challenge comes from the clock — time runs out very quickly.

In *Diamond Dash 2* the game becomes more complex with the inclusion of springboards and spikes, but doesn't become any more fun.

There is an option to design your own screens, adding the ones that exist already — this is a very highly commendable feature of the game, the best part of it in fact as these screens can be saved to and loaded from tape.

Considering the time spent on this section, it is very sad that the game plays so badly. Harry the Headbanger looks like he has some sort of

muscular disease. He jinks from location to location with almost unalterable crudity. The climbing of ladders is exactly the same as the jumping of platform levels and the game is not smooth enough to allow the jumping to have a great deal of skill in it.

This game would probably have been acceptable before *Makin' C*, *Scooping*, *Abdaca*, or *Convent of Chaos* (reviewed elsewhere) but now must come a poor second.

It reminds me very much of *Dinkie's Dee* without the neatness, especially in the way it plays. I'm afraid it must receive almost the same overall rating.

However, I can see it having some appeal when people start to design their own screens for their friends.

My advice for *Starship Software* the game play routines to make them a lot smoother, forget scrolling on the screen — it takes far too long and is even more irritating than games that play too long a burst of music before every life; allow the man to jump further, add an option to use the keyboard — these are not games that need joystick control, however easy it may be to do in machine code. With these alterations and the same screen designs you will have a very playable game.

The clones are becoming a very interesting field of study as each seems to surpass the former in neat or class ineptitude.

Jason Orban



Swoop!

Program: *Star Swoop*; Blaby Software, Crossways House, Lutbanwark Road, Blaby, Leicestershire

Price: £1.99

THE FIRST of my bunch of games from Blaby software is a fast-action Mode 24 shoot-em-up in space.

The idea is to mercilessly annihilate the Zargon Fleet, by shooting them with your ship at the bottom of the screen. The game is very simple, just move left and right, and destroy as many of them as you can.

The Zargons, a particularly nasty form of alien, swoop in from the top of the screen, make slow but first circular motions above you and then dip.

The game is played out against a starry scrolling background which utilizes one of the more useful of Mode 24's quirks. Your ship is quite disappointing to look at, bearing more resemblance to an Egyptian Pyramid than a high-powered assassination machine, but this is a very small flaw in the graphics

which are exceptionally smooth and clear.

The sound too is very good, and is co-ordinated nicely with the graphics to help the mood of the game.

For its superb programming, though, the game has a rather voluminous fault — it doesn't change. The aliens begin to fire after a while, and they get faster until they are too fast, but they don't end. There are rarely more than three at a time on the screen, and after a while the game becomes simple, repetitive and — dare I say it? — boring.

It is a great pity that the author of this program has written an excellent piece of code but failed to add the very little extra that would have turned it into a big hit.

I may be doing this game an injustice, in that I may not have played it enough to have become sufficiently good to complete the first set of aliens, but, to be brutally honest, I have no wish to play it any more.

The advertising blurb for the game is very true and can, in any case, be taken literally, if not as intended.



Jason Orban

Endless Crosses?

Program: Endless Thoughts and Crosses, R & P International, PO Box 120, Westley, Middlesex HA2 2UG

"ENDLESS" is perhaps a touch exaggerated, but this is certainly a jumbo-size version of the old favourites, taking place on a 14 x 10 grid on which the aim is to place five thoughts or crosses in a row, like an elongated Connect Four. Obviously you could play your own game of Thoughts and Crosses with pencil and paper, and make it even more endless than this, so the main attraction has to be the inclusion of a single-player option, in which the Dragon plays the thoughts once your first cross has been placed in one of the centre squares.

Each move has to touch the edge or corner of a previous move, as in Othello, and while the computer is "thinking" you can press the "R" key to see the best move it has discovered so far. The response is reasonably quick, though

some of the program's priorities seem a little wrong as you still have to wait even when there's only one move the micro can make to prevent you completing five in a row.

Other options include various combinations of screen colours, the chance to look again at the last two moves made, and also an option to take back the last two moves, though the accompanying notes warn you that this could then lead to certain illegal moves being accepted. There's only one skill level, and it does offer a tough game, though I beat it on the third attempt when I began to work out some of the tactics of this Go-Tac-Toe.

Not a stunning piece of software, then, but it's while away an hour or so if you fancy something harder than Thoughts and Crosses and easier than Othello.

Mike Gerard



A real thrill

Program: Black Tower, Thrillsoft, 40 Trenton, Kentucky, File KY2 5MT.

THIS IS a BASIC adventure by Thrillsoft, a company new to me, if they learn to program in machine code, one obviously destined for success.

The reason I say this is that this adventure appears to have been well designed, though not implemented to its full potential.

The adventure has you transported upon an island to which you want to search for your friend, who disappeared under mysterious circumstances...

However, this game has one strange anomaly not found in other adventures for the Dragon in that the player is controlling not only himself as "Joe Average" but also a muscular father, a slightly weaker mother, and a young child, each of which can perform certain tasks that the others cannot.

For example, whilst you may not have enough strength to lift a large rock, the father might, so whilst "GET ROCK" as a command will give a reply

along the lines of "You can't do that" typing GET ROCK (where T is the code for father) will achieve the desired effect, and so on.

The adventure starts fairly innocently (but is planned so that just as the adventurer starts to become a bit bored with the drudgery of the setting they come across a diary which reads "... no, I won't spoil the surprise — suffice it to say that it is enough to switch the player back into the game with renewed vigour.

I hope that the game I reviewed was a review (pre-production) copy as the cassette cover was not really printed and the game stopped with a 70H error when I died from drinking a poisoned stream (which I suppose I should have EXAMINED first); due to the anti-gravity technique employed, the game was un-stable (without POORING around in the guts) and so, for the average Dragon owner, unnecessary, and thus in need of re-loading — not really very fair!

I would have liked a list of commands, and some more



Program: Datafall Microedit, 41 Tynar Road, St Austell, Cornwall PL23 5JG.

Price: £1.99

THIS IS the first of two games that set you up at the bottom

of the screen as a catcher trying to catch the falling objects. The idea is simple and in one case works quite well.

Sadly, this is not the version that works. On my second game I just kept going until I gave up through boredom!

There's really very little to say about a game like this. Movement is proportional and therefore tricky to use, the data that is falling is boring and unimaginative, and the game has not got that extra "oomph" to set it above the rest.

Sure, it's well programmed, and has no bugs, but so was "Guess a number between one and one hundred" (the program which everyone wrote on their ZX-80s for those of us who remember that far back) and it played as well as this.

Jason Orbaum



Chaos!

Program: Caverns of Chaos, Bialy Software, Crossways House, Lutternorth Road, Bialy, Leicester.

Price: £3.99

ATTACK of the clone mimes ... Episode several hundred and eighty six.

This is the first of what looks like being a series of games in the tradition already mentioned enough times. The difference between this and its adventureshianness twin (joined by the clip) is that this game is absolutely superb.

It moves with all the beauty of its renowned father figure and is in fact a lot more accurate in its collection detection than the Dragon version of its revered predecessor.

The screens are very well designed and beautifully filled with a very clearly pronounced art which, of course, appeared to my warped mind (immediately). Each has a clearly defined route and although I have only finished the first six

or seven (Bialy kindly provided me with the key word which enabled me to start at any screen so I have now seen them all (and I'm not publishing the keyword — unless of course someone out there in the real world can provide what I like to call "the right price").

The graphics are very good, the title man looks suspiciously like the Mink Willy with a space-helmet on, and the sound is fine.

You have nine lives (which gives the player a fair chance to get through all 20 screens, allowing for carelessness). Lives are lost by bumping into one of the many objects or falling too far (although this does seem to be a very long way). The man can leap great distances and all the Matthew Smith jumping tricks are shown in early on to allow the programmer to come up with one or two of his own.

To sum up then, a very well-designed and executed program which should delight any Mink Miner too.

Jason Orbaum



purple prose to describe the locations, but I can wait for Intros or Level 9 to recognise the Dragon!

The game has SAVE and LOAD commands and is a fairly easy adventure, so for

the beginner who likes a challenge you could do a lot worse than get this program — provided they iron out the bugs!

Jason Orbaum



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Learn Basic

Program: Learn BASIC Programming on the Dragon 32, Logic 3, Speetra/View, 165 Oak Road, Morden, Surrey SM4 4LN
Price: £14.95

IT'S CLEAR that computer manufacturers are always faced with a problem when it comes to designing their documentation. Buyers will include first-time users as well as experienced programmers, so instruction in programming skills is needed as well as details of the BASIC and hardware features of the machine.

Recent computers, such as the Commodore 16 split the documentation into sections: a guide to the computer, an introduction to programming and an advanced guide (for which you unfortunately have to pay extra). The Dragon is one of those computers that tried to put everything into the manual, and in doing so, failed to provide a clear introduction for new users.

'Learn BASIC Programming' is a series designed to refresh those parts that manuals fail to reach and covers several machines. The Dragon version consists of an A4 size book (as large as *Dragon User*) containing about 300 pages, as well as two cassettes of sample programs and a flow-chart stencil. From the style of the text, it should not be too difficult for most learners, although adults should find it amiable.

The chapters start from fairly simple stuff, setting up, using the keyboard, etc. and progress through the usual rules of PRINT statements, variables, simple programs, inputs and loops up to chapters on sound and graphics and use of maths functions. This is covered in a fair amount of detail and is quite good at explaining the more difficult features.

It is disappointing to discover that although it has an index, there isn't a chapter breakdown at the beginning, so it is difficult to discover the structure of the book. One reason why there isn't a breakdown may be that the structure of the book is very linear. In other words, there are no alternative routes through the book — you start at the beginning and continue until you reach the end.

This may seem to be very logical, but it's not the only way people use books, as educationalists discovered in America in the 50's and 60's when they tried to introduce teaching machines. It is true that there are many areas of programming which depend on earlier building blocks of knowledge, but the course would have been more useful if the chapters had been more self-contained, to allow a 'dipping-in' approach.

The book has many diagrams which are very useful, as well as many short programs to demonstrate the points being covered. The cassettes contain some of these, as well as several quizzes so you can monitor your progress. One of the programs is full of deliberate errors, so you can practise editing skills as they are covered in the text. The way the cassettes are used to back up the book seems to be a very good idea, although it undoubtedly helps to explain the high price of the package.

According to Logic 3, the philosophy of the package goes back to that of the developers of BASIC in the 60's, and the chief author, Professor Andrew Colin is the founder of the 'Synthesis Method' of teaching BASIC. In spite of the high pedigree, it is disappointing to discover that although this book will teach you how to program in BASIC, and is one of the clearest books in this area, it does little to encourage elegant programming.

Many universities no longer consider BASIC a suitable programming language, and ignore it completely. Of course to do this in the world of home

computers, that are without exception BASIC machines, would be stupid. What is important, however, is that the way BASIC is introduced should encourage an approach to computing that allows users to easily transfer to other programming languages. If BASIC is considered as a tool to help solve problems, then finding the solution and working out the program flow is just as important as actual coding.

This package does encourage the use of flow charts, which soon show up weak ideas, and does include a flow-chart stencil. Some of the programming examples, however, are themselves very poor examples of good structure, and one 20 line program has no less than 7 GOTO's. There is no mention of prog-

ram modules, using sub-routines to perform particular tasks and making it easy to understand the flow of the program. I understand that these features are covered in the follow-up package, 'Advanced Programming on the Dragon'. It is a shame that these points could not have been introduced in this book, as they lie at the heart of good programming.

To sum up, 'Learn BASIC Programming on the Dragon' is a nicely presented package that does a good job of filling in the gaps in the manual for the person learning programming. Although I would disagree with the way some of the ideas are introduced, the text is very clear and would certainly help you to find out more about your Dragon.

John Sartor



Bull!

Program: Buller, Morden, 41 Troop Road, St Austell, Cornwall PL26 5JE
Price: £1.99

A FEW anecdotes in the country still possess original working machines with the game on them. It involves, quite simply, shooting at plastic ducks, rubber rabbits, etc in a simulation of a fairground or carnival shooting stall. You know the sort where the sights are always fixed?

The game never caught on in the arcades and is unlikely to catch on here as it is too simple. After the first fifty games (it sounds like a lot but isn't when you think about it) it is easy to get through the first screen perfectly and all that remains is a series of similar screens.

An attempt to build the interest in the game is the inclusion of a 'Bonus Game With Tommy Tank' (I assume tank???). This is pointless, contains very little skill and is phenomenally boring to play if a player intends to include a bonus game, they should at least have the sense to make it good fun!

The game also has a bug. Although the bullet count starts at 45 the last bullet is only allowed to travel one line up the screen before the game ends (surely it would not have taken a major program restructuring to decrement the



count when the bullet leaves the screen or impacts with an object?)

The game, for all its snide comments, is still a good game and well written, but my dirty mind couldn't help but wish that the programmer's name was Andrew as it would have added a certain something to the title screen. Still, I suppose I'll just have to go on taking the pits.

The game incorporates the now famous Black, Green, or Bull! (BRO) colour selection but, as usual, looks best in black.

If you liked it in the arcades you won't be disappointed with this version, even if the proportional movement is initially difficult to handle. Me, I'd be pressed to say I liked getting ducks.



Jason Osborne



Olympia

Program: Olympia, Blaby Software, Crossway House, Luttenworth Road, Blaby, Leicestershire
Price: £3.99

This IS a version of a game that has now become an arcade classic — Hyper Olympia. However, it has a lot of faults and very few redeeming features.

Let us start with the faults. First, the arcade game involved using either one button very quickly (by the muscle tension and spasm method) or two buttons (the pianist's method). The Blaby version uses the space bar to run, and only the space bar. This means that those who were used to co-ordinating two hands will have to start all over again.

Secondly, the game does not feature all six events, choosing instead to omit the javelin throw (presumably because the programmer assumed lazily that it is unpopular, leaving such a close similarity to the long jump). Thirdly, the events are nar-

ranged. The arcade events were 100 Metres, Long Jump, Javelin, 110 Metres Hurdles, Discus, High Jump. The event order in Blaby's attempt is 100 Metres, Discus, Long Jump, 110 Metres Hurdles, High Jump. This is a small fault, which some may even consider an improvement but, in an arcade copy, as few changes as possible should be made.

Next, the game does not incorporate a sideways screen scroll (although it would not have been difficult to write) which means that the proportional speed in comparison to player height on screen is laughable.

The angle increases far too quickly, leaving very little to judgement, and far more to luck. This is a very serious fault, more serious as it is easily rectifiable.

There are only five hurdles and they are too precise in their jumping requirements. Although I have progressed through this event I have yet to complete it without tripping over one or more hurdles.

There is no resemblance to the arcade in the high jump! You run to the bar (by pressing the spacebar as fast as possible) and then pressing

shift, I have not succeeded in doing this yet so I have no idea what the commendation display is like.

The game's major virtue is that it has the additive quality of the original, it is a slightly diluted form. The events are,

for all their numerous and irritating faults, good fun, and they have a temporarily addictive quality that wears off only after a large number of games.

Jason Osborne



Fingers!

Program: Fingers, Blaby Software, Crossway House, Luttenworth Road, Blaby, Leicestershire

Price: £3.99
FIRSTLY, may I congratulate Blaby on a fast and efficient mail order service. When the original version of this refused to load I was sent another by first-class post on the day I rang up. This is the sort of service that will keep the Dragon alive, and is rather different to that offered by certain other big Dragon software companies.

So, to the game. Well, guess what? It's a letter Chase! The line the character has no name at all — he is supposed to represent the player himself. And the aim? To open safes by collecting all the keys on each screen.

The graphics are actually in

colour (shock horror) and look very good.

The layouts are well designed, the graphics clean, and there is an option to start in any of the 13 screens.

The usual platforms, collecting walkways, and conveyor belts are there, but this game has an interesting extra control, although played by joystick (no keyboard option... grt) the space bar reverses the direction of all the conveyor belts. This has allowed the programmer to design some new tricks into the screens.

On the whole a very competent and well contrasted.

Not as good as *Chase* or *Chase* and it seems to have a very small number of screens, but for £3.99 who cares? Well above average, and it's nice to dodge stupid monsters in colour.

Jason Osborne



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Popular Computing Weekly
Dec. 1981





THE MONTHS course is going to be exceedingly educational, dealing later with moments of historical importance in the development of the adventure game, but first with some ruses on Microdeal's *Stygio*. No, not that someone's solved it, but the derivation of the title. It hadn't occurred to me for one minute that it might be a real word, but I looked something up in the dictionary the other day I came across it, and in fact it has six different definitions in the various fields of mathematics, biology, astronomy, etc. In biology, for example, it means the inevitable union of two joints of a crinoid. Not many people know that, not even Microdeal's Managing Director John Symes, who I saw at the PCW Show in September. What he did know, though, was that Microdeal are still firmly behind the Dragon and have further adventures almost ready for release, interestingly enough one is to be released by them on two machines only: the Dragon and the IBM PC! Watch this space.

Even as yet unreleased titles to the depths of adventure history, those pre-war days of the 1970s when two Americans named Crowther and Woods wrote the first ever computer adventure, most commonly known nowadays as *Coleossal Cave Adventure*. This first game has remained one of the best, but till recently was not available to Dragon owners. Now Compuserve has released a version on disk only, operating under the DRAGONDOS system, so at least a few Dragon adventures out there will now have access to this classic adventure at the very reasonable price of £9.95. Not being dissatisfied with a DRAGONDOS system myself, I asked regular reader Nick Sutton from Rainford in Merseyside to review the game for me, and this is what Nick thought of it.

"Once this text-only adventure is loaded, you find yourself at the end of a road, next to a brick building, with a gully running close by. Nearby is a cave complex said by many to contain a fortune in treasure. Your brief is to collect as much treasure as possible from the cave and return it to the safety of the building. You're told that although many have entered the caves, few have returned. Very concerning.

"The adventure accepts the usual version input and the range of commands available is fairly standard and quite large,

except for a rather odd GET command which sometimes will GET objects a long way away from your present location. I found this very strange, but it does have its uses once you know what you are looking for. Also useful is the ability to move long distances by typing one word, usually a magic one discovered from somewhere in the adventure, although if you type BURLING when you're above ground then this will usually take you there.

"If the thought of playing this lengthy adventure with the Dragon standard text display sends chills through you, then fear not. The text has been reformatted into small, neat black-on-white text with line upper and lower case. All inputs and descriptions etc scroll up the screen, which can make it look a little confused but this is not a major problem. Talking of problems, the first one you might encounter is how to get into the caves, but this shouldn't present too many difficulties for readers of this page. Just don't forget your keys. Once inside you encounter a snake that's none too keen on letting you pass, though you should have found something on the way in to deal with this, if you can get it right, and so for the rather violent deserves you should try fighting it with tea. Other equally charming characters you will meet include a pirate who steals your treasure, a troll and a dragon. Problems range from easy to not-so-easy.

"The descriptive text can only be described as first class, and the location in particular, the volcano, takes two full screens to describe! I would recommend making regular use of the SAVE command (save to disk), as when you do the resurrection routine tends to be a little unreliable after the second time. Typing HELP gives you two screens of general information, although specific help is sometimes available provided you're prepared to sacrifice some of your vision.

"The adventure is one I would recommend to anybody with the hardware to run it, is good value, and compares well with other adventures I have played. Definitely one for the collection, and good work from Compuserve in bringing it out."

"And good work from Nick for that review. He also offers to help any readers transfer their tape-based software to disk, and has done this himself for *Mithras* and the *Mirrors*; *Escape from Pulsar 7*; *Mission of Doom*; *Sea Quest*; *El Dabiano*; and

Black Denston. Send me for details to Nick Sutton, 44 Holly Crescent, Rainford, St Helens, Merseyside WA11 9BT.

Nick's in good company in liking the *Coleossal Cave Adventure*, as someone who played the game enthusiastically in its mainframe days was Scott Adams, now a well-known adventure writer. He liked the game so much he wrote his own adventure, which he called *Adventureland*, and this became the first of a lengthy series from the company Scott Adams set up: *Adventure International*. Till now Dragon users have only had access to the more recent *Questprobe* series, the *Hulk* and *Spiderman*, but as last of but one of the early Scott Adams games have been Dragonised. This month, however, there's only room to look at the first, *Adventureland*.

The screen layout will be familiar to those who've done battle with *The Hobbit* (the giant green text screen) and it's a shame the text hasn't been reformatted in the Mysterious Adventures style. Not that good atmospheric text is the reason for buying a Scott Adams game, as he tends to be brief in the scenes, the challenge coming from the fantastic nature of the puzzles he sets.

In *Adventureland* your aim is simply to locate 13 valuable treasures, and the early locations include the traditional forest, meadows, lakes and caverns. There's a quicksand bog which you can only escape by dropping everything you're carrying... so how do you get at the treasure that's in there? And how do you deal with the nasty Chuggers that sink their teeth into you in the swamp? And what about the dragon sleeping in the meadow?

Before too long you should have used the familiar adventurer's axe to gain access to a large underground cavern, and then you can start exploring the tunnels and chambers... and the dreaded maze of pits. The presentation of the game leaves a little to be desired, with the screen being very cluttered and flashing constantly as well as rewritten and updated, but the adventure itself is intriguing and I fully expect to be trying to deal with questions on this and other Scott Adams adventures in future columns. The cost of each is £7.95, though at the time of writing *Adventure International* is still making their last-for-the-price-of-one summer offer, so check out their ads if you can.

Two readers this month have written to suggest an adventure-tapes section, and also ask about the legality of swapping software. I don't think there would be any problem in readers swapping original adventures on an informal basis, but no one should attempt to swap duplicated or pirate versions of tapes. We won't set up a separate section yet, but to set the ball rolling there's Brian Bux of 31 Westcott Road, Swindon, Wiltshire, who has finished with his copies of *Sea Quest*, *King of Darkness* and *Madness* and the Minotaur, and is looking for a version of *Doom*, *Shemangans*, and the graphics version of *Calico Island*.

Brian should have no trouble swapping his copy of *Madness* and *The Minotaur*, as I can guarantee getting at least one letter each month from a reader asking where he or she can get hold of a copy. This month's request is from Damian Road, 6 Toland Square, Rowlandston Lane, London SW15 5PA. Damian offers help in exchange for use on *Calico Island*, *Time Machine*, *Franklin's Tomb* and *Ultimate Adventure*, and needs to know how to enter the *Big Gem* from being eaten by ants and what is the use of the mirror in *The Muck*. We also ask why *Colossal Cave* isn't available on tape for the Dragon, and suggests I set about the task of adapting it. Well, Damian, I'm sure if it could be done easily then either Level 9 or Compuserve would have produced a version on tape, though if anyone wants to try doing it then the adventure storyline is not protected by copyright and is available for anyone to



adapt or publish. (That doesn't mean Compuserve's disk version is not covered

by copyright, incidentally.)

A query from Stephen McDermott "and his dad", of Rose Cottage, Belsay, Newcastle upon Tyne, who have been battling with *Shemangans* since Christmas and want to know how to deal with the snake and what use the young woman is who's lying in a field. As often happens, the hints are connected, and if you can get the woman to move then you might find something to help you shift the snake.

Finally some hints on *Mansion of Doom* from reader C. Vaughan of Cardiff. The hints are printed backwards, in case some readers would rather not see them. Firstly, ELDN ACBN TDBE MTON ODUDY; CTE DCBA SRN GYRA NCHT CDEHT; SGAC NPPQ HTN SROO GZCR EHTH CTAC; EKAN EYBE SROO NOMP DHD.

Month next you see ... sorry, can't get out of the habit. See you next month.

Adventure Contact

To help puzzled adventurers further, we are including an Adventure Helpfile — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help-

file, 12-13 Little Newcott Street, London WC2R 2PP. As soon as enough entries have arrived, we will start printing them in the magazine.

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

Adventure

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

Dragon Answers

The blues?

I OWN a Dragon 64 computer and have noticed that when in the BASIC mode the cursor changes to a blue colour. As the BASIC is in RAM is it possible to change the colour of the cursor by POKEing somewhere?

Phil Jackson
Solihull
West Midlands

IT IS possible to change the colour of the cursor in 64 mode because, as you say, the BASIC is stored in RAM, and so can be changed by POKEing. The two locations that need to be changed are \$4194, which holds the graphics character for the cursor, and \$4198, which is equal to the graphics character less 143. The following table gives the values to be poked for the various colours:

Colour	\$4194	\$4198
Yellow	159	16
Red	161	48
White	207	94
Green	223	88
Purple	239	96
Orange	255	112

Floating point

COULD you please clarify the method of dealing with real numbers and integers with respect to machine code. I am having difficulty understanding how to deal with the ROM routines INTCHR (address \$5B120), GETANSW (\$6B07) and MOVFM (\$635F).

When passing a numeric Basic variable to assembly routine via a BSR call I always end up with an integer result no matter what is passed.

M Anderson
45 Great South
Road

TO ACCESS the value passed to a BSR function in its full floating point form does not require the use of any ROM routines. The Floating Point Accumulator will hold the value all entry to your routine. This is shared between locations 79 to 81.

Similarly, the value returned by the BSR function will be the floating point value stored in this accumulator. The various ROM routines often used simply convert 16-bit numbers to and from floating point form.



Ram to?

I HAVE recently bought a Dragon disk drive, but have come across a problem. My problem is associated with programs such as *The King and Lane Algebra*. I can save both of these to disk, and load them back in, but they will not run correctly when executed, presumably because of BIOS using RAM at 1538 — 2071. Is there a way of returning this RAM to the program before the game is EXECuted?

Willy Holmes
8 Moken Crescent
Marinerston
Chesham

PROGRAMS that require the BIOS memory but which do not actually load into that area can usually be run by adding the following command before the EXEC command — POKE 248,255. This stops Dragonoids from altering page 8 memory during the IRQ routine. As this will also have the effect of not stopping the disk motor if it is on you should also add PORT \$DFF48 if it stop the disk immediately.

Battlezone

I HAVE had my Dragon for nearly a year and over that time I have bought a wide selection of games for it. But so far I have not found a game that is like *Battlezone*. Could you please tell me if there is such a game for the Dragon and if so where I could get it from and how much.

Nicholas Furnell

THE MOST accurate copy of a *Battlezone* game that I have seen for the Dragon is *Bomber's Revenge* from Design Design Software. This uses *Micro-Byte* PROSC 4 graphics for the win-

frame effect with the motion of keyboard or joystick control. Prices vary, but you should be able to get a copy for about £7 from one of the mail-order advertisers in *Dragon User*, or you can contact Design Design at 2 Ashton Way, East Hertsford, Sunderland.

'Allo, 'allo synthesis

I WOULD like to know if you could tell me of any speech synthesizer that slots into the PROSC2 interface on the Dragon 64. I would prefer it to be the *Allophone* type, but I would consider any others. I am looking in the price range of about £40. Also could you advise me on a way of adding an external speaker with or without breaking into the machine.

Alan Wilson
36 Spencer Lane
Sunderland
Lancaster WA4 6AR

THERE ARE a number of speech synthesizers available for the Dragon computer. One of the most impressive I have seen is from J Morrison Ltd, better known for their software. Their 'Speakway' unit uses the allophone technique for creating words and costs £25. Also compatible with the Dragon is the new *Speech-Brain ROM-PAC* from Tandy. This is a more sophisticated package, which includes 2k of RAM in standard form. It costs £36 and is available from Tandy stores.

You cannot connect an external speaker to the Dragon directly, as all sound outputs need amplification. The best place to get a sound signal from is the speaker socket.

A real character

I WOULD be grateful if you could show me how to redefine the enter character set, as I have tried many times without success. I would appreciate it if you could also show me how to alter the colour of the character set, as I am sure this would be an asset when writing adventures or word processor programs. I would also like to know if the new character set will be compatible with the printer. How many colours would be available with the new character set, and how much memory would this routine take up?

Leslie Jones
139 Ashley Court
Plymouth
Hampstead
Croyd

UNLIKE some other computers, it is not possible to redefine the Dragon character set as it is held on an internal ROM as part of the graphics chip, nor is it possible to change the colour of the characters apart from SCREEN 0,1.

There is no shortage of programs available which will display text on the hi-res screen, and allow you to change its colour and redefine the characters. One of the best such programs is *Alpha Magic* from Knight Software.

Light fantastic

I HAVE recently received a *Lightpen* (the Datapen advertised in your magazine) and would like to know how to convert an (X, Y) co-ordinate in *Prose 4*, I print size 256 x 100 into a Print 41 position on the text screen.

Barry Garath
132 Clonsilla Road
Co Down
Northern Ireland
BT20 4NR

IT IS relatively simple to convert PROSC 4 co-ordinates to a PRINT41 position. The following Basic routine shows how, assuming X and Y to contain the hi-res co-ordinates. P will contain the print co-ordinates.

```
100 P=INT (X/8) + 32*INT (Y/12):PRINT P:GOTO 1
```


Firmware

Brian Cudge explores the Dragon's ROM in a special series which builds up month by month into a firmware manual.

THIRTEEN MONTHS it is the turn of the Text Input and Output section of the Dragon's ROM. The routines in the 'Text Manager' deal with reading the keyboard, and writing characters to the screen and printer.

Text Manager Memory Map

The following locations are associated with the Text Manager. Many of them can be used by the Basic programmer, notably those which control the set up of the printer.

- 5284 Address of Keyboard Input Buffer.
- 106 VDU Comma Field Width. This is the number of spaces between items printed with a comma — 16 by default.
- 107 VDU Last Comma Field. This should be equal to the width of the screen less the value in 106.
- 108 VDU Current Column number. Can take a value from 0 to 255, and is the same as returned by POS20 in Basic.
- 109 VDU Line Width — the number of characters per line.
- 111 DEVN — this is an important location called 'Device Number'. It determines in which device text output goes and input comes from. It takes the following values — 0=VDU, 255=TAPE, 256=PRINTER. For a printed directory listing try POKE 111,254:DH.
- 130 ASCII Code of last key pressed. Remains intact until the next key is pressed — is it is not reset when the key is released.
- 136/137 Current VDU cursor address. The memory address of the current screen print position. Takes the values 1024 to 1035.
- 143 Cursor Flash Counter. A location used to count down to zero to control the rate at which the cursor blinks.
- 161/162 Keyboard scan delay constant. This delay is used to try prevent 'bouncing' on the keyboard.
- 163 Printer Comma Field Width. The number of spaces between items printed with a comma — default is 16.
- 164 Printer Last Comma Field. Should be equal to the width of the printer less the value in 163.
- 165 Printer Line Width — set this to the width of your printer, eg 80 columns.
- 166 Printer Head Column. The same value as returned by the POS20 function in Basic. This will only operate correctly if locations 163-165 are set up.
- 326 Printer auto LF/CR flag. A non-zero value will cause the end-of-line sequence to be output after

- a line has been printed. Location 156 must be correctly set up.
- 329 Caps Lock Flag. A non-zero value causes Uppercase.
- 336 Number of characters in the End-of-Line sequence — range 1 to 4.
- 337-338 End-of-Line characters. By default these are set up as CR/LF/MULL/MULL. The end-of-line sequence is output when a CR is sent to the Printer output routine.
- 339-345 Keyboard 'Roll Over' table. Used when scanning the keyboard and to check if same key has been released.
- 1621/62 End-of-line delay for RS232 port on Dragon 64.
- 1623 Dragon 64 Printer select flag — 0=Centronics port, non-zero = RS232 port.
- 66267 Dragon 64 RS232 port baud rate controller port.

- The following locations are different for the Tandy COCO:
- 149/150 Serial printer baud rate constant.
- 151/152 Printer End-of-Line delay constant.
- 360 Caps Lock Flag — Non-zero causes Uppercase.
- 326-345 Keyboard 'Roll Over' table.

Text Manager Firmware Routines

Scan KBD

Dragon 40101 (Tandy 41401)
Scans the keyboard for a character. If no character is available then a 2640 is returned in the A register and the Z condition code is set (SCC), otherwise the ASCII code of the character is returned in the A register. Shift-Q, the caps lock key, is dealt with internally and will return a zero.

Wait Key

Dragon 34081 (Tandy 44539)
Calls the 'Scan KBD' routine until a key is pressed. The ASCII code is returned in the A register. The Break key is also checked for, and if pressed the 'STOP' routine is executed.

Wait with Cursor

Dragon 41194 (Tandy 46338)
Calls the 'Scan KBD' routine until a key is pressed. The flashing cursor is displayed at the current print position whilst waiting for a key. A space is printed over the cursor when a key is pressed to remove it from the screen. The ASCII code of the key is returned in the A register.

Update Cursor

Dragon 46533 (Tandy 41369)
Depreciates the cursor flash count location, and if zero resets it to 50 and flashes the cursor.

Clear Screen

Dragon 47735 (Tandy 43264)
Clears the screen to spaces and resets the cursor position to the top left of the screen.

Clear 50 to 0

Dragon 47737 (Tandy 43268)
Clears the screen to the character in the G register and resets the cursor position.

Clear VDU Line

Dragon 46268 (Tandy 41763)
Clears the current VDU line from the current cursor column to the end of line and sets the cursor position to the start of the next line.

OUTCHAR

Dragon 46416 (Tandy 41823)
Outputs the character in the A register to the device number in DEVN (see 111). Any special action for CR is also handled by this routine. This is the central character output routine for all devices.

Out String

Dragon 37693 (Tandy 47516)
Outputs a text string to the device number in DEVN. On entry the X register points to the byte before the first character in the string. The string is terminated by a zero byte.

Print CR/LF

Dragon 37695 (Tandy 47518)
Moves the cursor position down to the start of the next line, scrolling the screen if necessary. This routine is a quick method of sending a CHR\$(13) to the OUTCHAR routine.

Print Number

Dragon 38264 (Tandy 46568)
Outputs the 16 bit number in the D register to the device number in DEVN. The number printed is between 0 and 65535, unsigned, with no leading or trailing spaces.

Reset VDU

Dragon 43323 (Tandy 38116)
Resets the default VDU screen mode and offset to start at address 1024.

VDUout

Dragon 46326 (Tandy 41736)
Prints the character in the A register to the VDU, but does not reset the screen mode and position. This can be used to print characters on an orange background for example.

PRINTROUT

Dragon 46410 (Tandy 41853)
Sends the character in the A register to the printer. This routine waits for the printer to become ready if it is busy. In the Dragon 64 ROM, the routine also waits if any key is held down.

POBFL

Dragon 46354
Moves the printer head to the start of the next line. The End-of-Line character sequence is set in the printer to achieve this.

PRINTWIDOUT

Dragon 46373
The character in the A register is sent to the printer directly. No interrupt of the CR character takes place. This routine is not necessary, and indeed does not exist in the Tandy ROM.

Next month, the Graphics Firmware and Memory Map.

This is the third part of Brian Cudge's series on the Dragon's ROM routines. If you have missed the previous issues, they can be obtained for £1.25 each (including postage and packing) from our editorial offices.

Competition Corner

Answers to Competition Corner,
Dragon User, 12-13 Little Newport
Street, London WC2E 8PP.

IN THE February 1988 issue of Dragon User we looked at MagicSquare, Matrikoshka, and pyramidal numbers with brief reference to the order of numbers known as perfect squares. As these 'perfect' squares occur with some regularity in mathematical puzzles their examination may prove useful. In the world of these problems reference to square numbers almost exclusively refers to integral squares — that is numbers in the series 1, 4, 9, 16, 25, ... and so on. In everyday life perfect squares occasionally occur — the 3 by 3 grid of the noughts and crosses game, the 8 by 8 grid of the chessboard, or the 18 by 19 grid of the colonial game of 'Go'. In mathematical puzzles they tend to occur with even greater frequency.

Consider the following: Henry had been saving pennies. By laying them out on the floor he was able to arrange them in rows with as many coins to each row as there were rows in all. Henry also had three piggy-banks in which he kept the coins. When he had filled the piggy-banks, each with the same number of coins, he had just two coins left over. What was the smallest amount that he could have had?

Reducing the problem to its mathematical 'bones' we are required to find the smallest square number which leaves a remainder of two when divided by thirteen. So we might devise the following program:

```
10 T=1
20 T=T+2
30 D=INT(T/13):R=T-(D*13)
40 IF R=2 THEN PRINT T:END
50 T=T+1:GOTO 20
```

In this program, T equals the number of coins in each row, T, the total number of coins present, D, the numbers of coins in each of the piggy-banks, and R, the remainder after the division. Line 40 ensures that the first time that R equals 2 the program stops.

If we want to type in the program and RUN it we would wait a little while for the expected result. After a time, when nothing had happened, we might suppose that the program contained a bug, or, alternatively, that either our typing in of the program or our mathematical interpretation of the problem was faulty.

In fact, the problem is incapable of solution. Add the line: 35 PRINT R and

DARK STAR



DRAGON 20/84
MANY COLORS 20/84

re-run it. Note how R, the remainder, is always either 0, 1, 3, 4, 6, or 12, and never 2, 5, 6, 7, 8, or 11. This general property applies to any prime divisor, and once the remainders have been worked out for any given prime, the set of numbers obtained will apply to all possible squares when divided by that prime. For example, dividing any square by 3 will always give a remainder of 0 or 1, and never 2. Dividing it will give a remainder of 0, 1 or 4, and never 3 or 5; dividing by 7 gives a remainder of 0, 1, 2, or 4 but never 3, 5, or 6. Such an insight can prevent much wasted time when interpreting a problem into mathematical terms.

Other 'rules of thumb' can also be useful. As the units digit of a perfect square can only be either 0, 1, 4, 5, 6, or 9, we can say at once that any number ending in 2, 3, 7, or 8, cannot be square. Similarly, the Digital Root of a square can only equal 1, 4, 7, or 9, so any number with a DR of 2, 3, 5, 6, or 8 can also be deemed to be non-square without the necessity of actually working it out. Note that these checks can only be used as a negative test — it is to say that a certain number is not a

perfect square. It is not correct to assume that a number which passes these tests is square, only that it may be.

There are a number of other interesting properties of squares which can sometimes assist in problem solving. Every odd number greater than 1 can be expressed in at least one way as the difference of two squares. Similarly, every multiple of 4 greater than 4 can also be so expressed. There are an infinite number of perfect squares which are the sum of two smaller squares. For instance $2^2 + 4^2 = 20$, or $6^2 + 8^2 = 100$. This is, of course, the Pythagorean relationship, though here it refers to integral solutions. Automorphic numbers are a particular type of number whose squares have as their last digits that number itself. Single examples include the squares of 5 (25), 6 (36), 25 (625), and 425 (180625).

Interesting from a numerical point of view are such squares as 136954276 and 622207468, which contain the ten unreplicated digits, and 1026753849 and 9814072658 which contain all ten. In total there are 63 squares which contain all nine digits unreplicated, and 67 which contain all ten.

This month's competition is based on an old mathematical chestnut that was popular some years ago. Mrs Smith has an egg tray the size of a small table top, divided into square compartments, with as many compartments to the row as there are rows. She has just enough brown and white eggs to exactly fill the tray. Moreover, she finds that she can arrange the brown eggs to fill a perfect square in the centre of the tray, with a uniform margin of white eggs around the outside. Alternatively, if she puts the white eggs in the centre, she finds that the square is one size larger than before, but she can only do this by first putting one brown egg in the exact centre compartment. Again, the brown eggs remaining form a uniform border. How many eggs of each colour has she?

Unfortunately, there is more than one answer to the problem as stated. Does not give the exact size of the table, or does it mention the type of eggs involved. In view of this can you find the three smallest possible answers?

Prize

THE PRIZE this month is from Design Design — 20 copies of Dark Star can be won by readers clever enough to solve Gordon's latest conundrum.

Rules

20 WIN a copy of Design Design, you must first solve the answer to the above problem, and, secondly, demonstrate how you solved it with the use of a BASIC program written on your Dragon.

Please do not send in a cassette containing your answer.

Make sure your name and address is printed clearly on your entry and mark

the envelope November competition. Envelopes which do not say which month you are entering for will be disqualified.

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

Entries must reach Dragon User by the last working day in November. The winners will be announced in the February 1988 issue. The editor's decision is final and no correspondence will be entered into.

August Winners

TWENTY readers have won themselves copies of Software Project's Jet

Get Well

They are Douglas Mouton of Gillingham, D Stanley of Newport, Rachel Hart of Kintalov, D Child of Wood, Luis Marinho of San Sebastian, Spain, Martin Preston of Kington, D Chambers of South Shields, W Coulson of Blinninghams, Chris Gill of Weymouth, James Beale of Folkestone, G Chamberlain of Hillview, Peter Hackett of Colbury, Derek Proby of Chatterton, Mike Colby of Haslingfield, D Richardson of Hove, P Whelan of Slievegave, Simon Astley of Sandon, Gaila Blaskov of Ramat Gan, Israel, Justin Hill of Chatham and Tareyq Lorraine of Clarendon.

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