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International edition

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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
documentation that you can make with your
Dragon. The Dragon computer was founded
on it to be the market with a powerful version of
BASIC, but with very poor documentation.

Articles which are submitted to Dragon
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Editorial

MSX HAS BEEN the subject of considerable publicity in recent months. A host of well-known names such as Toshiba, Sanyo and Spectravideo have pledged their support to the MSX standard which allows software written for one machine to run on all other MSX compatible machines. Software companies too have generally been in favour of the new standard, though most of them are still waiting to see how the machines actually sell.

In an attempt to gather more support to the MSX banner, the MSX working party organised a recent junket to the south of France to officially launch their range of events. Unfortunately, this trip was timed to coincide with the first day of the Personal Computer World show, a clash which should not have been difficult to avoid.

Those people opposed to MSX cite its 280, 8-bit, processor as being old-fashioned and out-of-date, to say nothing of being too expensive. Adherents to the MSX ideal will reply about the advantages of software and hardware compatibility. In reality, MSX is probably neither as bad nor as excellent as it is painted. Whether it succeeds or fails will depend as much on the skill with which it is marketed as on its own merits.

The relevance of all this to Dragon is that Eurohard appears to have acquired a licence to produce an MSX machine. Given that Eurohard is now manufacturing Dragons in Spain, this implies that future Dragons may be based upon the MSX standard rather than the familiar 8089 chip. Consequently, Dragon's future may be intimately linked with the success or otherwise of MSX.

However, Dragon users can take some comfort from Eurohard's Justo Alvarez who has pledged that the UK will not be abandoned. Nevertheless, it would seem obvious that Eurohard's first priority must be to build up the Spanish and European markets. The UK, certainly as far as the 32 and 64 are concerned, offers fewer opportunities for immediate expansion.

The question which will concern existing Dragon users is whether or not any future Dragon MSX machines will be compatible with the original 32 and 64. This question is, as yet, unanswered.

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 WC2R 3LD.

Screen dumps wanted

YOUR correspondent, Graham Marshall (September *Dragon User*, letters) must surely be mistaken about his 180K joystick not working. I have repaired various joysticks for the Dragon over the last two years and it works well with 180K potentiometers, or even 50K of a pinch.

The only possibility I can think of for his problem is that potentiometers come as linear resistors or as logarithmic resistors. If you have a log potentiometer instead of linear then you have trouble and possibly that is the problem.

On another matter, *Dragon Data* formerly offered, free-of-charge (*Dragon World* Number 2, page 11) information on screen dumps for the Epson and other printers. Could somebody possibly let us have this information. I have an Epson FX-80.

Y Shirley
56 Waterfall Circle
Manchester
Nuffield

The height of fashion?

WHY IS IT, as your September editorial has it, that the *Dragon 32* is "regarded as slightly out-fashioned now"? Let's examine it.

Is 32K RAM old-fashioned? It's good enough most of the time for home computer applications. 32 characters per screen line, and reverse video for fewer characters, may not be the latest thing, but they hardly matter except for word processing, and the better WP programs overcome the problem anyway.

I have been able to compare the *Dragon 32* in some detail with a newer arrival, the *Disk Arnie*, which had some very good reviews, and is certainly a nice machine, with some "pluses" such as a larger keyboard, auto-run on demand, integer variables, and a PEP/AT... UNTL command. On the other hand, it lacks the *Dragon's* consistently PER/ULB (essential in my view), INCTL, and ST/SL/SL; and the extremely useful *Dragon* feature of accepting MIBS in the LHS of an assignment statement.

The *Dragon* allows 352 characters per command line, giving

one effectively the equivalent of a limited Pascal "block" facility after "TRON" or "BLOC", while the *Disk Arnie* allows 80. The *Dragon's* facility for storing data on tape is quite primitive.

From a brief look at the hand-book of a still newer (and much anticipated) arrival, the *Amstrad*, even this doesn't seem to have all the *Dragon's* plus points enumerated, though it does of course have some plus points of its own. We are told that in the 68000 the *Dragon* has the most modern processor, though how that helps, except for assembly language programming, is not clear. All in all, however, the *Dragon 32* has some very solid virtues, which competitors in the same price bracket do not seem to have fully emulated even today.

Nigel Webster
London

Handicapped database

WE ARE in the process of establishing a database of software for the Handicapped — *Handsoft*. Briefly, each entry to the database will contain a description of the programs, the handicaps they are suitable for, the type of computer system required, name and address of supplier/developer and price, and so on. This information will be made available through printouts in answer to specific enquiries.

The aim of *Handsoft* will be to facilitate the exchange of information on software relevant to any aspect of the lives of handicapped people. One major addition will be the concerted effort to promote the database, and therefore the software, abroad. This is what we have been doing successfully for non-software products in the field.

Screen dump provided

BELLOW please find a listing and sample run of a Basic program for the *Dragon 32* which dumps the contents of the high resolution screen to an Epson FX-80 printer. I doubt whether a simpler program screen dump program can be written in Basic.

Stan Geyrhofer
Cambridge

```
1: BLOW DUMP HI-RES SCREEN TO EPSON FX-80 PRINTER
2: MOD BY COMPUSER@LIMITED
3: BLOW SET LINE SPACING TO 1/2IN INCH
4: BLOW PRINT-3,CHR$(27),M;CHR$(8)
5: BLOW FOR I=0 TO 31
6: BLOW PRINT-3,CHR$(27);M;CHR$(9);CHR$(I);
7: BLOW CHR$(M)+I+1+32
8: BLOW FOR I=0 TO (CHR$(PRINT-3,CHR$(PRINT-3);I)-4)-32:PRINT I
9: BLOW PRINT-3:PRINT I
10: BLOW FOR I=0 TO 1%:BLOW SET I% INCH LINE SPACING
11: BLOW PRINT-3,CHR$(27);M;CHR$(12)
12: BLOW END
```

NOT SUPPORTED BY PUBLISHING LTD (1983) REF: DCS 0217

TO: 01010
FROM: 01010
MODE: A-100 TO 100 STEP 5:ENCLOS: J=0;J0=2;J1=1010
TO: 01010



As we are currently collecting and processing information, we would be pleased to hear from any of your readers who may wish to contribute to *Handsoft*. For further information please contact me at this address. Hand-

capped Persons Research Unit,
Newcastle Polytechnic, St. 1
Coach Lane, Coach Lane Camp-
us, Newcastle upon Tyne NE1
7TU.

Peter Curran
Handicapped Persons
Research Unit

Software Top 10

1	(5)	Up Periscope	Beyond
2	(5)	Ring of Darkness	Winterson
3	(-)	Chuckle Egg	A&P
4	(1)	Petro	Seals-Jolly
5	(3)	Hunehsbuck	Coenah
6	(3)	Hungry Horace	Melbourne House
7	(-)	Chocolate Factory	Minkis
8	(-)	Dragonfly 2	Hanson
9	(-)	Space Shuttle Simulator	Melwood
10	(-)	Cave Fighter	CAD

Chart compiled by Websters Software

Tape to disk

I AM interested in corresponding with someone on the subject of reformatting programs written for tape onto disk and retrieval for the *Dragon 32* to disk storage retrieval under *Dragon 32S*.

If anyone is interested please write to me at Hemagol 30
Rimov, Kral-Dvo 25702, Jucel

Nancy Taylor
Israel

RETURN OF THE RING

THE RING
OF
DARKNESS
PART II

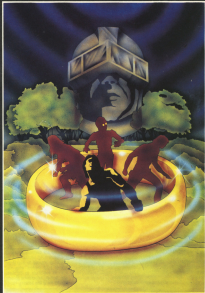
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6809 show

OVER seventy-five per cent of the available stand space at the 6809 Colour Show for Dragon and Tandy users on November 17 and 18 had been filled at the time of going to press.

Richard Bergin, project manager of Computer Marketplace, organisers of the event, was confident that the show would be a success (judging by the response both from companies that will be showing their products and from the public at large). "We have had an average of £70 per day of ticket sales for the show," said Richard, "which is just less at the same time as we had for the Acorn User show that we organised earlier in the year."

The show, the first ever for the Dragon and Tandy compa-

nies, will be a major opportunity to gauge the amount of commitment left for the Dragon. Most major Dragon software houses have booked stand space and it is believed that Eurohard SA, the Spanish manufacturers of the Dragon, may be there.

Justin Alvarez, Eurohard's industrial engineer (see profile, page 18 in this issue) has shown an interest in the event and, according to Richard Bergin, it is hoped that he may do a radio interview on the Young London spot.

Miles Querish, a former Dragon Delta director, has been in touch with Eurohard about the possibility of someone from the company appearing on London Broadcasting Corporation's Young London spot.

at 3 to 3.15 pm on Sunday, 11 November, a week before the show starts.

Miles's interest in the show is purely personal, having worked so hard to bring about the success of the Dragon Professional and CG-8.

Neither BBC nor Touchmaster will be attending.

Microdeal will be selling its products at a special offer, with at least £1 off everything according to managing director John Symes. Some items will have up to 75 per cent off, and Microdeal will also be introducing its new range of low cost games for the Dragon.

There will also be a free stand for the User group or any group of people who come up with the best application for Dragon software, manuals or other forms of communications.

Richard Bergin has written to several User groups giving them the chance to come up with an idea, and any group of persons interested in having a stand at the fair and who come up with the best idea for an application for the Dragon are asked to contact Richard at Computer Marketplace, 20 Orange Street, London WC2H 7ED, telephone 01-580 1812.

Computer Marketplace is also offering readers of Dragon User a 50p discount to enter the show.

Simply cut out the coupon on this page and take it along with you when you go to the show. The coupon is valid for one day only and only one coupon per ticket is allowed.

Unpaid debts

GAMES and Computers founder John Richardson is facing legal proceedings to recover outstanding debts.

Several companies are believed to be seeking court permission for public examination of his accounts. Microperipherals has entered judgement against him for £5,500 as proprietor of Games and Computers, according to company secretary Richard Davis. A charging order has also been made against his property, although the serving agents have been unable to locate him. Permission is now being sought to serve a writ by post.

Readers who have sent money to the club are unlikely to see either their money or any orders that they may have placed. It is thought that John Richardson has debts totaling £20,000.

Computerhouse UK Limited are not involved in any of the legal action. As of the 26 August John was effectively disbarred from the company.

Alan Manshagh of Computerhouse UK Limited said that John had been operating as a sole trader under the name of Computerhouse UK since January 1984. He approached Alan and other directors of what is now Computerhouse UK Limited (see Dragon User, September page 8) who initially tried to help people to secure their orders. John was appointed to the board of directors as a trustee to Computerhouse UK Limited taking over the activities of Computerhouse. However, when Alan realised the extent of John's troubles it was decided not to take over the activities of the club. This leaves John Richardson as a sole trader liable for all outstanding debts. "It never was our problem," said Alan Manshagh, "John got himself into a terrible mess and we tried to sort out his problems".

Coloword Computers who are interested in taking over the running of the club are likewise not involved in any of the legal action. David Tomlinson of Coloword Computers has taken the list of club members, thought to number about 2,000 and is in discussion with several interested parties about the editing of a magazine.



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GEC price deal soon

CUT PRICE Dragons and peripherals could be on offer soon throughout the major retail stores in Britain.

GEC is negotiating with Bevis, Deans, Dorn and other high street stores the price of its Dragon Data stock according to a spokeswoman at the company.

The company also has an agreement with Eurohard to sell future Eurohard products it was confirmed.

Rob Bosanko, former chairman of GEC Radio and Television, who played a major role in GEC's affairs with the Dragon (see Dragon User, May 1984) is, however, no longer involved with proceedings. He

has left GEC to join an electrical equipment manufacturer and has been replaced by Dr Ian Johnson, who has come from GEC Microchannel. This



meets the GEC has now lost its two top men (Brian Moore and Rob Bosanko, pictured) involved in the Dragon take-over.

Complete system

COMPLISENSE is offering Dragon 32 owners 240 credit in part exchange for any of its new deals. Managing director Ted O'Connell said that the company is making available several packages to provide users with a complete system.

A Dragon 32, single disk drive, Plus operating system, Editor/Assembler and disk Basic will retail for £298.95. Other packages incorporating hard disk drives and OS-9 are also being offered.

Any used Dragon 32's that the company gets hold of will be donated to Local Education Authorities. However, Ted cautions that only a few 32's will be available for donation.

The reduced prices have come about due to GEC making available its stocks that it obtained from Dragon Data.

For full details of the available packages and prices contact Complisense at 286D Green Lanes, Palmers Green, London, N13.



The 1002/1003 modem manufactured by Marsile Technology is a BAST (British Approach Based for Telecommunications) multi-speed modem which can be used with telecommunications systems run by British Telecom. The modem, which is compatible with a number of computers including the Dragon 64, has data rates of 75, 300, 600 and 1200. Unfortunately the company has no plans to write any software for the Dragon so Dragon owners would have to write their own. Further details about the modem (price approx £150) are available from Marsile Technology, 10-12 St Peters Street, Ipswich IP1 1BX, telephone 0473-503845.

New titles on the way

TACKLING Weetabix mufflers, gold bar pickers and microwave passengers are some of the delights awaiting users of the latest batch of software for the Dragon.

From Romik Software comes Weetabix versus the Tichos, a machine code arcade game featuring the characters from the Weetabix television advertisement.

The game is available from Weetabix at £3.75 including post and package and VAT. (Weetabix club members can receive a copy for £2.75.)

Weetabix are also holding a national competition offering 100 Dragon 64's, together with disk drives, colour portable televisions, six games including Weetabix v the Tichos and a glow in the dark poster as prizes. Details of the competition can be found on any Weetabix cereal packet.

Baby Computer games has four new Dragon titles. The Bells is a Handback type game with 14 screens of danger for you to challenge. Peribus Pt puts you deep in the crystal mines against the dreaded Drive and Bomb the Gold has the same theme.

Mobiled Mansion is an arcade type adventure which has you in search of gold bars.

Baby's games now retail for £1.99 (down from £5.99) except for Mobiled Mansion which retails at £3.99. Further details from the company at Crossways House, Lutterworth Road, Leicester. All of the

games will be on display at the 1989 show.

Microdeal has two new releases for November, Cavans of Doom a machine code test adventure and Starspaces an arcade style game. The company has also released three new games recently. Crystal Castle is an arcade game, Spooky a graphic adventure, and Escape from Moonbase. All games retail for £5, though Microdeal is working on a new range of low cost games which it hopes to retail for about £3.

Both Microdeal and Baby are negotiating with Eurohard in the hope of getting their software included in Eurohard's packaging for Dragon.

Design-design, formerly Crystal Computing is putting out Hammer's Revenge for the Dragon. In very fast machine code, there is a full feature battle with missiles, tanks and so on. The expected retail price is £5.50.

Software cuts

TOUCHMASTER has dropped the price of its software for the Dragon. Most games now retail for £3.95 (including p&p) with educational cassette tapes costing £5.40.

A complete list of the latest Dragon software prices and a mail order form can be obtained from Touchmaster at PO Box 47, Port Talbot SA13 12C.



"Using HICK is the only one who can lead our Home More, so Richard had to depend on him for our investment program!"

The Spanish connection



A THIRD LEAGUE of life is being given to the Dragon, courtesy of Eurohard SA — the Spanish-based microcomputer manufacturer. Backed by a combination of public and private funds, Eurohard is in business to "give continuity to the Dragon's life and improve its overall standing", according to Genor Justo Alvarez, Eurohard's top man in the UK.

Genor Alvarez is Eurohard's director for Industrial Engineering. He has been in Britain for over a month-and-a-half organising and overseeing the transfer of machinery and products from Dragon Data's plant in Port Talbot to Eurohard's factory in Gacivens, Spain. His aim is to begin immediate manufacture of the Dragon 32 and 64 in Spain for world-wide distribution. In the short term, Eurohard will produce the Dragon to the exact same specifications as Dragon Data's 32 and 64 hardware, within six months, there could be some interesting developments.

Justo, who spent 10 years working for the national Spanish railway company prior to joining Eurohard, is hoping to specialise in the development of new products once he has managed to get the manufacture of the 32 and 64 on the way and has overcome any initial teething problems. With Spanish railways, he was responsible for development planning and was especially concerned with data processing. The Spanish railway company, he said, was the first in Europe to have electronic ticket sales, developed in conjunction with the giant German electronics company Siemens.

MSX — top of list

The project that comes top of his list is Eurohard's development plans in the manufacture of a Dragon MSX machine. Eurohard has obtained an MSX licence from Microsoft for an undisclosed sum and plans to begin production of the machine at the beginning of next year. The company is also studying the feasibility of adding a second chip to make the machine compatible with Dragon software. Justo confirmed that it was Eurohard and not DEC that has obtained the licence to

manufacture the Dragon MSX machine.

So important a priority is MSX, that Eurohard is studying, for the time being, plans to manufacture the Dragon Professional, or project Alpha, as Justo referred to it. "Alpha is not so important, we are more concerned with MSX and peripherals."

Eurohard has huge financial backing. Public sector finance comes from two Spanish development agencies — Sovix and In. Sovix is a local development agency with just under a 40 per cent stake in Eurohard, In, the national development agency, has a less than 10 per cent stake, but owns half of Sovix and is reportedly the largest business consortium in Spain. It has diverse fields of interest and is especially concerned with new technology, hence the stake in Eurohard.

Together, the two development agencies own just under half of Eurohard. The major backer of the company is a large financial group headed by Spanish Vias card chairman, Eduardo Mengo, though Vias card itself has no connection with Eurohard.

Formed earlier this year, Eurohard's headquarters is based in Madrid, the

communications capital of Spain. Eurohard's Madrid offices will be responsible for public relations and marketing, while the manufacture of the computers will take place in the Spanish regional development areas, Gacivens, near Portugal.

Justo claims that the Dragon is the third biggest-selling micro in Europe, coming behind the Spectrum and Commodore machines and, in Spain lastingly, ahead of the Atari and Cric. He intends to maintain and hopefully improve on this position, particularly in countries where there are no established computer firms.

Obvious advantages

There are obvious advantages in Eurohard's attack on the Spanish market and it is evident that the company expects to capture the lead from Sinclair. To back this up, a Spanish television programme is planned, with Eurohard taking a similar role to that undertaken by Acorn for the BBC computer show in Britain.

Justo stresses, however, that Eurohard is not solely concerned with the Spanish market. The company is concentrating on a world-wide user base, including Britain. In the UK, distribution will be by DEC with technical support by Techtelstar.

When asked if he thought that many more Dragons would be sold in Britain he replied that DEC is a large company "and large companies are not used to thinking in the short term — take this as a sign that the Dragon will improve its position in the UK". Justo went on to say that Eurohard is getting in touch with software companies in Britain, and indeed "with all the people we know who have connections with the Dragon".

"We are open to help and suggestions that could be beneficial for the Dragon, especially concerning software and peripherals — we can't distribute and sell them by ourselves. I hope this is the beginning of a new Dragon era", said Justo. "We don't want Dragon owners to feel abandoned — they are not abandoned — they are not abandoned."

— Gordon Ross



Genor Alvarez of Eurohard

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Match

Program: Chicken Run, Impact, 1 Hill Bottom Hill, London SW12 8JL. Price: £7.95

FARMER Folly runs a chicken farm — rather a small chicken farm, as there is only one chicken in it. You have to guide the chicken to the nest-boxes, where she will auto-lay and lay an egg, and to the feed trays to replenish her energy with corn. You also have to guide Farmer Folly to collect the eggs before they hatch into hungry chicks, and to fill the feed trays.

There is a buddy as well, of course — a fox appears at intervals through holes in the wire, intent on eating the chicken, or one of the newly-hatched chicks. Having a chick eaten is quite a good thing, as this prevents it from depleting the corn supply, if the fox eats your chicken, however, one of your three lives is lost.

The game is controlled by joystick only. The joystick lever controls the direction in which the chicken moves, and

the fire button controls the farmer. This technique of controlling two moving objects with the same joystick doesn't seem to be terribly effective; I found it impossible to persuade the farmer to do anything except run aimlessly up and down a ladder unless the fire button was held down continuously, when the farmer's movements were no less random but more purposeful.



The graphics are good, though I would have liked to have more than one screen. The sound effects are initially impressive, but soon become irritatingly repetitive.

On the whole this is an interesting game, but not, I think, one with lasting appeal.

Margaret Norman



sound effects too are a bit limited, consisting mainly of "boing" and "squeak" noises. The overall effect however is good, and compared to some

of the games currently on the market, Cu'ber scores well.

David Rowland



Stakes

Program: Cool Pays 21, Sino Software, PO Box 20, Watling, Surrey GU21 3DN. Price: £4.95

SINO Software is a new name to Dragon Owners, its first releases are both card games, namely Craps and Pontoon — the latter is reviewed here.

Cool Pays 21 is a faithful reproduction of the game of Pontoon with a few extras added. The program, which is written in Basic, automates on loading and after several title screens, some in high resolution graphics, gives brief instructions on how to play.

causes a different hand display to be shown. The game is very simple to operate, you simply enter your stake and press "1" to bet or "2" to stick.

Unfortunately, there seems to be a few bugs in the program. An ace can count as one or eleven in pontoon, but Cool always uses it as eleven which means for sometimes "busts" below 21.

Another, more serious, oversight is that the cards always appear in exactly the same order after loading the game. This is because the automatic routine used reads the random number seeds that the program uses, and the program doesn't bother to

Bubble

Program: Cu'ber, Mirovel, 41 Tivo Road, St Austell, Cornwall. Price: £5.95

CUBER from Mirovel involves directing a cubby looking orange creature of the same name around a pyramid of cubes. The object is to change the colour of each of the cubes to the "target" colour, displayed at the top of the screen, by hopping on them.



On the lower screens only

one or two hops are required to change a cube to the correct colour. However, as the game progresses, the cubes change colour every time you hop on them, even if they were the correct colour to start with.

Various noises exist to try and stop you. These include balls of assorted colours, Wipers, Dorks (1), and Nerfs (1). Some of which are fatal to touch, others do things like changing the colour of the cubes they jump on, just to make things worse. Jumping on a green ball causes all of the noises to freeze, allowing Cu'ber a few seconds respite.

The player has three lives, and when one is lost by touching something that shouldn't be touched Cu'ber emits a burbling noise and mutters "WTF?" in a speech bubble) under his breath. I suppose it's nice to find an alien that's human for a change (1).

The graphics are as good as PACER 3 allows, although the movement is rather jerky, and not up to the effort. Test Mix' usual standards. The



The graphics involved in the game range from good to disappointing — all the cards are displayed using low resolution chunky graphics and text, however there is a nice picture of Cecil P Dragon — your opponent in the card game. Cecil appears after each game either grinning or frowning depending on whether he has won or lost.

Achieving the magic 21

randomise these at the start of each game. Obviously, after a while you get to know the pattern of cards which defeats the object of the game.

At £4.95 this piece of software is one of the cheapest around, but don't expect to get anything stunning for that price.

Brian Cudge



Attack

Program: Android Invaders, Liverpool, 86 Lime Street, Liverpool L1 1JN. Price: £3.95

WHEN I saw the word "Invaders" in the title of this cassette, I must confess my heart sank a little. What games-players

(and reviewers) look for is something new, exciting, different... not just another version of a tired old game. Then I thought, no, there are so many invaders games on the market already that this surely can't be the same again — it must surely have some new twist to it — so I loaded it with high hopes. I'm sorry to say,

though, that these proved unfounded.



Not only is this a conspicuously unoriginal game, it isn't even a good one. There are some major bugs in it which cause you to die helplessly with great speed. I tried playing it with both keyboard and a joystick, at several different levels of diffi-

culty, with the same result every time — I shot one or two little androids, then I apparently got hit by a succession of invisible bombs and the game ended.

What I saw of the game before disappearing in a puff of smoke made it depressingly clear that, even without the bugs, this title would really not be a useful addition to anyone's collection. The graphics are unimpaired, the sound effects dull, and the action slow. The attractions promised by the instructions in later phases of the game didn't sound all that enthralling, either.

Sorry, Lynworts, but this really isn't up to the standards of commercial software nowadays. Back to the drawing-board with this one!

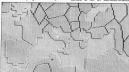
Margaret Norman



Legions

Program: The Fall of Rome, Angus Press Software, 1 Golden Lion Square, London W1R 3AB. Price: £9.99

This is an adventure-type game written in Basic, and also available for a number of other machines. The general idea is that you are in charge of the Roman Empire, with control over troops, income, expenditure and so on in all parts of your Empire. On the screen you have a coloured map of Europe (as we call it today) with the countries (as they were then) marked on it. Others are trying to destroy it.



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During each stage a marker indicates which country you are dealing with at any one time, raising armies, conscripting elite legions to invade legions and so on.

While you are busy trying to put your Empire in order,

Elven trial groups from the north cause a bit of bother and as if this was not enough you also have to fend time and resources to do battle with armies from the two Empires of the East.

The game progresses through three phases. The Income and Expenditure phase, the Movement phase and the Combat phase. I found that it took a great deal of practice to be able to understand and play the game properly and even stand a chance of securing a victory. Playing a game does take up a lot of time, but if you are "into" this type of game then it is quite good and takes a lot of concentration.



The display is also quite good, though I feel the game is not for the younger members of a family.

Bob de Greyton



STAR'S GAME

Quest

The Guardian of Shedin is defeated. The hero of the Evil Sage lies at bay. Now Ringbearer, wielder of the Four Bright Kings, must face the greatest challenge to return the Ring of Darkness to its creator on the hidden planet Ringworld.

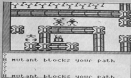
Program: Ring of Darkness, Wiltshire, 30 Uplands Park Road, Uxbridge, Middlesex UB8 3PT. Price: £9.95

WHEN Wiltshire originally released *The Ring of Darkness* it was surely one of the best adventure games available for the Dragon. The game enjoyed such success that it was inevitable that a sequel would follow.

Return of the Ring is subtitled "The Ring of Darkness Part 2", but as a piece of software it is far superior to its predecessor. The program is written in 100% machine code with full colour high resolution graphics (MPC001 2) mixed with text which includes lower case.

A three picture showing your location is constantly displayed, below this is a text window where commands and are entered. One of the best features of this game is its ability to handle whole sentences, such as "Give the dagger to Maria the 50" and so on.

The quest begins in a maze which is displayed from above, figure movement is achieved via the arrow keys. In this part of the adventure you can fight and transact with mutants and enter villages to buy and sell useful items. These villages are also displayed and entering a shop causes a 3D picture of the inside of the room to be dis-



As with the *Ring of Darkness*, side A of the tape enables you to set up your role play character — you are given points to divide up amongst number of lives and various characteristic attributes, and you must also decide what form your character will take, for example "Human Warrior" or "Elf Technician". This procedure need only be done once as you can save the game and your character on tape at any point.

The game itself is an odd two of the tape. Clear instructions are given as to when to start the cassette — the game is too large for 50k so parts are loaded in and out as required.

Other locations, such as the lower planet, are loaded in from tape and are shown in excellent 3D graphics. A few characters that you meet are controlled by a program called Acol, and are capable of doing most things you can do for your own free will and may join you to help in your quest.

There is plenty room to describe all of this game's features — the program took over a year to create. It is certainly the best adventure role play game that I have seen for the Dragon so far and is excellent value at £9.95.

Brian Cadogan



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Playing with sprites a la mode

Brian Cudge reviews Premier's sprite graphics board

FOR THOSE Dragon owners who turn green when they see graphics produced by Atari and IBM 54 machines, help is close at hand. Premier Microsystems has just released a sprite graphics board for the Dragon 32.

The board itself is connected via a ribbon cable to the Dragon's cartridge port and takes all its power from the host computer. After initial power up, the user simply types GOAC AH900 and takes the lead from the Dragon's ported and puts it in the one provided on the graphics board.

All the electronics are housed in a two-tone plastic case measuring about 4 x 6 inches, and it can be purchased either ready-assembled or as a kit. The circuitry is quite complex and very tightly packed so you need a fair amount of experience before attempting any self-assembly. Instructions and a wiring diagram are given in the manual, but these could hardly be described as being written for the beginner, and there are no hints or fault finding.

Four modes of operation

The new display is produced by a Texas Instruments TMS 9929A VDC chip. This offers four modes of operation with 32 sprite levels and 16 colours.

Sprites are simply movable graphics objects which have their own priority level — that is, the sprites with a lower priority will pass "behind" those with a higher priority. Sprites are totally non-destructive and don't need to be "rubbed out" when they are moved. As each plane can contain only one sprite this means 32 individual sprites can be displayed at any time, although the lowest priority is the same as the background colour and will not often be used.

The four separate display modes offer the following:

Mode	Resolution	Colours
1 text	40 x 24	text only 2 of 16
2 text	32 x 24	sprites 16
3 graphic	64 x 48	16
4 hi-res	256 x 192	sprites 16

(2 in a group of 8 pixels horizontal)
4 Graphics 64 x 48 sprites 16

On power up, mode 1 is automatically selected with white text on a dark blue background. The display quality is very high — much improved on the Dragon's own hi display. Mode 1 is usually used for programming as this can display the most characters at once, but cannot have sprites. The display is noticeably slower than the Dragon's own, especially when scrolling.

Probably the most useful mode for

games is Mode 3. Although the resolution is a chunky 64 x 48, you do get the advantage of mixing text with graphics. In addition, all game characters are likely to be sprites which have the same resolution in any mode. Two sets of sprite shapes are available and all of these are redefinable. The first set is the entire character set, and can be used only in mode 2. The other set contains 32 shapes and can be used in any sprite mode.

Sprites can be displayed as either normal or double size in all modes. However, all sprites have to be the same size.

The graphics board also contains an option to interface the new commands available with Microsoft. The technique used is to intercept the command handler at the Dragon and check for certain commands such as Print and CLS. The computer is then redirected to give these new meanings. I prefer the method of adding commands, as this prevents the programmer from having to use rather meaningless commands like RESET to define a sprite shape. Most of the new meanings are more obvious; PACODE is used to select the mode, although the graphics page number is no longer required as the board has its own 16K of video memory.

This extra memory also has the advantage of freeing most of the Dragon's memory that is usually reserved for its own display — over 5K is returned to the user, it is not possible to switch between the Dragon's display and the board's display, without switching off first. Also the Dragon's sound is not produced through the TV speaker when using the sprite board.

Comments to exit points, these flow and sprites are created, this is the most useful command. not been set neither Print command.

be used as normal on the now expanded screen. Put and Get are not included as these are obviously not needed with the introduction of sprites. PUT(x) is used to position a sprite on the screen — the x and y coordinates are given, together with the colour, shape size and level of priority.

In addition to the sprites, all the characters are redefinable using the "PRDEF" command, so it is possible to get pseudo hi-res graphics even in the text modes.

Although the display potential of the board is greater than anything a Dragon could normally produce, the implementation of the Basic leaves something to be desired. As already mentioned, the "new" commands are either limited compared to the Dragon's own. In addition, one of the most important parts of sprite graphics is missing completely — that is collision detection.

The games programmer will have to muck around with comparing coordinates, with all the problems that entails. There is also no facility for setting sprites moving on their own in a given direction, each one has to be individually moved. With 30 odd on the screen this can seriously affect the speed of a Basic game.

The manual which Premier supplies with the board also contains details of machine code entry points to their ROM for anyone wanting to write arcade speed games using the board. The manual describes each command in detail, but there is only one example program given at the end and this doesn't even use sprites! Although the general documentation is good, it is not up to Premier's usual high standard. Many more example programs are needed.

Comes the crunch

The crunch comes when you see the price — £26.95 as a kit or about £30.75 ready-made. This may seem a bit, but is not unreasonable considering the components involved. Unfortunately for Premier, I think many users will plump for cheaper software alternatives like "Sprite Magic" from Knight Software at £17. Although you don't get the advantages of 16 colours, an improved display and hardware sprites, you do get the same upper/lower case, software sprites and a much more thorough extension to Basic.

The final decision as to whether you really need this board is yours of course, but be warned, the board will only operate with 52K machines. Due to a short-cut taken by Premier in its design, the board will not work with upgraded Dragon's or Dragon 54's. However, Premier say they can alter boards for 54K machines if required. ■



Peter Skiles of Premier

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Spiderbyte

D J Orrell spins a web to catch a fly

HARRY'S WEBB is a game for one player requiring quick reactions and concentration at all times. Using the keyboard you must direct Harry around the screen in pursuit of flies. Each time you catch and kill one, another appears at a different location.

The flies, however, will not sit and wait for ever — they will fly about aimlessly. The game itself has five levels with 10 flies to kill in each level. You will automatically progress to the next level when you have killed all 10.

To add a little more tension to the game a frog is working his way down the right hand side of the screen and should be reached the bottom before you have caught

10 then he will leap out and gobble you up.

Program Notes

20-40 Sets up music strings
60-210 Prints instructions
320-440 Main loop
450-480 Moves spider up
510-540 Moves spider down
580-590 Moves spider left
610-640 Moves spider right
680-690 End routine
800-840 Checks score
950-1000 Reads data to graphics screen
1130-1280 Draws main screen
1300-1530 Draws fly screen



```
1  @#####
2  @#####HARRY'S WEBB#####
3  @#####(C) JORRELL#####
4  @#####D. J. ORRELL#####
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9  @#####
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7 Plastic Cards
1 Reference Card

```

500 PUT(X,Y) :=(X,Y)+B,PSET:Y=Y+7:
V1=Y+17
510 GET(X,Y) :=(X,Y)+B,GOPUT(X,Y) :
=(X,Y)+B,PSET
520 GOTO 320
530 *****left*****
540 IF X=0 THEN X=B:GOTO 320
550 PUT(X,Y) :=(X,Y)+B,PSET:X=X-7:
X1=X-7
560 GET(X,Y) :=(X,Y)+B,GOPUT(X,Y) :
=(X,Y)+B,PSET
570 GOTO 320
580 *****right*****
590 IF X=225 THEN X=225:GOTO 320
600 PUT(X,Y) :=(X,Y)+B,PSET:X=X+7:
X1=X+7
610 GET(X,Y) :=(X,Y)+B,GOPUT(X,Y) :
=(X,Y)+B,PSET
620 GOTO 320
630 *****top and bottom*****
640 IF (242-177)<1249,1641,BL,PSET
650 GET(242,177)-(249,1641),FILL
660 Y=Y-164
670 FOR F=242 TO 4 STEP 7
700 PUT(F,F1)-(F+7,F1+7),F,F,PSET
710 GET(F-F,71)-(F-F,F1+7),F,F,GOPU
T(F-F,71)-(F-F,F1+7),F,PSET
720 NEXT F
730 PUT(F,F1)-(F+7,F1+7),F,F,PSET
740 FOR F=164 TO Y+16 STEP 7
750 PUT (F-F1)-(F-F,F1+7),F,F,PSE
T
760 GET(F,F1)-(F-F,F1+7),F,F,FILL
770 PUT(F,F1)-(F-F,F1+7),F,F,PSET
NEXT F
780 LINE(F+1,71)-(F+1,164),Y+1,PSET
:GOTO(150,164),LINE(F+1,71)-(F+1,71
)+1,PSET
790 FOR X=0 TO 18+7,Y+7,B,PSET
800 FOR D=0 TO 30:NEXT
810 PLAY"TSOZLWFLZB-LW-LZFLWFDZD
S12Z-FWZLZLZB-DZLZDZLZDZ-FZLZC"
820 CLS
830 PRINT:GOTO 100 GAO THE FROG GO
T WAAAAAHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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840 IF X=177 THEN PLAY "S12Z+2S1D
S1D 2 F4LZLW PLAY B1:CLS:GOTO
850 PUT(X,Y)-(X+7,Y+7),B,PSET
GOTO 310
870 PLAY"VZLQZLFLZLZLZDZBWFZFLZB
880 GOTO 310
890 GOTO 200 GOTO 310
900 IF SC=0 THEN R=7:L=5:PLAYW+G
GOTO 240
910 IF SC=30 THEN R=15:L=4:PLAYW+
GOTO 240
920 IF SC=20 THEN R=20:L=3:PLAYW+
GOTO 240
930 IF SC=10 THEN R=25:L=2:PLAYW+
GOTO 240
940 GOTO 330
950 PROBE4,1,FCLS WAO ST=(513):Y=7
970 FOR CH=0 TO 7:NEXT CH/32
980 FOR Y=0 TO 7:NEXT Y
990 FOR ST=224:WH=CH:32:W,CD
1000 NEXT Y,CH:RESTORE
1010 GET(0,0)-(7,7),B,G:GET(0,0)-(
7,7),B,G:GET(116,0)-(123,7),B,G:
GET(124,0)-(131,7),B,G:GET(132,0)-(13
9,7),F,G
1020 GET(140,0)-(147,7),F,G:GET(148,
0)-(155,7),F,L,G:GET(156,0)-(163,7),F,L
,G:GET(164,100)-(167,107),B,G:FCL
S
1030 RETURN
1040 DATA 0,195,36,24,126,153,36,6
4
1050 DATA 0,66,36,123,126,24,36,19
5
1060 DATA 68,73,82,28,28,82,73,68
1070 DATA 54,146,84,56,56,84,146,5
4
1080 DATA 56,24,68,90,153,153,165,
195
1090 DATA 165,66,66,60,24,60,90,66
1100 DATA 1,178,81,120,120,81,178,
1
1110 DATA 66,90,60,24,60,66,66,165
1120 NEXT
1130 *****DATA END*****
1140 FCLS
1150 G=1
1160 LINE(225,0)-(225,181),PSET
1170 FOR D=0 TO 23
1180 CIRCLE(0,0),D,0+D+0
1190 NEXT
1200 PLAY"0=4T01:GOTO(0,
1210 NEXT
1220 X=110
1230 FOR D=0 TO 171 STEP 62
1240 LINE(0,0)-(225,11),PSET
1250 NEXT
1260 FOR D=225 TO 0 STEP 62
1270 LINE(0,0)-(0,191),PSET
1280 NEXT
1290 RETURN
1300 PROBE2,1,FCLS
1310 CIRCLE(127,96),20,4,2,CIRCLE
(127,99),25,4,2.5
1320 PSET(127,96),21:PSET(121,96),21
1330 LINE(127,99)-(127,103),PSET
1340 LINE(100,99)-(100,70),PSET
1350 LINE(100,97)-(100,70),PSET
1360 LINE(60,70)-(70,110),PSET
1370 LINE(100,99)-(100,70),PSET
1380 LINE(94,70)-(74,125),PSET
1390 LINE(80,70)-(80,120),PSET
1400 LINE(114,90)-(114,70),PSET
1410 LINE(114,97)-(114,70),PSET
1420 LINE(114,90)-(114,100),PSET
1430 LINE(114,99)-(114,70),PSET
1440 LINE(114,70)-(110,125),PSET
1450 LINE(114,70)-(114,120),PSET
1460 DRAW:RESTORE,40:GOTO(100,100):GOTO
POLY(0,100):GOTO(100,100):GOTO(100,100):
GOTO(100,100):GOTO(100,100):GOTO(100,100):
GOTO(100,100):GOTO(100,100):GOTO(100,100):
GOTO(100,100):GOTO(100,100):GOTO(100,100):
1470 DRAW:RESTORE,146:GOTO(100,100):GOTO
(100,100):GOTO(100,100):GOTO(100,100):
GOTO(100,100):GOTO(100,100):GOTO(100,100):
GOTO(100,100):GOTO(100,100):GOTO(100,100):
1480 GOTO(0,0)
1490 PLAY"TS+2F
1500 RETURN

```

Turtle comes out of its shell

John Payne presents a turtle graphics program written in Forth

TURTLE GRAPHICS is based on the "turtle", which can be told to move forward or backward, left or right and various other things. The original "turtle" was a hemispherical shell containing motors and electronics, that was linked by a cable to a computer. By typing commands on the computer, the turtle could be moved around the floor (which really needed to be covered with paper). It had a pen which could be up (not touching the floor) or down (touching the floor) so that as the turtle moved it could draw a line on the floor that showed the path it had followed. Similar turtles are still available.

A later idea was the "screen turtle" which moves around on a television screen instead of on the floor. This program provides turtle graphics based on a "screen turtle" by giving Forth definitions of the words a Turtle should understand.

The Forth definitions are on screens 4 to 16 of the listing. They have been tested and found to work on both C64 and

Dragon Data Forth (however the Dragon Data Forth I used had an error that prevented text being entered in the Forth screen — this error is fixed by H&L 26/86 4P/IC 5). The definitions should also work on other versions of Forth if words that calculate sine, cose lines and save screen areas, are defined.

You need to know two things about the turtle: where it is and which direction it's facing. You can tell where it is because it is drawn on the screen (as a right-angled triangle). The pen (which draws on the screen if it is down) is at the right-angled corner of the triangle. The arrowhead shape of the turtle is designed to point in the direction which the turtle is facing, which is the direction it will move when ordered to go forward.

To move in other directions, the turtle must first be turned to face the required direction, and then ordered forward. Bear in mind that the screen is showing the floor, and you are looking at the turtle and

floor from above. This means that if, for instance, you order the turtle to turn right 45 degrees, it will turn 45 degrees clockwise.

Once screens 4 to 16 are loaded, you can tell it what to do using the following words:

1) Display Control Words:

T This word switches the display from the last screen (where you type it) to word(s) to the graphics screen (which is the floor that the turtle moves around on). This word should be used before a sequence of commands to the turtle, if you want to see the commands being executed.

Example 1: TD PD SD RT TD PD
Note: Both words are not executed until you press the Enter key so all the examples must, if correct, be finished by pressing Enter.
(S/N/T ?) This has the same effect as T except that a different set of colours is used. ▶

```
SCR # 4
0 : *** TURTLE GRAPHICS ***
1
2 : COPYRIGHT J. P. PAYNE 1983
3
4
5
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11
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```

```
SCR # 5
0 : COS 90 + ERG
1
2 : LOOP OVER OVER
3
4 : 25000 VARIABLE X
5 : 25000 VARIABLE Y
6
7 : VARIABLE PINK
8 : VARIABLE BLUE
9
10 : T BL SCREEN 0.1
11 : 25000 0 DO LOOP . --O
```

```
SCR # 12
0 : 1 VARIABLE PFORM
1
2 : COPY PFORM 0 IF WIFE ENDIF
3 : PFORM 0 IF LOOP 50 ERG
4 : LINE 0 ENDIF . 0
5
6 : PFORM 0 IF TURTLE ENDIF
7 : PD WEDGE 0 BODY COPY
8
9 : --O
10
```

```
SCR # 5
0 : VARIABLE PWR
1
2 : PWR 25000/25000/10/PWR+1
3
4 : TFORM
5
6 : PWR PWR/PWR+25000/PWR+PWR/2
7 : PWR 0 IF (PWR/2500)
8
9 : LINE 25000/PWR PWR 0/PWR PLL
10
11 : --O
12
```

```
SCR # 6
0 : PWR COPY 0 IF PWR 0
1 : ELSE 0 ENDIF
2
3 : 1000/100 0 IF WIFE ENDIF
4 : 1-1000 PWR 24 24000 PWR 24 24
5 : 1000/100 0 IF PWR 0
6 : BODY LOOP COS +1000 X 0 T
7 : BODY LOOP SIN +1000 Y 0 T
8 : PWR 25000 --O
```

```
SCR # 13
0 : BT PFORM 0 IF WIFE ENDIF
1 : WEDGE 0 IF PFORM 0
2 : PFORM 0 IF TURTLE ENDIF
3
4 : BT FORM 0
5
6 : CONSTANT GREEN + CONSTANT RED
7 : CONSTANT YELLOW
8 : CONSTANT BLUE --O
9
```

```
SCR # 6
0 : SCIN 00 C/0/0/0/0/0
1 : P/0/0/0/0/0/0/0/0/0/0/0/0/0
2 : TFORM 0/0/0/0/0 0 DO LOOP
3 : 0/0/0/0 OVER 0 0
4
5 : SETUP XL 0 DO 90 1 - PWR
6 : TFORM SCIN RED PWR 0 LOOP
7 : SETUP XL TFORM PWRIN
8 : 1000 CONSOLE OFF --O
```

```
SCR # 14
0 : T BL 0
1
2 : 00 00 WEDGE FORM
3 : LINE
4 : 0 0 DO 10 - 0 PWR WIFE LOOP
5 : 0/0/0 0 0 0 1000/100 0 1000/100
6 : 0 WIFE WIFE LINE FORM GET
7 : 0 WIFE WIFE LINE FORM PUT . --O
8
```

```
SCR # 14
0 : WIFE PFORM 0 IF WIFE ENDIF
1 : 10 WEDGE 0 WIFE DO
2 : PFORM PFORM 0 IF TURTLE ENDIF
3 : CLR 0 0 PLL 0 10000 X
4 : WIFE Y 0 WEDGE 0 WIFE
5 : PFORM 0 IF TURTLE ENDIF
6
7 : --O
8
```

```
SCR # 7
0 : LINEIN CLR 00 0 DO PFORM
1 : 0 WIFE 0 ENDIF PWRIN
2
3 : 0/0/0/0 CLR 00 IF PFORM 0
4 : 0/1 0/1 0/1 0/1 0/1 0/1 0/1 0/1
5 : ELSE 0 0/1 0/1 0/1 0/1 0/1 0/1 0/1
6 : 0 0/1 0/1 0/1 0/1 0/1 0/1 0/1
7 : 10000 ENDIF . --O
```

```
SCR # 15
0 : PFORM PWR 24 0 PWR 0
1 : 00 PFORM/PWR/PWR/PWR/2
2 : 00 0 1000/1000 0 1000/1000
3 : TURTLE WEDGE 0
4 : WEDGE 0 BODY 0
5 : 0 LOOP 0 WEDGE 0 00 + PWR 0
6 : 0 LOOP 0/00 LINE 0 1000 0 WIFE
7 : LINE 0 0 WEDGE 0 00 + BODY
8 : 00 PRINT . --O
9
```

```
SCR # 15
0 : WIFE PFORM 0 IF WIFE
1 : 0 PFORM 0 ENDIF
2 : BODY PFORM 0 0 IF TURTLE
3 : 1 PFORM 0 ENDIF
4 : 0 PFORM 0 PFORM 0
5 : PFORM 0 PFORM 0
6 : PWR PWR 0 0 0 0 0 0 0 0
7 : --O
8
```


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required

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Build your own drawing arm

Peter Whittaker explains how to build a drawing arm

4848G is another project for fellow Dragon owners with hand-rated soldering irons. I have long regarded with jealousy the digitising units or drawing arms available for the Spectrum and BBC micros. I eventually set out to see what I could accomplish with my trusty Dragon.

The 6 bit A/D converter used by the Dragon joystick splits the reading from a 100K potentiometer into 64 steps (0-63). If the standard 100K pots with 270 degrees of turn are used, there is an angular resolution of about 4.5 degrees per step (270/64). With a drawing arm of 18 inches in length pictures could be copied in blocks of a half-inch-square resolution. This is obviously completely useless. The problem is resolved by using 100K pots with only 30 degrees of rotation. This gives an angular resolution of 0.5 degrees per step, and with a 10 inch arm a copying resolution of 0.1 (1/10) inch squares. This is good enough to be worth doing.

The 30 degree pot does not allow much movement so the positioning of the two arms has to be redesigned. Placing them at right angles (figure 1) gives 30 degrees of movement in both axes. The area covered will not be a perfect square, but a rhomboid. This is because the angle of the second arm to the vertical will vary according to the angle of the first arm (figure 2). However, accurate copying will be achieved within this rhomboid area.

If we take the shoulder as our origin (O.O) the position of the elbow (A/E) can be easily calculated.

$$A = L * \cos(A1)$$

$$B = L * \sin(A1)$$

If the first arm is not horizontal the second arm will not be vertical when it is at right angles to the first arm. The angle of

the first arm (A1) needs to be subtracted from the angle of the second (A2) to find its angle to the vertical (figure 3). The position of the "finger" (C.D) can now be calculated.

$$C = A - L * \cos(A2 - A1)$$

$$D = B - L * \sin(A2 - A1)$$

If the arms are 10 inches long these will



Fig 1 Back arm design

be a range of finger positions from 7 inches to 13 inches along each axis. If this is multiplied by 10 then the equivalent point on the hires screen can be plotted (listing 1).

Listing 2 scales up the size of the copy and draws a line from the last point set to the next. By pressing the fire button, the program switches between drawing a line and moving a dot across the screen. Pressing any of the keys 0-8 will set the colour of the line. Pressing the (ir) key will dump the screen to a Sokolova printer.

To construct the electrical wiring of the drawing arm, the wiring diagram used is exactly the same as that for a joystick (figure 4). Take the joystick unit and with a small screwdriver or penknife bend back the clips which hold the potentiometers in



Fig 2 Angle of second arm to vertical

place (figure 5). The assembly will fit snug once the pots have been removed.

Take the four long pieces of wire and solder one to each of the pins #1, 3, 4 and 5 of the DIN plug. Solder the extra long wire to pin #2. Now connect and solder wire #1 to the centre leg of pot #2 and wire #2 to the centre leg of pot #1 and wire #4 to one leg of the fire button. Use a 12 inch wire to connect the left leg of pot #1 to the left leg of pot #2.

A second 12 inch wire connects this left leg of pot #2 to the spare leg of the fire button, which is then further connected to wire #3 from the DIN plug. Connect wire #5 to the right leg of pot #1, and a 12 inch wire to further connect this leg to the right



Fig 3 Joystick with

leg of pot #2. Insulate all connections with tape, and check for short circuits.

To construct the drawing arm themselves, obtain two pieces of strip metal (wood, cardstock, or whatever) about 18.5 inches long, and drill a hole at one end of each just big enough to fit over the lug on the potentiometers. Drill a second larger hole at the other end of the first arm so it can be inserted into the hole on the underside of the pot without rubbing.

Plug the DIN plug into the right joystick



Fig 2 Area covered by drawing arm



Fig 4 Circuit diagram for drawing arm

at, type in listing 3 and RUN it. Set pot to a value of 31 and then glue an arm on to the lug of each pot. Check to make sure that you can turn it sufficiently to get the full 0-99 range of readings, then glue the back of pot #2 to the end of arm #1 (with the hole in it) making sure that pot #2 can still turn.

Pot #1 can either be permanently fixed to a drawing board, or temporarily stuck to the table with blu-tack. If blu-tack is used

then be careful that moving the arm turns only the potlug and not the whole pot assembly in its blu-tack base.

That should be the drawing arm complete. Minor adjustments may have to be made to the program. The ratio of $(X-32)/2$ for the angle may need slight adjustment depending upon the accuracy of the pots used. The actual length of arms used if not 10 inches each also needs to be taken into account. The programs will run much

better if your Dragon can take the speed-up pole (POK055-495.0). ■

Parts list

- 4 pieces of wire 2 inches long
- 4 pieces of wire 4 inches long
- 2 pieces of wire 12 inches long
- 1 of 270 Degree 1-pin DMM plug
- 1 push-button switch
- Tandy 270-1047 \$7.99 per pack of 6
- 1 Tandy digital potentiometer 271-095 at \$2.99

```

10 PMODE4.1:PCLS:SCREEN1,1
20 L=10
30 R1=JOYSTK(0):R2=JOYSTK(1)
40 R1=(R1-31)/2*(100/3,1415926)+R2=(R2-31)/2*(100/3,1415926)
50 X=LRC COS(R1)+SINK R2-R1:Y=LRC SINK R1+COS R2-R1:Y
60 X=INT(100X+0,5):Y=INT(100Y+0,5)
70 PSET(X,Y,1):GOTO20

```

Listing 1

```

10 L=10:A=2:PMODE3.1:PCLS:SCREEN1,1
20 R1=JOYSTK(0):R2=JOYSTK(1)
30 R1=(R1-31)/2*(100/3,1415926)+R2=(R2-31)/2*(100/3,1415926)
40 X=LRC COS(R1)+SINK R2-R1:Y=LRC SINK R1+COS R2-R1:Y
50 X=INT(200X-4)+0,5:Y=INT(200Y-4)+0,5)
60 A=INKEY$:IF A#""THEN G0
70 IF A#>"/"AND A#<"."THEN COLOR VAL(A#):GOTO100
80 IF A#="B"THEN 140
90 IF PEEK(63288)=126 OR PEEK(63288)=254
THEN SOUND(100,1):IF A=1 THEN A=2 ELSE A=1
100 ON A GOTO 110,120
110 LINE(X,Y):PSET:GOTO20
120 P=PPPOINT(X,Y):FOR B=1 TO 8:PSET(X,Y,B):NEXT PSET(X,Y,P)
130 DRAW "BH"*(STRK X)+", "+(STRK Y):GOTO20
140 CLS:PRINT"CHECK PRINTER IS ON AND CENTER":D=5041194
150 PMODE4.1:SCREEN1,0
160 PRINT#-2,CHRK(13):CHRK(12)
170 FOR A=0 TO 255 STEP 1
180 FOR B=191 TO 0 STEP -1
190 C=128+PPPOINT(A,B)+PPPOINT(A,B)*2+PPPOINT(A+1,B)*3+4+PPPOINT(A+1,B)
20+PPPOINT(A+2,B)*16+PPPOINT(A+2,B)*32+PPPOINT(A+3,B)*64
200 PRINT#-2,CHRK(C):CHRK(C)
210 NEXT B:PRINT#-2,CHRK(13)
220 FOR B=191 TO 0 STEP -1
230 C=128+PPPOINT(A+3,B)+PPPOINT(A+4,B)*2+PPPOINT(A+4,B)
24+PPPOINT(A+5,B)*8+PPPOINT(A+5,B)*16+PPPOINT(A+6,B)*32+PPPOINT(A+6,B)*64
240 PRINT#-2,CHRK(C):CHRK(C)
250 NEXT B:PRINT#-2,CHRK(13)
260 NEXT A:PRINT#-2,CHRK(13)

```

Listing 2

```

10 CLS
20 PRINT#22,"POTENTIOMETER CALIBRATION."
30 PRINT#26,"POTENTIOMETER #1":JOYSTK(0)
40 PRINT#168,"POTENTIOMETER #2":JOYSTK(1)
50 IF INKEY#=""THEN#0 ELSE END

```

Listing 3



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207,127),4,4:CIRCLE(140,130),15,2:P
AINT(143,127),2,2:CIRCLE(204,130),1
5,2:PAINT(207,127),2,2
71 CIRCLE(215,40),5:CIRCLE(205,20)
,5:CIRCLE(225,60),4,2:CIRCLE(160,5
0),15,4:PAINT(100,50),1,4
72 THE 30 BLOCKS
73 FOR X=50 TO 200 STEP100
74 FOR Y=0 TO 150STEP 60
75 LINE(X,Y)-(X+50),(Y+30),PSET,
B
76 LINE(X+50,Y+30)-(X+100,Y+60),PS
ET,B
77 NEXT Y:NEXT X
78 LINE(5,0)-(255,100),PSET,B
79 IF I<>1:GOTO1
80 PAINT(210,160),2,0:PAINT(10,10)
,0,0:PAINT(10,160),3,0:GOTO102
81 PAINT(210,160),3,2
82 FOR D=1 TO 4:PDPYB TO D+1:NEXT
B ELSE:PRINT"32,"IF YOU WOULD LIKE
TO BE REMINDED OF THE DRAWING ON
C IT HAS BEEN SHUFFLED PRESS THE
"/ KEY"
84 REM GET EACH BLOCK
85 GET(5,0)-(55,30),A1,G
86 GET(55,0)-(105,30),B1,G
87 GET(105,0)-(155,30),C1,G
88 GET(155,0)-(205,30),D1,G
89 GET(205,0)-(255,30),E1,G
90 GET(5,30)-(55,60),A2,G
91 GET(55,30)-(105,60),B2,G
92 GET(105,30)-(155,60),C2,G
93 GET(155,30)-(205,60),D2,G
94 GET(205,30)-(255,60),E2,G
95 GET(5,60)-(55,90),A3,G
96 GET(55,60)-(105,90),B3,G
97 GET(105,60)-(155,90),C3,G
98 GET(155,60)-(205,90),D3,G
99 GET(205,60)-(255,90),E3,G
100 GET(5,90)-(55,120),A4,G
101 GET(55,90)-(105,120),B4,G
102 GET(105,90)-(155,120),C4,G
103 GET(155,90)-(205,120),D4,G
104 GET(205,90)-(255,120),E4,G
105 GET(5,120)-(55,150),A5,G
106 GET(55,120)-(105,150),B5,G
107 GET(105,120)-(155,150),C5,G
108 GET(155,120)-(205,150),D5,G
109 GET(205,120)-(255,150),E5,G
110 SCREEN1,0
111 GET(5,150)-(55,180),A6,G
112 GET(55,150)-(105,180),B6,G
113 GET(105,150)-(155,180),C6,G
114 GET(155,150)-(205,180),D6,G
115 GET(205,150)-(255,180),E6,G
116 REM MOVE THE BLOCKS
117 X1=5:Y1=0:R=5:Y=6
118 P=1:FORP=2 TO 4
119 Q=AND(2):GOTO1014
120 NEXT P
121 IF SAE="Y" THEN S=1
122 REM MOVE THE BLOCKS AGAIN
123 FOR P=1 TO6:G
124 Q=AND(4)
125 GOTO1014
126 NEXT P
127 R=0
128 REM KEYBOARD COMMANDS
129 A=INKEY$:IF A="" THEN129
130 IF A="/" THEN GOTO102
131 R=R+1
132 IF ASC(A)=8 THEN Q=1 ELSE IF
ASC(A)=94 THEN D=2 ELSE IF ASC(A)
1=9 THEN D=3 ELSE Q=4
133 S=AND(10),1
134 ON Q GOTO 106,107,108,109
135 GOTO 129
136 IF X=1=0 AND P<S:G THEN 126
ELSE IF X=1=0:AND P=S:G THEN129 ELSE
E=X-1:GOTO140
137 IF Y=1=0 AND P<S:G THEN126 EL
SE IF Y=1=0 AND P=S:G THEN129 ELSE
E=Y-1:GOTO140
138 IF X=1=6 AND P<S:G THEN124
ELSE IF X=1=6 AND P=S:G THEN 1
29 ELSE E=X+1:GOTO140
139 IF Y=1=7 AND P<S:G THEN 126 E
LSE IF Y=1=7:AND P=S:G THEN 129
ELSE Y=Y+1:GOTO140
140 X2=X1+50-45:Y2=Y1+50+5:Y2=(Y1-
1)+30:Y2=Y1+30:Z=ASC(Y)ON 2 GOSU
B 145,146,147,148,149,150,151,152,
153,154,155,156,157,158,159,160,16
1,162,163,164,165,166,167,168,169,
170,171,172,173
141 IF P<0 THEN K3=2+1:GOTO1010
142 IF P<S:G THEN K2=2+1:GOTO1012
143 IF S=5 AND Y=6 GOTO 174 ELSE 1
29
144 PUT(1450-45,(Y-1)+30)-(X+50+5,
Y+30),6,PSET:G1X1,Y1=61X,Y1=61X,
Y1=6:K3=K3:Y1=Y:RETURN
145 PUT(182,Y2)-(183,Y3),A1,PSET:60T
0144
146 PUT(X2,Y2)-(X3,Y3),B1,PSET:60T
0144
147 PUT(X2,Y2)-(X3,Y3),C1,PSET:60T
0 144
148 PUT(X2,Y2)-(X3,Y3),D1,PSET:60T
0144
149 PUT(X2,Y2)-(X3,Y3),E1,PSET:60T
0144
150 PUT(X2,Y2)-(X3,Y3),A2,PSET:60T
0144
151 PUT(X2,Y2)-(X3,Y3),B2,PSET:60T
0144
152 PUT(X2,Y2)-(X3,Y3),C2,PSET:60T
0144
153 PUT(X2,Y2)-(X3,Y3),D2,PSET:60T
0144
154 PUT(X2,Y2)-(X3,Y3),E2,PSET:60T
0144

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155 PUT(X2,Y2)-(X3,Y3),A3,PSET:GOT
Q144
156 PUT(X2,Y2)-(X3,Y3),B3,PSET:GOT
Q144
157 PUT(X2,Y2)-(X3,Y3),C3,PSET:GOT
Q144
158 PUT(X2,Y2)-(X3,Y3),D3,PSET:GOT
Q144
159 PUT(X2,Y2)-(X3,Y3),E3,PSET:GOT
Q144
160 PUT(X2,Y2)-(X3,Y3),A4,PSET:GOT
Q144
161 PUT(X2,Y2)-(X3,Y3),B4,PSET:GOT
Q144
162 PUT(X2,Y2)-(X3,Y3),C4,PSET:GOT
Q144
163 PUT(X2,Y2)-(X3,Y3),D4,PSET:GOT
Q144
164 PUT(X2,Y2)-(X3,Y3),E4,PSET:GOT
Q144
165 PUT(X2,Y2)-(X3,Y3),A5,PSET:GOT
Q144
166 PUT(X2,Y2)-(X3,Y3),B5,PSET:GOT
Q144
167 PUT(X2,Y2)-(X3,Y3),C5,PSET:GOT
Q144
168 PUT(X2,Y2)-(X3,Y3),D5,PSET:GOT
Q144
169 PUT(X2,Y2)-(X3,Y3),E5,PSET:GOT
Q144

```

```

170 PUT(X2,Y2)-(X3,Y3),A5,PSET:GOT
Q144
171 PUT(X2,Y2)-(X3,Y3),B5,PSET:GOT
Q144
172 PUT(X2,Y2)-(X3,Y3),C6,PSET:GOT
Q144
173 PUT(X2,Y2)-(X3,Y3),D6,PSET:GOT
Q144
174 REM CHECK IF DONE
175 FOR S=1 TO 6:FOR R=1 TO 5
176 IF A$(S)=REP(0),0) THEN NEXT R
:G ELSE 127
177 CLS:PRINT @ 265,"*** DONE ***
*"
178 FOR S=1 TO 10
179 SCREENS,OS:GOTO 120,2 :SCREENS
0,1:GOTO 120,2:END IF
180 CLS:PRINT@255,"DONE (R):";:PROV
ID THE DISPLAY :PAGE 2-14
"MARKYLEN":IF DATE="" THEN PRINT @
265,"PRESS FOR A DATE (Y)";:GOTO 120
180P,"*****"
181 SWP="" :GOTO 120
182 IF INKEY="" THEN 182
183 IF INKEY="" THEN CLS:NEW
184 CLS:GOTO 120
185 PRINT 3,5:SWP=SWP,0
186 FOR S=1 TO SCREENS:TO
END :PRINT 1,1:SCREENS,0
187 GOTO 127

```

Rotator

From Neil Blagden in Scotland

MY PROGRAM for the Dragon 32 is a three-dimensional rotator, showing the principle of rotating a symmetrical shape in three dimensions.

It is not a real rotator as two points

remain fixed, however, it looks as if the whole shape is rotating. You are given the option of rotating a cube or a pyramid.

I use PCLS instead of PPRINTing each line, so when clearing many lines, PCLS is faster and therefore gives a smoother display, rather than clearing each line separately. The speed-up code (POKE 44444,0) is used in lines 200 and 230. If your Dragon crashes when these are

used, simply delete these two lines. Though the graphics are not as fast or as smooth.

Program notes

10-140	Tab: Raris
150-240	Instructions
250	Input data or program
300-700	Drawing and rotation of cube

```

10 *****
20 ***3D ROTATOR***
30 ***N.BLAGDEN***
40 *****
50 *TITLE
60 CLS
70 L=END(16)+1)*16
80 PRINT@14,CHR$(140+L)+CHR$(140+L
)+CHR$(141+L)+CHR$(128)+CHR$(142+L
)+CHR$(140+L)+CHR$(137+L);
90 C=END(33)*16
100 PRINT@75,CHR$(140+L)+CHR$(140+
L)+CHR$(141+L)+CHR$(128)+CHR$(138+
L)+CHR$(128)+CHR$(133+L);
110 PRINT@72+36,CHR$(135+L)+CHR$(1
31+L)+CHR$(135+L)+CHR$(128)+CHR$(1
39+L)+CHR$(131+L)+CHR$(134+L);
120 PRINT@172,"rotator";
130 PRINT@172+64,"any"?CHR$(128)+"
key";
140 IF INKEY="" THEN 70

```

```

150 CLS:PRINT" 3D ROTATOR IS
A THREE ' DIMENSIONAL SIMULATI
ON OF A SPINNING CUBE OR
PYRAMID (DEPENDS ON WHICH YOU W
LL ENTER) YOU CAN START AND S
TOP ROTATION USING THE SPACE BAR, S
O IF YOU PRESS THE SPACE"
160 PRINT@426,"ANY KEY"
170 IF INKEY="" THEN 170
180 CLS
190 PRINT"SWP ONCE, AND THEREAFTER
TWICE QUICKLY, IT IS POSSIBLE TO
FLICK THE MOVEMENT THROUGH EACH FR
AME SEPARATELY; IF YOU PRESS 'C' WHIL
E THE PYRAMID IS ROTATING, IT WILL
SWAP TO A CUBE, AND IF YOU PRESS 'W'
WHILE THE CUBE IS ROTATING IT W
ILL SWAP TO"
200 PRINT@241,"A PYRAMID"
210 PRINT@429,"ANY KEY"
230 IF INKEY="" THEN 230

```

Continued on
page 60

DRAGON 32

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```

240 INPUT CUBE OR PYRAMID
250 CLS:PRINT#70,"CUBE OR PYRAMID"
  IF INPUT#4<0:IF LEFT$(A$,1)="" THEN
    CLS:PRINT#77,"CUBE":FOR I=0 TO 90
    @NEXT I:GOTO520ELSE CLS:PRINT#75,"P
    YRAMID":FOR I=0 TO 90@NEXT
260 PDHEA5495,0
270 PNODE4,1:SCREEN1,1:COLOR0,5:PG
    LS
280 'PYRAMID
290 LINE(150,50)-(120,90),PSET
300 J=90:H=100:Q=90
310 LINE(150,50)-(180,90),PSET
320 DRAW"DB130,90,R#0"
330 FOR P=120 TO 180 STEP2
340 IF INKEY="" THEN STOP
350 LINE(150,50)-(120,90),PSET
360 DRAWING & ROTATION
370 LINE(150,50)-(180,90),PSET
380 LINE(180,90)-@,Q),PSET
390 LINE(120,90)-@,Q),PSET
400 LINE(150,50)-@,Q),PSET
410 IF P<150 THEN Q=Q+1 ELSE Q=Q-1
420 H=H-2
430 IF P<150 THEN J=J-1 ELSE J=J+1
440 LINE(120,90)-@,J),PSET
450 LINE(180,90)-@,J),PSET
460 LINE(150,50)-@,J),PSET
470 IF INKEY="" THEN GOTO(122) THEN 480 ELS
    E 490
480 IF INKEY="" THEN GOTO(122) THEN 480
490 PCLS
500 NEXT
510 GOTO300
520 PNODE4,1:SCREEN1,1:COLOR0,5:PG
    LS
530 PDHEA5495,0
540 J=90:H=100:Q=90
550 'CUBE
560 FOR P=120 TO 180 STEP2
570 IF INKEY="" THEN STOP
580 LINE(150,90)-(155,70),PSET
590 'DRAWING & ROTATION
600 LINE(@,Q)-@,Q-20),PSET
610 LINE(120,90)-(120,70),PSET
620 LINE(@,J)-@,J-20),PSET
630 LINE(@,J-20)-(120,70),PSET
640 LINE-@,Q-20),PSET
650 LINE-155,70),PSET
660 LINE-@,J-20),PSET
670 LINE(@,J)-(120,90),PSET
680 LINE(120,90)-@,Q),PSET
690 LINE(@,Q)-(155,90),PSET
700 LINE(155,90)-@,J),PSET
710 IF P<150 THEN Q=Q+1 ELSE Q=Q-1
720 H=H-2
730 IF P<150 THEN J=J-1 ELSE J=J+1
740 IF INKEY="" THEN GOTO(122) THEN 750 EL
    SE 760
750 IF INKEY="" THEN GOTO(122) THEN 750
760 PCLS
770 NEXT
780 GOTO540

```

Keybeep

From Stephen Young in Files

This S-MART machine code program is in response to P & Norris request (Dragon Answers, May) for a routine to activate/deactivate the keyboard routine.

It works by diverting the character feed routine located at \$00F7 to a short routine which checks to find if the characters from the feed routine are either RS — keyboard, or RC — keypad. If so, the routine acts accordingly by turning the beep routine on or off.

If the characters from the feed routine are not RS or RC, then they are passed on to the Basic interpreter to be executed normally. As the original keyboard routine remains unchanged in the same location as for G.D. Brooks' original contribution, it is probably best to reinitialize the warning to disconnect a printer if you have one before activating the program.

Dragon Users with the original contribution to tape (Dragon User, Open File, October 1983) should be able to save some typing, although the complete program is listed here for ease of entry. Once the program has been entered, it can be saved as a machine code file:

CSAVE#8 "KEYBEEP",&OFFF,&OFFF

A small amount of space should be

cleared after loading, that is CLEAR 200, \$H7F70 before the program can be called using EXEC &H7F71. This only needs to

be done once after loading and from then on your Dragon has increased its vocabulary by two words.

```

10 .....
20 ' KEYBEEP
30 ' RC:!!
40 .....
50 CLEAR 200,$H7F70
60 DATA B6,B7,B7,01,B6,B6,7E,B7
70 DATA 00,AB,B6,7F,B7,00,AF,B6
80 DATA B6,B7,00,AA,39,01,4B,26
90 DATA 1C,1C,AA,13,00,01,1D,AA
100 DATA B6,7F,00,AB,B3,53,37,10
110 DATA B1,51,27,14,1C,AA,B3,00
120 DATA 01,1D,AA,B6,4B,7E,B6,26
130 DATA 1C,7E,7F,FD,01,AA,0E,7F
140 DATA 1C,39,7F,FD,01,AA,0E,7F
150 DATA 34,36,0E,00,01,19,0E,00
160 DATA 01,39,01,86,50,B7,20
170 DATA 7F,01,12,7F,01,13,86,FF
180 DATA 25,8A,0B,B7,FF,23,86,FF
190 DATA 01,B4,F7,B7,FF,01,86,FF
200 DATA 05,B4,F7,B7,FF,01,73,FF
210 DATA 20,24,10,30,1F,24,FC,05
220 DATA 10,10,1C,04,12,3D,EF,1C
230 DATA 00,70,26,C5,35,34,39
240 FOR N=$H7F71 TO $H7F74
250 READ A$:PDHE N,VAL("M"+A$):NE
  E I
260 EXEC $H7F71

```

Tim Lewis

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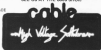
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Book: *Training Your Dragon*
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John Skuse
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IT IS unfortunately true that most computer manuals leave a lot to be desired. This is not always the writer's fault, as he/she often has to use a prototype machine that is nothing like the finished article. Manufacturers are notorious for their changes, both up and beyond the launch of the new computer. This provides other authors with the opportunity to delve into different aspects of the machine that the manual has failed to cover.

The Dragon has been better than most in not allowing its configurations, but the manual itself seems in for a certain amount of criticism at the launch in not providing enough clear explanation for the first-time user. *Training Your Dragon* aims to help the beginner get to grips with his machine although more experienced users may like the detailed explanations of some of the features.



In 25 chapters, the book ranges from beginner's basic through graphics and sound up to a brief explanation of machine code. There are many short programs scattered through the text to explain particular points, and the occasional diagram to illustrate the text. The style is friendly, if rather verbose, but has a tendency to become rather warty in places.

The chapter on editing is well presented and will encourage any reader to spend

more time on learning its use than is one of the Dragon's four points. Many users never become familiar with some of the editing commands which are well worth the trouble of learning.

Another part of the book is particularly liked was the large section dealing with graphics techniques. There are eight chapters on this subject and in some ways there is too much detail here. The advice is likely to find it rather overwhelming, as you have to read pages and pages of text before you actually discover how to do anything. For someone who has spent some months puzzling over the manual, however, it is perfect just about right. You will find new ideas that are not available elsewhere, but you do have the advantage of having them all together in one volume.

I am surprised to see this book appears so long after the launch of the Dragon, and in some ways the publishers have probably left it too late for this book to sell well, which is a pity as it is obviously the result of some hard and careful work. If you are new to the Dragon and can't find a copy of *Going Ahead With Colour Basic* from your local Tandy shop, still my favourite introductory Dragon/Colour Computer book then you could do worse than buy *Training Your Dragon*.

John Skuse

Book: *Exploring Adventures on the Dragon*
Author: Peter Gerard
Publisher: Quorumsoft
Price: £8.95

PETER GERARD, author of several books on the Commodore computers, has now turned his attention to the Dragon with this book for would-be adventure game programmers. The book brings its Commodore origins in places, with references to the desirability of using lower-case text and selection of screen and border colours, both unavailable on the Dragon, but the program listings have fortunately been edited more thoroughly than the text, and should run satisfactorily on the Dragon if you have the energy to type them in. If you don't

you will be relieved to know that a cassette version is available.



Three complete adventure games, all written in Basic to the same format, are provided, and there is a line-by-line explanation of one of the listings. The idea is that a careful study of the listing should enable you to write your own games along similar lines. The author has thoughtfully provided some skeleton plots as well, for those readers whose programming skill exceeds their inventiveness.

The book also contains a section on the history and development of adventure games, with detailed descriptions of the original *Adventure* and some of the *Scott Adams* adventures (not, as far as I know, available on the Dragon) and a rather unnecessary section on elementary programming.

It's by no means the worst computer book I've seen, but you'd do better to spend your money on a subscription to an adventure magazine.

Margaret Roman

Book: *6809 Machine Code Programming*
Author: David Barrow
Publisher: Granada
Price: £7.95

THERE IS no shortage of books about machine code on the Dragon—some are good, some are bad, *6809 Machine Code Programming* by David Barrow is, despite its unoriginal title, one of the better ones.

The book starts off assum-

ing no previous knowledge of machine code and tries to eliminate some of the myths which surround this language. Chapter two is rather boldly entitled "How to Write machine code programs", it is David introduces the principles of structured programming, including flow charts, documentation and debugging.

6809 Machine Code Programming is designed principally to be a collection of program subroutines which are both useful and also serve to introduce the concepts of programming in the computer's native language. Subsequent chapters deal with number crunching, the Dragon's support chips, high resolution graphics and sound. Particularly interesting is chapter seven, which includes a program to display full upper and lowercase characters on the hires screen.



DAVID BARROW

All of the routines are excellently documented and much useful information can be found within them for the non-coder. Although some technical information is given, it would have been nice to see a decent memory map, and perhaps a list of useful ROM routines.

There are a number of useful appendices covering 6809 architecture and assemblers. If you're looking for a book on 6809 machine code with references to the Dragon then this is worth considering. What it lacks in technical information, it makes up for in its general approach.

Dorian Gudge

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Dragon Answers

Perfect harmony

I HAVE noticed on some of my games tapes that the accompanying music is played in harmony (that is, more than one note at a time).

I have never seen any information on how this is achieved and would be most grateful if you could enlighten me.

*J W Robinson
Brimingham
Cheshire*

THIS type of music is only available by using machine code routines which are not particularly easy to write. A program called "The Composer" is available from Microdeal which allows you to enter music in four voices in simple note form. The program will then create a machine code routine which you can save and use in your own Basic programs.

Composer costs £15 and is available from Microdeal at 41 Trout Road, St Austell, Cornwall, PL23 5AL.

Connect a cassette

IS IT possible to connect an ordinary cassette microphone (with cassette jack-plug) to the joystick port of the Dragon 32? If so, what pins should I connect to the two lines of the jack-plug lead? I hope to use the microphone input in a speech-recognition program, by reading the value of the joystick port from Machine Code.

*James Cockey
Country
West Midlands*

THE short answer is NO. The joystick ports use 5V devices which output voltage — this could damage your microphone and any other device you plug in. Joysticks, lightpens and so on give a resistance value which can be detected by the ROM routine which compares the voltage sent out to that coming back.

You would be better to connect your microphone via an amplifier (such as a cassette recorder) to the tape socket on the Dragon.



Making more memory

I HAVE just recently purchased a Dragon Data disk drive and found out that because the disk cartridge takes up the first page of graphics memory, I could not get some of my programs to either load or run.

This is very annoying as every time I want to load my favourite game, I have to take out the disk cartridge. Are there any machine code routines or tricks that I may enter before loading?

*Jandy Wilson
Liverpool*

IT IS possible to "unplug" the disk cartridge by using software, so the computer thinks it isn't there. The program to do this is too long to list here, but is fairly simple to write given the following information.

You need to copy the Basic boot program from 8000 to 8005, this starts at address 8070. You then need to change this up so that it doesn't check for the disk cartridge (it does this by looking to see whether the first five bytes at 8150-5 are '00'). Finally you need to manually set the top of memory pointers and rerun your modified bootup program in Basic.

To return to the disk, simply type POKE 112,0 and press reset.

Graph equation

I HAVE owned my Dragon 32 for some months now and have been buying your magazine Dragon User. In it, I have seen, on an

advertisement for a printer, a graph drawn.

I would like to be able to enter an equation and have it plotted on a graph. Please can you show me a program that will do this.

Trace Stewart

THE functions SIN, COS, and TAN are useful for drawing the type of graphs you describe. The particular graph shown in the advert you refer to is a simple sine graph, which can be drawn with the following short program:

```
10 PMODE 4,1 : COLOR 0,1
20 PCLS : SCREEN 0,1
30 FOR X = 0 TO 255
40 Y = SIN(X/255 + 0.2827) * 40
+20
50 PLOT(X,Y) : NEXT X
60 GOTO 30
```

Print m/c numbers

I HAVE two questions I would like to ask you:

(1) How do you achieve DLSAD and DLSADM in machine code?

(2) How do you print numbers in machine code as JGR 44-8044 only prints a letter?

*David Hooley
Ayrshire*

TO access DSAVER set up the firmware in loc. 474-487, then LOW system code to prog.

```
POKE X
LOW output of data
STX 487
LDC word of data
POKE X
LDC wordy data
POKE X
STX 485
JMP 38125
```

TO access DLSADM use JGR 41180.

To print a 16 bit number in the D register to the screen use: DLR 171

JGR 38256
and to the printer use:
LOW 4754
STX 171
JMP 38256

Tandy interface

I HAVE had a Dragon 32 for about one and a half years and am thinking of buying a Tandy TP-10 printer, but have heard that it is incompatible.

Can I modify this printer to work with the Dragon, and if so, can you show me the connections between a five-pin din plug and a parallel plug. I would like to make my own lead as ready-made leads are expensive.

*Nicky Allard
West Midlands*

THE Tandy TP-10 is not compatible with the Dragon as it has only a serial interface and the Dragon requires a parallel interface. It is certainly not possible to connect the two directly and so far as I know there is no interface available to do this. The printer is designed only to be used with the Tandy Case.

VARPTR and USR

PLEASE tell me how to call machine code routines from a Basic program using DEF USR?

Also, could you explain VARPTR, how it is used and what it is used for.

*Richard Craig
Bairymear*

THE USR command can be used when your machine code routine needs to pass values to and from Basic. If your routine starts at address 32000, then the USR address is set up as follows: DEF 32000 = 32000

To call your routine and pass a variable to it use:
X = USR0 (VARPTR(X)) (Dragon 32)
X = USR (VARPTR(X)) (Dragon 64)

VARPTR returns a 16 bit address of the variable pointer, this can be returned in the D register if your program uses JGR 58623. Then D3 will be the length of the string X, and D+2 will be the address of the start of the string.

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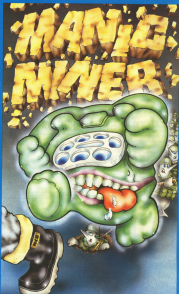


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AFTER LAST month's goodies, with *The Hulk* and the first in the *Mysterious Adventures* series, it's rather a quiet time, which should be good news for everyone's pockets. If you do have money to spend, though, then Channel 4 continues to churn out *Dragon* conversions of the *Mysterious Adventures*, of which there will be 11 in total, and at £9.95 a time it makes you glad to be a reviewer.

I had been hoping to run through the *Mysterious Adventures* in order, but they are arriving rather haphazardly, the most recent to turn up being their latest title, *Waxworks* (number 11). Before that however, I had an opportunity to look at number five in the series, *Feasibility Experiment* — not a Brian Howard solo this time but written jointly with Warner Barnes. The format is the same for all the series I've seen so far: a text-only CD version and a graphics-led version on the same tape, with the top quarter of the screen taking care of the description, visible objects and exits, and your commands and the responses scrolling up in the bottom three-quarters of the screen.

Feasibility

From the start it would seem that *Feasibility Experiment* is a sci-fi type of story: "Far beyond the outermost Galaxy of our universe, beyond the wildest imaginations of mortal man lies a newly born World." It has been built by beings who have no physical form but are merely clouds of pure mental energy. So where does Fred Blagg, humble *Dragon* owner from Stoke Poges, come into this?

It seems things have gone wrong on this world and they need a Superhero from Earth as a sustaining life force, and you have been whisked away to wake up in an odd mansion, not realising you are undergoing the experiment of the title to see if you are a worthy Superhero. Come on Fred, you can do it! You have 700 turns, with a soft voice regularly whispering how many you have left.

Going East takes you into a Viewing Room, through the window of which you can see a prize of lions. Funny, I thought. A little further on I wandered down a tunnel and came out in an arena where a lion proceeded to rip me apart. Not so funny, I thought. The sword I had found didn't seem to have much effect on the ravenous lion,

but after a wander round a maze of tunnels I found a means of defence enabling me to get safely through the arena, when I found myself in the Emperor's Box — I made a polite enquiry and was attacked by his guards. Charming.

Travelling the other way leads to grassy plains and mountain paths with several objects, including the odd treasure, which is what you are looking for. Collecting the treasures proves your heroic qualities. The standard of this series is fairly consistent as regards toughness, and also as regards the fairly terse descriptions: "I'm in a weapons room," and "I'm in a tunnel" and so on. *Feasibility Experiment* didn't appeal to me as much as some of the others because of its rather disjointed nature, although this is part of the overall logic. If you like the series, however, then it shouldn't disappoint.



Proffered for me was the new title, *Waxworks*. Here, you wake up in the leisure lounge of a deserted waxworks. Moral: if you want to stay out of trouble, don't fall asleep. You always wake up somewhere strange. This place is even stranger as you're not told what you're meant to be doing. The cassette comes with a leaflet giving you the outline for the first 10 adventures in the series, but not the eleventh. No wonder they call them *Mysterious*.

All that the first screen tells you is "I remember coming to the Waxworks ... I

must have slept. The place is dark! It's Spooky! What now?" What indeed? Well you can start by examining the wooden beam, the public telephone, the old fashioned slot machine and the seating around the leisure room, before wandering off to check out the exhibits of the Grand Hall. This must be the first adventure where you can utilize the command EXAMINE (JACQUES COURTEAU).

Scuba Gear

In front of this exhibit you're asked a riddle, and though I've given the right answer I doesn't seem to have done the much good yet ... I couldn't persuade old Jacques to hand over his scuba gear, which would surely come in handy in the large aquarium tank where you come to grief in the teeth of Jaws IV. There's another exhibit covering the ascent of Everest, and other features include a series of old sewers full of rats, a baited rat-trap, but no visible means of escape, and a maze in the Hall of Mirrors which needs to be thoroughly tested and investigated as it leads to more than one place. *Waxworks* might be a bit more expensive than a visit to Madame Tussaud's, but I can guarantee it's last longer.

Finally this month a query from a reader who recently bought the graphics version of *Calisto Island* from *Dragon* Issue, Alan Gayer of London 3142 says that he loves the graphics, but unfortunately can't get out of the first few locations. He read in a review that the adventure opens up when you make your way to Professor Leggett's secret laboratory, but the laboratory's proving a little too secretive for Alan. This is one of those occasions where looking once at an object is not enough, you have to look twice. And if you want a clue as to which object, all I'll say is that Mrs Thatcher's got one.

If other readers have any queries then I'll try to help if I can, and in the spirit of mutual co-operation that seems to exist amongst adventurers, if anyone out there has completed *Madness* and the *Mirror* I'd be glad if they could spare a minute or two to write to me. ■

Each month Mike Gerrard will be taking all adventures for the *Dragon*. If you have an adventure you want reviewed or you need advice or have some to offer write to Mike Gerrard's Adventure Trail at *Dragon* User.

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THE Dragon User Discount Club is designed to save you money. This month's special offer, which is only open to readers of this magazine, features six software titles for the Dragon 32 from Computer Rentals. Each game has been reduced to £5.45, down from £5.95. To order your game(s) simply cut out the coupon on this page and send it, together with a cheque or postal order, to: Dragon User Discount Club, 12-13 Little Newport Street, London WC2R 3LD.



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Counting counters

Melbourne House provides the prizes to
Gordon Lee's historic puzzle

THERE MUST be many of us, I'm sure, that have sat up late into the night with a tricky program on our Dragons, and who have found that on finally going to bed, sleep is denied us as the problem persists, in going round and round in our brains. If you have been so affected you may be surprised to hear that a similar problem was not unknown to one of the most well known figures in English literature just a century ago. That person was Lewis Carroll, and I hasten to add that it was not



Prize

MELBOURNE HOUSE is offering 30 readers a chance to win a copy of its sequel to Hungry Horace, *Horace Goes Stargazing* (published in the September issue of Dragon User).

Rules

THERE WERE TWO winners chosen from amongst the many entrants in the August Competition. The first prize winner is Adrian Forsman from Milton Keynes who is the recipient of a £20000 dual disk drive system from Cumans. Second prize, the single disk equivalent, the £10000, has been won by Tom James of London in Derby.

Both winners correctly stated that the key-code used was 499 to obtain the message "CRACK THIS ON YOUR COMPUTER AND YOU MAY WIN THIS MONTH'S DRAGON USER COMPETITION."

August winners

TO WIN a copy of the game you must show both the answer to the competition and how to solve it with the use of a Basic program developed on your Dragon. Please do not send in a cassette containing the answer. As a tie-breaker complete the following sentence in 15 words or less: "I want to own a copy of Horace Goes Stargazing because..."

Your entry must arrive at Dragon User by the last working day of November. The winners and the solution of the puzzle will be published in our February issue. Entries will not be acknowledged and we cannot enter into correspondence on the result. You may only enter the competition once.

computer problems that were the cause of his insomnia, but mathematical notions of a more general nature.

Lewis Carroll, the pen name under which the Reverend Charles Lutwidge Dodgson published his invertebrate students' classics, was also the author of more academic works on formal logic and Euclidean geometry. However, it is probably for his creation of such characters as the Cheshire Cat, Queen of Hearts, Mock Turtle and the Walrus and Carpenter that he will be best remembered.

Photography

Educated at Rugby and Oxford, he entered Christ Church, Oxford in 1861 and was appointed lecturer in mathematics there in 1854. His other interests were in photography, then in its infancy, and in which he achieved a fair amount of notability and in the church — he was ordained a deacon in the Church of England in 1861.

In between the fantasy world of Alice in Wonderland — (just imagine what sort of computer adventures he could have written) — and his mathematical works, he created a number of interesting collections of puzzles and diversions. These he assures us in the preface to the first edition of his *Pillow Problems*, were thought out while lying awake at night. Indeed, appended to many of the puzzles in this collection are the actual dates on which

they were devised. For instance, on 8 September 1867 he invented the following curious problem:

"A bag contains two counters, as to which nothing is known except that each is either black or white. Ascertain their colours without taking them out of the bag."

He then proceeds, by a convoluted process of logic, to show that the bag must contain one black and one white counter. Perhaps the strange logic is to be expected from the creator of Alice's Adventures in Wonderland!

"Take some more tea," the March Hare said to Alice earnestly.

"I've had nothing yet," Alice replied in an offended tone. "So I can't take more."

"You mean you can't take less," said the Hatter: "It's very easy to take more than nothing."

For this month's competition we are reproducing one of Lewis Carroll's puzzles — dated 4 March, 1860. There are three bags, each containing six counters; one contains five white and one black; another, four white and two black; the third, three white and three black. From two of the bags (it is not known which) a counter is drawn (one from each), and which proves to be one black and one white. What is the chance of drawing a white counter from the remaining bag?

Assume that Lewis Carroll had a computer and show how he might have used it to solve this problem.

St. George now has two choices!

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